



The Implementation of the Supply Chain Operations Reference Model in Developing the Enterprises in the Fishery-Based Food Industry in Pangkalan Baru

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Abstract. Bangka Belitung, an Indonesian province known for its archipelago nature, holds significant potential in fisheries, with an annual fishery product potential of 1,059,000 tons. The province also houses numerous micro, small, and medium enterprises (MSMEs), totalling 12,843 in 2016. Considering this, the government aims to boost the food industry based on fisheries, projecting an additional IDR 30 billion in value, an 8% growth rate, an export value of IDR 4,500,000 million, job opportunities for 25,000 individuals, and an investment value of IDR 200 billion from 2019 to 2024. However, the current plan needs an effective information system in the supply chain process, leading to limited understanding among stakeholders. This study focuses on mapping the current supply chain of two MSME products, Rusip and Fish Crackers, in Pangkalan Baru and proposes SCOR model performance metrics to improve the MSMEs and supply chain performance. According to the analyses, it is found that the supply chains of Rusip and Fish Crackers are similar, except for the layer of suppliers involved in the sourcing process. This study suggests 12 metrics for improvement and emphasizes the need for government involvement in leading and monitoring the development process to ensure success.

Keywords: MSMEs, SCOR Model, Supply Chain Mapping

1 Introduction

Bangka Belitung is a province in Indonesia known for its archipelago nature. Bangka Belitung recorded 12,843 micro, small, and medium enterprises (MSMEs) in 2016. Considering the area's potential, 13 strategic plans are designed.

with one of them being the strengthening program of the supply chain in the related industry [1]. Supply chain management integrates various processes to prepare and deliver products or services to customers, encompassing planning, sourcing, production, delivery, information systems, payment, consumption, and returns [2]. As for the first step, doing a supply chain mapping is undeniable [3] to generate opportunities for network redesign and performance improvement [4]. This study aims to map the whole picture of the current supply chain of two MSME products, Rusip and Fish Crackers, in Pangkalan Baru, and provide performance metrics for improvement based on the SCOR model.

2 Methods

Research conducted in Pangkalan Baru on the 5th – 11th of March 2023 focuses on fish crackers and Rusip. Primary data was collected via semi-structured interviews with informants selected through judgmental sampling—no predetermined sample size, as stated by Kumar [5]; data was collected until saturation point. Secondary data from digital files owned by informants support statements, but its use depends on supply chain information system integration. The questionnaire was used to rate the importance of the predetermined metrics selected from the interview results, particularly for determining the SCOR metrics for improvement. In filling out the questionnaire, the informants must rate the metric's importance with options starting from 1 = Very unimportant until 5 = Very important.

Data analysis will focus on describing the current supply chain using the SCOR model. Informant information will be recorded electronically for accurate conclusions [5]. The triangulation method, combining interviews, observations, document analysis, and questionnaires, will enhance data validity and credibility in overcoming potential biases [6].

3 Results and Discussion

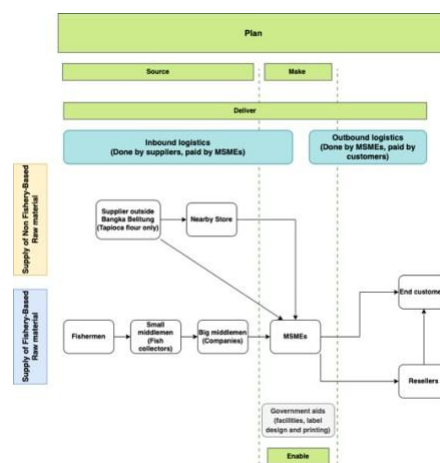


Figure 4. Supply chain map and business process in general for *Rusip* and fish crackers.

Overall, the two products follow two different characteristics of production mode. *Rusip* production uses the Make-to-stock mode, which emphasizes readiness to minimize order lead time, as it takes at least eight days to be finished. On the other hand, fish cracker production tends to use both Make-to-stock and Make-to-order modes depending on the ongoing situation.

The sourcing process involves two types of suppliers: those for fishery-based raw materials, typically with three layers in the supply chain, and non-fishery-based raw materials, usually with a maximum of two layers. Fishery-based materials are sourced directly by fishermen from the sea, with seasonal considerations affecting collection variety and timing. Fish are then sold to fish collectors, often subsequently to companies and any leftovers are supplied to MSMEs. Non-fishery-based materials are readily available in local stores, but tapioca flour may come from suppliers beyond Bangka Belitung or outside the island, depending on MSME preferences.

Moving forwards to the making process, each product follows the procedure as shown in the Fig. 5 and Fig. 6.



Figure 5. Production process of fish crackers.



Figure 6. Production process of dried *Rusip*. The production of *Rusip* skips the 6th step.

In Pangkalan Baru, MSMEs receive support from Disperindag for labelling their products, while the government assists in facilities and training. Post-production involves direct sales to end customers, resellers, and private labellers, both offline and online. MSMEs funded by customers mainly handle outbound logistics, whereas inbound logistics are managed by suppliers, with MSMEs covering the costs. Furthermore, MSMEs in Pangkalan Baru prioritize waste management, selling liquid and solid waste to potential beneficiaries instead of littering, demonstrating their conscientious approach.

3.1 SCOR Metrics

Table 1. Table of questionnaire results.

No.	Metrics	Question	Average Score
1	RL.3.31	How much do you think Compliance Documentation is important in a supply chain? (e.g. Material Safety Data Sheets)	5
2	RL.3.43	How much do you think other required documentation is important in a supply chain? (e.g. quality certification)	5
3	RL.3.45	How much do you think payment documentation is important in a supply chain? (e.g. contract payment, invoice)	4,7 14
4	RL.3.50	How much do you think shipping documentation is important in a supply chain? (e.g. packing slip, bill of lading)	4,8 57
5	RL.3.18	How much do you think the percentage of fully managed orders is important in a supply chain?	4,5 71
6	CO.2.7	How much do you think recording materials management and planning costs is important in a supply chain? (e.g. supplier sourcing, contract negotiation and qualification)	4,8 57
7	CO.3.9	How much do you think recording the cost of inbound and outbound logistics is important in a supply chain?	4,8 57
8	CO.3.12	How much do you think recording the Indirect Cost Related to Production is important in a supply chain? (e.g. equipment and facilities)	4,8 57
9	CO.3.20	How much do you think recording the cost of Obsolescence for Raw Material, WIP, and Finished Goods Inventory is important in a supply chain. (e.g. expired products)	4
10	AM.2.4	How much do you think recording the supply chain revenue from the business is important?	5

11	AM.3.3	How much do you think recording the recovery potential of the used material is important in a supply chain? (Percentage of the product content that is recyclable or reusable)	4,8 57
12	AM.3.5	How much do you think recording the actual amount of recovered materials is important in a supply chain? (Percentage of materials that are recycled or reused)	4,8 57

The proposed reliability metrics encompass aspects of sourcing to delivery processes, including RL.3.18 (fully managed orders), RL.3.31 (material safety data sheets), RL.3.43 (quality certification), RL.3.45 (payment documentation), and RL.3.50 (shipping documentation), with informants rating them between 4.571 and 5.00, serving as a preventive measure against fraudulent practices in the supply chain. RL.3.18 also aids MSMEs in tracing customer orders and understanding demand patterns over time. To address cost recording deficiencies, CO.2.7 (direct material cost), CO.3.9 (product transfer cost), CO.3.12 (indirect production costs), and CO.3.20 (risk mitigation costs) are suggested, rated from 4.00 to 4.857, considered vital for future development. Additionally, informants highly rate AM.2.4 (revenue documentation) at 5.00 and AM.3.3 (recyclable/reusable materials) and AM.3.5 (production material reuse) at 4.857 enables MSMEs to monitor sales, profits, waste potential, and waste utilization for business and environmental benefits.

4 Conclusion

Based on Fig. 4 and the analyses, the author can also conclude that the supply chains of Fish Crackers and Rusip are similar. However, the only difference in the chain for the two products is that *fish crackers* are more likely to involve any parties outside Bangka Belitung. In the matter of performance metrics, a total of 12 predetermined metrics by the author are all agreed upon by the informants regarding the urgency to be applied for further improvement. Five metrics focus on reliability, four on cost management, and three metrics on asset management. These metrics will act as the initial data set to be collected as the initiation step for developing MSMEs through its supply chain.

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