

Research on the impact of enterprise digital transformation on the enhancement of export competitiveness

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Abstract: In recent years, China's foreign trade has made remarkable achievements, but at the same time, Chinese enterprises face increasingly fierce international competition. In the past, most domestic enterprises relied on low-cost strategies to participate in price competition, which resulted in a long lack of core technologies of Chinese enterprises and the lack of R & d and innovation ability, which also made a large gap between the quality of export products of Chinese enterprises and developed countries. Therefore, how to improve the quality of China's export and thus enhance its export competitiveness has become an urgent problem to be solved. The rapid development of digital technology makes enterprises face an unprecedented situation. Digital technology has the advantages that other traditional factors of production do not have, and can promote the transformation and upgrading of traditional industries, promote the innovative development of enterprises, and stimulate the development vitality of market entities. However, digital transformation has not achieved all-round popularization and application in most Chinese enterprises. Therefore, digital transformation has become the realistic demand and the requirement of The Times for Chinese manufacturing enterprises to improve the quality of their export products. Therefore, this paper explores the mechanism of how to improve the export competitiveness of enterprises, which is of great significance for enhancing the new power of China's foreign trade, consolidating the development foundation of foreign trade and improving the quality of China's foreign trade.

1. Introduction

With the rapid development of technologies such as artificial intelligence, big data, and cloud computing, digital technology has had a profound impact on people's work and life. The rapid changes in the digital society and the innovation and application of digital technology have brought unprecedented challenges to the development of enterprises. The rapid development of digital technology has promoted the widespread application of information technology worldwide, accelerated the pace of economic restructuring and upgrading in various countries around the world, and also brought tremendous changes to traditional industries. Digital transformation has become an important trend in the current development of China's economy.

2. Mechanism analysis of enterprise digital transformation affecting export competitiveness

2.1 Improvement effect of production efficiency

After the completion of the digital transformation, the manufacturing efficiency of their products will be further improved, thus enhancing their export competitiveness. As the digital economy develops, inefficient companies will be eliminated, while those with higher productivity levels and higher marginal output will gain greater market operations. It can be seen that the application of digital technology can effectively improve the production efficiency of the manufacturing industry, and further enhance the export competitiveness of enterprises. With the rapid development of technologies such as artificial intelligence, big data, and cloud computing, digital technology has had a profound impact on people's work and life. The rapid changes in the digital society and the innovation and application of digital technology have brought unprecedented challenges to the development of enterprises. The rapid development of digital technology has promoted the widespread application of information technology worldwide, accelerated the pace of economic restructuring and upgrading in various countries around the world, and also brought tremendous changes to traditional industries. Digital transformation has become an important trend in the current development of China's economy.

In recent years, China's achievements in foreign trade have been remarkable. In 2022, China's trade in goods overcame multiple unexpected factors, with its total import and export volume exceeding RMB 40 trillion for the first time. Despite its high base in 2021, it still maintained stable growth and reached a new historical height in scale. China has quietly become the "main force" driving global economic development. But at the same time, the problem of China's manufacturing industry being large but not strong has become increasingly prominent. On the one hand, China's labor advantage is gradually disappearing, and labor costs are increasing year by year. Many manufacturing industries are shifting to lower cost countries such as Vietnam. On the other hand, the COVID-19 has swept the world, the trend of anti-globalization has emerged, and European and American countries have imposed a scientific and technological blockade on China, making the competitive environment for Chinese enterprises in the international market increasingly grim. In the past, most domestic enterprises relied on the "low cost" strategy to participate in price competition, resulting in a long-term lack of core technology and insufficient R&D and innovation capabilities for Chinese enterprises. This also led to a significant gap in the quality of export products between Chinese enterprises and developed countries. The manufacturing industry is the lifeblood of high-quality development, therefore, how to improve the quality of China's export products and enhance export competitiveness has become an urgent problem to be solved.

As the world's largest export trading country, China has established good trade relations with multiple countries, thus playing a crucial role in the world economy. However, China's current export trade still relies on low cost rather than high quality as its competitive advantage, which cannot fully meet the needs of the international market. Therefore, using digital transformation to improve enterprise innovation capabilities and achieve the transformation from "Made in China" to "Made in China" is crucial for enhancing China's export competitiveness.

2.2 Cost-reduction effect

On the one hand, visionary modern business bosses employ professional managers to manage the company for them, which leads to the generation of internal agency costs; the gradual application of digital technology in distribution and enterprise regulation. On the other hand, digitization can adjust the cost of communication between enterprises and the market by coordinating the information. From the perspective of the interaction between the producers and the customers, the

digital platform can provide the consumers with more information about the producers, reduce their search costs, and thus improve the search efficiency[1]. From the perspective of the interaction between enterprises and upstream enterprises, digital technology enables enterprises to communicate more effectively with upstream enterprises, have a more thorough understanding of them, and conduct more efficient communication with them, so as to reduce the negotiation cost and bargaining cost of enterprises, that is, the external transaction cost of enterprises. Compared with traditional production factors, digital technology has efficient information transmission and broad information coverage capabilities. Relying on information technology to optimize, innovate, and recreate enterprise organizational structure, production and operation models, core competitiveness, etc. can promote the transformation and upgrading of traditional industries, promote the innovative development of manufacturing enterprises, and stimulate the vitality of market entities. However, digital transformation has not achieved comprehensive popularization and application in most Chinese enterprises. Therefore, with the gradual decline of competitive advantage in China's manufacturing industry, digital transformation has become a practical demand and era requirement for Chinese manufacturing enterprises to improve the quality of exported products. Therefore, this article attempts to explore the mechanism of how digital transformation of enterprises can improve export competitiveness, which has important practical significance for enhancing the new driving force of China's foreign trade, consolidating the development foundation of foreign trade, and enhancing the competitiveness of China's foreign trade.

2.3 Improvement effect of supply chain concentration degree

The development of digital technology allows companies to provide consumers with more competitive products. First of all, through digital transformation, enterprises can establish a more streamlined and more efficient supply chain integration system, realize the optimal allocation of resources, and then promote the improvement of enterprise business performance. In the process of cooperation with suppliers and customers, through the mutual trust and cooperation relationship established with multiple supply chain members, we can select and stabilize loyal customers and promote the business development of the enterprise. Second, use the digital transformation to enable suppliers, producers and sellers to play different roles in the supply chain, turning the entire supply chain into a supply network, thus promoting efficiency improvement. Domestic and foreign scholars have conducted many studies on the digital transformation and export competitiveness of enterprises, mainly focusing on the following aspects.

In research on digital transformation of enterprises, Huub Meijers (2014) [1] pointed out that in a fully specified growth model, the use of the Internet cannot directly explain economic growth. The use of the Internet has had an impact on trade, which in turn has an impact on economic growth. Leonard Heilig, Eduardo Lalla Ruiz, and Stefan Voß (2017) [3] proposed a conceptual game theory framework that allows for the consideration of benefits and cost allocation from inter organizational, intra organizational, and meta organizational perspectives, and further demonstrates how this framework can be used to develop tools and methods to support strategic decision-making, promote digital transformation of seaports, and solve new economic problems and challenges. Antonopoulou Katerina et al. (2023) conducted a qualitative and in-depth case study on a higher education institution in the UK, empirically exploring the combination of digital technology and organizational level changes during the pandemic, and demonstrating that extreme uncertainty can promote digital transformation. Vuchkovski Davor et al. (2023) explored the challenge of transitioning teams from traditional environments to virtual environments under unique conditions in response to the global pandemic lockdown and the survival needs of enterprises, and proposed seven different digital dynamic capabilities for teams undergoing digital transformation. Zeng

Jingyan and Zeng Guohua (2023) explored the impact and mechanism of digital transformation of manufacturing enterprises on innovation. Research has found that digitization can significantly promote the R&D investment and patent output of manufacturing enterprises. Mechanism analysis shows that digital transformation promotes enterprise innovation through two channels: alleviating financing constraints and increasing government subsidies. Zhuo Min and Cai Ziyue (2023) analyzed the impact and mechanism of digital transformation of Chinese A-share listed companies from 2010 to 2020 on their financial reporting quality. The results show that the implementation of digital transformation in enterprises has significantly improved the quality of financial reporting. Digital transformation can improve the quality of financial reporting by alleviating information asymmetry and enhancing the effectiveness of internal control. In declining enterprises, state-owned enterprises, and large enterprises, digital transformation plays a more significant role in promoting the quality of financial information. The innovation of this article lies in the expansion and extension of the influencing factors of enterprise export competitiveness based on the traditional research on export competitiveness, in response to the new trends and characteristics of digital transformation. This article regards digital transformation as an important factor affecting export competitiveness, and studies the impact of digital transformation on enterprises' export competitiveness, thus enriching the perspective of China's export competitiveness research.

3. Measurement of the status quo of China's export competitiveness

This paper uses the export technology complexity of the enterprise to measure the export competitiveness. This is because the improvement of export technology complexity can promote the improvement of the export structure and its position in the global value chain, that is, the increase of export competitiveness. The specific calculation process is described as follows.

First step, calculate the technical complexity of the product j:

$$PTC_j = \sum_m \frac{(x_{mj}/X_m)}{\sum_m (x_{mj}/X_m)} \times gdp_m \quad (1)$$

Among them, the technical complexity of product j, the export value of product j in country m, the total export value of all products in country m, and the per capita GDP of country m.

The second step is to quality adjust the technical complexity of the product:

$$Q_{mj} = P_{mj} / \sum_n (\alpha_{nj} \times P_{nj}) \quad (2)$$

$$PTC_j^{adj} = (Q_{mj})^\mu \times PTC_j \quad (3)$$

Among them, formula (2) is the product quality measured by the unit price of export products. Q_{mj} represents the export quality of product j in country m, the export price of product j in country m, and the proportion of the export value of product j in country m in its total exports in the international market. $P_{mj} / \sum_n (\alpha_{nj} \times P_{nj})$ Represents the relative price of product j, the higher the relative price, the higher the quality of the product. Formula (3) is the technical complexity of the product after quality adjustment, expressed by it.

The third step is to sum the adjusted product technology complexity, which can obtain the export technology complexity of the enterprise:

$$ETC_j^{adj} = \sum_l \left(\frac{x_{lj}}{X_l} \right) \times PTC_j^{adj} \quad (4)$$

Among them, the export value of the product j in the enterprise l, and the export

value of the enterprise l , is the final calculated export technology complexity of the enterprise, that is, the export competitiveness of the enterprise. In the regression model, the pairs were log-treated. ETC_j^{adj}

4. Policy recommendations

4.1 Strengthen the role of digital trade in improving productivity

4.1.1 Optimize the business processes

Enterprises need to analyze and evaluate existing business processes, identify bottlenecks and problems, optimize and improve through digital technology, reduce duplication of work and human intervention, and take the initiative to use various digital technologies to fully integrate various resources for production. In addition, enterprises should also use digital technology to innovate business models, develop new products and services, expand market space and business models, and improve the efficiency and quality of business processes.

4.1.2 Establish a data management system

Enterprises need to establish a complete set of data management system, from data collection, analysis, application to protection, to ensure the security and reliability of data.

4.1.3 Pay attention to the cultivation of digital talents

In the process of digital transformation, foreign trade enterprises need talents with digital operation thinking to ensure the effective implementation of digital operation management. Foreign trade enterprises should expand the sources of digital talents, formulate appropriate talent introduction strategies, actively cooperate with colleges and universities, gradually establish specialized bases for foreign trade digital research and training, and strengthen the training of relevant talents. In addition, enterprises also need to attract, train and retain digital talents through training, recruitment and other ways, ensure the successful implementation of digital transformation, and establish an open, innovative and collaborative digital culture within the enterprise, encourage employees to participate in digital transformation, and promote the in-depth implementation of digital transformation.

4.2 Use of digital transformation to achieve cost reduction and efficiency increase

The application of digital technology can automate enterprise processes, thus reducing human and time costs. For example, the use of robot automated production lines, automatic collection and analysis of data, automatic financial approval, etc., can reduce the workload and error rate of employees.

Data analysis using digital technology. Digital technology can help enterprises collect, analyze and utilize data more efficiently to better understand market demand, optimize supply chain, and improve product quality and services. These data analysis results will help companies better manage costs, improve efficiency, and optimize business processes. Cloud computing can also provide enterprises with better security and reliability, and can freely adjust resources according to data traffic and requirements.

We will promote the integration of traditional industries and e-commerce. With the disappearance of the competitive advantage of the traditional foreign trade development mode, the digital transformation of foreign trade enterprises has ushered in a new opportunity. Promoting the

integration of traditional industries and e-commerce is of great significance for promoting the digital transformation of foreign trade. Enterprises use e-commerce platforms for sales and procurement, and directly communicate with customers through e-commerce platforms, and do not need to spend a lot of time and human resources to develop and maintain physical stores, which can reduce marketing and transaction costs.

4.3 Promote the construction of smart supply chains

Through the coordination of logistics, capital flow and information flow, foreign trade enterprises can achieve the goal of digital transformation. With the increasingly extensive application of Internet technology and information technology in international trade, cross-border e-commerce has gradually become an important trend of trade development, promoting the digital transformation process of foreign trade enterprises. At present, the foreign trade industry is in urgent need of further improving the digital ecosystem and establishing financing channels for digital related businesses to promote the acceleration of the digital transformation of foreign trade enterprises.

At present, the vast majority of enterprise supply chain planners still rely on spreadsheets and other tools for data summary and analysis, which puts forward higher requirements for the statistical analysis ability of employees. These work requires a large number of human and material resources to support, and the efficiency is low, so to a certain extent, hindered the development of supply chain management business to information. The wide application of digital technology brings unprecedented convenience and efficiency to the prediction and demand perception modeling of supply chain, thus further improving the accuracy and response speed of supply chain.

5. Conclusion

His article analyzes the impact of digital transformation on the improvement of export competitiveness, but due to the complex theoretical knowledge and limited academic level, this study is not yet in-depth and thorough. In addition, although corresponding countermeasures and suggestions have been proposed in this article, there are often complex situations that affect the whole body when implementing them, so adjustments need to be made during the specific implementation.

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