Cultural and Strategic: Logistics Collaboration and Supply Chain Performance Model For Small and Medium Enterprises

Suryadi Hadi[1], Kadek Agus Dwiwijaya[2], Mohammad Ali Murad[3], Ni Luh Verha Anjany[4], Stiven Thomas[5]

{suryadihadi@untad.ac.id[1], kadekagus@untad.ac.id[2], alimurad@untad.ac.id[3], veraanjani672@gmail.com[4], stiventhomas1709@gmail.com[5]}

Department of Management, Tadulako University, Central Sulawesi, Indonesia[1,2,3,4,5]

Abstract. This study aims to develop a logistics collaboration model for small and medium enterprises (SMEs) to improve supply chain performance. SMEs often face unique challenges such as limited resources, lack of technological integration, and inefficient logistics operations, which hinder their competitiveness in the market. By exploring various collaboration strategies, this research seeks to identify effective methods for enhancing logistics efficiency and supply chain coordination among SMEs. Confirmation of the hypotheses in this model is necessary to provide an in-depth understanding of the relationship between logistics collaboration and supply chain performance in SMEs. Therefore, implementing logistics collaboration strategies can help improve the supply chain performance of SMEs. This study provides valuable insights for SME managers and policymakers, highlighting the importance of fostering collaborative logistics practices to enhance overall supply chain performance. The proposed model is a practical framework for SMEs seeking to leverage collaboration to overcome logistical challenges and achieve sustainable growth.

Keywords: *Logistics Collaboration, Supply Chain Performance, SMEs*.

1 Introduction

In the era of globalization and increasingly fierce business competition, supply chain management has become one of the key factors in determining the success of a company[1], including Small and Medium Enterprises (SMEs). SMEs play an important role in many countries' economies, as they contribute to GDP and provide employment for millions of people. However, SMEs often face significant challenges in managing their supply chains due to resource constraints and smaller operational capacity compared to large enterprise[2]s. One way to overcome these challenges is through logistics collaboration. Logistics collaboration refers to cooperation between various parties in the supply chain to achieve common goals, such as increased efficiency, reduced costs, and increased customer satisfaction[3], [4]. Through effective collaboration, SMEs can leverage their partners' resources and expertise, reduce uncertainty, and improve their competitiveness in the market.

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Although the potential benefits of logistics collaboration have been widely recognized, its implementation among SMEs still faces several obstacles. Many SMEs are hesitant to share information and resources with their partners due to concerns about data security and losing out on a competitive edge. In addition, limitations in technology and infrastructure are also major obstacles. Therefore, in-depth research is needed to develop a logistics collaboration model that suits the characteristics and needs of SMEs. This article aims to develop a logistics collaboration model that can improve the performance of SMEs' supply chains. This model will cover various important aspects of logistics collaboration, such as information sharing, joint planning, resource sharing, and technology integration. This article will also explore how factors such as trust and commitment between supply chain partners can affect the effectiveness of collaboration.

This research uses a theoretical and empirical approach. The theoretical approach includes a broad literature review to identify the basic principles and best practices in logistics collaboration. Meanwhile, the empirical approach involves collecting data from SMEs to test proposed hypotheses and measure the impact of logistics collaboration on supply chain performance. The main purpose of this study is to provide practical guidance for SMEs in implementing logistics collaboration. By adopting the proposed model, SMEs are expected to overcome their operational challenges, improve efficiency, and achieve a competitive advantage in the market. In addition, this research also contributes to the supply chain management literature by providing new insights into how logistics collaboration can be effectively implemented among SMEs.

In the structure of this article, the first part will discuss a literature review regarding supply chain management in SMEs and logistics collaboration. The second part will outline the development of the conceptual framework and research model. The third section will describe the results and discussion, including hypothesis testing and practical implications of the proposed model. Finally, this article will conclude by summarizing the main findings and providing recommendations for further research. By understanding and adopting effective logistics collaboration, SMEs can be better prepared to face operational challenges and competition in the global market. This article aims to be a valuable resource for SME managers, researchers, and practitioners in the field of supply chain management, as well as make a significant contribution to improving supply chain performance among SMEs.

2 Literature Review

2.1 Definition

Logistics collaboration refers to the strategic cooperation between various entities in the supply chain, such as manufacturers, distributors, retailers, and third-party logistics providers, to achieve common goals related to operational efficiency, cost reduction, and improved customer service[5]. This collaboration involves sharing information, co-planning, and sharing resources to optimize the flow of goods and information along the supply chain. According to Simatupang and Sridharan [3], logistics collaboration can be defined as a joint effort by two or more organizations to plan and execute supply chain activities in a more coordinated and synchronous manner.

2.2 Types of Logistics Collaboration

Horizontal Collaboration

Horizontal collaboration involves cooperation between companies that are at the same level in the supply chain, such as two manufacturers or two retailers[6]. The main goal of horizontal collaboration is to achieve economies of scale and improve operational efficiency[7]. For example, two manufacturers working together can share production or logistics facilities to reduce costs and increase efficiency. This collaboration also allows companies to share knowledge and technology, which can increase innovation and competitiveness.

Vertical Collaboration

Vertical collaboration involves cooperation between companies at different supply chain levels, such as manufacturers and retailers. The main goal of vertical collaboration is to optimize the flow of goods and information from upstream to downstream. By working together vertically, companies can improve coordination, reduce wait times, and improve response to market demand. For example, collaboration between manufacturers and retailers can include production adjustments based on real-time sales data from retailers, which helps to reduce overstocks and product shortages in the market.

2.3 Logistics Collaboration and Supply Chain Performance

Logistics collaboration has a significant impact on supply chain performance[8], [9]. Previous studies have shown that effective collaboration can lead to increased efficiency, reduced costs, and increased customer satisfaction[10]. Logistics collaboration allows companies to integrate their processes and reduce duplication of efforts[11]. For example, sharing information in real-time between manufacturers and retailers can reduce demand uncertainty and allow for more accurate production planning. This leads to a reduction in overstocking and understocking, thereby improving overall operational efficiency. Companies can reduce operational costs by sharing resources and information[12]. For example, companies can optimize shipping routes and minimize transportation costs through shared shipping planning. In addition, collaboration in inventory management can reduce the cost of storing and handling goods. Effective logistics collaboration allows companies to respond to customer requests more quickly and precisely[13]. With better integration of information and communication systems, companies can ensure that products are available at the right time and place, thereby increasing customer satisfaction. Through collaboration, companies can share the risks associated with supply chain uncertainty[14]. For example, in a crisis or supply chain disruption, collaborating companies can support each other by sharing information and resources to mitigate negative impacts.

2.4 Collaboration Strategies

Various strategies can be used by companies to implement effective logistics collaboration. First, sharing real-time information about market demand, inventory status, and production schedules is key to effective coordination in the supply chain. Information technology such as Electronic Data Interchange (EDI) and supply chain management systems (SCM) play a significant role in facilitating this exchange of information[15]. In addition, companies in the supply chain must engage in joint planning for activities such as production scheduling, inventory management, and capacity planning to ensure all parties are working towards the same goals and reduce the risk of operational plan mismatches[16].

Furthermore, sharing resources such as storage, transportation, and technology facilities can reduce costs and improve operational efficiency. For example, two companies can share a warehouse to reduce storage costs or use a shared transportation fleet to optimize vehicle usage. Additionally, effective collaboration entails addressing common problems through proactively identifying problems, sharing information related to the cause of the problem, and working together to find effective solutions. Finally, to ensure the success of collaboration, companies need to align their performance metrics by setting common goals and measuring performance based on agreed key indicators, so that all parties can work towards the same outcome and measure the success of the collaboration in a consistent way

3 Material and Methods

The main methodological approach in this study is theoretical analysis. It involves conceptual modeling of the relationships between key constructions based on existing theories. This analysis includes an in-depth understanding of the mechanisms that link logistics collaboration practices to supply chain performance. Diagrams and visual models are used to illustrate this relationship clearly. The development of the conceptual framework in this study begins with a comprehensive literature review. The reviewed literature includes previous theories and research in supply chain management, logistics collaboration, and SMEs. The main focus is identifying the key factors influencing SMEs' logistics collaboration and supply chain performance. Relevant academic articles, books, and industry reports are collected through academic databases such as Google Scholar, JSTOR, and ScienceDirect. Some key constructions are identified as important elements in logistics collaboration. This construction includes information sharing, joint planning, resource sharing, technology integration, and trust and commitment factors. Each construction is analyzed to understand its role in improving supply chain performance. After identifying the key constructions, the next step is to integrate the relevant theories to build a conceptual framework. Resource-Based View (RBV) theory and social network theory are used as theoretical foundations to explain how resources and relationships between companies can affect supply chain performance through logistics collaboration. This theoretical integration helps in understanding the relationship between key constructions and provides a strong theoretical foundation for the proposed model.

4 Results

4.1 Maps of Logistics Collaboration in The Present and The Future

Today, logistics collaboration among SMEs is growing rapidly, driven by the need to improve efficiency and reduce costs. Recent trends show that SMEs are increasingly adopting information technology to share data in real-time with their supply chain partners. For example, cloud-based warehouse and transportation management systems allow for better coordination between manufacturers, distributors, and retailers. However, despite the progress, SMEs still face several obstacles in implementing effective logistics collaboration. One of the main obstacles is the limited resources, both in terms of finance and experts. Many SMEs difficult to invest in advanced technology or train their staff in the best logistics collaboration practices. In addition, there are also challenges in building trust between supply chain

partners. Trust is a key element in logistics collaboration, but it is often difficult to build especially in new business relationships.

Looking to the future, logistics collaboration in SMEs is expected to be more advanced with the adoption of new technologies such as the Internet of Things (IoT), artificial intelligence (AI), and blockchain. This technology can provide better visibility and improve the accuracy of data shared between supply chain partners. For example, the use of IoT sensors in shipping can provide real-time data regarding the location and condition of goods, while AI can aid in better planning and decision-making. In addition, innovations such as digital platforms that allow integration between various supply chain partners are also expected to become more common. Not only does this platform allow for more efficient information sharing, but it also allows for easier co-planning and resource sharing. For example, a digital platform can integrate data from various SMEs operating within the same industry, allowing them to share transportation and warehouses, thereby reducing costs and improving efficiency.

4.2 Proposed Model

The proposed model for logistics collaboration and supply chain performance integrates both cultural and strategic dimensions, emphasizing their collective impact on performance metrics. The cultural dimension focuses on fostering trust, commitment, mutuality, and effective information exchange among supply chain partners[17]. Trust and commitment ensure reliable and enduring relationships, while mutuality implies shared benefits and responsibilities[18], [19]. Efficient information exchange enhances visibility and coordination, facilitating timely and accurate decision-making and smooth operations[20]. Strategically, the model includes joint planning, resource sharing, risk sharing, technology integration, and innovation. Joint planning optimizes resource use and synchronizes operations, while resource sharing, such as pooling storage and transportation assets, lowers costs and improves service levels[6]. Risk sharing through joint contracts and insurance mitigates uncertainties[6]. Technology integration, leveraging IoT, AI, and blockchain, enhances real-time tracking, transparency, and data-driven decision-making[14], [21], [22]. Collaborative innovation drives the development of new products and processes, fostering long-term competitiveness. The effectiveness of logistics collaboration is measured by several performance metrics: responsiveness, efficiency, competitiveness, market share, profit levels, and product quality[1], [23], [24], [25], [26], [27], [28], [29], [30], [31], [32]. By integrating these cultural and strategic elements, the proposed model creates a robust framework for logistics collaboration, leading to enhanced supply chain performance. This holistic approach addresses both relational and operational aspects, fostering a synergistic environment where all partners can thrive. Figure 1. illustrates this research model.

4.3 Model Hypotheses

This research model underlines the importance of logistics collaboration as a driving factor for supply chain performance. Cultural and strategic elements play a crucial role in building strong relationships and improving efficiency in the supply chain. The following are two research model hypotheses that, if proven true, will enable us to conclude that SMEs may improve supply chain performance by embracing cultural and strategic components.

Hypotesis 1: Logistics Collaboration (Cultural Elements) Affects Supply Chain Performance

Sharing timely and accurate information can improve coordination and reduce uncertainty in the supply chain[4], [15], [33], [34]. For example, real-time inventory information allows for better production planning and quick response to changes in market demand. By doing so, SMEs can avoid excess or understock, and improve operational efficiency, and customer satisfaction. Building trust and commitment between supply chain partners strengthens collaborative relationships and improves overall performance[6], [16], [35], [36]. Strong trust facilitates the sharing of sensitive information and long-term commitment, allowing all parties to work together more effectively and efficiently, and better address shared challenges.

Hypotesis 2: Logistics Collaboration (Strategic Elements) Affects Supply Chain Performance

Co-planning between supply chain partners allows for more efficient resource allocation and better coordination, ultimately improving cost efficiency and delivery reliability[37], [38], [39], [40], [41], [42]. For example, manufacturers and distributors involved in joint planning can reduce transportation costs by optimizing delivery routes and production schedules, ensuring products arrive on time and on demand. Sharing resources such as production, transportation, and storage facilities helps SMEs meet customer demands more quickly and efficiently, thereby increasing customer satisfaction. For example, two companies that share production facilities can increase their capacity to handle sudden large orders, ensuring customers receive their products on time. By sharing risks, SMEs can be more resilient in the face of disruption and minimize its negative impact. For example, having mutual insurance or performance-based contracts can reduce the risk of financial losses due to supply chain disruptions, such as delays in delivery or damage to goods, thereby maintaining operational continuity and financial stability. Collaboration in innovation allows SMEs to continue to adapt and evolve, maintaining a long-term competitive advantage. For example, collaborative development of new products can combine the expertise and resources of various partners, opening up new market opportunities and increasing competitiveness in the industry. The integration of technologies such as IoT, AI, and blockchain helps in real-time tracking and better coordination across the supply chain[43], [44], [45]. For example, blockchain technology can improve transparency by providing immutable transaction records, while IoT and AI can provide predictive insights and process automation, improving supply chain efficiency and responsiveness[43], [45], [46].

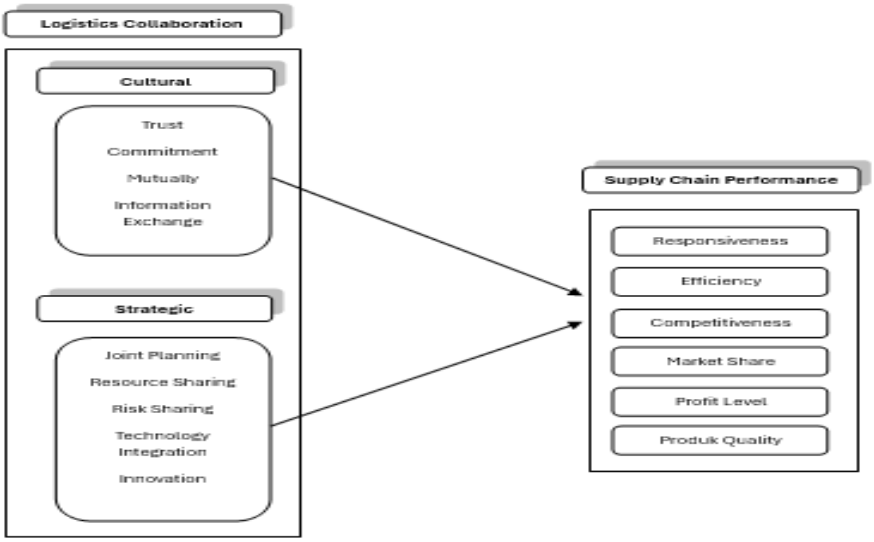

Fig. 1. Research Model

5 Conclusions

The results of the literature reveiew show that there remains a significant information gap regarding the relationship between logistics collaboration in small and medium-sized enterprises. Logistics collaboration is a key strategy that can help SMEs improve their supply chain performance through various levels of integration and complexity of cooperation. This article has outlined the different types of logistics collaboration, ranging from transactional collaboration that is basic to strategic collaboration that involves deep integration and long-term planning. Each type of collaboration offers unique benefits for companies, with the main focus on improving operational efficiency, reducing costs, and increasing customer satisfaction. Accurate information and real-time sharing through Information Sharing are proven to improve coordination and reduce uncertainty in the supply chain. Joint Planning allows for more efficient resource allocation and improved delivery reliability, while Resource Sharing helps SMEs meet customer demands more quickly and efficiently, thereby increasing customer satisfaction. Overall, this study provides strong empirical evidence regarding the importance of logistics collaboration in achieving superior supply chain performance. Companies that can build strong collaborations with their business partners will be better prepared to face increasingly complex and dynamic business challenges. The results of this study have practical implications that are very relevant for business. Companies need to realize that success in managing the supply chain depends not only on the company's internal efforts, but also on the company's ability to establish good cooperation with its business partners.

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