

# Progress and Evaluation Index of Digital Transformation of China's Manufacturing Industry

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## Abstract

With the gradual popularization of the Internet, the concept of digitization and intelligentization has penetrated into the development concept of all walks of life. China has become a big manufacturing country, but to continue to develop into a world manufacturing power, it is necessary to improve the digital level of domestic enterprises. Therefore, on the basis of domestic policy support, the author will lead readers to further explore the progress of digital transformation of China's manufacturing industry, and summarize a set of evaluation indicators combined with their own situation.

## Keywords

manufacturing industry; digitization; digital evaluation index.

## 1. Introduction

In recent years, the development of big data, intelligent, cloud computing and other digital technologies has been highly concerned by social groups, especially the digital development of all walks of life needs to rely on the support of information technology. On the current development situation, the digital level of China's manufacturing industry is uneven, and the vast majority of small and medium-sized enterprises are still in the initial stage of digital development. As the cost advantage of China's manufacturing industry is becoming weaker and weaker, we need to focus on the digital progress of manufacturing industry, study evaluation indicators, improve innovation ability, accelerate the transformation of manufacturing industry, and reshape international competitiveness.

## 2. Digital Transformation of China's Manufacturing Industry

In the Internet age, more and more countries take the development of digital economy as an important way to promote their economic growth. Among them, digital economy promotes the informationization development of manufacturing industry and improves the intellectualization level of manufacturing industry. In the trend of globalization, for some developed countries with good manufacturing foundation, such as the United States, Germany and other countries, the digital level of their manufacturing industry is high. Therefore, the digital transformation of these countries focuses on the development of network and intelligence. For example, Germany develops industry 4.0, and the United States promotes industrial Internet. On the other hand, the manufacturing industry of China's large-scale enterprises has begun to enter the stage of digital development, but most of the small and medium-sized enterprises are still in the low-speed development stage, and the degree of digital dependence is not enough. Therefore, the manufacturing industry transformation of Chinese enterprises still needs "supplementary lessons".

In order to promote the introduction of information technology into emerging industries and traditional manufacturing industries and improve the level of digital development, China's

leadership has constantly improved the policy system for the transformation of the manufacturing industry, providing technical support and preferential policies for enterprises. Therefore, the digital level of China's manufacturing industry is constantly improving, and the progress trend is as follows:

### **2.1. The Policy Environment of Digital Transformation of Manufacturing Industry is Constantly Improving**

In 2015, the State Council successively issued (Guidelines on deepening the Integrated Development of Manufacturing and the Internet), and (Made in China in 2025) These policy documents provide clear direction and policy support for the digital transformation of manufacturing industry. The Ministry of industry and information technology department, the Ministry of Finance department and other departments also issued the (Intelligent Manufacturing Development Planning (2016-2020 year)), (Industrial Internet Development Action Plan (2018-2020 year)) and other documents.

The specific objectives and key tasks of digital transformation of manufacturing industry are clarified. Therefore, the author believes that the above-mentioned documents have formulated supportive policies and measures in the fields of information technology development, achievement practice, infrastructure construction, breakthrough in key fields, international cooperation, finance, taxation and talent guarantee, and the continuous improvement of the policy environment, which has promoted the transformation of China's manufacturing industry and accelerated the full realization of domestic manufacturing industry 3.0.

### **2.2. The Digital Transformation of Manufacturing Industry is Progressing Steadily, But the Progress of Network and Intelligence is Slow**

on 1.19.2020, The Ministry of industry and information technology department of the people's Republic of China issued (2019 China Electronic Information Manufacturing Industry Comprehensive Development Index Report), the report shows that China's electronic information manufacturing industry has entered a critical period of high-quality development. The main driving force of development has gradually shifted from scale dividend to industrial innovation and transformation value-added, and the industrial development has entered a new stage of "substantial breakthrough from low-value links to high-value links through re-development". [1] China's manufacturing industry is in a transitional stage from industry 2.0 to industry 3.0. From the actual situation, compared with small enterprises, large enterprises are more connected nearly industry 3.0.

According to the 2018 China Enterprise Digital Development Report released by IDC, what is the international data company, The proportion of digital economy in China's GDP has been increasing year by year, and manufacturing industry has become a key digital industry. At the same time, China's consumer industry has a relatively high degree of digitization, However, the degree of manufacturing digitization is low, more than 50% of the manufacturing enterprises are still in the stage of single point test and local promotion.

On the other hand, the comprehensive development index of the manufacturing industry released by the Ministry of Industry and Information Technology shows that the proportion of China's manufacturing industry in R&D, manufacturing and export is increasing year by year, while the index value of networked and intelligent development is low. The report indicates that the digital transformation of China's manufacturing industry is progressing rapidly, but the index of integrated interconnection and intelligent collaboration is low, that is, the improvement of intelligence and networking is slow.

### **2.3. The Industrial Internet Application in the Forefront of Manufacturing Industry has Made Rapid Progress.**

Industrial Internet realizes man-machine connection through intelligent machines, combines software and big data analysis to reconstruct global industry and stimulate productivity. That is, the development of industrial Internet is one of the goals of digital transformation of manufacturing industry, aiming to improve the level of software and hardware networking in manufacturing industry. According to the calculation of China Industrial Internet alliance, the direct industrial scale of China's industrial Internet is about 570 billion yuan in 2017, and it is expected to reach trillion yuan in 2020. At the same time, China prospective industry research institute predicts the development of China's industrial Internet. In 2017, the scale of China's industrial Internet market will be 467.7 billion yuan, and it is expected to reach 692.9 billion yuan in 2020.[2]

From the data observation, the development of industrial Internet provides support services for the digital transformation of manufacturing industry, and the speed of digital transformation of China's manufacturing industry will be further improved.

## **3. Evaluation Index of Digitization of Chinese Manufacturing Industry**

At the made-China 2019 Summit held on March 20, Xu Yu, executive member of the China Committee of 100 Information Technology, pointed out that there are three important indicators that need to be attached great importance to in the process of intelligent transformation. First, we should pay attention to the value-added of data assets, which is the key to realize data-driven intelligent transformation, and also an important indicator to measure the success of the transformation. The second is to improve the ability of sharing resources, which includes the level of sharing external resources and the degree of sharing internal resources, which reflects the ability of intelligent manufacturing to explore and use network value. Third, we should pay attention to the improvement of business accuracy, including the progress of product research and development, operation and service, which is the concrete embodiment of intelligent level.[3] At the same time, it is found from the report that China's manufacturing industry is in a critical period of transformation, and the digital economy is in a stage of catching up with and competing for the lead. Therefore, the author will focus on the digital input and output, to further comb the evaluation indicators of manufacturing digitization.

### **3.1. Digital Input Index of Manufacturing Industry**

The digital investment index of manufacturing industry mainly measures the importance of Chinese enterprises in talent investment, R & D investment, information technology investment and infrastructure investment in the production process. Only with reasonable digital investment can the manufacturing industry develop steadily.

#### **3.1.1. Talent Investment Input**

Talent input is an indispensable power support for all walks of life to realize digitization. Talent is the source of digital technology output. Therefore, talent investment is one of the important input indicators of manufacturing digitization. Secondly, starting from the three elements of education investment, population quality and employment proportion, this paper uses the proportion of higher education investment in GDP, the proportion of people aged 25-34 who have obtained higher education, and the proportion of digital knowledge-based talents to measure the investment of digital talents in manufacturing industry.

#### **3.1.2. R & D Investment Input**

In the Internet era, R & D is the premise for all walks of life to carry out innovation activities, and R & D is one of the important links for manufacturing industry to realize

digitization. Therefore, the author thinks that the ratio of R & D funds to enterprise income is used to evaluate the R & D investment and measure the R & D investment of manufacturing industry digitization.

### 3.1.3. Information Technology Input

Information technology is the guarantee that all production activities can be carried out continuously. With the network as the medium, information technology can develop rapidly, and the manufacturing industry can carry out industrial transformation under the drive of information technology development. Therefore, as one of the digital input indicators of manufacturing industry, information technology input index can be divided into four aspects: intelligent hardware, intelligent software, information network and information technology service.

### 3.1.4. Infrastructure Investment Input

Infrastructure is the condition for the digital development of manufacturing industry. It not only relies on the traditional production facilities, but also develops a new generation of intelligent facilities. The infrastructure investment can be evaluated by the number of infrastructure production facilities owned by enterprises and facilities based on big data intelligent technology, which can be used as the infrastructure investment index of manufacturing industry digitization.

## 3.2. Digital Output Index of Manufacturing Industry

### 3.2.1. Production Cycle Time Limit

The direct embodiment of manufacturing digitization is: the shortening of production cycle, the intelligent system can timely, accurately and efficiently collect and manage the data of sales, procurement, warehouse and production links, and effectively solve the problems of opaque production schedule, difficult traceability of quality problems, inaccurate inventory data, and easy error of time and piece work. Therefore, one of the output indicators of digital manufacturing industry is put in the production and manufacturing link, that is, the period of production cycle is one of the output indicators.

### 3.2.2. Visual Management Degree of Production Process

To a certain extent, the visual management of production process can reflect the progress of digital transformation of manufacturing industry. That is to say, if the degree of visual management is high, the work efficiency of its employees will be faster, and the digital output index of manufacturing industry will be better reflected.

## 4. Summary

Under the competitive pressure of the international environment, the cost and price advantage of China's manufacturing industry is getting smaller and smaller. Therefore, the digital transformation of manufacturing industry is necessary and imminent. To explore the progress of digital transformation of manufacturing industry can help the country to formulate industrial digital policy better, and promote the national industry to accelerate the realization of digitization. At the same time, the evaluation index of the digitization of manufacturing industry also has guiding significance to the digitization degree of each industry and reflects the real situation of the development of digital economy.

## References

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