Digital Transformation of Cross-Border Logistics: A New Model of International Trade

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Abstract: With the rapid development of global economic integration and information technology, cross-border e-commerce, as an emerging model of international trade, has brought profound impact and change to traditional industries, and has become an important engine to promote the digital transformation and upgrading of traditional industries. The traditional international freight forwarding supply chain process is short and simple, while the cross-border e-commerce logistics supply chain business process is long and complex. Therefore, in the process of transformation from traditional freight forwarders to cross-border e-commerce logistics, there are insufficient supply chain integration ability, lack of reverse logistics support, imbalance of cross-border logistics network, fragmentation of data information system and other problems that need to be overcome. Based on the background of cross-border e-commerce, this paper makes an in-depth analysis of the status quo and urgency of the transformation of logistics marketing strategies, summarizes and analyzes the driving forces of digital transformation, and explores feasible ways of transformation based on case analysis.

1 INTRODUCTION

Logistics, which was used only as a military term for many years, has become an indispensable component of today's business processes. Every business that produces goods and services prefers to deliver these goods and services to its customers in the most optimal way. In fact, in today's business world, where the number of businesses operating on a global scale is increasing day by day, making supply chains and especially logistics support processes efficient is a key element in gaining competitive advantage. For this reason, logistics has become an area that needs to be worked on meticulously (Başer, 2024).

Cross-border e-commerce conducts transactions via Internet platforms. Consumers order, enterprises pack and ship to logistics, and payment is confirmed after the buyer checks the goods. The logistics link is vital; otherwise, transactions may be interrupted. The international logistics system is complex. Firstly, its digitalization and industry concentration are low, with independent logistics enterprises and unopened systems, causing issues like low investment, long delivery, and frequent losses for cross-border e-commerce. Secondly, there are numerous logistics providers with varying service levels, mostly using extensive traditional methods, which make tracking hard, increase loss risks, and prevent real-time monitoring of goods. This leads to delivery delays and other problems, and as cross-border platforms rank enterprises based on these indicators, frequent issues will affect the ranking.

In the digital age, emerging technologies like big data, IoT, and intelligent tech drive enterprise transformation, especially benefiting cross-border e-commerce. China's cross-border e-commerce has a low entry threshold and high profits, attracting many players. But traditional foreign trade enterprises lacking relevant experience struggle to transform, mainly due to a shortage of digital talents. This talent scarcity is the root cause of the industry's fragmented state, making transitions hard. Small, scattered cross-border e-commerce firms have limited strength, less appealing to digital talents compared to large domestic e-commerce giants.

Cross-border e-commerce enterprises with small scales lack sufficient funds and have limited risk resistance. Focused on cost-cutting for higher profits

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during operation, they often overlook digital technology. Considering it time-consuming, labor-intensive, and too costly, they underinvest in it due to insufficient knowledge. As a result, business leaders pay little attention, allocating minimal resources, leaving these enterprises at a disadvantage in the competitive market.1.2 Global supply chain fragmentation. Based on this background, this paper analyzes the driving force and mechanism of digital transformation of cross-border logistics.

2 CROSS-BORDER LOGISTICS DIGITAL TRANSFORMATION DRIVING FORCE

2.1 The Status of Cross-Border Logistics

In international trade, cross-border logistics shoulders the crucial task of transporting goods from the seller's country or region to the buyers. It serves as a pivotal link in facilitating the transfer of commodity ownership. Without efficient and dependable cross - border logistics, the delivery of goods in international trade would be unfeasible, and transactions between buyers and sellers could not be concluded.

At the same time, cross-border logistics is a vital component of the global supply chain, playing an indispensable role in maintaining its stable operation. This highlights its significance in ensuring supply chain stability.

2.2 Technological Progress

In transport and logistics, key transformation tools are electronic document systems, digital goods tracing, smart-contract payment systems, information exchange platforms, and digital transport corridors (Nikolaeva et al., 2020). The improvement of logistics efficiency has enabled the transportation of some goods that are not suitable for long-distance transportation. Meanwhile, the development of logistics technology has further reduced costs and promoted the development of cross-border e-commerce.

First of all, efforts should be focused on the research and application of cutting-edge technologies such as big data, cloud computing, the Internet of Things, and artificial intelligence to build a smart logistics ecosystem. Cross-border e-commerce platforms can accurately predict market demand through big data analysis, optimize the supply chain, and reduce inventory overstock and operating costs. Logistics companies can thereby achieve intelligent scheduling, route optimization and real-time tracking, improving delivery efficiency and customer satisfaction. Cloud computing provides strong support for the processing of massive data, enhancing the stability, efficiency and scalability of the logistics information platform. Secondly, the introduction of blockchain technology has brought revolutionary changes to the transparency and security of the logistics industry chain. By establishing an unalterable distributed ledger, it can ensure the authenticity and credibility of data throughout the entire chain of goods from production, transportation to delivery, effectively solving the trust issue in cross-border e-commerce, reducing fraud risks and improving transaction efficiency. Through the establishment of an industry-university-research cooperation platform, the government, enterprises, universities, scientific research institutions and other forces are gathered to jointly carry out key technology research, standard formulation, talent training and other work, forming a good situation of complementary advantages and collaborative innovation, and providing a steady stream of intellectual support and technical reserves for the deep integration and development of the logistics industry chain and cross-border e-commerce(Guo, 2024).To boost logistics performance with current tech, managers should: integrate info systems, make proper ICT-related decisions for logistics planning, automate processes, develop omni - channel logistics, enhance communication with clients and suppliers, and gain quality management skills via training. (Moldabekova et al., 2021).

2.3 Policy Support

Developing and implementing basic concepts for a cross-border transport and logistics cluster can create conditions to boost service volume and quality and gain a competitive edge. (Liashenko and Trushkina, 2021).

The RCEP agreement lowers trade barriers, both tariff and non-tariff, among member countries. This means that cross-border e-commerce companies can enjoy lower import tariffs and lower costs when participating in the markets of RCEP member countries. This will undoubtedly promote the development of cross-border e-commerce scale in the region and the growth of China's cross-border e-commerce import and export. By simplifying and standardizing trade procedures and customs clearance procedures, RCEP improves the flow efficiency of

goods and services, and has a positive impact on the logistics and distribution process of cross-border e-commerce. The region covered by RCEP has a large population and economic volume, and cross-border e-commerce enterprises can more easily enter these markets through the RCEP framework and expand their customer base; RCEP encourages cooperation and innovation among member states in the field of digital economy, promotes technology exchange and digital transformation, which means that cross-border e-commerce enterprises can obtain more technical support and digital solutions, and further improve their operational efficiency and user experience; The market integration and resource complementarity of RCEP member states bring broader competition and cooperation opportunities for enterprises in cross-border e-commerce, and enterprises can optimize resource allocation and market layout through more effective partnership and supply chain management. In general, these regulations will provide better norms and guarantees for digital trade among RCEP member states and help promote the development of the digital economy and enhance economic cooperation among member states (Zhou and Vagrancy, 2024).

2.4 Market Demand

From the perspective of market demand, with the rapid development of cross-border e-commerce, consumers have an increasing demand for fast, accurate and traceable logistics services. Traditional logistics models are often difficult to meet the requirements of timeliness and information transparency of cross-border e-commerce, so consumers' demand for high-quality products, the increase in global Internet usage, the progress of cross-border logistics technology and the improvement of global supply chain capabilities have brought opportunities for the rapid growth of cross-border e-commerce.

3 CASES ANALYSIS

Organizations that regularly generate new ideas and secure resources succeed in the market by creating, developing, and launching new products, services, and technologies (Parfenov et al., 2021).

3.1 CMA CGM's Digital Innovation in the Maritime Sector

As a prominent global shipping and logistics brand, CMA CGM encounters multiple operational hurdles during its business expansion. Among them are the inefficiencies stemming from conventional logistics practices, the substantial expenses associated with maintaining fleet effectiveness, and the arduous task of monitoring cargo across extensive shipping networks. To tackle these problems, CMA CGM initiated a strategic digital transformation endeavor, aiming to optimize its global operations and elevate customer service quality.

The digital transformation of CMA CGM centers on incorporating cutting-edge technologies to simplify operations and boost logistics efficiency. Key initiatives involve upgrading the automation system and the customer relationship management system. By utilizing intelligent technologies to automatically handle and track containers, the company has enhanced tracking precision, minimized time lags, and notably increased operational reliability and customer satisfaction. Moreover, the system conducts real-time data analysis for fleet management and operational decision-making, enabling proactive maintenance strategies, optimizing shipping routes, and strengthening logistics planning. As a result, costs are saved, and fleet utilization rates are improved.

Through targeted digital initiatives, CMA CGM has achieved remarkable enhancements in its operations. By deploying automated systems and capitalizing on advanced analytics, the company has streamlined its processes, significantly cut down on operating expenses, and simultaneously enhanced fleet management efficiency. These technological advancements not only optimize internal workflows but also elevate customer satisfaction by delivering more reliable and efficient services.

3.2 JingDong International Cold Chain

Jing Dong relies on the integrated cold chain service capability of the cold chain storage network, cold chain transport network and cold chain distribution network, the establishment of a complete cold chain logistics supply chain, The temperature of the whole chain is controllable, the process is visible, and the source can be traced, which improves the integrated operation and precise control ability of warehousing, transportation and distribution.

JD.COM cooperated with China, Tai Sen to build an automatic three-dimensional cold storage, and invested several intelligent storage devices, such as double stretcher stacker, pallet conveyor, WCS software products with three core modules such as task center and RFID information tag system, to realize the cooperative work and orderly connection

of multiple devices, improve the efficiency of production links and reduce storage costs.

In addition, JD.COM and the International Cold Chain Commodity Exchange Center jointly built a spot trading platform for cold chain commodities and conducted in-depth cooperation in many fields such as cold chain logistics warehouse allocation. We also cooperated with Yuhu Group to jointly build a full-link digital intelligent low-carbon circulation scheme for cold chain ingredients, build a digital low-carbon cold chain smart park, and explore digital intelligent supply chain solutions.

4 A NEW MODEL OF DIGITAL-DRIVEN INTERNATIONAL TRADE

4.1 Digital Logistics Infrastructure Construction

Building denser logistics nodes around the world, including overseas warehouses and sorting centers, to reduce the time and cost of cross-border shipping, especially in high-demand market areas, setting up forward warehouses or distributed inventory systems can significantly improve response speed and customer satisfaction; Increase investment in warehouse facilities, adopt advanced warehouse management systems (WMS) and automation equipment, improve storage density and operational efficiency, use ships, planes, trains and other modes of transport to build a diversified and efficient transport network, especially in sea transport, can order large container ships to expand cargo space, improve transport efficiency and cost effectiveness; As an important gathering place of logistics activities, logistics park's planning, construction and operation management level directly affect logistics efficiency.

4.2 Digital Supply Chain Management

Digital supply chain management is a kind of supply chain management method based on digital technology and data, which makes supply chain management more efficient, transparent and intelligent. During the Fourth Industrial Revolution, digitizing logistics infrastructure is essential with many options, from mobile devices for managers to AI in transportation. In the fifth stage, the future of digitizing logistics infrastructure is a self-adjusting real-virtual cyberspace with AI, which aims to reduce logistics transaction costs and risks through cross-border supply chain integration. (Motahhir and Bossoufi, 2021). At the heart of digital supply chain management is the Internet of Things (iot) technology, which connects sensors with the Internet to enable the automatic exchange of data between items. In the supply chain, iot technology can provide real-time logistics and inventory data, which can help enterprises make more accurate decisions; Using data analysis and forecasting can help enterprises predict the future supply and demand situation, thus helping enterprises to develop more effective supply planning and management strategies (Dildor and Narimonjon,2020).

At the same time, data analysis can also find problems in the supply chain and provide solutions to make the supply chain more efficient and reliable. Blockchain technology can help businesses ensure the security and trustworthiness of data, especially transaction data that occurs in the supply chain. The degree of digitalization significantly influences operational speed and accuracy and offers opportunities to enhance supply chain adaptability and flexibility (Shadibekova and Ismoilov, 2022). Blockchain technology can track the origin and flow of products to comply with transaction regulations and regulatory standards; Ai technology can provide automated planning and scheduling, enable the autonomous operation of supply chains, and improve the efficiency and flexibility of supply chains. In addition, according to a survey of global enterprises conducted by Deloitte, 54% of respondents indicated that digital supply chain management is a key development direction for their companies, and 44% of respondents are adopting digital supply chain management (Ye, 2025).

5 CONCLUSION

This study deeply analyzes the key role of cross-border logistics digital transformation in building a new model of international trade, aiming to provide theoretical support and practical guidance for the transformation and upgrading of related industries. Through continuous exploration and practice. Digital transformation has reshaped the operation process of cross-border logistics. From order processing, warehousing management to transportation and distribution, all links have realized efficient coordination and precise control with the help of digital technology, greatly improving the quality and efficiency of cross-border logistics services and injecting new impetus into the vigorous development of international trade.

Looking forward to the future, data will become the core element of cross-border logistics to reduce costs and increase efficiency. Achieve accurate demand prediction through big data analysis, optimize inventory management, and reduce storage costs; Use the Internet of Things technology to monitor the transportation status in real time, rationally plan routes, and reduce the waste of transportation resources. With the help of artificial intelligence to achieve intelligent decision-making, further enhance the automation and intelligence level of logistics operations. In order to better promote the digitization process of cross-border logistics, on the one hand, enterprises need to pay attention to technical adaptation, choose the appropriate digital technology according to their own business scale, characteristics and development strategy, avoid blindly following the trend, and ensure the deep integration of technology and business. On the other hand, it is essential to strengthen ecological synergy. Cross-border logistics involves customs, freight forwarding, warehousing, transportation and other parties, all parties should establish an open and sharing cooperation mechanism, break information barriers, build a digital ecosystem, optimize the allocation of resources and achieve mutual benefit and win-win results, so as to promote the continuous innovation and development of cross-border logistics in the tide of digitalization, and open up a broader development space for international trade.

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