Original Paper

Research on the Impact of Digital Transformation on Enterprises' New Quality Productivity

Shijie He[1]

[1] Guangxi Normal University, Guilin, Guangxi, China

Abstract

In the current turbulent global political and economic situation, experiencing unprecedented changes, new quality productivity and digital transformation have become hot topics in the field of national economy. From an international perspective, geopolitical conflicts and technological containment coexist, global industrial chains, supply chains, and innovation chains are deeply restructured, and external uncertainty has significantly increased; From the domestic situation, China is currently in a period of high-quality development, with rising labor costs, decreasing dividends from traditional factors, and bottlenecks in the economic cycle. New quality productivity, with technological innovation and data elements as its core, is a key lever for achieving quality change, efficiency change, and power change, which can promote economic development to "overtake". As its landing path, digital transformation forms a higher level of dynamic balance between supply and demand, providing a new sustainable growth engine for Chinese path to modernization.

Keywords

digital transformation, new quality productivity, innovation

1. Introduction

With the advancement of technology and the development of global economic integration, the traditional low-cost advantage is gradually disappearing, and the economic development model urgently needs to shift from a comparative advantage based on resource endowment to a competitive advantage based on core technology. After experiencing a high growth rate, China's productivity is in a critical stage of improving quality.

In the new stage of development, although China has achieved remarkable historical achievements, it also faces severe challenges.The traditional growth model in China is facing multiple constraints: the carrying capacity of resources and environment is approaching its upper limit,the demographic

dividend is weakening, and the traditional factor driven development model urgently needs to shift towards innovation driven innovation.At the same time, the international situation is also undergoing profound changes. Western developed countries are attempting to sever China's connection with the world economic system, which has led to China facing bottlenecks in high-end equipment manufacturing, core technology research and development, and other fields.Under such internal and external pressures, it is urgent to build a new competitive advantage centered on technological innovation.

In this context, the concept of new quality productivity has emerged. As a product driven by technological innovation in the context of the digital economy era, the formation and development of new quality productivity inevitably rely on the "backbone" support of digital technology. There are three important measures to accelerate the development of new quality productive forces: first, we must actively promote the innovative development of the digital economy; Secondly, we need to strengthen the cultivation of future and emerging industries; Thirdly, we need to accelerate the optimization and upgrading of the industrial and supply chains. This further indicates that the application and development of digital technology can provide transformative power for future industrial development and will become a necessary path for the development of new quality productivity. Digital transformation, as a micro practice of digital technology application in enterprises, is a comprehensive process in which enterprises apply digital technologies such as big data, cloud computing, Internet of Things, blockchain, artificial intelligence, etc. to business processes, organizational structures, production technologies, and other aspects.

The core proposition of current research is how to activate the innovation potential of enterprises through digital transformation, construct a virtuous interaction mechanism between technological breakthroughs and industrial upgrading, and ultimately achieve the transformation of development momentum. This process not only involves reshaping the competitiveness of micro enterprises, but also serves as an important support for high-quality macroeconomic development. As the micro foundation of economic operation, enterprises are not only the practical subjects of digital transformation, but also the key carriers for cultivating new quality productivity. Under the global digital wave, how to leverage digital technology to empower technological innovation, generate diversified innovative achievements, promote enterprise quality and efficiency improvement, generate and develop new quality productivity, and achieve high-quality economic development has become an important issue that urgently needs to be addressed in the academic community.

2. Research Hypotheses

The theoretical foundation of this study is rooted in the intersection of endogenous growth theory, new institutional economics, and the Schumpeterian innovation school. Firstly, endogenous growth theory views data as a non-rivalrous and reusable production factor, with marginal costs tending towards zero and increasing returns to scale. The digital transformation of enterprises embeds data into capital and

labor, leading to a "structural mutation" in the traditional production function and a continuous increase in total factor productivity, thus providing sustained impetus for new-quality productive forces. Secondly, new institutional economics emphasizes institutional costs and contract efficiency: digital platforms replace bureaucracy with algorithms, reducing information search, negotiation, and execution costs, and facilitating rapid reorganization of factors beyond the boundaries of the enterprise, forming "flexible-specific" assets. This not only maintains economies of scale but also unleashes innovative vitality, enabling new-quality productive forces to break through the rigidity of existing institutions. Furthermore, Schumpeterian innovation theory points out that revolutionary technological breakthroughs stem from new combinations of production factors; digital transformation integrates research and development, manufacturing, and service links into a real-time data closed loop through general-purpose technologies such as AI, industrial internet, and digital twins, shortening the innovation cycle, expanding the space for trial and error, and achieving "continuous creative destruction." This continuously refreshes quality, efficiency, and green standards, ultimately manifesting as a leap in new-quality productive forces. In addition, the theory of spatial spillovers and demand-side upgrading supplements that digital networks break geographical constraints, knowledge diffusion exhibits a power-law distribution, and regional-industrial chains iterate upstream and downstream simultaneously, further strengthening the positive feedback loop of transformation-productivity. In summary, the combination of the non-rivalrous nature of data elements, institutional cost reduction of digital platforms, and general-purpose technologies constitutes the theoretical logic behind the digital transformation of enterprises driving new quality productivity, providing solid support for subsequent empirical testing.

Many researchers emphasize that the deep application of digital technology in various business processes is the core of enterprises. Sun et al. (2021) pointed out that the integration of digital systems, terminals, and products in production, sales, and other processes is crucial. Hinings et al. (2018) further proposed that digital technology can introduce new subjects and practical methods, thereby stimulating new values. Karimi et al. (2015) argue that companies should enhance business efficiency, reform organizational structures, innovate business models, etc. by utilizing new digital technologies to better integrate into the vast ecosystem. Li et al. (2018) explored digital transformation as an important link in the process of enterprise transformation, involving fundamental changes in operational methods, business processes, organizational structure, and other aspects.

Regarding the relationship between digital transformation and new quality productivity, new generation information technologies such as big data and artificial intelligence have significantly improved total factor productivity by reducing information asymmetry (Llvonen, Llona et al, 2018); Empirical research further confirms that for every 1% increase in digital investment in manufacturing enterprises, the average total factor productivity increases by 0.3%-0.7% (Shu, 2025), which confirms the significant interaction between the two.

In summary, this study proposes the following hypothesis: digital transformation of enterprises can

significantly improve the level of new quality productivity.

3. Research Design

Based on the enterprise level, this paper selects Chinese listed companies on the Shanghai and Shenzhen A-share markets as the research subjects, with the sample period set to 2011-2024. Considering that China's digital economy entered a stage of rapid growth after 2010, and that official statistics for some variables in the new quality productivity evaluation system began to be collected in 2011, the research data sample period is set to 2011-2024.

This article uses fixed effects of individuals and years to examine the impact of digital transformation on new quality productivity in enterprises. And based on the assumptions, design the following multiple linear regression model:

$$NPRO_{i,t}=\alpha_0+\alpha_1\cdot Dig_{i,t}+\Sigma Control_{i,t}+\Sigma Year+\Sigma Ind+\varepsilon_{i,t} \tag{1}$$

In Model (1), NPRO serves as the dependent variable, representing new quality productivity; $Dig_{i,t}$ is the core explanatory variable, indicating the degree of digitization of enterprises; $Control_{i,t}$ represents control variables; Year denotes annual fixed effects; Ind represents industry fixed effects; $\varepsilon_{i,t}$ signifies the random disturbance term in the model; and the subscript i represents enterprises, while t denotes the year.

4. Empirical Analysis

4.1 Descriptive Stats

Table 1 presents the descriptive statistical results between variables. Among them, the mean of the dependent variable, new product productivity (NPRO), is 0.126, the median is 0.119, and the standard deviation is 0.074. The mean of new product productivity is slightly higher than the median, indicating that there are significant differences in the current level of new product productivity among small and medium-sized enterprises (SMEs) in China. Most enterprises have a relatively low level of new product productivity, while only a few have a higher level, exhibiting characteristics similar to a normal distribution, which is consistent with the research expectations of this paper. The mean of the core explanatory variable, digital transformation (Dig), is 1.587, with a maximum value of 6.380 and a minimum value of 0, and a standard deviation of 1.436. This indicates that there is still a significant gap in the degree of digital transformation among SMEs, and the sample spans multiple levels, making the data relatively reasonable.

Table 1. Results of Descriptive Statistics

Variable	COUNT	MEAN	MIN	SD
NPRO	45138	0.126	0.013	0.074
Dig	45138	1.587	0.000	1.587
Lev	45138	0.413	0.032	0.413

Growth	45138	0.138	-0.673	0.138
TobinQ	45138	2.000	0.795	2.000

4.2 Benchmark Regression Analysis

Table 2 presents the regression results of the impact of digital transformation on new-quality productivity. In Model (1) without the inclusion of control variables, the regression coefficient estimate for the degree of digital transformation (Dig) is 0.016, and it passes the significance test at the 1% level, indicating that digital transformation has a significant positive impact on new-quality productivity. Model (2) adds control variables for industry fixed effects and year fixed effects based on Model (1). Models (3) and (4) are the regression results with control variables added, with Model (4) controlling for industry fixed effects and year fixed effects compared to Model (3). It is evident from Models (1) to (4) that the coefficient between the level of enterprise digitalization and new-quality productivity is consistently significant and positive at the 1% level, indicating a significant positive correlation between the two. The empirical results consistently support research hypothesis H1, that is, enterprise digital transformation can significantly enhance the level of new-quality productivity.

Table 2. Results of Benchmark Regression Analysis

	(1)	(2)	(3)	(4)
Variable	NPRO	NPRO	NPRO	NPRO
Dig	0.016***	0.015***	0.015***	0.013***
	(32.345)	(24.845)	(30.514)	(21.878)
Lev			-0.020***	-0.014***
			(-4.879)	(-3.892)
Growth			0.014***	0.015***
			(15.753)	(17.671)
TobinQ			0.002***	0.002***
			(5.204)	(4.596)

5. Conclusion

Amidst the wave of the digital economy, the digital transformation of enterprises has shifted from being an "optional" to an "essential" step for survival. Firstly, as the marginal returns of traditional factors decline, data, as a non-competitive new factor, can break through the boundaries of the production function and directly enhance total factor productivity through the recombination of algorithm models with existing factors. Secondly, the global industrial chain is undergoing accelerated restructuring, with green, low-carbon, and flexibility becoming entry thresholds. Only by leveraging digital technology can enterprises track carbon emissions in real-time, quickly switch production lines, and meet compliance and customization demands. Thirdly, as consumer dominance increases, enterprises need to utilize data-driven precision research and development, precision marketing,

40

shorten innovation cycles, and reduce the cost of trial and error. Otherwise, they will be quickly replaced by competitors who iterate at a high frequency.

The reason why transformation has become an "amplifier" for new-quality productive forces lies in three core mechanisms: First, technological substitution. Applications such as industrial Internet, AI quality inspection, and digital twins have simultaneously reduced energy consumption per unit of output and the rate of defective products, making green and efficiency compatible for the first time. Second, factor reconstruction. Data connects the entire chain of research and development, procurement, logistics, and sales, precipitating reusable algorithmic assets with marginal costs approaching zero, forming a "snowball" effect of knowledge accumulation. Third, institutional upgrading. Platform-based and ecological organizations replace pyramidal structures, decentralizing decision-making power and enabling instantaneous matching between market signals and research and development resources, significantly reducing the cost of innovation and trial and error. It can be seen that digital transformation not only wins current competitiveness for enterprises but also injects "new-quality momentum" into long-term sustainable economic growth by reshaping production functions and organizational forms.

References

Hinings, B., Gegenhuber, T., & Greenwood, R. (2018). Digital innovation and transformation:An institutional perspective. *Information and Organization*, *28*(1), 52-61.

Karimi, J., & Walter, Z. (2015). The Role of Dynamic Capabilities in Responding to Digital Disruption: A Factor-Based Study of the Newspaper Industry. *Journal of Management Information Systems*, *32*(1), 39-8

Li, L., Su, F., Zhang, W. et al. (2018). Digital transformation by SME entrepreneurs: A capability perspective. *Information Systems Journal*, 28(6), 1129-1157.

Llvonen, L., Thalmann, S., Manhart, M. et al. (2018). Reconciling digital transformation and knowledge protection:a research agenda. *Knowledge Management Research & Practice*, *16*(2), 235-244.

Shu, H. (2025). A Study on the Modernized Paradigm of Suzhou Embroidery Inheritance Driven by Cultural New-Quality Productivity—A Three-Dimensional Perspective Based on Technological Integration, Industrial Upgrading, and Institutional Innovation. *Journal of Global Economy, Business and Finance*, *7*(7), 18-21.

Sun, X., & Zhang, T. (2021). Board gender diversity and corporate labor investment efficiency. *Review of Financial Economics*, *39*(3), 290-313.