

# High Quality Development Path of Manufacturing Industry in Yangtze River Delta under the Background of Global Value Chain Digitization

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## Abstract

Manufacturing as the pillar industry of the national economy, now facing great challenges brought by multiple pressure, at the same time, the global value chain also in the new round of scientific and technological revolution and industrial transformation presents a digital transformation trend, the continuous development of digital technology has gradually become a favorable starting point for realizing high-quality economic development. In this context, this paper first analyzes the development status and existing problems of the manufacturing industry in the Yangtze River Delta, and then puts forward four paths for the application of digital technology "layout innovation chain, upgrade industrial chain, optimize supply chain and enhance value chain" from the four segments of "research and development, production, circulation and service". Finally, based on the model and combined with the problems mentioned above, this paper puts forward some suggestions to promote the high-quality development of manufacturing industry in the Yangtze River Delta.

## Keywords

**Yangtze River Delta manufacturing; Digital Technique; Digital Economy; High Quality Development.**

## 1. Foreword

Manufacturing industry is the pillar industry of the national economy and the foundation of a country's economic and social development. As the region with the fastest economic development and the largest economic aggregate in China, the development of the Yangtze River Delta has attracted extensive attention from all walks of life since it was listed as a national strategy in 2018, and the manufacturing production level is in the leading position in the country.

However, in recent years, under the dual pressure of external environmental impact and lack of endogenous power, not only the Yangtze River Delta, China's manufacturing industry as a whole has fallen into the development dilemma of "extrusion at both ends". Under the background of the spread of anti globalization thoughts, in addition to the existence of trade barriers, the uncertainty of economic and trade relations and sudden public health events, some developed countries use the advantages of mature high technology to bring high-end threats, while some developing countries use the advantages of low cost of production factors to bring low-end threats. China's economic growth urgently needs to leverage new momentum.

On this occasion, the digital economy has gradually become an important engine for stabilizing economic growth and ensuring high-quality economic development. Data show that the scale of China's digital economy has ranked second in the world for many consecutive years, reaching 39.2 trillion yuan in 2020, accounting for 38.6% of China's GDP. The development and application of digital technology will promote the digital transformation of the global value

chain, which will not only change the density of contacts and improve the resilience against the crisis, but also be an important driver of the global economic recovery after the COVID-19 pandemic. Therefore, how to grasp the digital trend of the global value chain and realize the high-quality development of the manufacturing industry in the Yangtze River Delta region has become an important research topic.

## 2. Literature Review

Centering on the research theme of this paper, the literature closely related to this paper mainly includes three aspects: the digitization of global value chain, the high-quality development of manufacturing industry, and the impact of value chain digitization on the development of manufacturing industry.

In the related research of global value chain digitization, Guo Zhouming and Qiu Ying first gave the basic facts and theoretical mechanism for the reconstruction of the global value chain under the background of the digital economy, and put forward the strategy of strengthening China's position as the center of the regional value chain. Sun Zhiyan and Zheng Jianghuai completed the analysis of the impact of digital elements on the global value chain, summarized many key changes in the path, division of labor positioning and coordinated governance mode of countries when jointly building the global value chain, and then further analyzed the new situation and characteristics of the development of the global value chain, so as to put forward solutions for China to effectively respond to new challenges.

In terms of related research on the high-quality development of the manufacturing industry, Du Pengcheng and Hongyu have built an evaluation system for the high-quality development of China's manufacturing industry under the new "double cycle" development pattern based on the improvement of the manufacturing industry structure, and integrated green development into the goal. Xu Jialiang Based on the perspective of value chain upgrading, he discussed the problems to be solved in the high-quality development of China's manufacturing industry from the supply side, demand side, market side and technology side. Liu Wenrong emphasized the important role of innovation factors by constructing and revealing the action mechanism of factor allocation, innovation efficiency and ability on the high-quality development of the manufacturing industry.

In the study of the impact of the value chain digitalization on the development of the manufacturing industry, Liao Xinlin and Yang Zhengyuan proved that the digital economy can significantly promote the transformation and upgrading of the manufacturing industry through the construction of the model and through the demonstration. Li Jie, Yu Donghua and Zhang Mingzhi studied the driving mechanism of the transformation and upgrading of the manufacturing industry, and drew the conclusion that the high-density information technology can improve the total factor productivity of the manufacturing industry and then promote its high-quality development, which supplemented the influence mechanism of the digital economy on the development of the manufacturing industry. Gao Yunsheng and Yang Yang analyzed the goal and path of high-quality development of China's manufacturing industry under the background of global value chain reconstruction, and put forward suggestions from the perspective of adhering to innovation-driven development, establishing an open economic system, improving the supply level of factors and improving environmental rules and policies.

Throughout the existing studies, although the literature on the digital trend of global value chain and the high-quality development of manufacturing industry has been very rich, most of them stand at the national level, emphasize top-level design, or focus on the research on the transformation and upgrading of manufacturing industry in a province, and there are few studies based on the regional level. Therefore, the possible innovation of this paper is: under the background of the integration strategy of the Yangtze River Delta, starting with the four

main segments covered by the production system, this paper constructs a theoretical framework to analyze the integration of digital technology into the transformation and upgrading process of manufacturing industry from the perspective of the Yangtze River Delta urban agglomeration, and puts forward the corresponding countermeasures.

### **3. The Current Situation and Dilemma of Manufacturing Industry in the Yangtze River Delta Region**

#### **3.1. Current Situation of Development**

The Yangtze River Delta has a strong manufacturing foundation and outstanding advantages in scientific and technological innovation. It is the core area of China's manufacturing industry. In 2019, the industrial added value of three provinces and one city in the Yangtze River Delta will total 8.1 trillion yuan, accounting for more than 1 / 4 of the national total. In terms of the growth of manufacturing investment, Shanghai is 21.1%, Jiangsu is 4.6%, Zhejiang is 12.9% and Anhui is 10.1%, all higher than the national average of 3.1%.

Facing the global digital trend, all provinces and cities in the Yangtze River Delta have also put forward their own digital economy development goals. For example, Shanghai City has proposed to build "Asia Pacific Data Capital" and become China's national strategic data reserve center; Zhejiang province regards digital economy as the "No. 1 project" and wants to "strive for a national digital economy demonstration province"; Jiangsu Province has put forward the goal of building a "smart Jiangsu" and formulated the corresponding action plan; Anhui Province proposes to speed up the construction of "digital Jianghuai" and vigorously develop digital economy. A large number of local high-tech enterprises and leading enterprises have emerged, introduced and cultivated in various places, and some advanced manufacturing industries are in the forefront of the country and even the world.

#### **3.2. Existing Problems**

##### **3.2.1. Regional Development Is Unbalanced**

Affected by the geographical location, infrastructure construction and industry development environment, the economic gap between the three provinces and one city in the Yangtze River Delta does not show an obvious contraction trend, and the development gradient is obvious. Shanghai, which is in the first gradient, has realized the overall outward transfer of the manufacturing industry, while Anhui, which is in the third gradient, as the major industrial undertaking place in the region, has undertaken a large number of labor-intensive industries and some capital-intensive industries. There is still a gap in economic level between provinces and prefecture-level cities in the province, obvious income gap between urban and rural areas, unreasonable functional positioning of cities in the region, and unclear division of labor and cooperation have brought many challenges to the comprehensive and healthy economic development of the Yangtze River Delta region.

##### **3.2.2. Competition Is Fierce in the Region**

Although various provinces and cities have been actively carrying out industrial cooperation in various forms in recent years, such as cooperation in building inter provincial industrial parks and planning metropolitan areas. However, from their respective implementation plans for promoting the integrated development of the Yangtze River Delta, it can be found that the four places jointly aim at the strategic emerging industries of seven countries with great development potential and strong scientific and technological support, for example, an obvious phenomenon is that the proportion of electrical equipment manufacturing scale in Jiangsu, Zhejiang and Anhui provinces has increased significantly in recent years. The overlapping of leading industries will be accompanied by the inclination of policies to compete for new

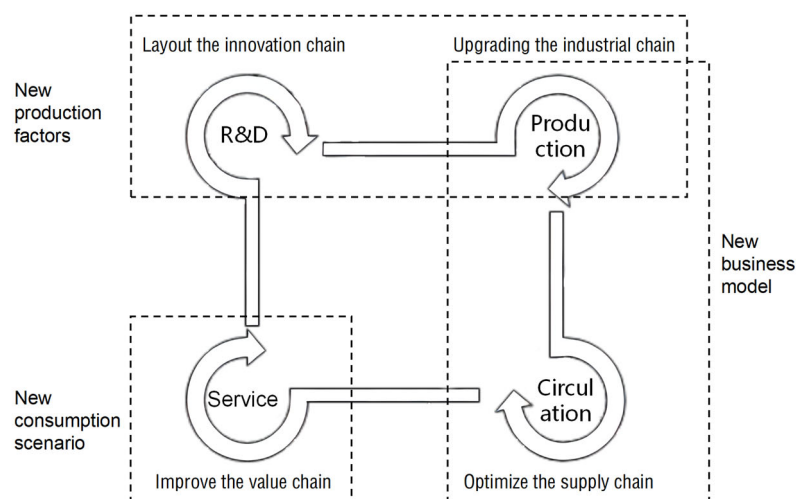
investment, new projects and new talents, which means that the industrial competition in the region will exist for a long time.

### 3.2.3. The Overall Added Value of the Products Is Low

Compared with several major urban agglomerations with a high degree of international integration, the Yangtze River Delta urban agglomerations have just become a world-class urban agglomerations, the added value of manufacturing industry is not high, the strength in the field of high-end science and technology and service economy is relatively weak, and the promotion and application of digital technology is not wide enough. Thanks to the advantages of demographic dividend and labor cost, China's manufacturing industry has achieved rapid development in the initial stage. However, with the weakening of this advantage and the gradual increase of resource constraints, the profits brought by manufacturing segments in the value chain are becoming smaller and smaller. In addition, various signs show that at present, some manufacturing industries in China still rely too much on foreign digital elements, resulting in the core technology and key parts are controlled by others. How to get out of the "low-end lock" and realize the improvement of product added value is a major problem faced by the development of manufacturing industry in the Yangtze River Delta.

## 4. Construction and Elaboration of the Theoretical Model

The theoretical model of high-quality development of manufacturing industry aims to realize digitization. Starting from the four segments of "research and development, production, circulation and service", it correspondingly puts forward four paths for the application of digital technology: "layout innovation chain, upgrade industrial chain, optimize supply chain and enhance value chain", which together form an important basis for new production factors, new business models and new consumption scenarios of manufacturing industry, support the digital transformation of manufacturing industry.



**Figure 1.** Theoretical model of high-quality development of manufacturing industry

### 4.1. Research and Development Segment- -Layout the Innovation Chain

Independent innovation is the fundamental driving force to promote the transformation of manufacturing industry, and also the basic requirement for talents under the background of global value chain digitalization. By increasing investment in innovative research and development, master of cutting-edge patents and technologies, create new intellectual property rights, to improve the additional value of research and development and design on the left side of the smile curve; Introducing and cultivating innovative and pioneering talents, the management should establish the concept that human resources are the first resource,

strengthen the cultivation of scientific research forces, and speed up the construction of high-quality and high-level scientific and technological talents, because science and technology are the key and talents are the core to make a good layout of the innovation chain; Encourage enterprises and institutions to cooperate to build research institutes and joint laboratories, focus on key core technologies, strengthen the systematic ability of scientific and technological innovation in the industry, adhere to problem-oriented, goal-oriented and achievement oriented, make accurate efforts for specific projects, and gradually solve the "weaknesses, weaknesses and loopholes" controlled by others.

#### **4.2. Production Segment- -Upgrading the Industrial Chain**

The essential feature of modern economic development is the industrial chain based on division of labor and cooperation. Optimizing the industrial chain is the fundamental measure to build a modern industrial system and optimize the social and economic system. First, we should focus on accelerating the construction of new infrastructure including 5G communication technology, industrial Internet and big data sharing platform, ensure to create a good environmental foundation for the development of intelligent manufacturing, and promote the upgrading of the industrial chain from relying on labor to relying on technology; Secondly, we should "lengthen the board and make up for weaknesses", start to improve the product quality of the industry in the fields with certain industrial scale advantages, and give preferential policies and support in talent allocation, capital and site resources to the industries with insufficient competitive advantages; In addition, vigorously develop digital resources, integrate data, a new factor of production, into the production segments of enterprises, use data + algorithm for result prediction and scientific decision-making, help improve the performance and production efficiency of final products or services, and give full play to the role of digital technology in the upgrading of industrial chain.

#### **4.3. Circulation Segment- -Optimize the Supply Chain**

An organization's supply chain is a key business process, which is very important for a successful customer experience. A high-performance supply chain can improve business efficiency and responsiveness, and meet customer needs anytime, anywhere. Use the Internet to realize the electronic communication between enterprise employees, suppliers and customers, improve the management efficiency of enterprise data information and reduce the probability of error with the help of the automatic operation of computer information system and the ability to process massive data; More accurate inventory monitoring through artificial intelligence technology and reduce the waste of resources, use the data of Internet of things sensors to gain insight into inventory location and status, and improve the inventory tracking function of the supply chain; Using the powerful functions of AI, on the one hand, it can accurately predict, quickly evaluate and more effectively alleviate the possible risks in the operation process and improve the overall operation efficiency of the supply chain. On the other hand, it can generate strong insight into potential benefits in combination with blockchain data calculation.

#### **4.4. Service Segment- -Improve the Value Chain**

Facing the great changes that have not been seen in a century, with the decline of the demographic dividend, China's manufacturing industry urgently needs to change from the traditional manufacturing centered to service-centered, and improve its competitiveness by changing the enterprise form and updating the service mode. Enterprises should strengthen customer-oriented marketing and services, use big data technology to analyze and mine consumer preferences, carry out accurate positioning and accurate marketing, and realize the efficient improvement of added value in brand services on the right side of the smile curve; At the same time, promote new digital retail technologies, such as augmented reality (AR),

Internet of things integration and geographic positioning strategy, create new consumption scenes such as "intelligent customization" and "experiential shopping", and present new shopping experiences for consumers; Improve the after-sales service system of automatic commodities, preliminarily filter and sort out the after-sales feedback through digital tools, form a processing mode with online as the main line and offline as the auxiliary, so as to achieve rapid response and efficient processing.

## 5. Countermeasures

In order to effectively solve the problems faced by the digital transformation of manufacturing industry in the Yangtze River Delta region, based on the above theoretical model and combined with the actual situation of the region, this paper gives the following countermeasures:

### 5.1. Work Along Both Lines to Ensure Regional Coordinated Development

To promote the regional coordinated development, close the gap between the three provinces and one city in the Yangtze River Delta, on the one hand, relatively backward provinces and cities are needed to increase policy support and capital investment, starting to improve their own industrial basic capacity and industrial chain modernization level. Learn from the advanced experience of the top 500 enterprises made in China, such as Guangdong ZTE and Beijing Sany Heavy Industry, that have successfully achieved digital transformation, integrate the data of new production factors into research and development and production segments, implement the layout of digital chemical plant transformation and unmanned plant construction. Make full use of data digitization to break the information islands, establish a digital operation platform, accelerate the improvement of innovation capacity. On the other hand, all provinces and cities need to strengthen the breadth and depth of mutual cooperation and mutual assistance, make good use of the radiation effect brought by the integration of the Yangtze River Delta, to realize the rapid diffusion and sharing of new technological achievements and the connection between upstream and downstream. In addition, in the subsequent development, Jiangsu, Zhejiang and Anhui provinces should not only continue to strengthen the cooperation with Shanghai, but also pay attention to the cooperation between the three provinces, and make joint efforts to cultivate the manufacturing enterprises in the Yangtze River Delta region into the digital lighthouse enterprises in the world.

### 5.2. Identify the Regional Advantageous Industries, and Strengthen the Industrial Division of Labor

Although the leading industries established between regions are very similar, the resource endowments are different, and the industrial foundation accumulated for a long time is also different. As long as we seize this important information, promote the formation of a vertical division of labor in the upstream and downstream of the industrial chain, and deepen industrial cooperation, we can turn competition into cooperation and achieve win-win results.

For the scientific identification of regional advantageous industries, to achieve precise industrial empowerment, In this paper, the RCA display comparative advantage index was used. Based on the research results of Zhou Hua and Zhang Xiaodong on the level of dominant comparative advantage of Jiangsu, Zhejiang, Shanghai and Anhui 42 industries in 2017, the following ideas can be provided for the industrial division of labor in the Yangtze River Delta: to expand Shanghai's absolute advantages in the financial field, build Shanghai into a world-class financial center; Focusing on the rapid development of Internet companies represented by Alibaba, give full play to the advantages of the software industry and service industry in Zhejiang Province, push forward the shift to the high-end manufacturing industry; Focusing on the excellent performance of Jiangsu and Anhui provinces in the high-tech manufacturing industry, taking advantage of the geographical advantages and resource endowment of the two

provinces, to achieve industrial undertaking and collaborative development. Through the division of labor between the four regions, it will better realize the concentration of regional resources, which will help to play the industrial agglomeration effect and further promote the integrated development of the four regions, so as to maximize the effect of the economic circle in the Yangtze River Delta region and make it a powerful driving force for China's economic growth.

### 5.3. Take the "Smile Curve" as the Guide and Extend to the Higher Added Value Segment

With reference to the "smile curve" proposed by Mr. Shi Zhenrong and guided by improving the added value of finished products, we need to promote the movement and positioning of the manufacturing industry in the Yangtze River Delta to blocks with high added value from two directions. First, focus on innovative research and design and cultivate the endogenous driving force for the development of manufacturing industry: all provinces and cities strengthen the construction of science and innovation Highlands, give full play to the advantages of high-quality resources of colleges and universities in the Yangtze River Delta, encourage leading enterprises to establish enterprise technological innovation incubation centers in conjunction with colleges and universities, and jointly create and build new technologies and projects; The enterprise should set up a special design and production team for the key materials and key parts that still need to be imported, breaking the restrictions of foreign suppliers and mastering the voice of production and operation; Strengthen the innovation segment in the "Introduction digestion absorption innovation" model, transform the technology spillover effect of the global value chain into the driving force of independent innovation, and gradually form the advantages of independent research and development and international brands.

Second, layout service transformation and promote new business forms of service-oriented manufacturing industry: deeply integrate the new generation of information technology focusing on 5G, Internet of things and Big data, promote the main modes of service-oriented manufacturing such as customized service, supply chain management, shared manufacturing and full life cycle management among enterprises, and innovate on this basis in combination with their own business content; Encourage enterprises to build cloud service platforms, focus on customers, promote the specialization and socialization of service system, and carry out whole chain services from design and development, production and manufacturing, storage, transportation and sales, installation and acceptance, use training, quality assurance, maintenance and recycling; Strengthen the training of innovative, applied and compound talents in service-oriented manufacturing, such as setting up service-oriented manufacturing related courses by relying on Colleges and universities and relevant training institutions, and building a talent exchange platform by holding industrial design competitions.

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