

Research on Strategies for Empowering the Transformation and Upgrading of Guangdong Province's Manufacturing Industry with Digital Economy

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Abstract

The deep integration of the digital economy and the real economy has become an important driver for promoting the transformation and upgrading of traditional manufacturing industries. Actively promoting the transformation and upgrading of the manufacturing industry in Guangdong Province will help improve the quality and speed of development of the manufacturing industry in Guangdong Province, and achieve high-quality development of the manufacturing industry. Therefore, based on the realistic requirements and supporting conditions of empowering the manufacturing industry in Guangdong Province with the digital economy for transformation and upgrading, it is necessary to explore the bottlenecks faced in the development process, and propose effective strategies for optimizing the development environment of the digital economy, comprehensively cultivating digital technology talents, optimizing industrial layout, and expanding open cooperation to promote the effective implementation of the transformation path of the manufacturing industry in Guangdong Province.

Keywords

Digital Economy; Manufacturing; Transformation and Upgrading.

1. Introduction

In recent years, with the rapid development of new generation information technologies such as the Internet of Things, cloud computing, big data, artificial intelligence, and the advent of the digital economy era symbolized by 5G and industrial Internet, China's traditional industries are undergoing significant changes. The digital economy is injecting strong vitality into the digital transformation and upgrading of traditional manufacturing industries. As the manufacturing industry continues to develop, China has become a pillar of the global manufacturing industry, with the competitiveness of low-end and mid-range manufacturing gradually strengthening, and some industries have already reached world-class levels. On July 24, 2023, General Secretary Xi Jinping emphasized at a meeting of the Political Bureau of the CPC Central Committee the importance of promoting the construction of a modern industrial system, accelerating the cultivation and growth of strategic emerging industries, and fostering more pillar industries. He also highlighted the need to promote deep integration between the digital economy and advanced manufacturing and modern services, and to ensure the secure development of artificial intelligence, indicating China's strong focus on developing the digital economy as a key task and setting the direction for the future development of the manufacturing industry.

The rapid development of the digital economy has led to a surge in the quantity of related achievements, while its connotation and research framework continue to evolve. Carlsson believes that the digital economy is a combination of information technology and the internet, capable of having a significant impact on productivity and efficiency, serving as a form of

connection for various thoughts and behaviors [1]. Li Changjiang's in-depth analysis of the origin and evolution of the concept of the digital economy suggests that the essential characteristic of this economic form is the production through digital technology [2]. In 2020, China Academy of Information and Communications Technology established the "Four Transformations Framework" for the digital economy, elaborating on the connotation of the digital economy from the perspectives of digital industrialization, industrial digitization, digital governance, and data value. In 2021, the National Bureau of Statistics categorized the digital economy industry into five major types: digital product manufacturing, digital product services, digital technology applications, digital element-driven industries, and digital efficiency enhancement industries, leading to a broad consensus among many scholars on the connotation of the digital economy.

Existing literature confirms the promoting role of the digital economy in the transformation and upgrading of the manufacturing industry. Zhang Qian and others point out that the digital economy can improve the efficiency of the industrial chain operation, promote the modernization of the industrial chain, and empower China's ascent in the global value chain [3]. Research by Zhang Qing and colleagues indicates that digitalization in manufacturing can optimize and upgrade the quality of exported products by reducing the fixed production costs of product quality through enhancing innovation and research and development capabilities [4]. Li Chunfa and others, from the perspective of the industrial chain, suggest that digital information will serve as a medium for the circulation of the industrial chain, leading to the restructuring and gradual comprehensive digital transformation of the manufacturing industry[5].

Currently, the economy and society of Guangdong Province are at a critical juncture of transformation. The key to promoting the transformation and upgrading of the manufacturing industry lies in advancing the deep integration of the digital economy with manufacturing. Therefore, this article focuses on the development advantages of the manufacturing industry in Guangdong Province, delves into the intrinsic connection between the digital economy and the transformation and upgrading of the manufacturing industry, and puts forward considerations on how the digital economy can empower the transformation and upgrading of the manufacturing industry in Guangdong Province.

2. Realistic Requirements and Supporting Conditions

2.1. Realistic Requirements for the Digital Transformation of Manufacturing Industry in Guangdong Province

2.1.1. Digital Economy Drives High-quality Development of Manufacturing Industry

The vigorous development of digital economy in Guangdong Province has significant advantages, providing new opportunities for the innovative development and transformation and upgrading of the real economy. Among them, it plays a strong scientific and technological innovation strength and potential value in the fields of intelligent connected vehicles, new generation of electronic information, and intelligent robots. However, the key technologies, especially the computing power construction platform project, need to be broken through, and the links such as high-end chips, operating systems, and industrial design software are still restricted. The digital foundation of relevant manufacturing enterprises is not solid, there is no strong computing power platform support, and there is not enough big data resources, which leads to the lagging upgrade of digitalization degree industry 4.0.

2.1.2. Building a World-class Advanced Manufacturing Base

The development level of the manufacturing industry in Guangdong Province ranks at the forefront nationwide. However, due to differences in economic strength and industrial

development levels among cities within the province, significant regional disparities and low regional synergy are evident [6]. The core manufacturing areas are concentrated in the four cities of Guangzhou, Foshan, Shenzhen, and Dongguan, while other cities such as Zhuhai, Zhanjiang, and Zhaoqing have relatively lagging development, showing clear gaps compared to the core cities. Against this backdrop, Guangdong Province aims to leverage its advantages in manufacturing industrial belts and the internet, harness the radiating driving role of core cities, optimize the collaborative innovation environment, and build a global manufacturing center and world-class advanced manufacturing base.

2.2. The Supporting Conditions for the Transformation and Upgrading of the Manufacturing Industry in Guangdong Province Empowered by the Digital Economy.

2.2.1. The Digital Infrastructure Continues to Be Improved.

In recent years, Guangdong Province has vigorously promoted the construction of digital infrastructure, achieving significant results. By the end of 2022, the province had put into operation 300,000 data center cabinets; by the end of 2023, the scale of 5G base stations in the province had exceeded 320,000; the number of fixed broadband access ports in the province surpassed 100 million, ranking first nationwide, achieving full coverage of 5G technology in intelligent manufacturing. The construction of digital infrastructure is the cornerstone of digital economic development, and its integration with the manufacturing industry can effectively reduce costs and increase efficiency for enterprises, providing more important support conditions for the digital transformation of the manufacturing industry.

2.2.2. The Scale of the Digital Economy is Gradually Expanding.

The digital economy, as the engine driving high-quality development and the new direction for future development, is gradually becoming an important productivity factor in the South China region. According to data from the Department of Industry and Information Technology of Guangdong Province and the Guangdong Provincial Bureau of Statistics, in 2022, the scale of the digital economy in Guangdong Province reached 6.41 trillion yuan, an 8.6% year-on-year increase. It accounted for 49.7% of the regional GDP and 12.8% of the national digital economy scale, maintaining the top spot in the country for the sixth consecutive year in terms of overall scale.

2.2.3. The Institutional Conditions for Digital Transformation are Continuously Improving.

Guangdong Province has successively issued corresponding plans such as the "Guangdong Province Manufacturing Industry Digital Transformation Implementation Plan (2021-2025)", the "Guangdong Province Manufacturing Industry High-Quality Development 14th Five-Year Plan", "Several Opinions on High-Quality Development in the New Era in Guangdong", "Opinions on High-Quality Construction of a Manufacturing Strong Province in Guangdong", and the "Regulations on Promoting the High-Quality Development of Guangdong Province's Manufacturing Industry". These plans provide important support in terms of industrial ecology, resource allocation, dual-chain integration, finance, talent, and other aspects, further guiding the direction, clarifying the focus, and providing strong guarantees for the digital transformation of the manufacturing industry in the province.

3. Bottlenecks in Existence

3.1. The Degree of Comprehensive Integration of the Two Transformations is Not High.

Under the new wave of technology, whether the integration of information technology construction and industrial construction can deeply empower enterprise digitalization is the necessary path to promote the transformation and upgrading of the manufacturing industry. Currently, although there has been some progress in the integration and development of new technologies such as the Internet of Things, big data, and artificial intelligence with the manufacturing industry in Guangdong Province, there is still a significant lack of depth and breadth in integration. Issues such as the manufacturing industry being large but not strong, key core technologies being subject to others, and the slow progress of digital transformation in traditional industries have not fundamentally changed yet [7].

3.2. Insufficient Reserves of Digital Talents.

From the perspective of high-quality development of the manufacturing industry, establishing a talent support system and building a high-quality talent team are key ways and important manifestations of the transformation and upgrading of the manufacturing industry. The rapid development of the digital economy has led to manufacturing enterprises facing a shortage of talents in technological innovation and digitalization, hindering the pace of transformation and upgrading of the manufacturing industry. Currently, the supply of digital talents in Guangdong Province is limited, especially in terms of talents with relevant professional skills and experience, resulting in an imbalance between supply and demand. Therefore, Guangdong Province urgently needs to establish a talent support system, promote the decentralization of talent policies, and provide solid support of digital talents for the transformation and upgrading of the manufacturing industry.

3.3. Industrial Structure Urgently Needs Optimization.

Guangdong Province, as one of the most prominent regions in China's digital economy development, holds an important position. However, there are issues in industrial structure convergence in intelligent manufacturing in Guangdong Province, mainly reflected in weak innovation capabilities, low product added value, and unreasonable industrial layout, especially evident in the industrial structure convergence in Shenzhen, Dongguan, Foshan, Zhuhai, Zhaoqing, Zhongshan, and Jiangmen. In addition, traditional manufacturing industries still account for a large proportion in Guangdong Province, and the depth and breadth of digitalization promotion in the manufacturing industry are insufficient, severely hindering the transformation and upgrading of the industrial structure.

4. Measures to Effectively Implement the Path of Promoting the Transformation of the Manufacturing Industry.

4.1. Optimize the Environment for the Development of the Digital Economy.

New formats and models of the digital economy continue to emerge, making the importance of optimizing the environment for digital economic development increasingly evident. Specific measures can be taken in the following two aspects: on one hand, strengthen the construction of digital infrastructure. Firstly, it is necessary to enhance the research and development efforts of digital technologies in manufacturing enterprises in Guangdong Province, promote the empowerment of artificial intelligence in the manufacturing industry, and improve the innovation level of enterprises. Secondly, accelerate the construction of digital platforms such as cloud computing and big data centers to lay the foundation for the industrial development of the manufacturing industry. On the other hand, strengthen policy support. Relevant guiding

policies for the development of the big data industry should be formulated to promote the positive interaction between the digital economy and policies.

4.2. Comprehensive Cultivation of Digital Technology Talents.

With the deepening development of the digital economy, traditional manufacturing industry talents are increasingly unable to support the construction of manufacturing industry transformation and upgrading, and there is an urgent need to deepen reforms in the cultivation of digital technology talents. On one hand, universities in Guangdong Province need to dynamically adjust the cultivation of digital talents, promote the cross-integration of artificial intelligence, big data, and other disciplines with other professional subjects. On the other hand, the government needs to improve talent incentives to attract more digital talent teams, rapidly build a high-quality talent pool, and leverage the aggregation effect of talents. Additionally, companies should focus on the "retraining" of talents by establishing and improving training systems for digital technologies to help employees in the manufacturing industry transition towards technical talent roles.

4.3. Optimize Industrial Layout.

Guangdong Province should base its optimization of industrial layout on the economic strength and location factors of each prefecture-level city, explore and streamline the industrial chains, supply chains, and advantages of each city, clarify the industrial positioning and development priorities of each city, guide the rational transfer of industries by focusing on key areas and taking a holistic approach. Furthermore, it is essential to leverage the radiating role of core cities, strengthen deep cooperation between core cities and surrounding regional cities, vigorously develop effective coordination of industrial chains and supply chains in the western and northern regions of Guangdong, and cultivate new economic growth points.

4.4. Expand Opening up and Cooperation.

It is necessary to give full play to the advantages of Guangdong's manufacturing industry, such as its location, industrial agglomeration, abundant labor force and complete manufacturing categories, take the construction of the Belt and Road Initiative as the impetus, take the development of the Guangdong-Hong Kong-Macao Greater Bay Area as the overhang, expand domestic and external opening-up with the help of platforms such as the Guangdong-Hong Kong-Macao Cooperation Development Platform and the Guangdong Pilot Free Trade Zone, and actively integrate into the domestic and international double cycle. Adhere to the implementation of wider scope, wider areas, deeper level of opening up, support the provinces and cities to rely on their advantageous industries to extend the characteristic digital industrial chain to build a strategic and overall industrial chain, to achieve industrial digitalization and digital industrialization coordinated development pattern.

5. Conclusion

The rapid development of the digital economy is a key driving force for the transformation and upgrading of the traditional manufacturing industry. Optimizing the development environment of the digital economy, comprehensively cultivating digital technical talents, optimizing the industrial layout, and expanding opening up and cooperation are the fundamentals of competition for the transformation and upgrading of the traditional manufacturing industry under the background of the digital economy. Guangdong Province should pay attention to the shortcomings of the advanced manufacturing industry in the development process, adapt to the needs of the development of the digital economy era, actively promote the process of transformation and upgrading of the manufacturing industry, and provide a more solid guarantee for the economic development of Guangdong Province.

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References

- [1] Carlsson B. The Digital Economy: what is new and what is not? [J]. Structural change and economic dynamics, 2004, 15(3): 245-264.
- [2] Li Changjiang. A Preliminary Exploration of the Connotation of the Digital Economy[J]. E-Government, 2017, (09): 84-92.
- [3] Zhang Qian; Ren Baoping. Mechanism, Objectives, and Pathways of Digital Economy Driving Industrial Chain Modernization[J]. Journal of Zhengzhou University (Philosophy and Social Sciences Edition),2023, (05):39-45+128.
- [4] Zhang Qing; Yu Jinping. Manufacturing Digitalization and Quality of Export Products--Empirical Research Based on Chinese Manufacturing Enterprises[J]. International Business2023, (05): 21-39.
- [5] Li Chunfa; Li Dong-dong; Zhou Chi. The Mechanism of Digital Economy Driving Transformation and Upgrading of Manufacturing: Based on the Perspective of Industrial Chain Restructuring[J]. Commercial Research, 2020, (02): 73-82.
- [6] Feng Weyi. Digital Transformation Path and Countermeasures of China's Manufacturing Industry under the Background of Digital Economy[J]. Contemporary Economic Research.2021, (04):105-112.
- [7] Meng Jing. Research on the Strategies for Empowering the Transformation and Upgrading of Anhui Province's Manufacturing Industry with the Digital Economy[J]. Jiangsu Commercial Forum,2023, (11):108-111.