



# Status Quo and Suggestions for the Digital Transformation of the Manufacturing Industry in Guangdong Province

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**Abstract.** This paper analyses the status quo and necessity of the manufacturing industry's digital transformation in Guangdong Province, combined with the government documents Guangdong Province, to understand and analyze the path of the digital transformation of the manufacturing industry in Guangdong Province. This paper mainly puts forward two suggestions. Firstly, to realize the digital transformation of the manufacturing industry in Guangdong Province, the government should do the essential work of digital transformation. For example, promote the breakthrough and application of industrial software, develop intelligent hardware and equipment, cultivate an industrial Internet platform, improve digital infrastructure, and build a digital security system. Secondly, the government should also increase the proportion of “on the cloud and the platform”, strengthen publicity efforts on the cloud and the platform, encourage traditional manufacturing enterprises to deepen the network transformation, and strive to build various forms of the industrial Internet platform.

**Keywords:** Digital transformation · Guangdong province · Manufacturing

## 1 Introduction

### 1.1 Research Background

As countries worldwide pay more and more attention to the digital economy, digitalization has formed a significant situation in the world. In this context, on January 12, 2022. The State Council of China issued the 14th Five-Year Plan for Digital Economy Development (from now on referred to as the Plan), which clarified the guiding ideology, basic principles, development goals, essential tasks, and safeguard measures for promoting the healthy development of digital economy during the 14th Five-year Plan period. By 2025, the value-added of the core industries of the digital economy should account for 10% of GDP. By 2035, China will strive to establish a unified, fair, competitive and mature modern market system of the digital economy, with the development level of the digital economy at the forefront of the world.

Industrial digital transformation is essential content to push China's digital economy to the forefront of the world. China is a big manufacturing country. Guangdong province is the largest manufacturing province in China. The transformation in the digital world in Guangdong province's manufacturing industry has a demonstration role in the construction of digital China. According to the Opinions of Guangdong Provincial People's Government on Accelerating digital development, 2022 is crucial for Guangdong province to implement the 14th Five-year Plan of digital government reform and construction and step into a new stage. Guangdong province should build further advantages in the digital era. For instance, Seize the opportunity of creating the Guangdong-Hong Kong-Macao Greater Bay Area and Shenzhen as a pioneer demonstration zone of socialism with Chinese characteristics. Build Guangdong into a leading digital development highland centering on crucial areas of digital development such as digital economy, digital society, and digital government.

## 1.2 Literature Review

Many domestic academics have undertaken relevant studies and analyses on the manufacturing industry's change and upgrading. Jiang Li (2022) concludes that the proportion of transformation to digital in conventional manufacturing in Guangdong province is low, and the ratio of upper cloud platforms is low through interviews and questionnaires [1]. Wang Chunying and Chen Hongming (2021) believe that the digital transformation of enterprises mainly refers to the digital integration of traditional enterprises and modern network technology and the change to digitalization. Digital transformation of enterprises is necessary to some extent. On the one hand, it lies in the guidance of policies and the development of new infrastructure.

On the other hand, enterprises also need to realize industrial upgrading and improve efficiency [2]. Shu-Chun Liu (2019) said that promote the development of a high-quality digital economy, to discover "digital industry" and "digital industrialization" two-wheel driven, the time problem must focus on cracking the core technology, and the construction of the digital economy central strategic platform, to build world-class digital industrial clusters, promote digital technology alignment and penetration of the three major industries. At a deeper level, it is necessary to break the policy and institutional barriers that restrict the development of digital productivity and the construction of a digital economy ecosystem and build a regulatory mechanism and multi-governance collaborative governance mechanism that are compatible with the development of the digital economy [3]. Wu Lei (2020) finds that the new environment created in the digital era affects the process of Guangdong provincial government governance reform from three aspects: construction concept guidance, service mode adjustment, and carrier renewal. In terms of ideology, leaders should make decisions on government governance reform to the development trend of the digital era. In terms of mode, the public's awareness of digital participation should be improved, and effective communication with the government can be realized by relying on intelligent technology. For government departments burdened with heavy governance tasks, Internet thinking should also be used to enhance the social participation of enterprises and the public in digital government construction [4]. Song Qinghua, Zhong Qiming, and Wen Huwei (2022) found that industrial digitalization

significantly improved the total factor productivity of enterprises, which remained stable after a series of tests, and the productivity paradox of industrial digitalization was not established. Industrial digitalization has a substitution effect on low-end labour factors, and the benefits of digital transformation are greater for small and medium-sized businesses. Further study reveals that industrial digitalization can alter how businesses integrate into each value chain link through the “innovation incentive effect”, “value co-creation effect”, and “management optimization effect” to achieve enterprise productivity climb. The research results provide experience and decision-making reference for accelerating the digital transformation of China’s manufacturing industry and realizing the advancement to the middle and high end of the value chain [5]. Ni Dandan and Li Ying (2021) found that according to the distribution of current policy tools for manufacturing digital transformation in China and the experience and practices of leading manufacturing countries such as Germany and Germany, the Future manufacturing digital transformation policy of our government should be increased to encourage innovation-oriented GongGeiXing driving dynamics, strengthening the policy tool guided by perfecting the mechanism of the effect of environmental policy instruments, enhanced to share the risk-oriented XuQiuXing pulling development of policy tools, etc. It emphasizes the various policy tools combination of overall coordination and accelerates the construction of a complete policy framework system for manufacturing digital transformation [6]. OlhaProkopenko, Leonid Shmorgun, ViktorKushniruk, MarynaProkopenko, Liudmyla Huliaieva (2020) showed the efficacy of business processes might be assessed from a variety of perspectives based on the assessment’s goals, the size of the company, the extent of its activities, and a variety of other aspects.

In today’s environment, information is a valuable resource. Every second, humanity generates massive volumes of digital data, which take up storage space and assist businesses in their operations. To make the most of the information available, it’s vital to collect, organize, and evaluate it.

Capitalization has impacted every business to some degree, and it’s only the beginning. Businesses that want to succeed and grow must confront the challenges of the current economy; only then can they become leaders. This is where digital transformation will be beneficial [7]. Farkhod Mulaydinov (2021) found that it should be highlighted that the digital economy is a highly complex system that has been formed by man, a comprehensive system that manages, defines, organizes, and plans, all with the goal of ensuring long-term economic growth and raising living standards [8].

### 1.3 Research Significance

Through literature review, it can be seen that, at present, the academic circle focuses on the problems of China’s digital transformation and how leaders put forward reasonable reform decisions regarding the development trend, how enterprises solve the bottleneck problem, and how to increase the proportion of enterprises’ digital transformation and the ratio of cloud and platform. As the pioneer of digital transformation in China, Guangdong province has carried out digital economic construction earlier than other provinces. So studying the manufacturing industry’s digital transformation in Guangdong Province is essential.

This paper examines the digital transformation circumstances in the Guangdong manufacturing industry. Based on the existing research of domestic scholars, continue to study and analyze the current status of the industrial industry's digital transition in Guangdong Province and put forward suggestions. It provides a new direction for the digital transformation of the manufacturing industry.

## **2 Status Analysis of the Digital Transformation of the Manufacturing Industry in Guangdong Province**

According to the manufacturing implementation scheme for the digital transformation of Guangdong province (2021–2025) (starting now referred to as the “implementation plan”) is expected in 2023 in Guangdong province, strategic pillar industry clusters and strategic emerging industrial clusters to speed up the digital transformation, the province's manufacturing digital, networked, intelligent level promoted, new model and new formats widely. The overall strength of the industry has significantly increased. By 2025, the digitalization level of strategic pillar industry clusters and strategic emerging industry clusters will be improved considerably [9]. As the only new energy vehicle leader in China that has mastered the core technology of “electricity, electricity and electricity”, BYD plays a benchmark role in the digital transformation of its manufacturing industry in Guangdong Province and even the whole country. As a new energy automobile manufacturing industry representative, BYD has digital economy construction in research and development informatization, production digitalization, and intelligent products. At the same time, BYD also works with industrial chain partners to carry out exchanges and cooperation in electric vehicle intelligent network systems, supply chain information, intelligent manufacturing, extensive data analysis, and other aspects. For example, DLink, the bird's intelligent network system, has opened the control of braking, steering and drive, and 341 sensors and 66 control rights to promote the development of smart driving [10].

Meanwhile, according to the questionnaire analysis of 180 enterprises in Guangdong Province, more than 90% of them (92.28%) have implemented digital transformation, and more than 80% of them (85%) have applied accounting computerization, OA, ERP and other systems to implement digital transformation in the field of management. 75% of manufacturing enterprises have effectively improved their leadership and decision-making efficiency. More than half of them (56.67%) have implemented digital transformation in manufacturing, and nearly 1/3 (28.89%) have implemented digital transformation in much testing. 63.33% of manufacturing enterprises have effectively improved production efficiency, safety, and product quality [11]. In general, the manufacturing industry in Guangdong province benefits from the support of government policies and has more resources for digital transformation compared with other regions. Therefore, the manufacturing industry's digital transformation in Guangdong Province is stable and has excellent potential in the future.

### **3 Path of Digital Transformation of Manufacturing Enterprises in Guangdong Province**

#### **3.1 The Necessity for the Digital Transformation of China's Manufacturing Industry**

The manufacturing industry's digital transformation is a critical component of the industry's high-quality development and necessary support for the digital economy's growth. For the first time, the digital economy was mentioned in the government's work report in 2017. The report calls for "accelerating the growth of the digital economy". In 2022, The State Council issued the 14th Five-year Plan for The Development of Digital Economy. With the support of national policy, the manufacturing industry's digital transformation will become the focus of China's digital development. According to the digital data from the China Information and Communication Institute, China's digital economy continued to grow strongly, with a scale of 3.92 billion yuan, up 3.3 trillion yuan from the previous year and accounting for 38.6% of GDP in 2020. At the same time, China's digital industrialization scale will reach 750 million yuan, accounting for 19.1% of the digital economy and 7.3% of GDP, and the industrial digitalization scale will reach 3.17 billion yuan, accounting for 80.9% of the digital economy and 31.2% of GDP [9]. In general, the traditional industry has become an essential scene of digital technology application and innovation, and the integration between the two supports the rapid development of the digital economy. The manufacturing industry's digital transformation is a critical component of the industry's high-quality development and necessary support like data processing and online information sharing for the digital economy's growth. Although our country's manufacturing industry has advanced significantly in recent years, most of the smaller manufacturing enterprises are still in the traditional model of development. They are not only facing the workshop, the human capital cost, plus new crown outbreaks in recent years is a serious blow to the development of small manufacturing enterprises, and the digital transformation can't advance. The manufacturing industry is the foundation of China's economic growth, and there is enormous potential and market space to promote the digital upgrade of the manufacturing industry. Therefore, the digital transformation of many traditional industries strongly supports the development and growth of the digital economy.

#### **3.2 Accelerating "Go to the Cloud and Go to the Platform"**

According to the Implementation Plan and Several Policies and Measures for the manufacturing industry's digital transformation in Guangdong Province (after this referred to as Policies and Measures) [10], "Implementation Path" put forward a clear path for manufacturing enterprises. Path 1, namely, "one line, one policy", promotes small and medium-sized manufacturing enterprises to speed up the popularisation and application of digitalization, speed up "go to the cloud and platform", and integrate into the industrial chain and supply chain. Manufacturing enterprises should further formulate the "on-cloud platform" catalogue and speed up the "on-cloud platform" of industrial equipment and business systems. To further reduce the threshold and cost for enterprises to access the cloud and platform, we will adopt the approach of "platform sharing,

government subsidizing, and enterprises contributing”. Encourage industrial Internet platforms to cooperate with digital transformation service providers to create system integration solutions that deeply integrate industry knowledge and experience. “On the cloud and platform” is the inevitable choice of the transformation of the digital in the Guangdong manufacturing industry. In 2018, the top national node of industrial Internet identification analysis (Guangzhou) was first opened in China. The amount of identification analysis reached 1.49 billion, ranking first in the country. In 2020, Guangdong built 124,000 5G base stations [12]. At the same time, In the 2021 critical index report on the application level of industrial Internet platforms released by The National Industrial Information Security Development Research Center, Guangdong ranks first in China [13]. The technical support has ensured that the Guangdong manufacturing industry’s digital transformation into “upper cloud and upper platform” is successful.

### **3.3 Promote Integrated Application Innovation of Leading Manufacturing Enterprises**

The government will promote integrated application innovation in leading manufacturing enterprises, further strengthen the top-level digital design, and promote the optimization and upgrading of business processes. Comprehensively improve the transformation level of leading enterprises in digital management, intelligent production, network collaboration and service. At the same time, it further improves the rate of smart equipment, achievement conversion, labour productivity, product excellence rate, energy conservation and emission reduction rate, and production safety rate. Before the digital transformation, Midea Group, a leading manufacturing enterprise in Guangdong Province, had problems of disunity of systems, disconnection of data, and extreme “isolation” of information of different businesses. With the start of digital transformation, the order delivery cycle of Midea Group is shortened by 56%, channel inventory is reduced by 40%, and the product quality index is improved by 15% [14]. According to the above data, digital income has increased imminently and is reflected in all business segments. Midea Group’s digitalization has set a benchmark for global pan-manufacturing enterprises that digital transformation is required to increase inside information sharing as well as the proportion of accessing cloud and platform.

### **3.4 Promote Digital Upgrading of Industrial and Supply Chains**

Promoting digital upgrading of industrial and supply chains. “One chain, one policy” will accelerate the digital upgrading of industrial and supply chains in key industries. The upstream and downstream of the industrial chain should build Bridges through digitalization, coordinate reasonably and improve the efficiency of information transmission. At the same time, enterprises need to optimize the structure and spatial distribution of industrial chains to form a new, controllable and flexible industrial and supply chain system. The digital manufacturing economy’s upstream, middle and downstream interpretation is that the digital economy’s upstream is mainly based on infrastructure and other underlying architectures, namely, essential hardware and software. For example, 5G – communication technology, optical cable – communication lines to realize optical signal transmission, chips - semiconductor core products. The middle reaches of the

digital economy mainly revolve around digital industrialization, which is the information communication industry, such as the telecom industry, Internet industry, big data, blockchain, etc. The digital economy's downstream is industry digitalization, which mainly focusing on industry digitalization. Industry digitalization refers to the improvement of industry productivity brought by digital technology and the new industry model and business form it brings. Such as digital government, smart city, digital governance, Internet of vehicles, etc.

## **4 Suggestions on the Digital Transformation of Guangdong Manufacturing Industry**

### **4.1 Do the Essential Work of Digital Transformation Well**

With the support of policies, the manufacturing industry's digital transformation in Guangdong province has an excellent development prospect. The first step is to lay a solid foundation to continue achieving breakthroughs. The implementation plan mentioned the promotion of industrial software research and application, the development of intelligent hardware and equipment, the cultivation of an industrial Internet platform, the improvement of digital infrastructure, and the construction of a digital security system. We should strengthen overall coordination, increase policy support, strengthen talent support, strengthen financial services, provide public services and create a good environment. With a good foundation for digital transformation, it is necessary to increase the proportion of "upper cloud and upper platform" and strengthen the transmission of upstream and downstream data of the industrial chain.

### **4.2 Increasing the Proportion of "Accessing Cloud and Platform"**

Although the industrial industry is undergoing a digital change in Guangdong province taking the lead in China, there are still some problems in the traditional manufacturing industry, such as the low proportion of digital transformation, low proportion of network transformation, high transformation cost, insufficient support, insufficient talent, insecure data and inconsistent industry standards [15]. It is necessary to encourage traditional manufacturing enterprises to accelerate digital transformation. The government should help manufacturing enterprises to deepen network transformation and strengthen SaaS services and the cloud platform publicity to create various forms of the industrial Internet platform. Vigorously introduce and train digital transformation talents, enhancing the construction of data security protection systems for manufacturing enterprises, accurate formulation, and application of industrial standards for the transformation of manufacturing enterprises. Therefore, enhancing the proportion of enterprises "on cloud and platform" will be a critical turning point in Guangdong's manufacturing industry's digital transformation.

## **5 Conclusion**

### **5.1 Key Findings**

Thanks to the policy support and its muscular economic strength, the digital transformation of the manufacturing industry in Guangdong Province has been at the forefront



of the country. However, in combination with the goal of China's future digital economy, Guangdong Province, as the benchmark of China's digital economy development, still has a long way to go. Through research, this paper finds the necessity for the digital transformation of the manufacturing industry in Guangdong Province, which is embodied in the significant role of the economy of the digital age of the manufacturing industry in improving China's overall economy in recent years. At the same time, combining the "implementation plan" and the policies and measures for the future of Guangdong's manufacturing digital transition path to understand and analyze. It is concluded that Guangdong province should increase the manufacturing digital transformation "cloud platform" and promote the leading manufacturing enterprise application integration innovation in three aspects, and promoting digital industry chain supply chain upgrading breakthrough.

## 5.2 Future Studies

The manufacturing industry's digital transformation in Guangdong Province will be constantly upgraded and improved with macro conditions and policy objectives. This paper only analyses the manufacturing industry's digital transformation in Guangdong Province by combining some development stages and policy documents in the current location. In the future, digital transformation will continue to develop rapidly. Subsequent studies can continue to analyze the future development trend of digital transformation of the manufacturing industry in Guangdong Province based on the actual development situation and policy documents of manufacturing enterprises.

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