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Research on the influence and countermeasures of digital trade on the enhancement of China's industrial chain in the context of "One Belt and One Road"

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Abstract: *The development of digital technology has brought great opportunities for our country's foreign trade innovation, and digital trade has become an important starting point for the upgrading of global value chain. This paper is mainly divided into the following four parts: First, it expounds the development status of digital trade and China's global value chain under the background of "The Belt and Road"; Secondly, the theoretical mechanism of digital trade to China's global value chain upgrading is reviewed. Next, it points out the existing problems of digital trade in the upgrading process of China's global value chain. Finally; According to the existing problems, the corresponding countermeasures and suggestions are put forward.*

Keywords: *Digital trade; Global value chains; Countermeasures and suggestions*

1. Introduction

In recent years, with the wide application of digital technology and information technology, the digital economy has become an important engine to promote the transformation and upgrading of China's economy. According to the "China Digital Economy Development Research Report (2024)" released by the China Academy of Information and Communications Technology, the digital economy has become the core engine driving China's economic growth. In 2023, the scale of China's digital economy will exceed 53.9 trillion yuan, accounting for 42.8% of GDP and contributing 66.45% to GDP. With the continuous development of a new generation of information technology, digital trade has a profound impact on all aspects of the national economy, and has increasingly become a new driving force for China to expand domestic demand, improve quality and efficiency. The report to the 20th National Congress of the Communist Party of China clearly stated that we should promote the optimization and upgrading of trade, innovate the development mechanism of service trade, develop digital trade, and accelerate the building of a strong trade country. The rapid development of digital technology in our country has accelerated the digitization process in all fields of economic activities. At the same time, technological and business model innovations have profoundly changed the way traded goods and services reach markets. Whether it is the Internet, big data, blockchain, cloud computing and artificial intelligence, they all help to improve trade efficiency and reduce trade costs, thus creating more trade opportunities[1].

In the context of the rapid development of China's digital trade, the wave of digital trade development is bound to promote the upgrading of China's industrial chain and value chain. With the proposal of the "Belt and Road" Initiative, the trade between China and the neighboring countries along the routes is becoming more and more frequent, and digital trade plays an important role in it[2]. Therefore, it is of great theoretical and practical significance for China's economy to explore the impact of the development of digital trade on the upgrading of China's global value chain in the context of the "Belt and Road Initiative" [3].

2. Digital trade and development status of China's global value chain

2.1 Our country digital trade development status

2.1.1 Scale of digital trade

In recent years, the scale of China's digital trade has shown a steady increase. In terms of total

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volume, the cross-border e-commerce transaction volume in 2023 will be 2.38 trillion yuan, accounting for 18.6% of foreign trade, and the global proportion is 38%; In 2023, the import and export value of digital service trade will be 372.7 billion US dollars, an annual increase of 14.2%; Cloud computing services exports $6.4 billion. Companies such as Alibaba Cloud and TikTok promoted rapid growth in cloud computing and digital content exports, but high-end digital services (such as industrial software) remained dependent on imports, with a trade deficit of $47 billion. From the perspective of regional distribution, the Yangtze River Delta contributes 53% of the national digital trade volume, while the central and western regions account for less than 12%, showing a significant imbalance.

2.1.2 Digital multinational enterprises

In recent years, China's digital multinational enterprises have developed rapidly, and have become an important force to promote digital trade and the upgrading of global value chains. From the perspective of enterprise types, it mainly includes four categories: Internet platform enterprises (such as Alibaba, Tencent, ByteDance), digital solution providers (such as Huawei, ZTE), cross-border e-commerce enterprises (such as SHEIN, Temu), and digital content enterprises (such as Miha You, iQiyi), which have made remarkable achievements in the global market. Alibaba International Digital Business Group covers more than 200 countries and regions, and overseas e-commerce GMV will reach $68 billion in 2023. TikTok's global monthly active users exceeded 1.5 billion; Huawei has built 20 5G innovation centers overseas, and overseas revenue will account for 36% in 2023. SHEIN generates $32 billion in revenue through flexible supply chains; Miha Tour "Original God" overseas revenue accounted for more than 70%. However, compared with the international leading enterprises, China's digital multinational enterprises still have a significant gap[4]. According to the data of the Fortune Global 500, the average overseas revenue of China's 19 listed digital enterprises in 2023 will only account for 15%. Although China's digital multinational enterprises occupy a certain share in the global market, compared with the developed countries, there is still a certain gap in the influence of Chinese enterprises in the global market, technology reserves and innovation capabilities.

2.1.3 The level of emerging digital technology

China has made remarkable progress in the research and development and application of emerging digital technologies, especially in cutting-edge technologies such as artificial intelligence, big data, cloud computing and blockchain. From the perspective of technological development status, China has strong competitiveness in the frontier fields of artificial intelligence, blockchain, quantum computing, etc. WIPO data shows that in 2023, China's artificial intelligence patent applications account for 37% of the world, the number of blockchain application scenarios ranks first in the world, and nine chapters of quantum computers achieve "quantum computing superiority." Taking enterprises as an example, Huawei Shengteng AI chip performance has reached 80% of the international leading level, Baidu Feizhu deep learning platform serves more than 5 million developers around the world, and Ant chain has achieved large-scale application in cross-border trade, supply chain finance and other fields. The rapid development of these technologies provides a strong support for digital trade. However, although China has made great progress in technology application, there are still shortcomings in core technology and original innovation, especially in key fields such as high-end chips and operating systems[5].

2.1.4 Digital trade service system

The construction of China's digital trade service system has made remarkable progress, and the coordinated development of all key links is taking shape. In the field of payment and settlement, third-party payment platforms represented by Alipay and wechat Pay have completed their business layout in more than 200 countries and regions around the world, and the cross-border payment scale has exceeded 1.2 trillion US dollars in 2023. The cross-border RMB payment system (CIPS) covers 180 countries, with an average daily transaction volume of 300 billion yuan. In terms of logistics services, SF Express, Jingdong Logistics and other enterprises have increased the time of cross-border e-commerce logistics to 3-5 days through technological innovation such as intelligent sorting and drone delivery, and the digital operation of China-Europe Express has reduced cross-border transportation costs by 23%. The digital renminbi pilot program was expanded to 26 regions, and the cross-border financial blockchain service platform raised more than $400 billion in total, benefiting more than 100,000 foreign trade enterprises. However, the shortcomings of the service system are still obvious, and relevant policies and service systems need to be further improved [6].

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2.2 Development status of China's global value chain

Global Value Chain (GVC) is a new model of international division of labor, with the important characteristics of product production processes being split into multiple countries for processing. GVC is an international division of labor system targeting processes and production links, which has gradually become the trend of world economic development. At present, the global value chain (GVC) is undergoing profound changes driven by digitalization, and China's position in the global value chain shows the typical characteristics of "scale leading but level waiting to rise". On the one hand, from the perspective of participation, China has deeply integrated into the global value chain system, the World Bank data shows that in 2023, China's manufacturing value added accounted for 31% of the world, ranking first in the world for 13 consecutive years, and the GVC participation index in the fields of electronics, machinery, textiles and other fields reached 0.68, significantly higher than the global average level. On the other hand, from the perspective of the value chain position, China is still mainly concentrated in the processing, manufacturing and assembly links. According to the calculation of the United Nations Industrial Development Organization, China's GVC status index is only 0.17, which is significantly lower than that of other developed countries, especially in the proportion of high value-added links such as research and development, design and brand services is less than 20%, showing a "big but not strong" situation[7].

3. Theoretical mechanism analysis of digital trade on China's global value chain

3.1 Direct effects of digital trade on GVC upgrading

3.1.1 Trade cost saving effect

The most direct impact of digital trade on GVC upgrading is to reduce trade costs. When a country participates in the GVC division of labor, the different processes of product production are split into multiple countries, and there are multiple cross-border intermediates. From the import of intermediate goods to the export to downstream enterprises to reach the hands of consumers, each stage of production in the process will gradually accumulate trade costs. During this period, digital trade has simplified customs clearance processes and procedures by using "single window" systems, paperless trade, electronic payment, electronic signature and authentication, and reduced the import price of intermediate products at each production link. With the play of the chain effect of the supply chain, the price of industrial manufactured goods will eventually be greatly reduced and the added value of export trade will increase, thus offsetting the "cascade effect" of trade costs in the production process. In addition, the simplification of trade rules and the improvement of trade transparency have reduced legal and regulatory costs, played a key role in the stability and smooth flow of transnational industrial chains and supply chains, and lowered the threshold for developing countries to integrate into the GVC division of labor system, thereby eliminating trade barriers. On the one hand, digital trade expands the geographic space and market scope of GVC activities; On the other hand, it provides an important opportunity for a country's GVC to transition to higher value-added links, as it promotes GVC upgrading[3].

3.1.2 Innovation-driven promotion effect

The development of digital trade can break the limitations of time and space, drive the effective dissemination and integration of knowledge and information, increase enterprise innovation, and promote enterprises to absorb frontier technology spillovers more quickly, so as to promote the generation, diffusion and transformation of new technologies in the process of knowledge sharing and multiplication, and ultimately improve the level of technological innovation. Digital trade has enhanced the industrial sector's attention to digital, intelligent and other production methods. The penetration and integration of digital technologies such as blockchain, big data and cloud computing with the manufacturing industry has promoted the realization of unmanned production and remote control, and digital technologies have been innovated and upgraded in more extensive and in-depth applications. In addition, the non-competition of knowledge enables the international importers of high-quality intermediates to "learn by acquiring knowledge" and to achieve technological iteration by learning and imitating the advanced technology and experience of other countries. The improvement of technological level can enhance the export competitiveness of a country's intermediate products, thus promoting the upgrading of GVC[3].

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3.1.3 Optimize the effect of resource allocation

On the one hand, digital trade promotes capital, labor and other production factors to break through the inter-regional market barriers caused by geographical distance to a certain extent, and achieve more effective flow. The stronger the liquidity of capital, the more conducive to the flow of capital into innovative industries. The reasonable flow of labor resources can increase the adaptation rate of labor force at all levels and industrial structure in the region. On the other hand, digital trade can optimize the allocation of technological factors, promote the development of technological industrialization through leading technological breakthroughs, and promote the industrial structure from traditional labor-intensive industries to technology-intensive industries. In addition, factor flow can also improve the industrial structure by promoting industrial agglomeration, which has the effect of technological progress and will drive the upgrading of GVC[6].

3.2 Indirect effects of digital trade on GVC upgrading

3.2.1 Technology spillover effect

Digital trade can drive GVC upgrades by facilitating technology spillovers. Digital trade can not only eliminate trade barriers between countries, but also reduce the trade cost of intermediate goods production, so that countries that are unable to enter the international market due to high trade costs can obtain intermediate goods, thus expanding the range of types of intermediate inputs used in downstream links. Intermediate trade, as an important "glue" in GVC, can bring technology spillover to importing countries as a carrier of knowledge. Intermediate inputs have high value-added attributes, and importing countries can obtain high-end production factors by importing intermediate inputs through cross-border trade, which on the one hand makes up for the supply of domestic factors, and on the other hand improves production efficiency by forming complementary effects with domestic intermediate products. At the same time, due to the spillover of knowledge, countries with intermediate inputs can continue to learn, and expand their position in the GVC division of labor by imitating and learning from other countries' advanced technology and experience. Therefore, digital trade promotes GVC upgrading through technology spillover effect[8].

3.2.2 Market competition effect

Digital trade will promote the upgrading of GVC through market competition effect. Digital trade can reduce trade costs and lower the international market access threshold, enabling many developing countries with weak comparative advantages to enter the international market and participate in the GVC division of labor, driving many new downstream enterprises in production-related industries to flood into the international market, stimulating market competition and reducing the market share of various countries[9]. First of all, in order to compete for market share, downstream enterprises will take the initiative to increase research and development investment and improve innovation ability to improve the quality of export products, so as to enhance the competitiveness of products themselves, obtain more added value in the GVC division of labor, seek higher status and participate in a wider range of GVC activities to achieve GVC upgrade; Secondly, the fierce international market competition environment has also eliminated some small-scale downstream enterprises with backward production capacity and weak innovation ability, creating a group of enterprises with high productivity and high technology level, benefiting the GVC upgrade of the entire industry; Finally, upstream monopolies will put pressure on downstream enterprises by increasing marginal production costs and reducing the types and quality of intermediate products. Digital trade greatly increases the types of similar or similar intermediate products, providing more choices for downstream enterprises. The strengthening of competition weakens the inhibition effect of upstream enterprises and enables downstream enterprises to upgrade GVC[4].

4. The problems of digital trade in the process of upgrading China's global value chain

4.1 Imperfect digital infrastructure

Digital infrastructure is the cornerstone of the development of digital trade. However, there are still shortcomings in the construction of digital infrastructure in our country. First of all, the digital infrastructure construction of some countries along the "Belt and Road" lags behind, and the network coverage and transmission speed are low, which seriously affects the coordinated development of regional digital economy. For example, some remote areas have poor network conditions and slow data

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transmission, resulting in restrictions on cross-border data flows and real-time transactions. Second, although China has made certain progress in the construction of new infrastructure such as 5G and the Internet of Things, it still needs to be further optimized and expanded. Especially in terms of regional digital connectivity, the efficiency of existing digital channels is not high, which restricts the facilitation of digital trade. Therefore, it is urgent to strengthen the construction of digital infrastructure, improve network coverage and transmission speed, and promote regional digital connectivity[10].

4.2 Shortage of digital technology personnel

With the rapid development of digital trade, the demand for complex digital trade talents is increasing rapidly. However, there are obvious weaknesses in the training of digital talents. First of all, the curriculum of colleges and universities lags behind, and the lack of digital trade-related majors and courses leads to a disconnect between talent training and market demand. Secondly, in the process of digital transformation, employees' digital skills training is insufficient, which is difficult to meet the needs of business development. In addition, the high-end digital talent introduction mechanism is not perfect, insufficient international competitiveness, it is difficult to attract and retain the world's top talent. This talent shortage not only restricts the digital transformation of enterprises, but also affects our country's competitiveness in global digital trade. Therefore, strengthening the training of digital trade talents, adjusting college curriculum Settings, increasing digital trade-related courses, cultivating complex talents, improving talent introduction policy and attracting high-end digital talents around the world are the key to improving our country's digital trade competitiveness[11].

4.3 Data security risks

Digital trade involves a large number of cross-border data flows, and data security risks are becoming increasingly prominent. First of all, cross-border data flows have security risks and are vulnerable to cyber attacks and data leaks, which not only threaten the business secrets of enterprises, but also may affect national security. Secondly, the personal privacy protection mechanism is not sound, and the abuse of user data occurs from time to time, leading to the decline of public trust in digital trade. In addition, the data security legal and regulatory system has yet to be improved, and the supervision is insufficient, which is difficult to effectively respond to the increasingly complex data security challenges. Therefore, improving the data security protection system, accelerating data security legislation, clarifying cross-border data flow rules, protecting personal privacy and national security, promoting the establishment of a global data security governance framework, and strengthening international cooperation are necessary measures to ensure the healthy development of digital trade [12].

4.4 Imperfect digital trade rules

The rapid development of digital trade has put forward new requirements for global trade rules, but the current system of digital trade rules is not perfect. First of all, different countries have different policies on data localization and digital taxation, which increases the compliance cost of enterprises and affects the facilitation of digital trade. For example, some countries require data to be stored locally, which increases operational costs and technical difficulties for businesses. Secondly, global digital governance rules are not unified and international cooperation mechanisms are not sound, which makes it difficult to effectively resolve disputes in digital trade[13].In addition, compliance costs for businesses are high, affecting the efficiency and competitiveness of digital trade. Therefore, actively participating in the formulation of digital trade rules, using multilateral cooperation platforms such as the "Belt and Road" to promote the construction of an open and inclusive digital trade rules system, while actively speaking out in international organizations such as the WTO and safeguarding the interests of developing countries in digital trade are important ways to enhance China's voice in global digital trade.

5. Countermeasures and Suggestions

5.1 Strengthening digital infrastructure

In order to enhance the facilitation and efficiency of digital trade, digital infrastructure must be strengthened. First, we should increase investment in digital infrastructure in countries along the Belt and Road, improve network coverage and transmission speed, and ensure the coordinated development

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of regional digital economy. For example, through international cooperation projects, countries along the route can be helped to build high-speed networks and data processing centers. Second, improve the construction of new domestic infrastructure such as 5G and the Internet of Things, optimize the network layout, and ensure the efficient operation of digital trade. Especially in remote areas, network coverage should be increased to improve data transmission speed. Finally, promote regional digital connectivity, establish efficient and secure digital channels, and facilitate cross-border data flow and real-time transactions. Through these measures, we can effectively improve the level of digital infrastructure and provide strong support for the development of digital trade.

5.2 Strengthen the training of digital trade personnel

The rapid development of digital trade puts forward higher requirements for talents, so it is necessary to strengthen the training of digital trade talents. First of all, colleges and universities should adjust their professional Settings, increase courses related to digital trade, and cultivate interdisciplinary talents. For example, professional courses such as digital trade and cross-border e-commerce can be set up to enhance students' practical operation ability. Second, enterprises should strengthen the training of employees' digital skills and improve their digital transformation capabilities. Through internal training, external cooperation and other means, employees can improve their digital skills and business level. In addition, the government should improve the talent introduction policy to attract high-end digital talents from around the world and enhance international competitiveness. For example, it can provide favorable treatment and good working environment to attract overseas high-end talents to return to China for development. Through these measures, we can effectively alleviate the shortage of digital talents and enhance the competitiveness of digital trade of our country [14].

5.3 Improve the data security protection system

Data security is the key to the development of digital trade, so the data security protection system must be improved. First, data security legislation should be accelerated to clarify rules on cross-border data flow to protect personal privacy and national security. For example, special data security laws could be developed to regulate the collection, storage and use of data. Second, strengthen the protection of personal privacy and establish a sound data security supervision mechanism. The abuse of user data can be prevented through technical means and laws and regulations. Finally, promote the establishment of a global data security governance framework, strengthen international cooperation, and jointly address data security challenges. For example, it can participate in the formulation of international data security standards and promote the standardization of global data security governance. Through these measures, the level of data security can be effectively improved to ensure the healthy development of digital trade.

5.4 Actively participate in the formulation of digital trade rules

In order to enhance China's voice in global digital trade, we must actively participate in the formulation of digital trade rules. First, multilateral cooperation platforms such as the Belt and Road Initiative should be used to promote the establishment of an open and inclusive system of digital trade rules. For example, differences in national policies on data localization, digital taxation, etc. can be harmonized through bilateral or multilateral agreements. Secondly, we should actively speak out in the WTO and other international organizations to safeguard the interests of developing countries in digital trade. We can promote the fairness and rationalization of global digital trade rules through proposals and negotiations. Finally, strengthen policy coordination with other countries, reduce compliance costs for enterprises, and promote digital trade facilitation. For example, the harmonization and implementation of digital trade rules can be promoted through international cooperation projects. Through these measures, we can effectively enhance China's voice and influence in global digital trade.

6. Conclusion

This paper expounds the development status of digital trade and China's global value chain under the background of "One Belt, One Road"; To sort out and analyze the theoretical mechanism of digital trade to upgrade China's global value chain; At the same time, it points out the existing problems of digital trade in the upgrading process of China's global value chain. Finally, according to the existing problems, the corresponding countermeasures and suggestions are put forward, which can effectively

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solve the problems in the development of digital trade, promote the upgrading of China's global value chain, and enhance China's status and competitiveness in the global economy.

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