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# Analysis of the Impact of Industrial Digitization on the Domestic Economic Cycle

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## ABSTRACT

In recent years, under the influence of the background of globalization, the digitalization of manufacturing industry has become an engine to promote the domestic economic cycle. With the rapid development of information technology, digitalization technology is profoundly changing the production mode, management mode and market pattern of the manufacturing industry. According to the International Data Corporation (IDC) report, by 2027, the global investment in manufacturing digitization is expected to be close to four trillion U.S. dollars, and digitization will become an important driver for the transformation and upgrading of the manufacturing industry. In China, the manufacturing industry, as a pillar industry of the national economy, its digital transformation is of great significance to enhance competitiveness and promote high-quality economic development. On the one hand, digital technology improves the production efficiency of the manufacturing industry and also reduces production costs, enabling enterprises to better meet market demand and enhance market competitiveness. On the other hand, digital technology also accelerates product innovation and market response speed, enabling enterprises to launch new products faster and seize market opportunities. In addition, digital technology also helps to promote industrial chain synergy and integration, driving the development of related industries. This paper firstly explains the background and significance of the digitalization of the manufacturing industry, then discusses the direct and indirect impact of the digitalization of the manufacturing industry on the domestic economic cycle, and then analyzes the challenges and countermeasures faced by the digitalization of the manufacturing industry, so as to provide policymakers and business decision-makers with a scientific and reliable basis for decision-making. It is hoped that it can contribute to promoting the development of the digitalization of China's manufacturing industry and the benign operation of the domestic general cycle.

## KEYWORDS

Manufacturing; Industrial digitization; Domestic economic cycle; Challenges and countermeasures

## 1. INTRODUCTION

### 1.1. Background of the Study

The primary industry is the foundation of the country, safeguarding the basic needs of national life and supporting the development of the secondary and tertiary industries. The secondary industry is the core of the national economy, especially the manufacturing industry, which is the engine of the economy. The slow development of the manufacturing industry will drag down the overall economic development. 2015, "Made in China 2025" puts forward the importance of the manufacturing industry. 2021, "14th Five-Year" Intelligent Manufacturing Development Plan" specifies the objectives by 2025: First, 70% of manufacturing enterprises above the scale will realize digitalization and

networking, and 500 intelligent manufacturing demonstration factories will be built. First, 70% of manufacturing enterprises above scale will realize digitalization and networking, and 500 intelligent manufacturing demonstration factories will be built. Secondly, the market satisfaction rate of intelligent manufacturing equipment and industrial software will exceed 70% and 50% respectively, and 150 high-level solution providers will be cultivated. Thirdly, more than 200 standards have been completed, and 120 industrial Internet platforms have been built [1]. 2022, the report of the 20th CPC National Congress emphasized that high-quality development has become the core task of building a socialist modernized country in an all-round way. High-quality development of the manufacturing industry is the key, need to comply with the changes in development, to high-end, intelligent, green transformation, accelerate the structural upgrading, technological innovation, model optimization, make up for the short boards, strengthen the advantages, to achieve the quality of the manufacturing industry and the quantity of the double enhancement [2].

The digitalization of the manufacturing industry is a major trend, but faces multiple difficulties. Epidemic, international environment and demographic dividend reduction and other factors on the manufacturing industry, the survival of enterprises in a difficult environment, the digitalization of investment caution. Industrial digitization cycle is long, slow results, enterprises are difficult to grasp the input-output ratio, negative attitude. Currently, the digitalization of the manufacturing industry is at an inflection point, the need to accelerate the transformation to grasp the development opportunities, or may miss the opportunity. At the same time, digitization is the inevitable result of technological progress and market demand, and it is the key to promoting the domestic cycle and realizing high-quality economic development. Therefore, its importance and urgency should be fully recognized and the pace of digital transformation should be accelerated.

## 1.2. Status of Domestic Research

The impact of digitization in the manufacturing industry has sparked widespread concern and in-depth research globally. With the continuous development and application of digital technology, the manufacturing industry is experiencing unprecedented changes, the impact of which is not only limited to the industry, but also profoundly affects the operation and efficiency of the entire economic cycle. In China, studies on the digitalization of manufacturing industries have made remarkable progress. These studies believe that the digitalization of the manufacturing industry can significantly improve production efficiency, reduce production costs, optimize resource allocation, and thus promote the efficient operation of the entire economic cycle. Specifically, the digitalization of the manufacturing industry realizes the automation, intelligence and flexibilization of the production process through the introduction of advanced digital technology and intelligent manufacturing means. This not only improves production efficiency and product quality, but also enables the manufacturing industry to respond more flexibly to changes in market demand. At the same time, digital technology also promotes the deep integration of manufacturing and other industries such as services and agriculture, promotes the extension and expansion of the industrial chain, and further enhances the resilience and vitality of the economic cycle [3]. Moreover, enterprises, as specific practitioners of digital transformation, not only realize their own technological innovation and business strategy upgrading, but also promote the synergistic development of traditional industries and emerging information and digital technologies [4].

## 1.3. Research Objectives and Content

The purpose of this paper is to explore in depth how the digitalization of the manufacturing industry can become an engine that drives the domestic economic cycle. To achieve this goal, our research covers the background knowledge of the digitalization of the manufacturing industry and its far-reaching significance, and comprehensively explores the direct driving effect of the digitalization of the manufacturing industry on the domestic macrocycle, and also analyzes the indirect promoting effect of the digitalization of the manufacturing industry on the domestic macrocycle. In addition, we

study the problems and challenges encountered in the process of digitalization of the manufacturing industry and propose a series of strategies to deal with them.

# 2. DIRECT IMPACT OF THE DIGITALIZATION OF THE MANUFACTURING INDUSTRY ON THE DOMESTIC ECONOMIC CYCLE

## 2.1. Efficiency Gains and Cost Reductions

Industrial digitization helps the main body of the manufacturing industry to adapt to external changes more quickly and accurately, and to reduce the pressure brought by external shocks. The real-time data analysis and feedback mechanism of digitalization enables enterprises to adjust production plans and supply chain strategies in a more timely manner to ensure the continuous and stable operation of the industrial chain [5]. Digital technology can help enterprises identify bottlenecks and wasteful links in the production process through data analysis and model prediction, and then take targeted improvement measures. For example, through real-time monitoring of production line data, enterprises can find the abnormal state of equipment in a timely manner, prevent the occurrence of failures, and improve the efficiency of equipment use. In addition, the application of digital tools such as simulation software and 3D printing technology has greatly shortened the cycle time of product design and prototyping, reducing R&D costs. According to the data released by the German Federal Statistical Office in January this year, Germany's "Industry 4.0" strategy through the construction of smart factories, making the production efficiency increased by 20% to 30%, while reducing production costs by 15% to 25%. This efficiency improvement is not only reflected in the production line, but also in the supply chain management, inventory control and product design and other aspects. Through digital transformation, companies are more able to take advantage of the fierce market competition.

## 2.2. Accelerated Product Iteration and Market Responsiveness

The application of digital technology in the manufacturing industry has significantly accelerated product iteration and market responsiveness. Analyzing big data as an example, through real-time monitoring and analysis of consumer consumption behavior, enterprises can quickly capture market trends and changes in demand, so as to make rapid adjustments in the product design and production process. In addition, with the support of digital technology to promote the establishment of a direct link between enterprises and consumers, through social media, online customer service and other channels to interact with users, this interaction not only enhances consumer brand loyalty, but also provides companies with keen insight into market opportunities.

## 2.3. Building a Digital Platform to Promote Accurate Matching of Supply and Demand

In the process of digitization of the manufacturing industry, the construction of digital platforms shows great potential in promoting accurate matching of supply and demand. Through big data analysis and artificial intelligence algorithms, the digital platform is able to capture market dynamics and predict changes in demand in real time, thus guiding production planning and inventory management. In addition, by connecting manufacturers, suppliers, distributors and consumers, the digital platform realizes efficient collaboration of product information, logistics information and capital movements. For example, Alibaba's "new retail" model realizes a seamless connection between consumer demand and production supply by integrating online and offline resources. It is by changing the operation of the traditional manufacturing industry that digital platforms promote the efficient operation of the economic cycle.

# 3. INDIRECT IMPACT OF THE DIGITALIZATION OF MANUFACTURING INDUSTRIES ON THE DOMESTIC ECONOMIC CYCLE

## 3.1. Digitalization Enhances the Linkages Between Manufacturing and Other Industries

The application of digital technologies, such as the Internet of Things, big data analysis and cloud computing, has greatly facilitated the in-depth integration of the manufacturing industry with other industries, such as services and agriculture. Take Germany's "Industry 4.0" strategy as an example, which emphasizes the intelligent upgrading of the manufacturing industry through digital technology, and then promotes the in-depth integration of the manufacturing industry with information and communication technology, energy, logistics and other industries. This integration not only enhances the competitiveness of the manufacturing industry, but also promotes the development of related industries and the formation of new economic growth points. In addition, digital technology has promoted the integration of the manufacturing industry with service industries such as finance and education. Through big data analysis, financial institutions are able to more accurately assess the credit status of manufacturing enterprises and provide more precise financial services.

## 3.2. Digitalization to Accelerate Capital Flows and Optimize Resource Allocation

The wide application, integration and penetration of digital technology will give rise to some emerging super industries and huge fields, whose industrial organization and rule system must be ensured through "self-regulation" and "other regulation" to ensure their quality, so that digital technology can better serve the high-quality development of China's economy and play an active role in optimizing resource allocation and promoting the formation of a national unified big market. China's high-quality economic development, and play a positive role in optimizing resource allocation and promoting the formation of a unified national market [6]. Take Alibaba's "digital factory" as an example, through the integration of online and offline resources, it realizes the orderly flow of production factors and completes the digital management of the whole chain from raw material procurement to product sales. This model not only reduces intermediate links and lowers costs, but also optimizes resource allocation and improves the efficiency of the entire industrial chain through accurate data analysis. As Jeffrey Moore mentioned in Crossing the Chasm, "Digital transformation is the key for enterprises to cross the market divide and achieve sustained growth." In addition, digital technology also promotes the optimal allocation of financial resources. Taking Ant Gold as an example, the enterprise uses blockchain technology to more accurately assess the credit status of enterprises, reduce credit risk, and provide more convenient and low-cost financing services for small and micro enterprises, which not only alleviates the financial pressure on small and medium-sized enterprises (SMEs), but also improves the liquidity of capital.

# 4. CHALLENGES AND COUNTERMEASURES TO THE DIGITALIZATION OF THE MANUFACTURING INDUSTRY

## 4.1. Technology Upgrading and Human Resources Development

Currently, the manufacturing industry is experiencing a shift from automation to intelligence, which requires enterprises not only to upgrade existing production equipment, but also to introduce advanced information technology. As a result, the rapid iteration of technology also poses the challenge of a lack of talent for companies. According to a report by the World Economic Forum, by 2025, 50% of the world's workforce will need to be retrained or upgraded in skills to meet new job requirements. This requires not only the establishment of training mechanisms for continuous learning and skills upgrading within enterprises, but also the provision of appropriate support from

governments and educational institutions. Enterprises also need to focus on the cultivation of interdisciplinary talents, because digital transformation requires not only technical experts, but also complex talents who understand management, marketing and legal knowledge. Therefore, the cultivation of talents who can lead the technological trend and market changes is crucial to the future development of enterprises and even the entire manufacturing industry.

### 4.2. Data Security and Privacy Protection

Industrial digital transformation has more stringent requirements for data security, industrial chain digitization means that the production and operation data sharing between multiple upstream and downstream enterprises and related industries, and the data interconnection and integration of each link deepens [7]. The protection of these data is not only related to the core competitiveness of enterprises, but also to the security and stability of the entire economic cycle. For this reason, enterprises need to establish a strict data access control mechanism to ensure that only authorized personnel can access sensitive data. Secondly, advanced encryption technology is used to encrypt data to prevent it from being intercepted or tampered with. In addition, enterprises should conduct regular data security audits and risk assessments to identify and repair security vulnerabilities in a timely manner. Manufacturing enterprises must make data security and user privacy protection a core management issue during the digital transformation process to ensure that consumer rights are protected while promoting the economic cycle.

## 5. CONCLUSION

The core of high-quality economic development lies in innovation-driven and efficiency improvement. The digitalization of the manufacturing industry is precisely the concrete practice of this concept. Through the introduction of advanced technology, precise control of the production process is realized, improving product quality and production efficiency. At the same time, digital management can also optimize supply chain management, reduce operating costs and improve customer satisfaction. This comprehensive digital upgrading not only promotes the transformation and upgrading of the manufacturing industry itself, but also brings development opportunities for related industries and promotes the collaborative development of the entire industrial chain. Through the wide application of digital technology, manufacturing enterprises can continuously promote product innovation, management innovation and service innovation, so as to meet the diversity and variability of market demand. This market demand-oriented innovation model can not only enhance the market competitiveness of enterprises, but also promote the sustainable and healthy development of the entire economic system.

In the future, with the continuous progress of technology and the continuous expansion of application scenarios, digitalization will play an even more important role in the field of manufacturing. Intelligent manufacturing will become the mainstream production mode of the manufacturing industry, and digitalized services will be ubiquitous. This comprehensive digitalization upgrade will further enhance the competitiveness and innovation capacity of the manufacturing industry, and promote the entire economic system in the direction of higher quality and higher efficiency.

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