

Research on the impact of digital trade development on the optimization and upgrading of industrial structure in Guangdong Province

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Abstract: As an emerging industrial model in the digital economy era, digital trade can significantly drive the upgrading of industrial structure. This paper aims to empirically test the impact of digital trade on industrial structure upgrading in Guangdong Province and provide corresponding development strategies for digital trade. From the existing research literature, most scholars believe that digital trade has a positive impact on the upgrading of industrial structure in our country. However, most studies focus on the comparison between provinces and regions in China, and rarely pay attention to the changes within the province, so this is the innovation of this paper.

Keywords: Digital Trade, Industrial Structure Upgrading, Guangdong province

1. Introduction

After more than 40 years of reform and opening up, China's economy has achieved a leap-forward development, and has experienced a slow transition from extensive and barbaric development to a mode based on knowledge and technology as production factors. Nowadays, with the popularization of the new generation of information technology and the depth of digital technology, China's digital trade has developed rapidly. As a new factor of production, data has been valued by the country^[1].

China's economy is now in a pivotal stage of transitioning to high-quality growth. The labor and resource-intensive industries, which previously leveraged labor advantages, are no longer sufficient for current development demands, necessitating an optimized industrial structure. It is a general trend to use technology as a power source to inject traditional industries, integrate and transform traditional industries, and develop knowledge-intensive and technology-intensive industries. Digital trade changes the way of trade and realizes the digital transformation of traditional trade methods and trade objects, which can improve trade efficiency, reduce costs, broaden the scope of trade content and services, and play a positive role in the efficient transformation and upgrading of industries. Based on the above background, What is the status of digital trade development and industrial structure optimization in Guangdong Province? Does the development of digital trade have an impact on the industrial structure? How big is the effect? And through what path to achieve?

2. Literature Review

Both domestic and foreign scholars have conducted extensive studies focusing on policy, business environment, and international trade perspectives regarding optimizing and upgrading industrial structures. This paper analyzes various economic factors' potential influence over changes in an industry's composition. As digital trade emerges as a new trading mode, it will inevitably exert certain influences over how industries evolve. Therefore, the relationship between them has gradually attracted more academic attention.

2.1 Influencing factors of industrial structure upgrading

With the increase of economic aggregate and the improvement of development level, the upgrading of industrial structure is an inevitable economic process, and it is also an insurmountable stage and an unavoidable problem to achieve high-quality economic development. The change of industrial production structure has inspired a large number of scholars from various countries to study. Foreign scholars have made significant research contributions to the factors influencing the upgrading of industrial structure. Trevor (2006) concluded through empirical analysis that tangible capital and educational investment may have as big an impact on production patterns as industrial policies in specific sectors, emphasizing the importance of considering general equilibrium effects when understanding or formulating policies for industrial structure change. Facundo et al. (2011) studied the impact of a country's trade protection policy on industrial structure, finding that tariff

determines enterprise activities in a small open economy with heterogeneous enterprises, and the benefits of trade liberalization are related to vertical heterogeneity and transportation cost. Kurt (2020) analyzed economic aggregate value across 19 Asian countries from 1991 to 2016, highlighting the positive effect of industrial diversification on economic development. Domestic scholars have also conducted comprehensive research on factors affecting industrial structure upgrading. Fang Hui et al. (2021) analyzed 285 cities in China and found that the Belt and Road Initiative can improve urban industrial structure with varying impacts across regions^[2]. Qin Bo et al. (2020) empirically studied the impact of intellectual property demonstration city construction on industrial structure using panel data from 270 Chinese cities, showing significant improvement through their analysis^[3]. Han Yonghui et al. (2017) quantitatively identified industry-related policies' impact on regional industrial structure improvement using provincial panel data, demonstrating a significant promoting effect from these policies^[4]. Gao Changchun et al. (2021), based on panel data from 260 prefecture-level cities in China, analyzed e-commerce demonstration city construction's impact on regional industrial structures using difference-in-difference methods; they found it has a significant promoting effect with heterogeneity among different cities^[5].

2.2 The relationship between digital trade and industrial structure upgrading

Digital trade has a significant positive impact on economic prosperity. Based on the measurement of digital trade, Yang Huiying et al. (2022) empirical analysis reveals that digital trade development significantly fosters industrial structure optimization and upgrading, with varied effects across regions. In addition, they analyzed the transmission impact of digital trade development on industrial structure optimization through the intermediary effect model. It proves that digital trade can indirectly promote industrial structure by influencing technological progress, digital resource endowments, international trade and logistics^[6]. Fang Haowei et al. (2021) studied the relationship between China's digital trade development, industrial structure and high-quality economic development, and found that digital trade can promote the level of digital industrialization and industrial digitalization to promote the optimization and upgrading of regional industrial structure, and then promote high-quality economic development^[7]. Li Baomin et al. (2020) analyzed the relationship between digital trade and the upgrading of industrial structure based on the VAR model. The empirical results show that digital trade can promote the upgrading of industrial structure to a certain extent, and with the development of digital trade, the proportion of China's primary industry and secondary industry will gradually tilt to the tertiary industry, and the digitalization of industrial structure will continue to deepen^[8]. Yao Zhanqi (2021) used a structural equation model to show that digital trade development acts as a mediator for various factors—such as informatization level, government R&D spending, labor productivity, and trade volumes—to enhance industrial structure optimization and upgrading. Additionally, digital trade significantly boosts industrial upgrading through human capital and R&D intensity.

3. Theoretical analysis

3.1 The impact of digital trade on the optimization and upgrading of industrial structure

Digital trade, underpinned by digital technology, profoundly influences industrial structure upgrading, primarily through industrial digitalization. This is evident in the growing integration of emerging IT technologies like blockchain, 5G, big data, cloud computing, and the Internet of Things across various sectors. And digital trade has also changed the organizational form of the industry, enabling the transformation and upgrading of traditional industries. The improvement of the development level of digital trade has made digital technology and digital services widely applied in traditional industrial sectors, optimized the links of research and development, production, transportation and so on^[9], accelerated the reform of the internal organization mode of the industry, and promoted the transformation of traditional industries to high value chain and knowledge-intensive direction. Second, digital industrialization. The addition of data, a key factor of production, to production has promoted the improvement of productivity and the transformation of industrial organization, spawned many new products, new formats and new models, formed a digital industry chain, produced emerging digital industries such as electronic information manufacturing, information communication, and software, and enhanced the level of industrial structure. The digital industry also provides digital services and digital products for traditional industries to help industrial digitalization, and the positive interaction between the two accelerates the process of industrial structure optimization and upgrading.

3.2 The mechanism of digital trade to promote the optimization and upgrading of industrial structure

Digital trade enhances industrial structure optimization and upgrading through two main mechanisms: First, it drives technological advancement, alters production factor allocation, and fosters industrial transformation and upgrading. This progress in digital trade accelerates technological innovation. In terms of human capital, digital trade breaks the restrictions of time and space, popularizes online education relying on the Internet and information and communication technology, strengthens the dissemination of knowledge, and increases the possibility of economic entities benefiting from knowledge^[10]. The development of digital trade has also led to the demand for professional digital talents. The cultivation of relevant talents by universities and research institutes has promoted the improvement of human capital level and provided a good basic condition for technological progress. In terms of research and development investment, digital trade is highly dependent on digital technology, and the development of digital trade needs the support of new technologies, prompting relevant enterprises to increase investment in research and development, thereby promoting technological progress. On the other hand, technology drives industrial upgrading^[11-12]. Technological progress can promote the birth of new industrial sectors^[13], eliminate backward industries with low technology content, and enhance the level of industrial structure. The spillover of technological progress can also improve the allocation efficiency of production factors, strengthen the links between industries, enhance technology content, and promote the rationalization and upgrading of industrial structure^[14]. Second, digital trade enhances factor mobility, alters resource endowments, and thus improves production factor allocation efficiency, fostering coordinated industry development and industrial structure change. On the one hand, digital trade improves factor market efficiency and facilitates the flow of production factors. The development of digital trade increases market information, reduces the asymmetric degree of factor market information, enhances the interaction between market entities^[15], and improves the flow efficiency of production factors. The development of digital trade has also lowered the threshold of trade, and many small and micro economies have participated in economic trade, speeding up the flow of goods and production factors^[16]. On the other hand, as pointed out by Bai Junhong et al. (2017), factor flow, as a kind of spatial optimization, changes the resource endowment of various regions, promotes the integration of regional resources, promotes the redistribution of production factors, improves the allocational efficiency of production factors, and thus causes the change of industrial structure^[17].

4. Conclusion and discussion

Although Guangdong Province is a big economic province in China, there are still some problems such as unbalanced regional economic development, uneven regional industrial structure level and low efficiency of production factors allocation, which hinder the high-quality development of Guangdong Province's economy. The digital economy's mechanism for industrial structure optimization and upgrading involves advancing technology and facilitating factor mobility, which enhances factor allocation efficiency and drives industrial transformation and upgrading. The development of digital trade can strengthen the marginal utility of technological innovation and factor flow.

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