

Research on the Effect of Digital Economy on the Optimization of the Tertiary Industry

-- Taking the Yangtze River Delta as an Example

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Abstract

In view of the research on the impact of digital economy on the optimization of the tertiary industry, this paper takes the Yangtze River Delta as an example, starting from the current situation and existing problems in the integration and development of digital economy and the tertiary industry in the Yangtze River Delta, and analyzes the process of the impact of digital economy on the optimization of the tertiary industry from three perspectives: information matching, demand matching and future matching. The following conclusions are drawn: the combination of the tertiary industry with digital economy will change the traditional form of production function; Digital economy can accelerate the internal circulation of the tertiary industry economy and reduce information asymmetry; Digital economy has knowledge spillover effect, which can promote the development of the tertiary industry with higher quality.

Keywords

Digital Economy; Service Sector; Tertiary Industry; Yangtze River Delta; Influence Effect.

1. Introduction

As a new economic form in the current era, digital economy relies on the powerful Internet, cloud computing, blockchain and other emerging and developed information technologies as its premise, and processes a large amount of data to achieve rapid resource allocation and even regeneration, so as to achieve high-quality economic development. In addition to the above-mentioned provision of digital goods and services, digital economy can also promote the further improvement of human and machine productivity, improve the added value of products, and provide new vitality and new goals for the transformation of traditional industrial society.

The characteristics of digital economy are reflected in the duality of its identity: it can be regarded as a factor of production and put into production, or directly put into the market as a product to seek profits [1]. As a new factor of production, digital economy has great advantages over traditional factors of production such as land and technology in timeliness and accuracy. Timeliness can help producers master the market trend at the first time and speculate on the future development trend, so as to help producers better allocate their limited production resources to maximize profits. Accuracy is reflected in the degree of data matching in the digital economy. For example, it can accurately match buyers and sellers, which can make the product circulation more smooth, reduce the time cost and search cost of upstream and downstream enterprises' transactions, find buyers and sellers with only a small amount of cost, and quickly recover funds to invest in the reproduction link, which reflects the ability of the digital economy to promote the flow of production factors.

At the same time, the digital economy relies on various high-tech information technologies, and the data itself is the target data screened out from a large number of tedious data according to

certain purposes and standards. The process itself is also a mode of production, so the output data is also a high-value product [2]. This product can make China's limited resources meet the needs of the huge population to the greatest extent when the population dividend is decreasing year by year. The tertiary industry is also known as the service industry. In the fourth quarter of 2021, the tertiary industry, which accounts for 53.3% of GDP, will show an increasingly strong development trend and become a key aspect of promoting national economic growth. For the tertiary industry, the country initially paid attention to the development of weight, but today in the new era, it pays more attention to the improvement of quality. Especially in the context of the epidemic, the tertiary industry has begun to develop in line with the national policy, with the domestic big cycle as the main body and the domestic and international double cycle as the overall strategy. In terms of specific development degree, the development degree of service industry in the northern and eastern coastal areas of China is significantly higher than that in other regions, followed by the Yangtze River basin and the Yellow River basin, showing regional differences.

However, there are still many problems in terms of the actual development of the tertiary industry in the Yangtze River Delta. For example, the industry lacks a reasonable division of labor due to the separation. The Yangtze River Delta region includes 16 cities in Shanghai, Jiangsu and Zhejiang provinces. Due to the division of administrative management, it is difficult to coordinate between regions. In particular, the emergence of the COVID-19 has a great impact on the development of the tertiary industry in the Yangtze River Delta region, superimposed cyclical economic fluctuations, and posed downward pressure on economic growth.

2. Literature Review

Domestic scholars have conducted extensive research on the impact of digital economy on the tertiary industry. Liu Guowu et al. (2022) adopted the fixed effect model to draw the conclusion that digital economy can significantly promote economic development, accelerate the dynamic economic cycle while changing the traditional mode of production, knowledge spillover effect and other paths to promote the high-quality improvement of the service industry [3]. Wang Shuaijun et al. (2022) used the generalized least squares method (comprehensive FGLS) to make empirical estimates, and found that when the digital economy helps the spatial pattern of the tertiary industry cluster, the government should also increase efforts to improve the "digital divide" among regions, so as to narrow the regional differences in the service industry cluster benefits under the digital economy [4].

In terms of the actual application and impact effect of digital economy in the Yangtze River Delta, Xu Mengzhou (2022) analyzed the relevant influencing factors of the connection between the Yangtze River Delta urban agglomeration and digital economy by using social network analysis and QAP methods, and found that the regional connection of the Yangtze River Delta cities is relatively close, but the overall network structure is not stable, and the pattern of "one super city and many strong cities" appears [5]. Based on the urban fixed effect model and spatial model, Hu Honda et al. (2022) found that the digital economy has a spatial effect on the optimization of the industrial structure in the Yangtze River Delta, the spatial spillover effect is relatively weak, and the direct effect on the region is significantly positive [6].

In terms of the research on the impact of the tertiary industry cluster in the Yangtze River Delta, Lin Qiuping (2022) found that different types of producer services cluster can promote economic development, but the impact is different, and the impact is spillover [7]. Zhang Yijun (2022) proposed through the static panel model that the effect of the overall modern service industry agglomeration in the Yangtze River Delta on economic growth presents an "inverted U-shaped" effect, and its dynamic panel model also verifies the above conclusions [8].

3. The Current Situation and Problems in the Integration of Digital Economy and the Tertiary Industry in the Yangtze River Delta

At present, the application of digital economy in the Yangtze River Delta is the broadest and deepest compared with other regions in China. In terms of infrastructure construction, in the past year, the Yangtze River Delta has achieved simultaneous progress in unblocking the "big arteries" and dredging the "capillaries". For example, Shenwei Taihu Light Computer was successfully installed in Wuxi, the research and development team in Shanghai developed a nine chapter quantum computer, and the most dense high-speed railway network in China was formed again. All these reflect that the Yangtze River Delta region has accumulated a lot of theoretical knowledge and practical experience in digital construction research and development. With the construction of the digital Yangtze River Delta in full swing, the cities in the Yangtze River Delta are also increasingly connected.

In terms of industrial scale and benefit level, as the penetration rate of fixed phones, mobile phones and broadband in the Yangtze River Delta Economic Circle is the highest in all major economic circles, the digital economy has been highly popularized in the Yangtze River Delta, especially in urban agglomerations. It has now covered the three major industries, playing a role in promoting the rationalization and upgrading of urban industrial structure, and promoting the development of industries in different cities in the direction of agglomeration. This will bring huge benefits such as the reduction of transaction costs within the industry and the accumulation of capital and technology. When the digital economy industry continues to expand, a large number of technologies and talents required will stimulate the second rapid development of relevant education and technology industries, thus bringing the second dividend. However, compared with the external urban agglomeration, it is easy to generate siphon effect and absorb a large amount of external urban resources, which will have negative effects on the development of surrounding cities.

From the perspective of the current situation and dynamic development level of the digital economy in the Yangtze River Delta, from 2000 to 2020, the digital economy in the Yangtze River Delta has developed rapidly, the penetration rate of fixed phones, mobile phones and broadband has continued to increase, and high-tech development zones are gradually established and developing, which shows that the comprehensive competitiveness of the digital economy in the Yangtze River Delta is becoming stronger and stronger, The scores of input effect factors and output effect factors of the digital economy have also increased to varying degrees, which shows that the development of talents, scientific research and innovation, industrial scale and efficiency in the digital economy of the Yangtze River Delta has stimulated the interaction between industries, promoted the potential of economic growth, and made the development of the digital economy burst into vitality.

In recent years, the scale of the tertiary industry in the Yangtze River Delta has been increasing, and its proportion in the industrial structure has also been rising. The tertiary industry, like other emerging industries, is necessarily evolving from traditional industries, so there is no modern information without industrialization. However, many industrial industries in the Yangtze River Delta have been connected with artificial intelligence and other technologies, and their strong productivity provides a strong material foundation for the construction of service industries in the Yangtze River Delta. At the same time, the Yangtze River Delta has a high degree of informatization. The penetration rate of the three major information tools, fixed telephone, mobile phone and Internet broadband, is more than 10% higher than that of the Pearl River Delta and Beijing Tianjin Hebei region. Therefore, the high-level information construction in the Yangtze River Delta is the embodiment of the advanced level of the tertiary industry.

Taking the tourism industry of Jiangsu and Zhejiang in the Yangtze River Delta from 2000 to 2020 as an example, in addition to the overall outbreak of the global COVID-19 in 2020, which led to the decline of the tourism industry, the number of tourists and income in Zhejiang and Jiangsu increased steadily on the whole from 2000 to 2019, and the tourism industry developed upward. According to the fixed asset investment data of the tertiary industry in Zhejiang and Jiangsu from the National Bureau of Statistics, the fixed asset investment in the tertiary industry has been increasing from 2000 to 2020, which shows that the increasing fixed asset investment in the service industry and the improved construction level of fixed assets in the service industry have provided support and guarantee for the development of the service industry. It can be seen that the development level of the overall service industry in the Yangtze River Delta has been continuously enhanced, and the internal optimization and upgrading process of the industry has been accelerated; The scale effect of the service industry has been rising, which shows that the scale of the employed population and industrial benefits in the Yangtze River Delta service industry has grown rapidly, driving the transformation and upgrading of the internal industrial structure and the employment population structure of the service industry.

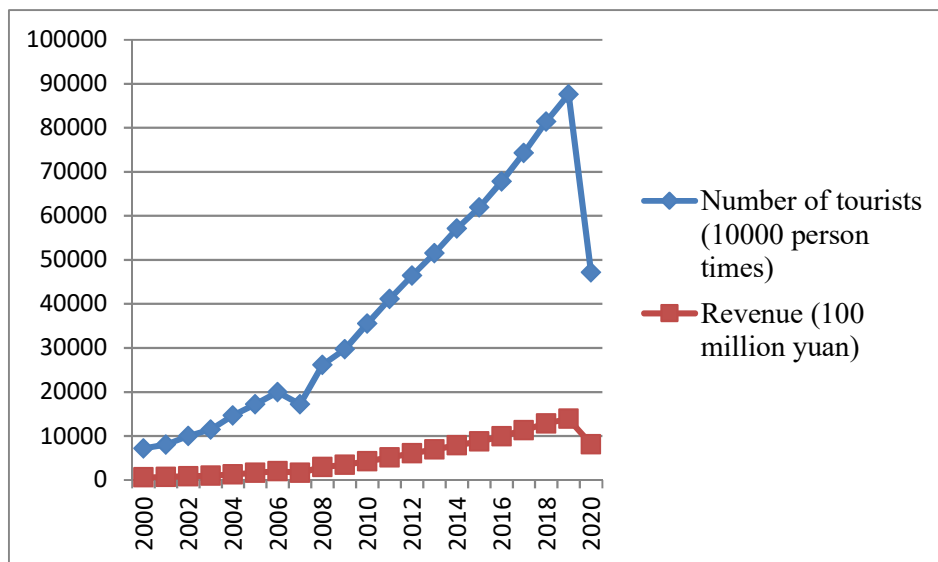


Figure 1. Tourism Development in Zhejiang Province from 2000 to 2020

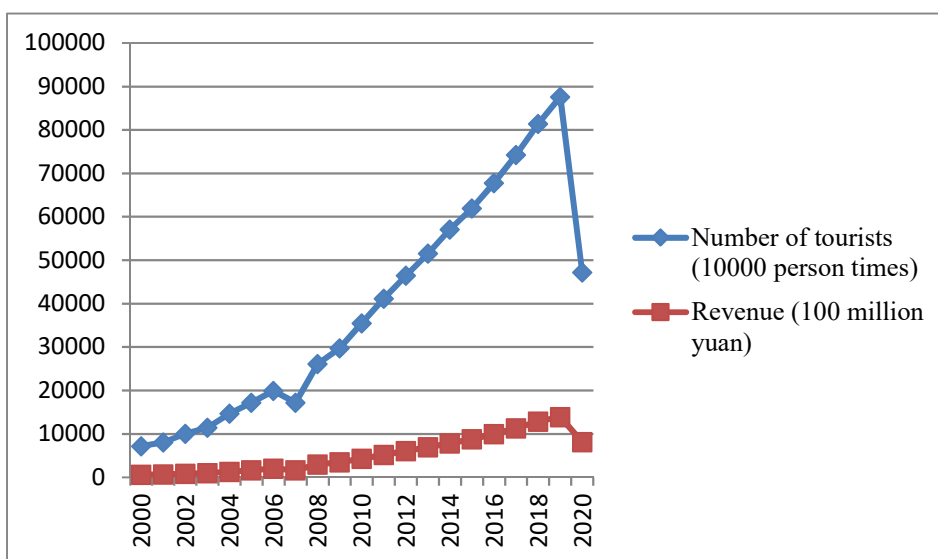


Figure 2. Tourism Development in Jiangsu Province from 2000 to 2020

The contradiction that the total amount of the tertiary industry is insufficient still exists. In the 1990s, the development of the tertiary industry in the Yangtze Delta was significantly accelerated, and the proportion of GDP was almost increasing year by year. However, when compared with the western developed countries, it can be seen that the service industry in the tertiary industry in the Yangtze River Delta accounts for less than 35% of all employees, which is far from the developed countries, and even lower than the level of developing countries such as Mexico and India. At the same time, traditional service industries account for a large proportion, and the development level of emerging service industries is generally low. In particular, the difference between the information service industry and developed countries is even greater. The development of industries such as finance and insurance, information services, scientific and technological research and development, education and training, to a large extent, reflects the level and level of the development of the tertiary industry. The relative lag of these industries constitutes obstacles to the optimization of resource allocation, the improvement of human capital quality, the improvement of technical level and the degree of social organization in the Yangtze River Delta.

As far as the Yangtze River Delta is concerned, different regions are under different administrations. At the same time, the spatial structure of the tertiary industry is not clustered due to regional space constraints. Therefore, the links between the tertiary industries in various cities still have room for improvement. In the comparison of industrial development in various cities, it is found that the quality of labor force and wage level in various cities are also very different, which further leads to a large "gap" between the tertiary industry in various regions.

4. Research on the Impact of Digital Economy on the Development of the Tertiary Industry in the Yangtze River Delta

From the perspective of information utilization, the integration of the tertiary industry and the digital economy can be divided into the following points. The first is information matching. Under the catalysis of the digital economy, the supply and demand sides can obtain accurate and comprehensive supply and demand information more efficiently. The second is demand matching. The supplier uses the Internet of Things, perceptual technology and other technologies to quickly respond to specific needs, so as to meet the personalized and differentiated market demand at the end of the demand curve. The last is future matching. Businesses related to the tertiary industry can use the Internet big data statistical analysis to predict the direction of development prospects.

Based on the above analysis and relevant literature summary, we can specifically analyze the specific impact of digital economy on the development of the tertiary industry from the following points.

First, the combination of the tertiary industry with the digital economy will change the form of the traditional production function. Because of the factors of data production and the influence of the network, the law of diminishing marginal productivity and increasing marginal cost will be invalid; That is, when the inputs of other production factors are the same, and the inputs of data production factors increase, the marginal output will not decrease, but may increase. At the same time, when the total value of the network increases, the marginal cost will also decrease. In the digital society, the production cost of enterprises is a high fixed and low marginal process; Therefore, in order to reduce the long-term average cost, enterprises often achieve economies of scale by expanding production scale. Therefore, data input is likely to promote the efficiency of the tertiary industry and enable the transformation of the traditional tertiary industry.

Second, digital economy can accelerate the internal circulation of the tertiary industry economy and reduce information asymmetry. Enterprise operation experiences three links: purchase,

production and sales. The three links may be in different time and space. The non pointedness will lengthen the industrial economic cycle time and increase the information gap between each link. The emergence of the digital economy will greatly reduce the flow cost between purchase, production and sales, consuming time. The convenience of the network and the wide spread of information can also greatly reduce the problem of information asymmetry. Therefore, the emergence of digital economy can improve the synergy between various links and other non data elements, thus improving the allocation efficiency of the tertiary industry.

Finally, the digital economy has a knowledge spillover effect, which can promote the higher quality development of the tertiary industry. According to the definition of digital economy, its development itself has the function of dissemination and diffusion, which has a positive effect on breaking the barriers of knowledge dissemination, increasing the spatial distance of diffusion, and stabilizing the social network system in the region. In this way, knowledge will first be spread and disseminated in some research and development departments, such as universities and research institutions, and then spill over to affect all aspects of the tertiary industry, comprehensively promoting the development of the industry in the direction of modernization and informatization.

5. Strategies for Upgrading and Transforming the Tertiary Industry in the Yangtze River Delta under the Promotion of Digital Economy

On the whole, the tertiary industry is an important symbol to measure the level of social modernization. At present, China's tertiary industry is the most active field of digital innovation. With the development of digital technology and the integration of digital economy industry and the tertiary industry, new models and new formats are constantly generated, which increase the content of service technology and enrich the content of service industry. Secondly, through the online and offline integration process, the supply side of the service industry can respond quickly to market demand, so that the service can truly meet customer needs and achieve the upgrading of the tertiary industry.

5.1. Strengthen Talent Training

The key measure to realize the upgrading and transformation of the tertiary industry is to attach importance to the training and construction of the tertiary industry talent team, so that they can have technical sensitivity and master certain relevant digital technologies. In this way, enterprises can keep pace with the times, keep up with the trend of the times under big data analysis, see through the effective information contained in the information market, meet customers' various requirements at a lower cost, and earn more profits for the company as much as possible. Nowadays, the tertiary industry in western developed countries has gradually transformed into a new type. We can also learn from foreign practical development experience in professional knowledge and management.

5.2. Increase Government Support

Under the influence of the digital economy, the relationship between cities in the Yangtze River Delta is getting closer and closer. In the cloud world, the transaction scope of the tertiary industry is getting wider and wider, and the transaction mode is getting simpler and simpler. However, due to the limitation of regional differences, the huge differences in regional development levels still more or less affect the exchanges and cooperation between cities or coordination and win-win results. If the government can give greater support to the development of the tertiary industry, more and more business models will be excavated under the influence of the digital economy. On the other hand, the competition among enterprises will turn from online to offline integration, and some non-standard vicious competition in the market will also appear in the network war. This requires the government to strengthen

innovation in the new mode of competition law enforcement, regulate the new form of online competition, and make the tertiary industry develop towards a more efficient and high-quality direction.

5.3. Use Digital Economy to Enhance Brand Competitiveness

In the modern tertiary industry, improving one's own hard power is the key to cultivating brand culture, but it is also particularly important to cultivate the soft power of brand culture. The root of the service industry is to serve people and provide customers with high-quality and satisfactory services. Brand culture is the external label of service. With the help of the digital economy, if we can use cloud computing and other designs to present the competitive advantage of the industry, and use big data to promote brand marketing, we can provide technical support for brand building.

Looking forward to the future, a deeper integration of various information technologies and industrial development will be a major trend, and the digital economy will enable the tertiary industry in the Yangtze River Delta to create more value. With the development of a new generation of information revolution, some traditional industries in the tertiary industry will return to the historical stage with a new attitude and be innovative in technology; Some emerging industries will continue to break through themselves and achieve upgrading and transformation. In the context of digital economy, the Yangtze River Delta region can also be more closely linked and cooperated, presenting a more complex information network, and promoting the overall optimization of the tertiary industry in the region.

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References

- [1] Liu Junwei. The Predicament and Development of China's Labor Value Theory in the Digital Economy Era [J]. Economic Research Guide, 2022,(22):7-9.
- [2] Gong Wenlong. Research on the coupling mechanism of data elements enabling other production factors in the digital economy era [J]. Business Economics Research, 2022,(06):185-188.
- [3] Liu Guowu, Li Junhua, Tang Chang'an. Digital economy, efficiency improvement of service industry and high-quality development of China's economy [J/OL]. Southern Economy, 2022. DOI: 10.19592/j.cnki.scje.400225.
- [4] Wang Shuanjun, Gao Yuelin, Wang Miaomiao. Research on Spatial Pattern and Influencing Factors of China's Digital Economy Development [J]. Journal of Hefei University of Technology (Social Science Edition), 2022,36 (03): 19-27.
- [5] Xu Mengzhou, Zhu Yongzhu, Yang Dapeng. Spatial Correlation and Collaborative Governance of Digital Economy Development: Taking the Yangtze River Delta Urban Agglomeration as an Example [J]. Governance Research, 2022,38 (05): 102-112+128.
- [6] Hu Honda, Shen Xiaodong. Research on the impact of digital economy on the optimization and upgrading of industrial structure -- taking the Yangtze River Delta as an example [J]. Journal of Dalian University, 2022,43(03): 87-95+105.
- [7] Lin Qiuping. The Impact of Productive Services Cluster on Regional Economic Growth -- Taking the Yangtze River Delta as an Example [J]. Qinghai Finance, 2022 (03): 11-17.
- [8] Zhang Yijun. Research on the Impact of Modern Service Industry Cluster in the Yangtze River Delta on Economic Growth [D]. Anhui University of Finance and Economics, 2022.