Research on Industrial Transformation Path of Jiangsu Province under Digital Economy

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Keywords: Digital Economy, Industrial Transformation, Development Path.

Abstract: The status of industrial structure not only reflects the quality of regional economic development, but also is an important basis for future regional economic growth. At present, digital economy has become a new development pattern of global economy. With the power of digitalization to guide the transformation and upgrading of related industries, and promote the integration and penetration of information technology and the real economy. On the one hand, this can accelerate the transformation of traditional industries to digital, and on the other hand, it can develop new forms of digital economy and form new drivers of economic growth. This paper analyzes the present situation of industrial structure in Jiangsu Province, explores the development path of industrial digitalization in Jiangsu Province, and promotes regional economic development.

1 INTRODUCTION

Industrial level is an important factor of economic growth, which determines the quality and level of economic development. Industrial structure is an important factor affecting economic growth. The transformation and adjustment of industrial structure are of great significance in the development of national economy. Jiangsu province is one of the major economic provinces in China. Since the reform and opening up, the economy of Jiangsu Province has developed rapidly. In 2020, the province's GDP reached 10.3 trillion yuan, ranking second only to Guangdong among 31 provinces, municipalities and autonomous regions in China. Facing the contradictions of industrial structure, such as uncoordinated industrial structure, excess production capacity, weak independent innovation ability, inadequate control of core technology, and the conflict between economic development and resources and environment, Jiangsu province has gradually lost the advantages of traditional elements after 40 years of rapid growth. The evolution of industrial structure from primary to senior is in urgent need. (Chen, 2017)

At present, digital economy, as an emerging economic form, has attracted wide attention from all walks of life and has great research value. This paper mainly focus on digital economic role in regional industry development problems, first by Jiangsu province bureau of statistics released the correlative data statistics yearbook 2020, Jiangsu province, by analyzing the digital economy under the current status and existing problems of the industrial structure of Jiangsu province to explore the path of digital economy's influence on the transformation and upgrading of industry of Jiangsu province, and the development direction of key industries.

2 THE INTERNAL MECHANISM OF DIGITAL ECONOMY PROMOTING INDUSTRIAL STRUCTURE UPGRADING

The internal logic of world industrial structure upgrading shows that technological progress is the internal driving force of industrial structure upgrading, and every technological progress will bring about the transformation of economic paradigm. Under the new economic paradigm, emerging technology industries tend to surpass the traditional industries and gradually become the leading industry in the industrial system, and promote the transformation and upgrading of traditional industries through the effects of industry association and technology diffusion, so as to upgrade the

industrial structure to a higher level. In the era of industrial economy, the optimal combination of production factors such as land, labor and materials promotes the iteration and upgrading of industrial structure. With the appearance of the law of diminishing marginal return, the growth capacity of the traditional factors of production has been increasingly weak, and the bottleneck constraints have become increasingly prominent. The digital economy created by the new generation of information technology takes data as the most important factor of production. The characteristics of high efficiency, cleanliness, low cost, reproducibility and mass acquisition of data overcome the inherent defects of traditional factors of production, and has a "high multiplier" effect. Although the cost of fixed assets in the early stage is high for the construction of digital infrastructure and the investment of intangible assets, once successful, the marginal use cost is low or even infinitely tends to zero. This not only breaks the trap of diminishing marginal return in the era of industrial economy, but also promotes the continuous improvement of value creation ability.

Digital economy can also promote the upgrading of industrial structure through continuous innovation. In the digital economy era, we can make full use of all kinds of existing resources through product innovation and business model innovation to empower traditional industries, create space for value increment, and realize the transformation and upgrading of traditional industrial structure. For example, in the financial industry, big data and artificial intelligence technology has been applied to risk control departments, which has greatly improved the risk control ability, and the financial system protection system is also gradually improved. The intelligence of digital technology can continuously innovate and learn. It can help human beings to complete the work that may not be completed for a long time, shorten the time of industrial upgrading, and improve the efficiency of industrial upgrading. More and more intelligent products create excess profits for producers. After traditional commodities are endowed with digital technology content, their

added value and derivative value also increase. Therefore, digital economy is a green, innovative, sustainable and high-quality economic paradigm, and a new driving force that can lead the upgrading of industrial structure.

3 CURRENT SITUATION OF INDUSTRIAL STRUCTURE IN JIANGSU PROVINCE UNDER DIGITAL ECONOMY

3.1 Current Situation of Industrial Structure of Jiangsu Province

3.1.1 Three Industrial Output Value Structure Analysis

According to the data of Jiangsu Statistical Yearbook, we can calculate the proportion of the three major industries in the total output value of Jiangsu Province from 2001 to 2019. Figure 1 shows the specific data.

From Figure 1, we can see that the industrial layout of Jiangsu Province has gradually changed from the "two, three, one" structure to the "three, two, one" structure. The proportion of primary industry decreased year by year, from 11.6 percent in 2001 to 4.3 percent in 2019. Before 2015, the secondary industry occupied the largest proportion and was the main force driving the economy of Jiangsu Province. Since 2005, the proportion of the secondary industry began to decline gradually. The proportion of the tertiary industry has increased significantly. By 2019, the proportion of the tertiary industry in Jiangsu Province has exceeded 50% of the total output value, and the tertiary industry has gradually become the main part of the industry, which is in line with the general law of industrial structure evolution. (Jiangsu Bureau of Statistics, 2020).
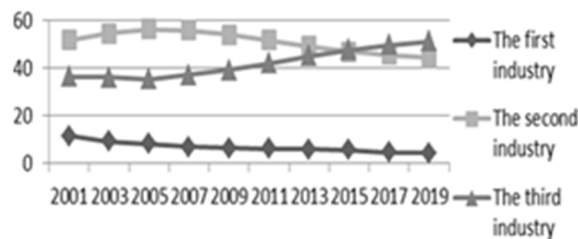

Figure 1: Proportion of Output Value of Three Industries in Jiangsu from 2001 to 2019 (%).

3.1.2 Analysis of The Employment Structure of Three Industries

In the analysis and comparison of the industrial structure, the analysis of the employment structure of the three industries is the focus of the research, because the employment structure is a basic indicator reflecting the change of the industrial structure.

From Figure 2, we can see that, from 2001 to 2019, the employment structure of the three industries in Jiangsu Province has undergone significant changes. The proportion of the employed population in the primary industry has continued to decline, from 41.3 percent in 2001 to 15.5 percent in 2019. Compared with 2001, the proportion of the employed population in the secondary industry has increased significantly, from 31% to 42.4%. The proportion of the employed population in the tertiary industry also shows an obvious upward trend, rising from 27.7% in 2001 to 42.1% in 2019. Moreover, the gap between the number of employed population in the secondary industry and the number of employed population in the tertiary industry is also narrowing. By 2019, the gap between the proportion of the two is only 0.3%. Thus, a large number of labor force transfer from primary industry to the second and third industry, with the change of employment structure in accordance with the laws of Clark, namely along with the development of the economy, raising the level of national income, labor force transfer from primary industry to secondary industry, the first but with the

further development of economy, labor force transferring to the tertiary industry. (Jiangsu Bureau of Statistics, 2020)

3.1.3 Analysis of Employment Structure of Three Industries

In the analysis and comparison of industrial structure, the analysis of employment structure of three industries is the focus of research, because employment structure is a basic index reflecting the change of industrial structure According to Figure 3, we can see that from 2001 to 2019, the employment structure of the three industries in Jiangsu Province has undergone significant changes. The proportion of employed people in the primary industry has been declining, from 41.3 percent in 2001 to 15.5 percent in 2019. Compared with 2001, the proportion of the employed population in the secondary industry has increased significantly, from 31% to 42.4%. The proportion of employed population in the tertiary industry also showed an obvious upward trend, rising from 27.7% in 2001 to 42.1% in 2019, and the gap between the number of employed population in the secondary industry and the number of employed population in the tertiary industry was also narrowing, until 2019, the gap between the two was only 0.3%. (Jiangsu Bureau of Statistics, 2020) Thus, a large number of labor force transfer from primary industry to the second and third industry, with the change of employment structure in accordance with
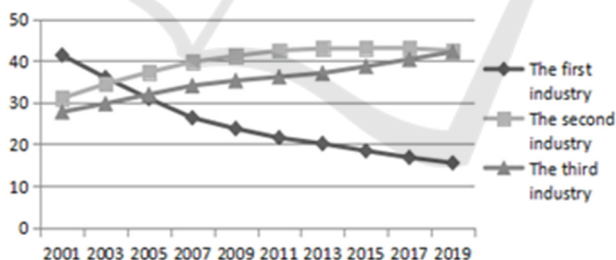

Figure 2: Proportion of Employed Population in Three Industries in Jiangsu from 2001 to 2019 (%).
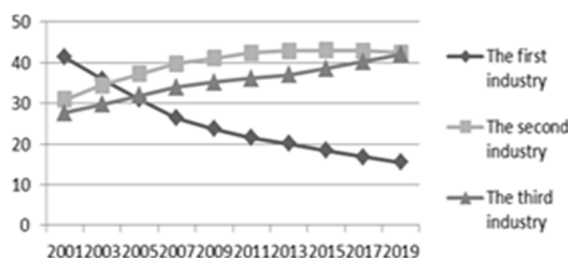

Figure 3: Proportion of Employed population in three Industries in Jiangsu Province from 2001 to 2019 (%).

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with the laws of Clark, namely along with the development of the economy, raising the level of national income, labor force transfer from primary industry to secondary industry, the first but with the further development of economy, labor force transferring to the tertiary industry.

3.1.4 Deviation Degree Analysis of Industrial Structure

When analyzing the industrial structure of a region, the coordination degree among industries and the effective utilization degree of resources should also be considered. It is a measure of the coupling degree of input structure and output structure. In terms of this coupling, researchers generally use the degree of structural deviation to measure the rationalization of industrial structure. Its computation formula is:

$$E = \sum_{i=1}^{n} | \frac{Y_i}{Y} * \frac{L}{L_i} | \qquad (1)$$

Where E represents the degree of structural deviation, "Y" represents output value, L represents employment, "i" represents the industry i, and N represents the number of industrial sectors, $\frac{Y_i}{Y} * \frac{L}{L_i}$ is the deviation degree of the industrial structure of the industry i. The deviation degree of a certain industry is positive, indicating that the proportion of the output value of the industry is greater than the proportion of the number of employed people. The stronger the ability to absorb labor, the tendency of labor transfer is there;

otherwise, there may be a trend of labor transfer out of the industry. The larger the structure deviation degree E value is, the more the economy deviates from the equilibrium state and the more unreasonable the industrial structure is. See the table1below for specific data.

From Table 1, we can see that the deviation degree of industrial structure in Jiangsu Province presents a downward trend, dropping from 1.71 in 2001 to 0.99 in 2019, indicating that the industrial structure of Jiangsu Province is evolving toward rationalization. Specifically, the deviation degrees of the primary industry structure are all negative, and the absolute value is always at a high level, with an average value of -0.72, indicating that the proportion of employed people in the primary industry is far greater than the proportion of output value, and there is a phenomenon of labor surplus, low labor output efficiency, and the labor force needs to be transferred to the secondary and tertiary industries. (Jiangsu Bureau of Statistics, 2020) The deviation degree of the secondary industry structure is positive, and presents a gradually decreasing trend, and finally reaches 0.05. The coordination degree of the industrial structure and the employment structure is continuously improving. The deviation degree of the tertiary industry structure has always been positive, while the deviation degree of the tertiary industry structure has always been positive and generally at a low level. It has been rising steadily since 2007, indicating that with the increase in the proportion of the output value of the tertiary industry, the labor force has been flowing from the primary and secondary industries to the tertiary industry.

Table 1: Deviation degree of industrial structure in Jiangsu from 2001 to 2019.

Year	The first industry	The second industry	The third industry	Degree of structural deviation
2001	-0.72	0.67	0.32	1.71
2003	-0.74	0.58	0.22	1.54
2005	-0.74	0.52	0.11	1.37
2007	-0.73	0.41	0.09	1.23
2009	-0.73	0.32	0.12	1.16
2011	-0.71	0.22	0.17	1.10
2013	-0.71	0.14	0.22	1.07
2015	-0.70	0.09	0.23	1.02
2017	-0.72	0.06	0.23	1.02
2019	-0.72	0.05	0.22	0.99

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3.2 The Development of Digital Economy Among Provinces

Data from the White Paper on The Development of China's Digital Economy (2020) shows that the digital economy in China's provinces has maintained a sustained growth trend in recent years, and provinces with higher levels of economic development have also developed rapidly. As one of the major economic provinces in China, Jiangsu province's digital economy development level is at the forefront of the country in terms of total amount, proportion and growth rate. (Li, 2020)

From 2012 to 2016, in the Beijing-Tianjin-Hebei, Yangtze River Delta and Pearl River Delta economic circles including Jiangsu Province, each province has formed agglomeration effect of scientific research and information technology resources, as well as prosperous tertiary industry and active consumption network, the development level of digital economy ranks in the forefront, higher than the national average. (Li, 2021)

4 THE DEVELOPMENT PATH OF INDUSTRIAL TRANSFORMATION AND UPGRADING IN JIANGSU PROVINCE UNDER DIGITAL ECONOMY

4.1 To Strengthen The Digital Transformation of Traditional Industry

Digital industry focused on using digital technology to upgrade traditional industries, through digital technology and information supply two main forms of the traditional three key sectors such as agriculture, manufacturing, services in the industry to upgrade, among them, from the production mode, management mode and circulation mode transformation agriculture, forming the countryside, it is also a practice of rural revitalization strategy, An important way to achieve targeted poverty alleviation; from the intelligent production, network collaboration, value-added services and other aspects to realize intelligent manufacturing, promote the emergence of "new manufacturing"; comprehensively improve the service level of finance, retail, logistics, education and other industries in terms of service mode and service content, so as to realize the intelligence and

digitalization of agriculture and manufacturing industry and the digitalization and diversification of service industry.

4.2 To Promote The Development of New Formats

In traditional manufacturing, especially in Jiangsu province has certain advantages of machinery, electronics, clothing and other industries on the basis of research and development, production operation, marketing, maintenance, promotion of new technology such as network collaborative design, virtual simulation, through the Internet platform for integrated production and marketing resource, such as the application of "Internet +" supply chain management mode, to promote the system of horizontal integration between enterprises, We will create a new form of manufacturing driven by digital technology.

4.3 Develop Service-Oriented Manufacturing

On the one hand, it establishes the data collection, analysis and manufacturing execution system, records the relevant data of intelligent products and users throughout the whole process, scientifically controls the entire supply chain and production line, and establishes the data resource catalog, opens the relevant data resources in an orderly manner, so as to improve the labor productivity of all staff and the CNC rate of equipment of key enterprises. On the other hand, C2B new business model is applied to deepen the application of digital technology in value-added services such as quality diagnosis and remote fault maintenance, and promote the transformation of manufacturing enterprises to full life cycle management, providing system solutions and information value-added services.

4.4 Develop Smart Services

With network platform development support services, with new technology and data as a driving force, on the basis of credit system, promoting new finance, retail, logistics, digital and wisdom, and wisdom to areas such as education reform, and orderly development of financial service of science and technology, so as to promote the rapid development of digital economy and industry integration, the third industry, because of the huge kinetic energy release. Fully integrating the existing subsystems of various departments, such as digital

urban management, urban planning, medical and health care, transportation and water conservancy, government services, public services and other information subsystems, can realize the multi-direction communication of information equipment, information resources and information systems across departments, and build a smart city of "intelligence, information and network".

4.5 Increase The Digital Talent Support

We will make overall plans for the development of digital industries, predict the demand for industrial talents, and accelerate the cultivation of digital talents in key industries and fields. We will establish a sound vocational education system and strengthen digital economy vocational training to meet the needs of talents. Establish regional digital economy excellent talent pool, build digital talent exchange information platform, open up excellent talent return information channel; encourage enterprises and the government to fund the exclusion of some digital economy high-tech talents to study abroad. Increase research funding for digital talents, cultivate "mass entrepreneurship and innovation" talents of digital economy, and promote the continuous growth of outstanding talents from all sides.

5 CONCLUSION

Through sorting out and analyzing the present situation of industrial structure and digital development of Jiangsu province, the following conclusions are drawn :(1) in terms of industrial structure, the industrial layout of Jiangsu province has gradually changed from the "second, third and first" structure to the "third," "second and first" structure, and the tertiary industry has gradually become the main industry; (2) in terms of employment structure, with the development of economy, the employment population of the primary industry in Jiangsu province gradually transfers to the secondary and tertiary industries, which conforms to the Clark law; (3) the deviation degree of industrial structure in Jiangsu province shows a downward trend, and the industrial structure is rationalizing. However, the primary industry still has surplus labor force, labor output efficiency is low. Therefore, under the background of the rapid development of digital economy, we can promote the upgrading of industrial structure and production type in Jiangsu province by means of Internet and digital technology, so as to

realize sustained, healthy and rapid economic development.

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