JURNAL INVASI
Jurnal Industri dan Inovasi
Jurnal INVASI: Industri dan Inovasi
Vol 1 No 1 September 2023, 23-30
PUBLISHER:
Program Studi Teknik Industri
Fakultas Teknik, Universitas Teuku Umar
Aceh Barat, Indonesia

Enhancing Performance of Small and Medium Enterprises (SMEs) through Supply Chain Integration - An Examination of the Fisheries Sector in Aceh

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Abstract *- This article proposes an qualitative approach to determine the underlying dimensions of Supply Chain Management (SCM) integration and its relation to performance among small firms in Aceh, Indonesia with special emphasis on the tuna industry. The overall aim of the study is to better understand successful SCM practices in Aceh and the challenges faced in the process. This paper uses qualitative data, which was collected from open-ended interviews with the stakeholders in a leading Aceh tuna business, together with the Supply Chain Operation References (SCOR) model, which is used to define supply chain processes and associated Key Performance Indicators (KPI). The result of this research indicated that the industry regards flexibility, efficiency, and quality as the most important indicators in their supply chain operation. However, factors such as financial, SCM expertise, infrastructure and resource create barriers in implementing an effective supply chain. Further to this, successful SCM strategies in improving SCM performance were identified based on each performance indicators. The result of this paper is expected to contribute to theoretical and practical knowledge of SCM practice, and to develop recommendation for future development of industry with small-scale capabilities.*

Keywords: *Supply Chain Management (SCM), SMEs, Key Performance Indicators (KPI), Perikanan Aceh*

Abstract *- Artikel ini melakukan pendekatan kualitatif untuk mempelajari faktor-faktor yang mendasari integrasi dari manajemen rantai pasok (supply chain) dan hubungannya terhadap kinerja dari usaha kecil dan menengah (UMKM) dengan penekanan khusus pada industri tuna di Aceh, Indonesia. Tujuan utama dari penelitian ini adalah untuk lebih memahami praktik integrasi dari manajemen rantai pasok yang sukses dan telah diterapkan oleh industri kecil di Aceh dan juga untuk tantangan yang dihadapi dalam prosesnya. Penelitian ini dilakukan dengan mengeksplorasi data kualitatif, yang dikumpulkan dari wawancara dengan para pemangku kepentingan pada rantai pasok tuna di Aceh, bersama dengan model Supply Chain Operation References (SCOR), yang digunakan untuk menentukan proses rantai pasokan dan indikator kinerja terkait. Hasil penelitian ini menunjukkan bahwa industri menganggap fleksibilitas, efisiensi dan kualitas sebagai indikator terpenting dalam operasi rantai pasok mereka. Namun, faktor-faktor seperti keuangan, keahlian SCM, infrastruktur, dan sumber daya menjadi penghalang dalam penerapan rantai pasokan yang efektif. Selanjutnya, strategi SCM yang berhasil meningkatkan kinerja SCM diidentifikasi berdasarkan masing-masing indikator kinerja. Hasil dari penelitian ini diharapkan dapat memberikan kontribusi untuk pengetahuan teoritis dan praktis dari SCM, dan sekaligus untuk mengembangkan rekomendasi untuk pengembangan industri dengan kemampuan skala kecil di masa depan.*

Kata Kunci: *Manajemen Rantai Pasok, UMKM, Indikator Kinerja, Perikanan Aceh*

INTRODUCTION

Today, Supply Chain Management (SCM) practices are becoming essential for organizations to achieve a competitive advantage in the global market. Since the number of competitors is escalating in both

local and global markets, making it more challenging for small and medium enterprise (SME) to survive and grow. These constraints highlight the importance of managing and improving organizational performance to produce and maintain products and services that are distinct from other industries. As a result, many enterprises have begun to integrate SCM practices to achieve an efficient management and develop competitive advantages (Syahputra et al. 2022).

In terms of resources and attributes to marine development. Aceh is a coastal province in Indonesia with a potentially valuable marines and fisheries sector. Dominated by Small and Medium Enterprises (SMEs), the sector contributes to the employment of over 80,000 people either directly or indirectly and had an estimated total production of 150,000 tons of fish in 2014 (FAO, 2005). Traditionally, most of these fishery's products have been sold to local markets, with the export-quality fish delivered to North Sumatra for export. Recently, to adapt to the changes in the market regulation, the tuna industry in Aceh has experienced transformation in its supply chain system. As an SME that traditionally operated as a supplier of raw (unprocessed) tuna to several industries in another province in Indonesia, the SME has transformed into a direct exporter of processed tuna to foreign markets. This transformation not only changed the relationships and networks among the stakeholders of the firm, but also shifted the business processes and management system within the company. Thus, the transformation has led to the integration of a new systematic supply chain system. By integrating a new complex supply chain system, SMEs will be more attuned to the sensitiveness of the business environment. SCM practice offers organizations a reduction in cycle time and inventory, while also providing the company with an accurate resource planning mechanism. In addition, flexibility to respond to customer demands and rapid decision-making behavior make organizations more able to adapt to constantly changing regulations and advancing technologies (Tidd, Bessant, & Pavitt, 2005). However, due to the nature of SMEs and their resource limitations, knowledge and financial results in SMEs having fewer advantages in supply chain practice, compared with larger enterprises. This paper focuses on supply chain integration strategy in the fisheries industry in Aceh and explores the success factors in managing this supply network. The main objective of the study is to examine and to achieve better understanding of how the SME in Aceh increases performance of the newly integrated system, and to explore the obstacles faced in the implementation of the system.

RESEARCH METHOD

This paper analyzed one of the tuna processing industry in the city of Banda Aceh, Indonesia, which has a newly integrated supply chain management (SCM) network to fulfill the export demand for tuna products. The integration of the new SCM system has created several changes to the business process of the company. Therefore, to understand the supply chain integration process and effect, this paper employed qualitative data, which was collected from open-ended interviews and direct observation to the stakeholders in a leading Aceh's tuna business. The stakeholders consist of 2 industry's practitioners and 1 supply chain expert in Indonesia. In addition, Supply Chain Operation References (SCOR) model was used to define supply chain processes and associated performance indicators. In this context, the SCOR model was used as a reference and benchmark to determine the most incremental indicators that have highest contribution organization's performance.

RESULTS AND DISCUSSION

3.1. Supply chain management practice of the fisheries industry in Aceh

The majority of fishing industry in Aceh is dominated by small and medium enterprises (SMEs), with the sector contributing up to 6.5 % of regional GDP and providing direct and indirect employment for over 80,000 people in the surrounding area (FAO, 2009). Due to the lack of processing facilities, previously most catches were sold to the local market, and the export-quality fish exported as unprocessed product through North Sumatra as the main distribution channel. In this scenario, the tuna industry had a limited responsibility for controlling the supply chain network, because most of the process were handled by different companies outside Aceh. However, industry experts in Aceh believed that the supply chain line had an unfavorable impact to the industry for several reasons. First, products' value continues to deteriorate due to the 12 hours distance from Aceh to North Sumatra, which gradually reduced the selling price of the product. The price of fish products is generally determined by its distribution system, with longer distribution systems has been proven in reducing the price of products and increasing production and distribution costs (Islam & Habib, 2013). Second, agri-food based industries are always under pressure to adapt and critical to a sudden change in requirements, issues and costumer demands (Meyers et al. 2012). Unfortunately, due to the limited access and direct end costumer approach of the system, the industry had low flexibility toward costumer demand which

resulted in low capacity for reaction and poor coordination in managing company costs and resources (Angkiriwang, Pujawan, & Santosa, 2014). To resolve these problems, the industry has recently transformed into a more global supply chain system, in which companies are now directly responsible for the processing (from whole unprocessed tuna to tuna loin) and distribution to export destination. Additionally, to support this new initiative, the industry has been required to implement new systems, management, and processing plant and to improve stakeholder relationship. Although the nature of SMEs poses significant limitations of resources in terms of finance and expertise, the industry claims that the new supply chain line brought about a significantly positive result in terms of financial and resource management. In addition, the current supply chain theories define that SCM integration provides various potential benefits to an industry in the long term. SCM practice offers organizations a reduction in cycle time and inventory, while also providing the enterprise with an accurate resource planning tool (Chin et al. 2013). In this newly integrated scenario, the Aceh fisheries industry is now less dependent on cold chain infrastructure.

3.2. The challenges and barriers of implementing supply chain management

Supply chain management (SCM) plays a crucial role in determining the survival and growth of a company, and in developing the competitive advantage of a company. Several studies have found the benefits of supply chain integration for company performance, benefit such as economic significance, sustainability impact, market competitiveness, food security and community welfare are of result of scm integration (Hendijani et al., 2023; Huo et al., 2014; Kumar et al., 2017; Som et al., 2019; Syahputra et al., 2022). However, the actual benefits of supply chain integration initiatives and their relation to performance may differ according to the organization, due to the differing capacities of companies to minimize barriers and challenges in implementing SCM systems. Govindan et al. (2014) identified technology, knowledge, and government involvement, and support as some of the barriers to SCM adoption. Meanwhile, Fawcett et al. (2008) indicate that information access and human behaviour are the chief barriers, because the ability of a firm to maximize the direct function and quality of its resources is clearly dependent on the ability of human to process the information and its follow ups. In the context of the tuna industry in Aceh, the SCM system is intended to achieve several goals, such as improvement in the valued added of the product, efficiency, and improvement in financial performance. However, as a relatively small firm, the tuna business in Aceh faces certain barriers and challenges in achieving optimal performance. SMEs differ from large companies in their ability to adopt new systems and, based on the interview with tuna industry expert in Aceh, a number of aspects have been identified that obstruct the adoption of a supply chain system in Aceh. The factors include: first, the inability to implement advanced information management system, since insufficient of information expertise and the cost of technology create boundaries for implementing information management techniques, a proper information handling will surely impact the lead time and production planning of the company. Second, fluctuation raw material from the fisherman supply also create huge obstacle for the company to earn continual profit, which resulted to a lower investment in a new resource. Last, low bargaining power over price that force the SMEs to rethink and replanning a better and a more efficient production and management technique to gain profitable outcomes but still need to maintain the highest quality standard of product and operation, which can be really expensive for the company to strive.

3.3. The goal of supply chain integration

Supply chain integration aims to create a seamless and efficient flow of information, materials, and resources from suppliers to customers, ultimately leading to improved overall performance, responsiveness, and competitiveness (Zhang et al., 2022). Close examination to the supply chain in Aceh reveals three expectations in its process, i.e. new market access, better customer satisfaction, and financial performance. In summary, the goal of the supply chain integration that was conducted by the case study company are outlined in Figure 1. and explained as follow.

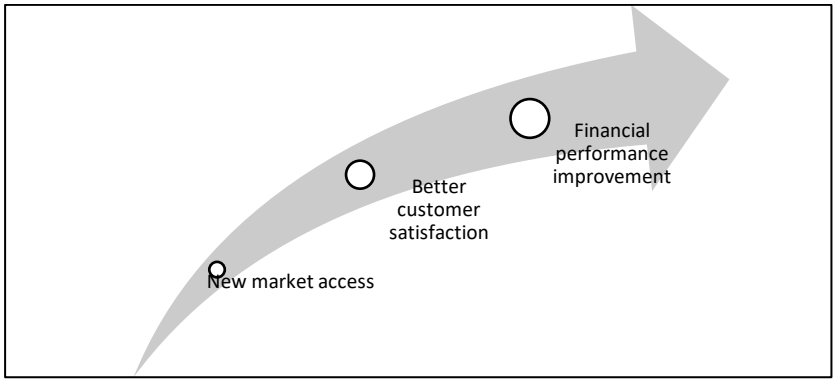

Figure 1. The Goal of Supply Chain Integration

3.3.1. New Market Access

With the growing global population and increasing demand for protein, especially for seafood, the potential market for fishing industries is becoming increasingly wider. The world population is expected to growth to approximately nine billion by 2050, with the global food requirement is predicted to grow by 70% in value due to the increased food consumption. Furthermore, the forecast for total seafood consumption is expected to rise by 3.7% by 2021, with a growing revenue that continues to grow at 0.9% and 2.7%, respectively, between 2015-16 and 2020-21(Wright Russel, 2018). Though this opportunity would likely to present potential benefit for the industry in the previous system, the fishing organization could sell the product to one exporter only. Thus, the new supply chain integration system is expected to open new potential market for the industry.

3.3.2. Better customer satisfaction

An efficient and effective SCM practice is one of the most effective techniques in achieving excellency in customer service and it directly dictates the two most crucial components of customer satisfaction: cost and distribution. An efficient supply chain helps company to achieve a high competitiveness index to beat the business's competitors on product over product sale and resulted in an increase in profitability. Thus, by having prominence-level performing operations, the company is able to exceed the end users' expectations on the delivery of the goods and consequently increase customer satisfaction and loyalty toward the product (Thatte, 2007). An effective SCM allows a business to achieve the desired outcomes. Choosing the most suitable systems, approaches, and networks helps in controlling the products chain from conception to delivery, reducing errors and increasing inventory efficiency (Sentia et al., 2022). Thus, more optimized supply chain will achieve better customer satisfaction and provide direct impact on creating profit for the firm.

3.3.3. Financial performance improvement

One of the most crucial aspects of SCM is to provide a contribution to the financial growth of an organization. Traditional initiatives aimed at financial growth concentrate on cost effectiveness: the streamlining of inventory level to minimize inventory carrying costs, automating of fulfilment operations to reduce the cost of labour, and consolidating of orders to cut shipment spending. In contrast, the more successful enterprise use supply chains to develop differentiation, improve sales, and gain new markets access, as a way to develop the competitiveness and shareholder value (Anderson, 2003). A separated focus on expenses and revenue generation facilitates supply chain practitioners to identify the structural identity of supply chain initiatives. As the enterprise put more strategic emphasis on SCM, management capabilities need to alter from a series of day-to-day process to a strategic system with supply chain integrators who expertly handle cross-functional and cross-company complexities. Thus, in this scenario, supply chain practitioners need to understand the relation and interdependencies between enterprise and to withstand any blockage of handling supplier and costumer relationship.

3.5. Key Performance Indicators (KPI) in the Aceh tuna industry

One of the most crucial aspects of SCM is to provide a contribution to the financial growth of a company. This study hypothesizes SCOR model as the framework of key performance components that build the performance perspectives for the SCM. Figure 2 explains the overall related KPI's that are associated within the case study company.

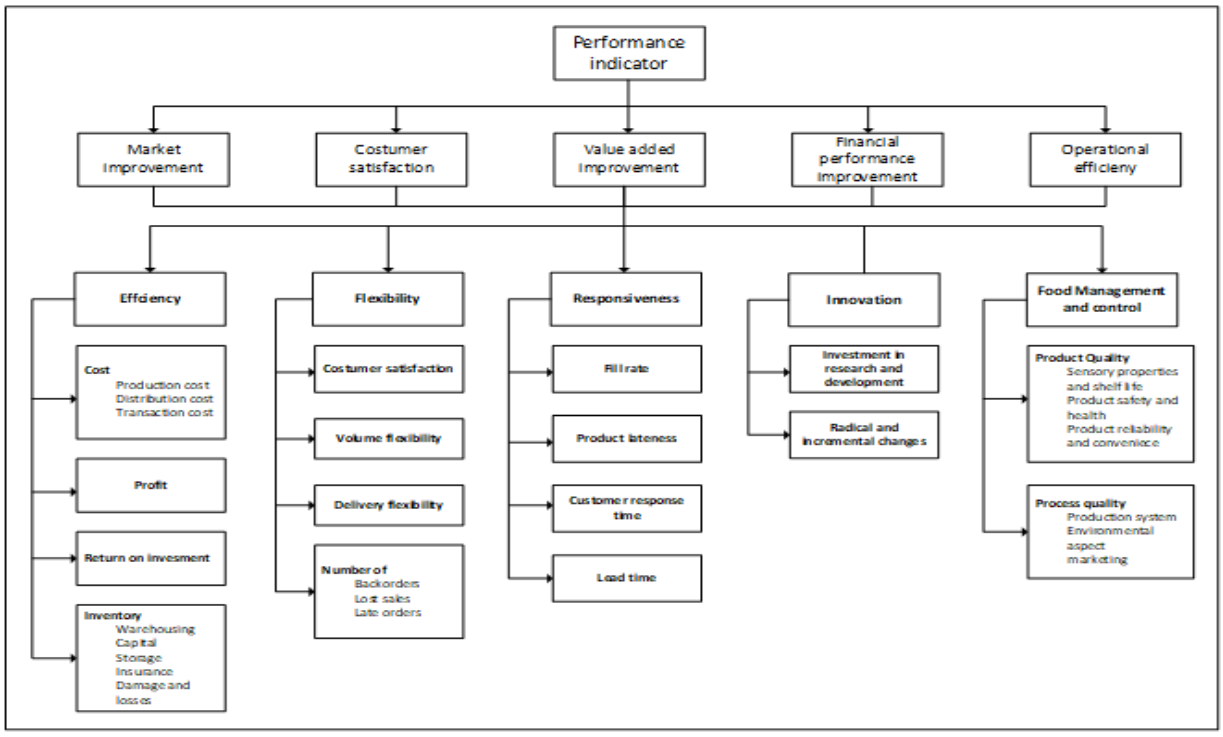

Figure 2. Key performance indicator of the case study company

Based on the expert opinion on the case study of the tuna firm, the key performance indicators that were regarded as the most influential factors in the supply chain line were presented in the Table 1.

Table 1. Key performance indicator of the case study company

Attributes	Context
Flexibility	The agility in which the supply chain responds to changes in demand and new regulation to achieve competitive advantages the criteria in flexibility are customer satisfaction and costumer relationship
Efficiency	Two major criteria that are employed in the supply chain management, namely, the cost-efficiency and the profit-maximization criteria
Quality	The attribute relates to the concern and expectation of the process quality and product quality to the costumer

The most consistent indicators for the performance of the case study supply chain network appeared to be revenue in efficiency aspect, product and process quality in quality and customer satisfaction which are characterized in Flexibility. In this regard, the goals of the supply chain integration can be obtained if the supply chain improves its performance.

3.6. How did the fisheries industry in Aceh improve its supply chain performance?

This section presents the strategies implemented by Aceh fisheries industry in aligning the performance of the supply chain based on the KPI criteria.

3.6.4. Flexibility

3.6.4.1. Improving Information access

Agility, responsiveness and information integration has been described as some of the aspects that determine the competitiveness of a company especially in the increasingly volatile market (Christopher, 2005) subsequently, the rate of high-quality information sharing between each member of a network improves the coordination capability and overall responsiveness of each firm and subsequently improve the supply chain performance (Kim, 2006). In the context of the Acehnese supply chain system, before integration of the supply chain system in the company, most information sharing

was strictly limited to the distribution destination in North Sumatra since the company was not selling the product directly to the customer. In addition, the current status of the supply chain of the agri-food sector is relatively volatile, owing to the nature of agri-food products having specific perishable characteristics, and social and customer attitudes towards issues like food safety, animal welfare and environmental pressure. This limitation in information flow clearly created a barrier for the organization to adapt to new regulations, expectations, and trends, which consequently reduced order fulfilment to the customer. Hence, by integrating to the new supply chain network, now the Aceh tuna industry has a direct access of information flow to the costumer since the company is directly contributed to the selling and export of the product to the costumer. Furthermore, the sharing of information across the chain will lead to closer integration and make it easier for the company to adapt and be more responsive to changes in the market environment. The owner of the tuna operation in Aceh also added that the new initiative has helped the company to identify and recognize consumers' preferences. The integration process also facilitates new market information sharing, which enables the company to identify changes in market regulations, in turn resulting in better inventory planning and the continuous flow of products to the market. Generally, the collective business function offers a collaborative accomplishment, while information sharing, solid communication, recognition of mutual benefits, and a high level of mutual integration can improve the likelihood of supply chain relationship achievement.

3.6.5. Efficiency

3.6.5.1. Improving value added of the product

With the rise of global competition, the demand of providing the optimal product to the costumer continues to expand. Companies need to improve the product offering by increasing the value added of the product. To increase the value, the tuna industry in Aceh employs a new processing technique that process a raw tuna to a tuna loin before export. The export costumer pays higher price for processed tuna rather than unprocessed raw material. In addition, a raw whole tuna possesses a natural acid in the innards system of the fish which can alter the flavour and quality of the tuna overtime which consequently lower the tuna quality before reaching the costumer. In addition, the processing system before the export increases the delivery flexibilities due to the weight reduction after processing. Thus, the industry has invested in a new processing facility to maintain the quality of the product at a premium level before export process.

3.6.5.2. Effective Logistics Cost Management Techniques

The fishing industry in general faces certain variation in the supply chain operation, as an operation and system that heavily depend on nature and natural phenomena, the unstability will heavily impact the harvest yield. This variation creates a barrier for a company to maintain the upstream demand. To anticipate this, the organization needed to invest in a new major supporting cold chain infrastructure as a way to ensure a stable inventory level. However, as a small firm with low financial resource, the industry struggled to invest in those high-priced infrastructures. In this regards, the Aceh's industry believes that the effective inventory system management is the only way to cope with the challenge. The industry uses just in time (JIT) inventory and logistic system that schedules delivery by supplier readiness. JIT is intended to have minimum stock in the inventory as it aims to have business produce just enough products to meet demand (White G.P, 2002). JIT ensure the continuous production and distribution flow to the costumer where consumer order drives the(Yang, Xie, Yu, & Liu, 2021)es (Yang, Xie, Yu, & Liu, 2021). In addition, the industry has shifted the distribution approach from using sea-cargo to the air-cargo. The advantage of using air-cargo is the distribution cost was not based on certain volume or surface area of the cargo of the goods, but calculated on the total weight of the product, which are suitable for JIT production system. For the large and heavy shipments, shipping via ocean is often much less expensive. However, as shipment sizes decrease due to the new JIT initiative, the margin between air and ocean prices also decreases. With a system that more responsiveness with supplier readiness, the company can reduce the unnecessary expense and risk especially with a low infrastructure to maintain the inventory and product quality.

3.6.5.3. Low Products Variation

SMEs with successful supply chain strategies only employ shorter ranges of the goods in the supply chain system. Many industries regard that a lower range of product offers better efficiency in managing production lead time and achieves higher delivery reliability than a company with higher product ranges (Renuka Herath, 2014). The same statement also applied in the context of the tuna

industry in Aceh which the owner regards that by focusing on only limited classified product that the industry able to achieve higher efficiency in processing. In addition, a lower product range also reduces the risk of cross-contamination which is one of the biggest concerns of the global fisheries market.

3.6.6. Quality

3.6.6.1. Improving Management Capabilities

Supply chain management (SCM) is defined as a complex process, involving various actors and scenarios. Organizations seek competitive capabilities that deliver customers' preferences and increase their financial performance. Supply chains are not only a network between firms and communities, but also a bridge network between products and information that is impossible to be achieved without functional support from human resources to control and manage the system. The owner of the industry explained that in order to support a good the management and capabilities, it is working collaboratively with the local government and several universities in Aceh to provide trainings and modules to the internal management of the company and the local Aceh fisherman's (suppliers). The training was intended to provide knowledge on the proper post-harvest handling and maintaining good quality standard. Furthermore, the owner also stated that the industry is highly open to any student or organization who want to conduct research in the company. He expects that the research will provide new dimension or perspective in solving a problem within the company network. The advantage of having top management capabilities will help the competitive dimension of the company, which will also drive innovation and collaboration within the company. This advantage will create significant impacts toward collaborative goals in the supply chain.

3.6.6.2. Food Safety Standardization and certification

Currently, there has been a shift of food standardization from individual level recognition to government or regional regulation. The new market demand and international regulation enforce a mandatory standard of product and production safety which forbade uncertificated product to enter the designated market (OECD, 2011). Thus, to compete with those industry and to be accepted in the international market. The tuna industry in Aceh has employed food and safety certification in both post and pre-harvesting production. The industry also worked with coastal communities to improve fish handling and hygienic practices and preservation techniques. This initiative has resulted in a better prices per catch as well as reduction in losses.

CONCLUSION

The fisheries industry is a thriving business with limited capabilities and resources and was able to survive and grow in the complex supply chain system. In their business process, Aceh fishery industries experienced fluctuation in material supply, inadequate information technologies and low bargaining power over prices. Thus, to anticipate the challenge in the supply chain system, The industry considered the basic steps needed to improve the supply chain which are focused on improving information access, improving the value added of the product, and improving management capabilities of both suppliers and the internal management of the company. The findings of this research are relevant not only to the case study case, but also offer implications for other emerging industry in the same patterns with limitation in resources and capabilities that liaise with international buyers, which are major challenges in SCM integrations.

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