

Marketization of Digital Economy Elements and High-Quality Development of Manufacturing Industry—Taking Jiangsu as an Example

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Abstract

With the advancement of industrial globalization and the rise of emerging productive forces, the digital economy has comprehensively penetrated into all aspects of life and work, and its element marketization process has increasingly boosted productivity. By analyzing the market allocation mechanisms of core elements of the digital economy such as data, algorithms, and platforms, this paper reveals the decisive influence of these elements in accelerating the transformation and innovation of the manufacturing industry, enhancing production efficiency, and improving resource allocation. Meanwhile, through the application analysis of actual cases at home and abroad, this paper puts forward strategic suggestions for promoting the optimization of the digital economy element market and the high-level integration and development of the manufacturing industry.

Keywords

Digital Economy, Factor Marketization, Manufacturing Industry, High-Quality Development, Resource Allocation, Jiangsu

1. Introduction

The rapid progress in the field of information technology has prompted the rise of the digital economy as a key component of the global economy. As a new collection of production factors, digital resources such as data, algorithms, and platforms have shown broad prospects in stimulating industrial upgrading, improving resource allocation, and enhancing production efficiency (Su, 2024). Based on the market-oriented mechanisms of digital economy elements, this paper delves into how these elements can foster high-quality development in the manufacturing

sector, offering a new theoretical perspective on the deep integration of the digital economy with the real economy. Utilizing big data technology, a quantitative analysis of the digital evolution of Jiangsu's manufacturing sector is conducted. By establishing an evaluation index system for the digital development index of the manufacturing industry, it objectively reflects the actual level of digital development in the manufacturing industry (Yang & Liu, 2023). It also fosters the development of an ecosystem encompassing various stakeholders, including the government, enterprises, research institutions, and financial entities, to jointly advance the deep integration and high-quality development of both the digital economy and the manufacturing sector. These innovations not only enrich the theoretical framework for the development of the digital economy and the manufacturing sector but also provide robust guidance and support for practical applications.

2. The Connection between the Digital Economy and the Development of Manufacturing Industry

2.1. The Relevance of the Digital Economy to the Manufacturing Industry

The relationship between the digital economy and the development of manufacturing industry has a profound and multidimensional theoretical foundation, which is mainly reflected in technological integration, industrial upgrading, and the transformation of economic growth models (Tian, Xia, Lu, & Peng, 2023).

From the standpoint of technological integration, the digital economy, centered on information and communication technology, integrates cloud computing, big data, the Internet of Things, and artificial intelligence among other new generation information technologies. This has expanded the boundaries of traditional manufacturing, achieving a profound fusion of the physical and digital worlds. This integration not only enhances manufacturing efficiency and flexibility but also fosters new production models and service models, including intelligent manufacturing, industrial internet, and remote operation and maintenance. The emergence of these new models and service models provides robust technical support and innovative impetus for the high-quality development of the manufacturing sector.

From the standpoint of industrial upgrading, the deep integration of the digital economy with the manufacturing industry serves as a key driver for industrial advancement (Zhang, Jin, & Chen, 2023). With the widespread adoption of digital technology, the manufacturing sector has seen profound changes in production methods, organizational structures, and value chain distribution. On one hand, digital technology has facilitated the optimization and upgrading of the manufacturing industry's internal structure, steering traditional industries towards higher-end, smarter, and greener directions. On the other hand, the digital economy has also encouraged cross-sector integration with other industries, spurring the emergence of new industries and growth areas, such as intelligent connected vehicles,

biomedicine, and advanced materials. The growth of these emerging industries not only expands the horizons for the manufacturing sector but also boosts the innovation capacity and competitiveness of the entire economic system (Chen et al., 2023).

In the shift toward new economic growth models, the digital economy offers fresh pathways and paradigms for the advanced development of the manufacturing sector. The digital economy allows manufacturing companies to more precisely anticipate shifts in market demand, enabling personalized customization and flexible production. Additionally, through data analysis and technological innovation, companies can consistently optimize production processes, enhance product quality, and cut operational costs, thus boosting overall economic performance and market competitiveness.

2.2. Research Approach of Interrelated Development

In the study of the aforementioned issues, the theoretical foundation is first established. Initially, the essence and scope of the marketization of digital economy elements are clarified, along with an analysis of the new characteristics of data, information, and other elements in the digital economy era and their pathways to marketization as production factors (Wang & Liu, 2024). Concurrently, the evaluation index system for the high-quality development of the manufacturing industry is outlined, establishing the research's fundamental framework and theoretical underpinnings. Through literature reviews, case studies, and other approaches, the current state of the marketization of digital economy elements is analyzed, covering the establishment of data trading markets, the delineation of data ownership, and data pricing mechanisms (Lu, 2022). Additionally, the challenges and opportunities encountered by the manufacturing industry during high-quality development are assessed, with a particular focus on the impact of the marketization of digital economy elements on the industry's transformation and upgrading.

The study utilizes empirical research methods, such as econometric models and comparative case analyses, to thoroughly examine how the marketization of digital economy elements facilitates high-quality development in the manufacturing industry by optimizing resource allocation, fostering technological innovation, and enhancing production efficiency (Wu, 2024). Special attention is given to the reshaping effects of data flow and information sharing on the supply and value chains of the manufacturing industry. Ultimately, based on the research findings, policy recommendations are proposed to advance the marketization of digital economy elements and high-quality development in the manufacturing industry.

3. The Connotation and Characteristics of the Marketization of Digital Economy Elements

3.1. Definition of Digital Economy Elements

The elements of the digital economy refer to the key supporting elements required

for the development of the digital economy. These elements revolve around data, integrate the power of contemporary information technology and communication technology, and drive the digital transformation and integration process of various industries, especially the industrial sector, through innovative applications and optimized resource allocation paths. The scope of the elements of the digital economy transcends traditional physical resources, covering the basic high-performance hardware equipment for building systems, highlighting the crucial importance of non-physical resources such as data-related resources, information technology services, and platform services. According to the unique attributes and development trends of the digital economy, the elements of the digital economy are summarized into several main categories:

Data Resources: Data is the foundation and key element of the digital economy, carrying diverse information about economic and social activities and exhibiting unique attributes of replicability, shareability, and discoverability. Through the process of collecting, integrating, analyzing, and applying data resources, it not only provides a solid empirical foundation for decision-making but also injects a continuous driving force into innovative activities.

Information technology: Information technology is a key technology supporting the development of the digital economy. It covers cutting-edge technologies such as cloud computing, big data, artificial intelligence, the Internet of Things, and blockchain. These technologies provide a powerful driving force for the innovation and progress of the digital economy by processing new information processing flows, enhancing information processing efficiency, and expanding the boundaries of information applications.

Internet plus: By using communication technologies such as the Internet and mobile Internet, this platform integrates various digital resources and services to build an open, collaborative, and resource-sharing digital ecological environment. It promotes the circulation of information, resource sharing, and the convenience of accelerating service provision, effectively promoting the widespread popularization and deep evolution of the digital economy.

Digital Talent: Digital talent is a key force in the development of the digital economy. Against the backdrop of the booming digital economy, professionals in the digital field have become a crucial element in driving its progress. These talents possess multiple skills such as information technology, data analysis, and innovative thinking, which not only promote the innovative application of digital technology but also contribute to the sustained and stable growth of the digital economy. This category covers a wide range of positions from technology research and development experts, data science analysts to product managers, each playing an indispensable role in the digital economy system and jointly driving the industry forward.

Policies and Regulations: Policies and regulations are crucial for ensuring the healthy development of the digital economy. By establishing norms, defining rights and interests, and strengthening supervision, a solid legal environment and

institutional guarantee have been created for the growth of the digital economy. When formulating and implementing relevant institutional norms, it is necessary to comprehensively consider the characteristics and needs of the digital economy to ensure that existing rules can keep pace with the ever-changing development of the digital economy.

3.2. Market-Oriented Allocation of Digital Economy Elements

Market-oriented resource allocation focuses on the core role of market forces in guiding resource distribution. In the context of the development of the digital economy, this principle is reflected in the allocation of various elements such as data resources, digital infrastructure, digital technology, and digital talents, gradually reducing direct dependence on government planning or administrative orders, and instead focusing more on the use of market mechanisms, such as supply and demand balance, price adjustment, and competition promotion. This allocation model can respond more agile to market dynamics, thereby improving the overall efficiency of resource allocation.

In the context of the digital economy, data is regarded as a core production factor, and its market-oriented resource allocation is primarily reflected in the commercial operations of data collection, storage, processing, analysis, and trading. With the platform mechanism of data trading, both supply and demand sides can freely engage in data transactions to achieve the optimal utilization of data value. Meanwhile, the continuous improvement in data rights confirmation, pricing, and circulation mechanisms has laid a solid foundation for the smooth implementation of market-oriented allocation of data elements.

The construction and operation and maintenance (O&M) process of digital infrastructure is continuously evolving towards a market-oriented path. The government adopts policy guidance and support measures, actively attracting private capital to participate in the construction and O&M activities of digital infrastructure, giving rise to diverse investment entities and operational mechanisms. This move not only accelerates the pace of digital infrastructure construction but also enhances its O&M efficiency and service quality.

The evolution, practice, and popularization of digital technology are deeply embedded in the drive of market mechanisms. Through the competitive situation among enterprises, the process of digital technology innovation and iteration is continuously accelerated, aiming to conform to and lead the changes in market demand. In addition, with the help of the market-oriented resource allocation system, the transformation and practical application of digital technology research results have been greatly promoted, injecting strong impetus into the continuous vitality of the digital economy.

Talents in the digital field are regarded as the key factor to promote the progress of the digital economy. Through the market-oriented resource allocation mechanism, these talents can achieve free flow, actively choose the best job positions and growth environment. This process not only stimulates the full release of the potential of digital talents, but also accelerates the innovation and overall development

of the digital economy.

4. The Impact of the Marketization of Digital Economy Elements on the High-Quality Development of the Manufacturing Industry

4.1. The Current Situation of Jiangsu's Manufacturing Industry

Jiangsu Province, as the core region of China's manufacturing industry, carries a huge manufacturing industry system with complete industrial chains and strong technical force, playing a pivotal role both domestically and internationally. In recent years, the manufacturing sector in Jiangsu Province has maintained a sustained and stable growth trend, becoming a key driving force for the economic upswing of the province and even the country. According to the 2023 annual work report of the Jiangsu Provincial Government, as of 2023, the value-added output of Jiangsu's manufacturing sector has reached 4.66 trillion yuan, accounting for 14.1% of the national total, solidifying its position as the leading province in China. In addition, the manufacturing industry in the province also shows significant influence on the global stage, with its value added accounting for about 4.2% of the global manufacturing industry, highlighting the strong international competitiveness of Jiangsu's manufacturing industry.

The high-end equipment manufacturing sector in Jiangsu Province has made rapid progress, cultivating numerous enterprises and product lines with international competitiveness. Especially in key industries such as aerospace, rail transportation, and marine engineering, enterprises in the province have demonstrated their profound technological accumulation and strong market competitiveness. The domestic market share of this industry continues to grow steadily, and its international market layout is also expanding, achieving dual expansion in domestic and international markets.

In recent years, Jiangsu Province has actively responded to and thoroughly implemented the national decision on the innovation-driven development strategy of high-end manufacturing industry, integrated it into the province's "556" industrial cluster cultivation system, continuously strengthen policy support and work promotion, and promote the development of high-end manufacturing industry in the province towards higher quality. To deepen this development process, Jiangsu Province has promulgated a number of policy measures, including the "Implementation Plan for Promoting the Integrated Cluster Development of Strategic Emerging Industries", which clearly points out that building an industrial cluster of intelligent manufacturing equipment is a key move, focusing on the development of areas such as robotics, high-end CNC machine tools, additive manufacturing, intelligent measurement and control equipment, and high-end construction machinery. These areas focus on improving the efficiency, precision, reliability, and long-term accuracy stability of equipment. In addition, the plan emphasizes the need to strengthen research and development of core materials, basic components, and related technical equipment, aiming to improve the self-sufficiency and

technical level of basic intelligent equipment and instruments in the country.

4.2. The Marketization of Digital Economy Elements Promotes the Upgrading of Jiangsu's Manufacturing Industry

In recent years, Jiangsu's manufacturing industry has occupied a place on the national and global stage, and this achievement is largely attributed to the strong driving force of the digital economy factor market. Its influence is mainly manifested in the following aspects:

Firstly, the market-oriented allocation of digital economy elements, especially the integration of big data, cloud computing, and artificial intelligence technologies, has greatly improved the production efficiency of the manufacturing industry. With the help of intelligent production lines, automated machinery and equipment, and continuous data flow analysis, enterprises can accurately control production processes, reduce unnecessary losses, optimize resource allocation strategies, and thereby reduce production costs. In addition, these advanced technologies enable enterprises to quickly adapt to changes in market demand, implement flexible production models, and enhance the ability to customize products.

Secondly, it promotes the process of technological innovation and industrial upgrading. Through the market-oriented allocation of digital economy elements, it injects strong momentum into technological innovation and industrial upgrading in the manufacturing industry. The openness and sharing mechanism of data resources, together with the widely deployed algorithm applications, effectively reduce the barriers to entry and cost burden of innovation, enabling small and medium-sized enterprises to also participate in the wave of technological innovation. In addition, the vigorous development of the platform economy model has opened up a new path for the deep integration of industry, academia, research, and application, accelerating the process of transforming scientific and technological achievements into actual productive forces, and thus helping the manufacturing industry to move towards the transformation trend of high-end, intelligent, and green.

The third factor is the improvement of supply chain management systems by digital economy elements. Market-oriented digital economy elements also promote the optimization and upgrading of manufacturing supply chain management. With the implementation of advanced technologies such as the Internet of Things and blockchain, enterprises can achieve seamless information integration at all stages of the supply chain, enhancing the visibility and tracking capabilities of the supply chain. This is beneficial for enterprises to accurately manage inventory status, predict market demand, design better logistics solutions, thereby reducing supply chain expenses and accelerating response rates. At the same time, the digital supply chain system also strengthens the flexibility and ability to resist external risks of the supply chain.

Finally, the digital economy elements have promoted the extension of market boundaries and the innovation of business models. The marketization process of

digital economy elements has promoted the expansion of the manufacturing market and the innovation of business models. The rise of new market platforms, such as e-commerce and cross-border e-commerce, has enabled manufacturing companies to connect with domestic and foreign consumer groups more efficiently and achieve diversification of sales paths. At the same time, big data technology and artificial intelligence-supported refined marketing and personalized recommendation strategies help companies more accurately grasp consumer needs and enhance their market competitive position. In addition, the development of the digital economy has also promoted various new business models such as the sharing economy and platform economy, which have opened up more abundant profit model choices for the manufacturing industry.

5. Strategic Suggestions for Promoting the Marketization of Digital Economy Elements and the High-Quality Integrated Development of Manufacturing Industry

Based on the characteristics of marketization of digital economy factors and the current application of digital economy in Jiangsu's manufacturing industry, the following suggestions are proposed:

1) Strengthen the construction of digital basic communication facilities: Take the lead in comprehensively deploying the fifth-generation mobile communication network (5G) within manufacturing parks to achieve high-speed connections between devices, laying the foundation for application scenarios such as remote monitoring and predictive maintenance. Encourage manufacturing enterprises to migrate to the cloud and utilize industrial Internet platforms, promoting collaborative operations in the supply chain and intelligent improvements in production processes. Build high-performance, low-carbon, and environmentally friendly data centers, providing flexible and scalable cloud computing services, offering strong support for big data analysis and intelligent decision-making in the manufacturing industry.

2) Promote the deepening of data element market circulation: improve the data property rights system, clarify the ownership of data property rights, protect the legitimate interests of the main body at all stages from data generation, processing to application, build a data asset evaluation system, and lay a solid evaluation foundation for data transactions. Promote the construction of data trading platform mechanism, advocate the establishment of national and industry-level data trading markets, realize the one-stop integration of data confirmation, trading, settlement and other services, encourage manufacturing enterprises to actively participate in data trading activities, and optimize resource allocation through data sharing and exchange. Comprehensively establish data security defense mechanism to ensure the safety of data during collection, storage, processing, and transmission. Emphasis on increasing the protection of personal privacy rights and interests, to ensure the legality and compliance of data use.

3) Accelerating the innovation and practice process of digital technology: The

first priority is to enhance R&D investment. The government should increase support for research and development of digital technology and drive breakthroughs in key core technology innovation. Encourage enterprises to expand R&D investment and build an innovative mechanism that combines production, education, research, and application. Secondly, it involves the popularization of mature technologies. Widely promote the application of mature technologies such as artificial intelligence, blockchain, and cloud computing in the manufacturing industry to promote the improvement of intelligent manufacturing capabilities. Encourage manufacturing enterprises to implement digital transformation and upgrading strategies and move towards the era of intelligent and networked production processes. On this basis, focus on the innovation of application scenarios. Based on the practical needs of the manufacturing industry, explore new scenarios for the application of digital technology such as smart factories, remote operation and maintenance, and personalized customization. Through the establishment of demonstration projects, lead and deepen the wide application and deep integration of digital technology in the manufacturing industry.

4) Improving the policy ecosystem and market operation mechanism: The primary task is to improve the policy framework. Formulate and improve the policy and legal framework that supports the deep integration of the digital economy and manufacturing industry, establish clear development directions, core tasks, and specific policy measures. Strengthen support for the digital transformation of the manufacturing industry, implement policy incentives in the form of tax relief and financial subsidies. Secondly, build a fair and competitive market environment, eliminate industry boundaries and regional restrictions, and promote the barrier-free flow and efficient allocation of digital economy resources. Strengthen market supervision functions to ensure the fairness and standardization of market competition. Finally, attach importance to the construction of standard system, accelerate the formulation and improvement of the standard system related to the integration of digital economy and manufacturing industry, and promote the internationalization process of standards. Encourage enterprises to participate in the formulation and popularization of standards, and drive the overall level of the industry.

5) Strengthening talent cultivation and recruitment strategies: Firstly, build a multi-dimensional education and training system, strengthen the collaborative role between higher education institutions, vocational and technical schools, and manufacturing enterprises, and jointly cultivate comprehensive talents who can adapt to the needs of the deep integration of digital economy development and manufacturing industry. Promote the growth of modern teaching modes such as online education and distance education to broaden the path of talent education. Secondly, increase policy support for the introduction of high-level talents, such as formulating special measures to provide housing subsidies, educational preferential treatment, etc., to attract top talents in the field of digital technology. Encourage manufacturing enterprises to establish R&D departments or innovation laboratories

to attract outstanding talents from around the world. Finally, pay attention to improving the practical operation skills of talents, by creating internship training bases and innovation and entrepreneurship platforms to provide a stage for talent practice and innovation activities.

6. Conclusion

The marketization of digital economy elements is one of the important ways to promote the high-quality development of the manufacturing industry. By strengthening infrastructure construction, promoting the digital transformation of industries, and strengthening the construction of talent teams, it can effectively promote the deep integration and development of digital economy elements and the manufacturing industry, injecting new impetus into the high-quality development of the manufacturing industry. In the future, with the continuous development and improvement of the digital economy, its role in promoting the high-quality development of the manufacturing industry will become more prominent.

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Conflicts of Interest

The author declares no conflicts of interest regarding the publication of this paper.

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