

An Overview of the Research Literature on the Topic of Supply Chain Management in the Shipping Trade

Kangan Chen^{1,a,*}

¹Department of Transportation, Shanghai Maritime University, Shanghai, China
a. 202110613019@stu.shmtu.edu.cn

*corresponding author

Abstract: In consequence of the relentless advance of globalization and the ascendant position of the digital economy, the great significance of the management of supply chains against the background of international shipping trade is becoming increasingly critical. Optimizing supply chain management technology is now regarded as a necessary step for the development of enterprises. This paper presents a systematic and detailed review of the literature on the integration of shipping trade and supply chain management technology. Meanwhile, this paper examines how supply chain management is influenced by the globalization and digitalization trend, involving risk management and technology application. Additionally, it investigates the contribution of green supply chain management in reducing environmental impact as well as enhancing corporate social image. Through a comprehensive analysis of existing literature, this paper proposes future research directions and feasible solutions, aiming to provide a valuable reference for enterprises and scholars. Finally, this paper combines the current situation of the shipping trade industry with projections about the future, and proffers recommendations for how shipping companies can curtail costs and enhance efficiency, enhance environmental protection and competitiveness.

Keywords: shipping trade, supply chain management, supply chain resilience, green supply chain.

1. Introduction

With the globalization of trade and the ongoing advancement of supply chain management, more focus has been placed on the significance of supply chain management in the shipping trade [1]. Presently, researchers are primarily focused on enhancing the efficiency and cost control of shipping trade by optimizing the management practices associated with the supply chain [2-4]. This involves the improvement of supply chain flexibility, risk management, information technology applications, and other related areas [5,6]. Scholars generally believe that implementing remarkable strategies in the management of supply chain will lead to a reduction in operational costs [7], an improvement in response times and an elevation in the competitive standing of enterprises within the market. In the present era, cutting-edge technologies like big data, blockchain and artificial intelligence have been applied to improving the management of supply chain [8]. Concurrently, the fields of supply chain risk management, resilience, and green supply chains are also receiving increasing attention [9], with a growing body of research. This paper aims to provide an overview of the current research status of

supply chain management in shipping trade and analyze the relevant research results from a theoretical perspective.

2. Summary of current situation

By synthesizing the extant literature and research, it is possible to summarize the prevailing state of the shipping trade industry with respect to supply chain management into follows:

(1) Global development trend: The global development trend is characterized by the continuous expansion of international trade, which has resulted in the emergence of a complex network of shipping trade under supply chain management across numerous countries and regions worldwide. This has resulted in the creation of a multitude of market opportunities and the development of intricate logistics nodes.

(2) Emerging technology applications and digital transformation: The use of information technology is increasing in the domain of supply chain management. Sophisticated technologies such as the Internet of Things, blockchain, machine learning and artificial intelligence are constantly being used in the shipping trade supply chain [8], which also drives the process of digitalization and automation within the industry. Companies are widely adopting software tools and innovative technologies to foster greater transparency and efficiency of shipping trade supply chain.

(3) The influence of the Internet and e-commerce platforms is increasing: the Internet provides an efficient channel for information sharing, which enables better coordination and cooperation between enterprises situated at the outset and those at the conclusion of the supply chain. E-commerce platforms serve as the link between supply chain participants, facilitating uninterrupted information sharing and collaborative work [10]. Suppliers, manufacturers, logistics service providers and customers can communicate and collaborate efficiently through the platform. In addition, the Internet and e-commerce platforms are particularly effective for customer service and market expansion.

(4) Green supply chain expansion: The development of green supply chains is being driven by a number of factors, including the Paris Agreement, the International Maritime Organization (IMO) sulphur cap, and national environmental regulations. These factors are forcing shipping companies to adopt more environmentally friendly measures. At the same time, many countries and regions are offering subsidies and tax incentives to encourage companies to adopt green technologies and practices. Market forces and cost considerations are driving companies towards green supply chains.

3. Research limitation

The lack of sufficient real-time data is a significant limitation in many studies, as they tend to rely on historical data and lack analysis of real-time data, which affects the prediction of dynamic market changes. The quality of the data is also a significant issue. The inconsistencies and inaccuracies in the data sources, which are a consequence of their diversity, restrict the universality of the research conclusions that can be drawn.

A further limitation is the lack of interdisciplinary integration, whereby most studies focus on a single field and lack a comprehensive analysis of economic, environmental, and social factors.

While emerging technologies are increasingly integrated into supply chain management, the utilization of nascent technological paradigms, including blockchain, machine learning and artificial intelligence has not yet received sufficient academic attention.

There has been an insufficient analysis of innovative models in the field of supply chain management. In particular, there has been a dearth of research on the impact of emerging business models and technology integration on the supply chain.

A paucity of risk assessment and management research has been conducted. There is a dearth of systematic research on risks such as geopolitical risks, natural disasters, and market fluctuations.

There is a notable absence of resilience research examining the shipping trade supply chain. There is a dearth of comprehensive analysis of the resilience and robustness in the shipping trade supply chain.

4. Problem analysis

Although supply chain management is becoming increasingly important in today's society and constantly evolving in the field of shipping trade. However, in many documents, the authors clearly point out that there are many deficiencies and problems in current supply chain management, which can be mainly classified as follows:

(1) Cost issues: The issue of cost is a significant challenge in this context. Notwithstanding the efficiency gains brought about by supply chain management, the logistics costs of the shipping industry remain at a relatively high level, a phenomenon that is particularly evident in China's shipping companies. The lack of an advanced supply chain model, the incompleteness of the supply chain system, and the dependence on external sources for essential equipment, instruments, and core technologies have contributed to the elevated logistics costs of China's shipping companies. In addition, the costs of the supply chain are mainly composed of the following: procurement costs, production costs, logistics costs, warehousing costs, risk costs, etc. These costs are often affected by a variety of factors. For example, fluctuations in fuel prices have a direct impact on transportation costs. For example, the sharp drop in international oil prices at the beginning of 2020 has enabled shipping companies to reduce costs significantly in the short term. Another example is the International Maritime Organization's (IMO) 2020 sulfur limit, which requires ships to use low-sulfur fuel or install desulfurization equipment. This regulation has significantly increased fuel and equipment conversion costs. At the same time, globally rising and fluctuating costs such as labor, technology investment and inventory management costs have a significant impact on shipping companies' management costs.

(2) Changes in customers' demands and service level issues: The ongoing advancement of the Internet and the expansion of e-commerce platforms have resulted in a notable diversification of customer requirements. Contemporary consumers exhibit a heightened preference for a wider range of product types, shipping methods, and delivery times, among other factors. There has been a notable increase in consumer demand for expedient delivery. This has resulted in heightened expectations regarding the timeliness of shipping services, compelling logistics providers to optimize routes and enhance shipping speeds. In the context of surging demand, the shipping industry encounters challenges in ensuring that its service levels align with customer expectations, leading to a decline in its competitive position [10]. The challenge of differentiating between customer groups and the necessity of enhancing service quality are pivotal constraints on the advancement of China's shipping industry. The term "high-quality service" encompasses not only the timely delivery of cargo but also encompasses multiple other aspects, including cargo safety, information transparency throughout the transportation process, and the speed of customer service responses. The customer base is becoming increasingly concerned about the real-time status and location of their goods. It is therefore incumbent on shipping companies to provide high-quality cargo tracking services, thereby improving transparency and accuracy in cargo tracking. Furthermore, in the context of market demand uncertainty and seasonal fluctuations, many shipping companies lack sufficient supply chain resilience and flexibility, making it challenging to adjust and respond in a timely manner.

(3) Technical level and policy issues: The contemporary landscape of supply chain management demands a multifaceted skillset, encompassing both technical expertise and managerial proficiency. Moreover, the deployment of sophisticated digital technologies represents a critical necessity. Nevertheless, the Chinese logistics industry is still in its nascent stages, and there is a significant deficit in both technological expertise and human capital. This has resulted in suboptimal efficiency and transparency in the management of supply chains and has also placed constraints at the level of

shipping companies seeking to expand their operations. While automation and intelligent technologies have the capability to markedly enhance the operating efficiency of supply chains, their implementation in the shipping industry remains relatively limited. The majority of terminals remain unautomated and unmanned. Additionally, the shipping industry is subject to a multitude of policies and regulations, including international trade policies, environmental protection regulations, and safety regulations. Shipping companies must continually adapt to frequent alterations in international trade policies and regulations due to shifts in the global political and economic landscape. The intricacy and ambiguity introduced by these modifications present a significant challenge for companies.

5. Recommendations

For the current supply chain management of shipping trade, the level and scale of supply chain management are constantly improving and developing. While embracing a multitude of sophisticated technologies, it is gradually evolving towards greater internationalization and sustainability. However, the numerous challenges confronting the sector present significant obstacles for shipping companies, necessitating a concerted effort to enhance and refine their practices. In this regard, the following recommendations are proposed :

(1) It is recommended that industrial development be promoted and that the logistics structure be optimized. Statistical data indicates that logistics costs account for over 40% of China's gross domestic product (GDP), a figure that is significantly higher than the proportion observed in developed Western countries, which stands at approximately 10%. However, this is closely related to the production model in China, which is dominated by industry and agriculture, while the West is dominated by the service industry. In light of the emergence of contemporary technologies, the focus of development is likely to shift towards manufacturing and services. As the foundation that supports industrial development, logistics needs to be continuously optimized and improved to support the development of the industry and inject new vitality into shipping companies.

(2) It is essential to reinforce customer relationship management and optimize the flexibility of the supply chain. It is widely acknowledged that customer demand serves as the primary determinant of the supply chain. If a customer relationship management system (CRM) can be utilized for comprehensive data analysis pertaining to customer demand, the provision of personalized and streamlined services, the establishment of an efficient customer satisfaction apparatus, and the prompt comprehension and responsiveness to customer demands and sentiments, it will undoubtedly greatly enhance the competitiveness of shipping companies in the market. At the same time, improving the flexibility of a company's supply chain can also help it remain competitive and reduce risks in an uncertain market environment.

(3) It is of the utmost importance to reinforce the advancement of environmentally conscious supply chains. The uptake of innovative technologies and the shift towards digitalization have become commonplace practices within the domain of supply chains. Consequently, shipping companies that proactively embrace green supply chains are poised to gain a foothold in the marketplace. In addition to responding to governmental initiatives and securing support, they will also be able to cultivate a superior corporate image and spearhead the environmentally sustainable growth of the industry.

Taking into account the existing literature and international policies, future research on shipping trade supply chains should be organized around the following directions to address current shortcomings and limitations while adapting to the trends in international policies and practices. The following directions are proposed for future research:

(1) Data-driven and intelligent supply chains: The collation and examination of real-time data can facilitate improved prediction accuracy and more optimal decision-making processes, with the assistance of big data technology. As an example, one may cite the improvement of the capacity to

gather real-time data with the exploitation of the Internet of Things (IoT). The Internet of Things (IoT) provides users access to enhancing the efficiency of cargo tracking and management within the shipping supply chain. Concurrently, the advancement and implementation of intelligent algorithms will significantly contribute to the optimization of transportation routes, warehouse management, and inventory control. Consequently, future research in this domain is poised to become a pivotal area of focus for companies, assisting shipping enterprises in enhancing their supply chain management capabilities.

(2) Sustainable and green supply chains: In light of the mounting global awareness of environmental preservation and sustainable advancement, it is inevitable that the shipping industry, as a pivotal component of global commerce, will integrate green supply chains and sustainable advancement as fundamental tenets in the forthcoming era. Therefore, future research may focus on green supply chain. This paper proposes three topics that can play an important role in future research on shipping trade. Carbon footprint analysis: examine the carbon footprint of maritime supply chains and propose strategies to reduce carbon emissions; Green logistics: explore the feasibility of using clean energy and green technology to promote the development of green logistics; The process of recovering and reusing resources: explore the application of circular economy models in maritime supply chains to promote the recovery and reuse of resources. These topics will become key parts of future research on sustainable and green supply chains.

(3) To enhance the resilience and mitigate the risk associated with the supply chain : Studies on managing the risk of supply chain and enhancing the resilience of supply chain represent significant avenues of inquiry within the field of supply chain management, particularly with regard to shipping trade. In light of the growing complexity and volatility of the global environment, it is imperative that supply chain management adopt a more flexible and resilient approach to risk management, enabling it to effectively navigate a range of unforeseen risks and challenges. For businesses, enhancing the resilience of their supply chains and streamlining risk management are perennial concerns. Consequently, future research should concentrate on this area, investigating how to integrate state-of-the-art technologies and construct models that facilitate efficient, adaptable, and risk-resistant supply chain management.

6. Conclusion

This paper presents a synthesis of existing literature on the key trends and challenges currently facing the shipping industry with regard to supply chain management. The management of supply chain plays an important role in improving shipping efficiency, reducing costs, and enhancing competitiveness. However, in the face of globalization and digital changes, the industry continues to grapple with challenges pertaining to inadequate risk governance and the tardy integration of advanced technologies. Future research can be carried out in three directions: data-driven and intelligent supply chains, sustainable and green supply chains, the management of risk and improvement of resilience within supply chains.

For the purpose of optimizing the effectiveness and stability for the whole supply chain, companies must implement a series of measures, including optimizing supplier networks, adopting advanced technologies, and strengthening information sharing and partnerships. Furthermore, contingency planning and employee training are essential components of this process. By doing so, companies can achieve greater supply chain visibility, which will allow them to better anticipate demand fluctuations and respond to emergencies.

In the context of contemporary environmental concerns, the idea of green supply chain and sustainability has become an essential issue for the shipping industry. The integration of green supply chain strategies enables enterprises to mitigate their impact on the environment, whilst simultaneously improving their public image and enhancing their competitive advantage in the marketplace.

Green Supply Chain Management focuses on making efficient use of resources, minimizing waste and adopting clean technologies. By optimizing transportation routes, improving energy efficiency and selecting environmentally friendly materials, companies can effectively reduce their carbon footprint. Furthermore, compliance and consumer demand for eco-friendly products are also driving the evolution of green supply chains.

It is anticipated that the future evolution of shipping trade supply chain management will be influenced by the advancement of technology and shifts in market demand. The increasing stringency of environmental regulations and public awareness of environmental protection will also make green supply chains a standard practice in the shipping trade industry. In order to succeed in this dynamic environment, businesses must adopt a strategy of continuous innovation and flexible decision-making. The utilization of data analytics and automation technologies will enable companies to improve decision-making efficiency and operational effectiveness while reducing human error. Through the implementation of continuous improvement strategies, the shipping trade industry will be able to achieve more efficient and sustainable growth, adapting to an increasingly complex global marketplace.

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