

Digital Economy Empowering New Quality Productive Forces: A Review and Implications

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Abstract: Currently, driven by the accelerated iteration of digital technologies such as big data, cloud computing, and artificial intelligence, the digital economy has become a crucial engine for generating new quality productive forces and promoting industrial upgrading. Building on a systematic review of the theoretical evolution and measurement methods of the digital economy and new quality productive forces, this paper outlines their enabling mechanisms, industrial synergy pathways, and policy practices, and summarizes regional disparities and spatial spillover effects. The main findings are as follows: First, the digital economy reshapes the traditional factor structure and significantly enhances total factor productivity through the permeation of data elements and technological innovation; Second, driven jointly by the consumer internet and the industrial internet, it optimizes supply–demand matching and service models while reducing operating costs and improving production efficiency; Third, policy environments and institutional coordination amplify the enabling effects, as evidenced notably in national big-data pilot zones and the “East Data West Computing” initiative. Looking ahead, empirical research should deepen the exploration of micro-level mechanisms and dynamic panel analyses, construct a measurement system of new quality productive forces that spans macro, meso, and micro scales, and investigate pathways for regional collaborative governance and green digital integration to address the complex challenges of the new era.

Keywords: Digital economy; Enabling mechanisms; Industrial synergy; New quality productive forces

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1. Introduction

In September 2023, General Secretary Xi Jinping first introduced the concept of “new-quality productive forces” during an inspection in Heilongjiang, describing it as an innovation-led, advanced qualitative state of productive forces that emerges from technological breakthroughs, innovative allocation of production factors, and industrial upgrading. At a collective study session of the Politburo in January 2024 this concept was further elaborated: the hallmark of new-quality productive forces is a substantial rise in total factor productivity, and the principal pathways to achieving it include improving workers’ skills and quality, promoting the intelligent transformation of means of labor, integrating digital technologies with equipment, and expanding the objects of labor. To realize its

guiding role, emphasis should be placed on emerging and future industries, while coordinating education, science & technology, and talent policies, and advancing industrial-chain modernization and high-quality development.

The 14th Five-Year Plan designates the digital economy as a key strategic engine. Under common taxonomies, the digital economy comprises “digital industrialization” and “industrial digitalization.” In 2023 China’s digital economy exceeded 40% of GDP; data are identified as a foundational strategic resource and digital technologies as the core drivers of value creation. Through factor empowerment, technological innovation, and industrial-chain collaboration, the digital economy reshapes the traditional production function and gives rise to new industries and business models. General Secretary Xi has stressed the importance of data, and the report of the 20th National Congress of the Communist Party called for deepening the integration of the digital economy with the real economy, an approach consistent with OECD definitions and one that underpins research on China’s digital economy.

From a theoretical perspective, research on the digital economy and new-quality productive forces has advanced systematically, yet separately. Studies on the digital economy concentrate on frameworks, development status, and economic effects ^[1]. Concurrently, research on new-quality productive forces centers on definitions, historical origins, and practical pathways ^[2].

Although the enabling role of the digital economy is theoretically acknowledged, empirical work on this relationship remains insufficient. Current literature often relies on macro-level expositions, neglecting micro-level analysis of how digital technology and data factor allocation translate into new-quality productive forces. Furthermore, a lack of systematic provincial-level panel data testing has limited the understanding of regional heterogeneity and the ability to offer targeted policy recommendations.

Therefore, future research must construct a macro-meso-micro measurement framework. Using dynamic panel models and cross-country comparisons is essential to test micro-level mechanisms, quantify institutional adaptation, and incorporate inclusivity and green transition perspectives. This approach will reveal the causal pathways by which the digital economy fosters new-quality productive forces, providing empirical evidence to inform coordinated policy in technology, institutions, and regional development.

2. Pathways for the digital economy to empower new quality productive forces

2.1. Empowerment mechanisms of the digital economy on new quality productive forces

The empowerment of new productive forces by the digital economy is primarily manifested through the drivers of data as a factor of production and digital technology innovation. New productive forces are constituted by high technology, digital technologies, and innovation capabilities, making them fundamentally distinct from traditional productive forces, which rely on the accumulation of labor, natural resources, and physical capital. In contrast, new productive forces depend more on innovative technologies, information flows, and data as a production factor. As the wellspring of productivity in the new era, the digital economy fosters the generation of new productive forces by optimizing resource allocation and promoting industrial upgrading.

On one hand, the digital economy provides technical support for new productive forces through the expansion of data as a production factor. Zhang points out that the core of the digital economy is data acting as a new factor of production ^[3]. Its integration with traditional factors propels a leap in productivity. Data transforms modes of production and reshapes the very essence of productivity, driving the development of new productive forces by optimizing production processes.

On the other hand, digital technology innovation is a key element in empowering new productive forces. Wang argues that innovation in digital technology drives changes in the allocation of production factors and enhances industrial innovation capacity and economic efficiency^[4]. For example, the application of technologies such as big data alters industrial structures, facilitates the transformation of traditional industries, and provides the technological foundation for the formation of new productive forces.

2.2. Synergistic effects between the digital economy and industrial upgrading

The digital economy and industrial upgrading share a profound synergistic relationship. The transformation and upgrading of the industrial structure is a crucial pathway for the formation of new productive forces, and the digital economy serves as the core impetus for this process. It facilitates the digital transformation and intelligent upgrading of industries, enhances the competitiveness of traditional sectors, and creates opportunities for the development of emerging industries.

An empirical analysis by Yu found that the promotional effect of the digital economy on new productive forces varies significantly across regions, with a more pronounced enabling effect in the western region and in smaller-scale cities, indicating regional heterogeneity in its impact^[5]. The widespread application of digital technology promotes the efficient allocation of resources and high-level collaboration across industrial chains, driving the development of new productive forces.

Concurrently, the role of the digital economy in advancing industrial upgrading is also manifested in the optimization of industrial structure and the acceleration of industrial integration. Zhang argues that the rapid development of the digital economy propels the restructuring of industrial chains and fosters industrial convergence, blurring the lines between traditional and emerging sectors^[6].

This cross-sector integration has become a vital avenue for the generation of new productive forces. Digital technology is driving a paradigm shift in the production models of traditional industries, moving from a reliance on labor and resources to a core focus on technological innovation and information flows. This shift enhances industrial efficiency, resource utilization, and innovation capacity, thereby fostering the formation of new productive forces.

2.3. Interactive relationship between the digital economy and social institutions

The digital economy not only drives the transformation of productive forces but also profoundly impacts social institutions. Its rapid development necessitates corresponding adjustments in social institutions and policy frameworks to accommodate new modes of production. It fosters institutional change by advancing industrial and productivity development. Ren posits that for the digital economy to empower the development of new productive forces, a synergy of technology, economy, and institutions is required, driving a comprehensive upgrade of productive forces, economic structure, and social institutions^[7].

Under the impetus of the digital economy, institutional change manifests in incentivizing innovation and optimizing resource allocation. Li points out that digital economy policies provide support and safeguards that incentivize corporate innovation, optimize resource allocation, and promote the development of new productive forces^[8]. For instance, government guidance in infrastructure construction encourages enterprises to utilize digital technologies, thereby enhancing innovation and production efficiency and driving industrial upgrading.

Furthermore, the development of the digital economy requires that government policymaking focuses on cultivating innovation capabilities and rationally allocating resources. The effective implementation of digital

economy policies can foster innovative breakthroughs in enterprises, optimize the environment and support systems, promote the integration of the digital and real economies, and accelerate the generation of new productive forces.

3. Conclusion and prospects

This paper analyzes the theoretical evolution, measurement methods, and enabling mechanisms of the digital economy and new productive forces, drawing the following core conclusions:

- (1) The digital economy reshapes the elemental structure of productive forces. The infiltration of data as a factor of production and the innovation of digital technology profoundly reshape the traditional elemental structure of productive forces. Data transcends the scarcity constraints of traditional factors, driving improvements in total factor productivity. Digital technology provides the technical support for the formation of new productive forces;
- (2) New productive forces exhibit multidimensional characteristics. They are characterized by high-tech, high-efficiency, and high-quality attributes. Their formation relies on the enhancement of laborer quality, the intelligentization of the means of production, and the extended scope of the objects of labor. Empirical evidence reveals regional disparities and spatial spillover effects in their development. The western and northeastern regions, constrained by innovation factors, rely on a “long-board effect,” while the eastern region leads synergistic development through technological diffusion;
- (3) The digital economy empowers new productive forces through a dual-pathway mechanism. In the industrial upgrading pathway, the digital economy promotes the intelligent transformation of traditional industries, reshapes supply-demand matching mechanisms, and achieves cost reduction and efficiency improvement, thereby providing the core impetus for new productive forces. In the institutional synergy pathway, the development of the digital economy necessitates an adaptive policy framework. Government investment enhances corporate innovation momentum and the efficiency of resource allocation, creating a positive feedback loop of “technology-institution-industry.”;
- (4) The enabling effect of the digital economy varies by region. This effect demonstrates a gradient characteristic, with a significant impact on the enhancement of new productive forces in the western region and in smaller-scale cities. Its role in the industrial upgrading of the eastern region is particularly profound.

Policy practices indicate that institutional designs, such as national big data comprehensive pilot zones, can stimulate technological breakthroughs in enterprises. It is necessary to formulate differentiated policies based on regional endowments.

Future research and practice must continue to deeply explore key areas, including the following aspects:

3.1. Research on micro-mechanisms and dynamic evolution

Future research should intensify explorations of micro-mechanisms, delving into causal chains at the enterprise level involving data factor allocation, digital technology adoption, and the generation of new quality productive forces, while integrating case studies and experimental economics methodologies to validate micro-level transmission mechanisms. Concurrently, dynamic panel models should be constructed to capture nonlinear relationships and time-lag effects between the digital economy and new quality productive forces, revealing the

long-term influences of technological iteration cycles and policy interventions.

3.2. Research on institutional adaptability and cross-national comparisons

Regarding institutional adaptability, research should examine the efficiency of productivity empowerment by the digital economy under varying institutional environments, particularly the impacts of disparities in data property rights legislation and cross-border data flow regulations on digital economy development. Through cross-national comparisons, common pathways for institutional optimization should be distilled.

Furthermore, aligned with the objectives of Chinese-style modernization, a policy evaluation framework centered on the three-dimensional synergy of “scientific and technological innovation-institutional innovation-industrial innovation” should be designed to quantify the equilibrium between institutional costs and productivity gains.

3.3. Integration and innovation in measurement systems

Future research should also commit to the integration and innovation of measurement systems, amalgamating novel data sources such as satellite remote sensing and enterprise big data to construct a new quality productive forces index that spans “macro-meso-micro” levels, transcending the limitations of traditional statistical calibers. Simultaneously, models for accounting the “implicit value” of the digital economy should be developed to quantify synergistic effects of data factors, such as platform ecosystem values and efficiency spillovers from algorithmic optimizations.

Disclosure statement

The authors declare no conflict of interest.

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