

Value chain model of the smoked fish industry in small island

Ariviana Lientje Kakerissa, Johanis Hiariey, James Abrahamsz, Yoisy Lopolalan

<https://doi.org/10.22306/al.v11i2.498>

Received: 02 Nov. 2023; Revised: 29 Dec. 2023; Accepted: 31 Jan. 2024

Value chain model of the smoked fish industry in small island**Ariviana Lientje Kakerissa**

Pattimura University, Department of Industrial Engineering, Jl. Ir. M. Putuhena-Kampus Poka, Ambon 97233, Indonesia, vianakakerissa71@gmail.com (corresponding author)

Johanis Hiariey

Pattimura University, Department of Fisheries Agribusiness, Jl. Ir. M. Putuhena-Kampus Poka, Ambon 97233, Indonesia, johanishiariey6@gmail.com

James Abrahamsz

Postgraduate Pattimura University, Department of Marine and Small Islands Resource Management, Jl. Ir. M. Putuhena-Kampus Poka, Ambon 97233, Indonesia, james.abrahamsz@fpik.unpatti.ac.id

Yoisy Lopolalan

Pattimura University, Department of Fisheries Agribusiness, Jl. Ir. M. Putuhena-Kampus Poka, Ambon 97233, Indonesia, oislopu21@gmail.com

Keywords: value chain, smoked fish industry.

Abstract: A fishing industry value chain model identifies production, distribution, and marketing stages that enhance the value of fishery products. It aids in cost breakdown, process optimization, and gaining a competitive advantage. The study links activities from fresh fish to smoked fish, tracking the entire process to the final consumer and identifying all involved actors. Quantitative and qualitative methods analyze data, determining production costs, selling prices, added value, and ratios in each distribution channel. Findings reveal six key players in the smoked fish value chain: fishermen, wholesalers, traders, processors/IKM, retailers, and consumers. Fishermen, wholesalers, and traders supply raw materials to processors/SMEs, which act as both producers and distributors. Retailers sell directly to consumers. Significant added value, exceeding 40%, suggests ample potential for growth in the smoked fish industry. The value chain model holds implications for fisheries in small islands with abundant natural resources, promoting increased efficiency, business sustainability, improved quality, social sustainability, enhanced added value, market development, monitoring, supervision, and strategic planning. Some policy recommendations from this study are expected to create a conducive environment for business sustainability, improved product quality, and added value in the smoked fish industry, as well as provide positive benefits to local communities and maintain market order.

1 Introduction

The value chain is a practical strategy that aids businesses in identifying and connecting with different activities to convert inputs into valuable outputs for consumers. The concept of value chain as presented by [1] demonstrates a comprehensive plan necessary to provide products or services that align with this idea. This involves various manufacturing or operational procedures, distributing products to end-users and managing their disposal after use. By conducting value chain analysis, companies can enhance their understanding of the product value chain, ultimately increasing their competitiveness. This entails a sequential progression of products through all chain activities, earning value at each stage. This concept is consistent with the perspective [2] that the products accumulate value as they transition between participants within the chain. In addition, the value chain provides greater value than the sum total of its activities. As such, a value stream represents a fresh method for creating business models that optimize business potential, reduce expenses, and equip the enterprise with sustained high-level competitiveness over the long run [3].

The Moluccas region comprises numerous islands and a larger expanse of oceanic territory than the adjacent

continent, making it endowed with abundant marine resources and fisheries [4]. According to [5], Moluccas Province is spread over an area of 46,914.03 square kilometers, accounting for 92.4 percent of the ocean's total surface and 7.6 percent of the continental area. It includes 1,388 islands with a potential reaching 536,112.6 tons, resulting in a production value of approximately IDR 13,820,522,191,000.

In 2019, Ambon City had 30 operating within the marine and fisheries industry. The companies included fresh, frozen, and processed products. Information pertaining to processed fish products in Ambon was compiled through the smoking and freezing method. The volume of smoked fish production totalled 3,828.32 tons, while frozen fish production amounted to 4,461.69 tons. Data from [6] indicates that the current capacity of fresh fish production in Moluccas is 29,010.53 tons with a production value of IDR 602,855,500,000. This situation suggests that there are business development opportunities in the fisheries sector. However, the fisheries industry that has developed is only a small and medium-scale industry.

Smoked fish SME is one of the most developed fisheries industries in Moluccas. Most Moluccans live in coastal areas and earn a livelihood as fishermen, enabling

Value chain model of the smoked fish industry in small island

Ariviana Lientje Kakerissa, Johanis Hiariey, James Abrahamsz, Yoisy Lopolalan

them to process a substantial portion of their catches as smoked fish. According to data from [6], the Ambon City area which serves as the capital of the province, is home to 3,820 fishing households in 2021. Research [7,8] has revealed that in the Ambon Island region, there are 99 small and medium-sized enterprises (SMEs) that engage in smoking fish. The long-term sustainability of this smoked fish industry depends on the consistent availability of fish as the main raw material. Therefore, cooperation among stakeholders involved in the fish processing industry, including business entities and government entities, is crucial to maintain fish production for smoked fish processors and consumers.

The value chain concept provides an effective strategic tool for analyzing and organizing organizational operations [9]. This idea is supported by [10], which suggests that value chains are an essential tool for collaborating with stakeholders, expanding market access, and producing foreign currency. and increasing production in most developing countries. Several additional authors, including [11,12], and [13], have also written about the value chain notion. Diagnosing a business entity's potential requires knowing if it can provide added value in the future and whether it can capitalize on this now [14]. In the field of strategic management, Value Chain Analysis is seen as a fundamental analytical tool. Consequently, its significance should not be underestimated; rather, it needs to be continuously enhanced and applied [15].

According to [16], examining the value chain proves beneficial for a firm in pinpointing bottlenecks. To thrive effortlessly in the market, companies must establish a competitive edge over their counterparts. This analysis aims to overcome inefficiency constraints, including unpredictability, reduce vulnerability, and enhance adaptability to any changes that may occur. The objective of this study is to assess the effectiveness of the value chain in the production of smoked fish. Each distribution point and marketing channel will be evaluated for added value. The policy recommendations resulting from this analysis will contribute to efforts aimed at boosting fisheries processing and marketing on Ambon and other small islands.

2 Methodology

To elucidate the efficiency at each value-added node in the marketing channel, the author employs both quantitative and qualitative methods. The quantitative method, using a descriptive approach, is utilized to illustrate the correlation between inputs and outputs in the value chain and to comprehend the impact of changes in price variables within the value chain. Meanwhile, the qualitative method is employed to capture the perceptions and views of various stakeholders regarding the processes and interactions within the value chain. It is also used to visualize how each stage in the value chain is interconnected. This research is conducted on Ambon Island at the six clustered locations of smoked fish

industries, including the Nusaniwe Subdistrict, Sirimau Subdistrict, Baguala Subdistrict, Teluk Ambon Subdistrict, Leihitu Subdistrict, and Tulehu Village, as well as Salahutu Subdistrict. The selection of these locations is based on the abundant availability of fishery resources, with a significant portion of the population residing in coastal areas and relying on the fishing sector for household income, engaging primarily as small-scale fishermen.

The data in this research is derived from a field survey conducted from January to June 2023. Respondents in this study included all parties involved in the smoked fish value chain, namely fishermen, SMEs (Small and Medium Enterprises) processing smoked fish, large-scale traders, collector traders, and retail traders located in the six regions of the clustered points. To gain a more in-depth understanding of the nodes in the value chain, the survey also covers fish landing ports, smoked fish processing facilities, and several markets on Ambon Island. In-depth interviews were also conducted with stakeholders to comprehend the production and distribution processes and factors affecting the smoked fish value chain, such as fishing boat owners, smoked fish SME owners, management of wholesalers and intermediary traders, and relevant government or agencies. Fresh fish production data from fishermen and smoked fish production data from smoked fish processors are collected to identify production volumes and types of fish produced.

The collected data is then analyzed to identify added value at each stage of the value chain. The difference between the product value and input costs, excluding labor costs is known as value added. The following are the components of the total value generated by the value chain (1), (2):

$$\text{Value added} = \text{Total of Revenue} - \text{The value of Intermediate/Level goods} \quad (1)$$

$$\text{Value Added Ratio} = (\text{Total Value Added} / \text{Product Selling Price}) \times 100\% \quad (2)$$

The results of this study are in the form of several policy recommendations that can be carried out by the government and business actors in the smoked fish chain to create an environment conducive to business sustainability, improved product quality, and added value in the smoked fish industry, and can provide positive benefits to local communities and maintain market order.

3 Result and discussion

3.1 Potential main raw material sources of smoked fish

The geographical location of Ambon Island, which is surrounded by sea waters, makes it easy for coastal communities living in the area to carry out fishing activities, taking into account seasonal and weather conditions. In addition, Ambon Island is supported by three

Value chain model of the smoked fish industry in small island

Ariviana Lientje Kakerissa, Johanis Hiariey, James Abrahamsz, Yoisy Lopilalan

Fisheries Management Areas (WPP), namely 714 (Banda Sea), 715 (Maluku Sea and Seram Island), and 718 (Arafura Sea). This condition provides an advantage for small-scale fishers in Ambon Island, as it opens up opportunities for the development of the capture fisheries processing industry [17-20].

Important information that must be done before analyzing value chain of smoked fish is to know in advance the source of raw materials that supply fish to smoked fish producers. Field research indicates that the source of raw materials for smoked fish is mostly obtained from local fishermen located at several points in Maluku area, such as Latuhalat, Laha, Tulehu, Waai, Seram and Masohi. The percentage of fresh fish supply can be seen in Figure 1.

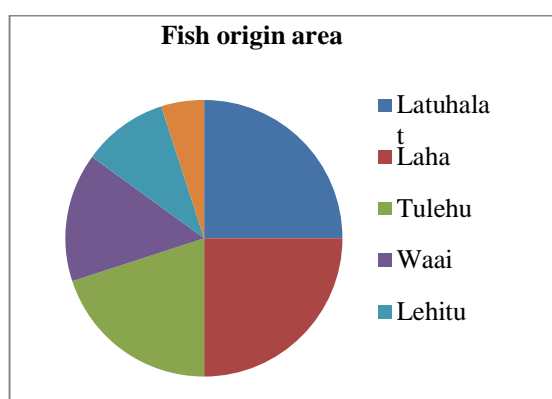


Figure 1 Source of fresh fish suppliers

The areas mentioned above are located in several regencies and cities, including Ambon City, Central Maluku Regency, and West Seram Regency. This is very possible due to the amount of capture fisheries production capacity for each district/city is quite large. Data on capture fisheries production capacity according to [6] are as follows: Ambon City with 25,343.00 tons, Central Maluku Regency with 174,875.50 tons and West Seram Regency with 67,582.80 tons.

3.2 Smoked fish value chain analysis

A value chain consists of a series of organizational tasks and processes that aim to increase value for

customers. These activities include design, production, marketing, delivery of products and supporting endeavors. The objective key in establishing a value chain is to maximize firm's revenue while minimizing production costs. Additionally, the value chain can raise the value or use of the product to be manufactured.

Analyzing the value chain involves examining the activities that contribute to creating value, which can come from both internal and external sources within the organization. The concept of value chain offers a viewpoint of the company's position in the industry value chain. In addition, value chain analysis further aids businesses to better understand the constituent elements of a product within the value chain. The particular value under consideration is the value that begins with the initial raw materials and extends to product management after consumers make a purchase. The company must identify their position within the value chain of the product. This is very important to identify opportunities from the competition. After identifying its position, the company recognizes the activities that make up the value. These activities are studied to identify whether they provide value to the product or not. If the activity provides value, it will continue to be used and improved to maximize value. Conversely, if the activity does not provide added value, it must be eliminated [21].

Activities involved in producing smoked fish are categorized into primary activities and secondary activities in this study. According to [22], primary activities are concerned with the physical production of goods and final sales. These activities are grouped into important categories that are critical to increasing the industry's value, such as inputs, operations, outputs, marketing and sales of products, and services. On the other hand, secondary activities are those that provide support to primary activities and reinforce each other. They are classified into four groups: enterprise infrastructure, human resource management, technology development, and procurement. The smoked fish industry on Ambon Island exhibits these primary and secondary activities in its operations as illustrated in Table 1 and Table 2.

Table 1 Primary activities of the value chain system for smoked fish

Primary Activities	Value Chain Actors					
	Fishermen	Wholesale Traders	Collecting Traders	Industries/SMEs	Retailers	Customers
Arrest	√	-	-	-	-	-
Storage	√	√	-	-	-	-
Processing	-	-	-	√	-	-
Distribution	√	-	√	-	√	-
Purchasing	-	√	√	√	√	√
Sales	√	√	√	√	√	-
Standardization	√	√	√	√	√	-

Value chain model of the smoked fish industry in small island

Ariviana Lientje Kakerissa, Johanis Hiariey, James Abrahamsz, Yoisy Lopolalan

Table 2 Secondary activities of the value chain system for smoked fish

Secondary Activities	
Infrastructure	Standardization of raw and supporting materials and final products
Human resources management	The existence of trainings from related agencies and universities
Technology development	Utilize production equipment assistance from the government and from universities
Procurement	Purchase of raw materials and supporting materials

In general, the chain of smoked fish production on Ambon Island from procurement of raw to marketing of final product, involves several processes:

1. Fishermen engage in the fishing process.
2. Fishermen themselves store their catch, while some of it is transferred to larger traders equipped with cold storage facilities to prevent spoilage.
3. The fishermen's catches are directly sold to major traders, intermediary traders, and small and medium enterprises that process smoked fish.
4. The smoked fish products processed by SMEs are sold to both retailers and consumers.

3.3 Value chain mapping of the smoked fish industry

Mapping the value chain is a critical aspect of conducting value chain analysis, with the aim of identifying the value chain actors who provide the most value. This aligns with the notion presented in [23] which suggests that the primary goal of value chain mapping is to recognize product flows and value chain actors.

When conducting value chain mapping, it is important to follow five fundamental principles:

1) mapping the actors or charting the participants within the value chain,

2) mapping the volume or charting the sales quantities of each participant throughout the value chain,

3) mapping the value or charting the product values at various stages of the value chain,

4) mapping the relative cost of processing or charting the percentage of expenses accrued by each participant within the value chain,

5) mapping information and knowledge transfer or charting the flow of information and technology transfer.

Mapping the smoked fish value chain on Ambon Island is as follows:

1. Actors mapping

The process of mapping actors (Figure 2) aims to determine the different entities involved in a value chain. A value chain's actors typically begin with producers and progress through middlemen to end customers. However, the actors can be expanded to include companies that supply inputs to producers as well as producers themselves.

Participants in the smoked fish value chain comprise of fishermen, wholesale traders, collecting traders, small to medium-sized industries, retailers, and consumers. Refer to the figure below for a visualization of these actors.

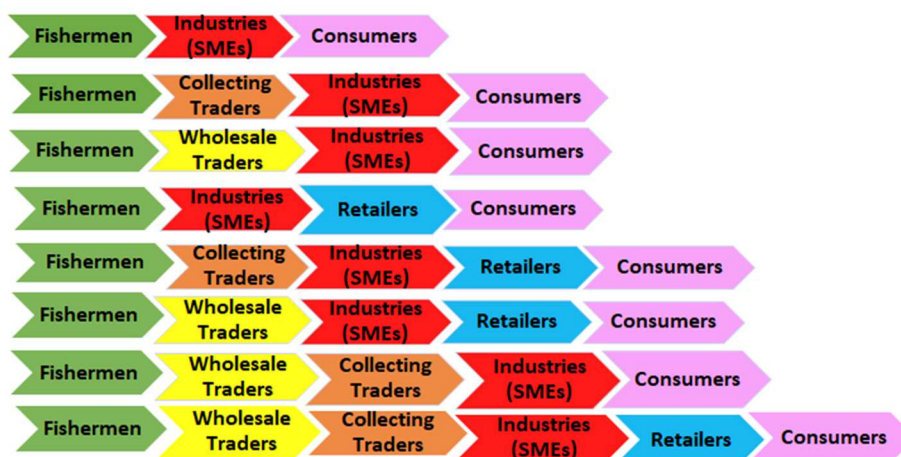


Figure 2 Mapping the actors in the value chain for smoked fish

2. Volume mapping

Volume mapping is utilized to map each actor's sales volume along the value chain. Volume mapping is

extremely important for determining commodity flows and sales share along the value chain.

The sales volume mapping for smoked fish on Ambon Island is depicted in the following figure (Figure 3).

Value chain model of the smoked fish industry in small island

Ariviana Lientje Kakerissa, Johanis Hiariety, James Abrahamsz, Yoisy Lopilalan

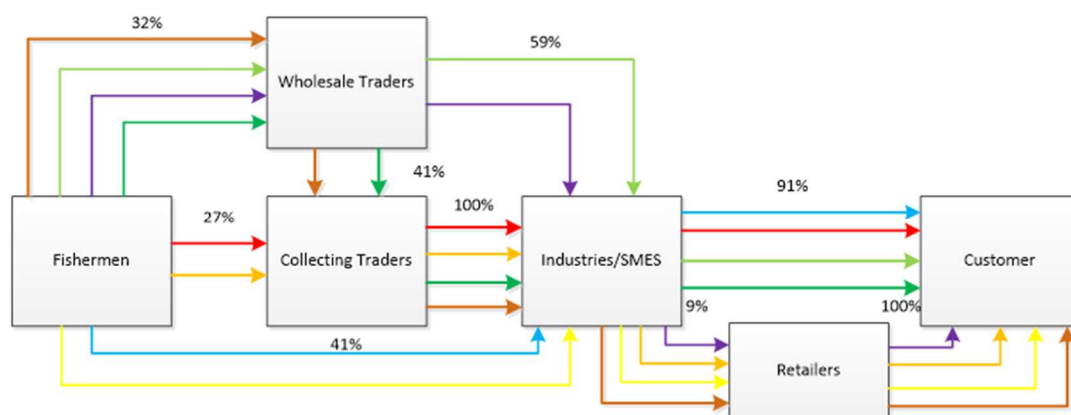


Figure 3 Sales volume mapping within the value chain for smoked fish

The volume of fish in each chain shows the average percentage of fish volume from each actor to the intended actor. Data from fishermen in six areas on Ambon Island revealed that on average 41% of their catch was sold directly to SMEs, 32% to large traders, and the remaining 27% to intermediary traders. SMEs that directly buy fresh fish from fishermen are located in coastal areas or near the beach or close to fish landing ports, such as in Latuhalat, Nusaniwe, Laha, Teluk Ambon, Leihitu, and Tulehu villages. Meanwhile, SME groups in the other two regions obtained fresh fish raw materials through intermediary traders and wholesalers. SMEs that chose to purchase raw materials from collecting traders did so because they were unable to purchase directly from fishermen, while SMEs that purchased raw materials from wholesalers faced difficulties in obtaining fresh fish at the fishermen or

collecting traders level during extreme weather conditions. Under such conditions, fishermen's catches are minimal and limited, making it difficult for SMEs to obtain fresh fish, leading to higher fish prices. This scarcity usually occurs during the lean season from June to September.

3. Value mapping

Value mapping determines the expenses of each player in a value chain. Value mapping is used to see the price received by every actor along the value chain and also to know the total cost.

In the value chain for smoked fish on Ambon Island, the costs incurred by each actor tend to be constant, but the price received by each actor is different for each marketing channel. Figure 4 shows the costs incurred and prices received by each participant per kilogram within the value chain specific for smoked fish.

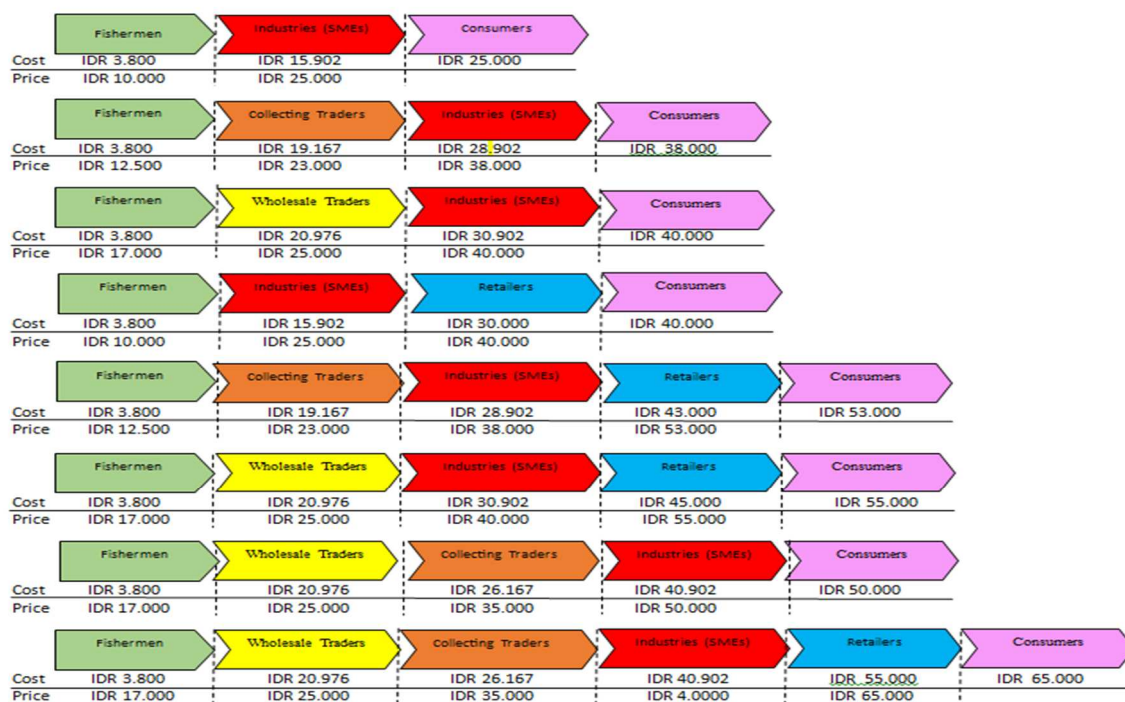


Figure 4 Value mapping in the value chain for smoked fish

Value chain model of the smoked fish industry in small island

Ariviana Lientje Kakerissa, Johanis Hiariey, James Abrahamsz, Yoisy Lopolalan

In the figure above, the cost components incurred by each actor per kg of product can be explained as follows:

- Costs for Fishermen include the average sum of the costs of fuel, fishing gear, transportation, preservation of catches, and fishermen's supplies while at sea.
- Costs for Wholesalers include the average summation of the cost of block ice, other production costs, and the purchase price of fresh fish from fishermen.
- Costs for Collecting Traders include the average sum of block ice costs, transportation costs, other costs such as retribution fees, security fees, etc., and the purchase price of fresh fish.

- Costs to SMEs include the sum of average production costs and the purchase price of fresh fish.
- Costs to Retailers include the average sum of operational costs and the purchase price of smoked fish products from SMEs.

4. Mapping the relative cost of processing

Mapping relative cost of processing is used to examine the costs that are incurred as a result of improving the efficiency of each participant within the value chain.

Mapping the relative cost of processing on the smoked fish value chain can be seen in the image below.

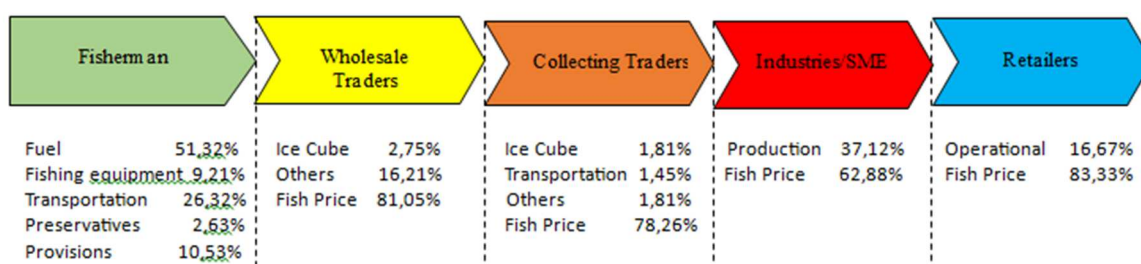


Figure 5. Relative cost of processing mapping in the value chain for smoked fish

The figure 5 illustrates the average percentage of cost components incurred by each respondent, namely fishermen, wholesalers, collectors, SMEs, and retailers in the six regions selected as research sites. The total cost for each actor is 100%.

5. Mapping information and knowledge transfer

Mapping information and knowledge transfer is valuable for understanding the information and knowledge

held by each actor possesses in relation to the commodities in the value chain.

In this value chain for smoked fish, each actor's knowledge is limited primarily to the weather, the price of fish and the type of fish available, which are heavily affected by natural conditions or weather, as illustrated in the table below.

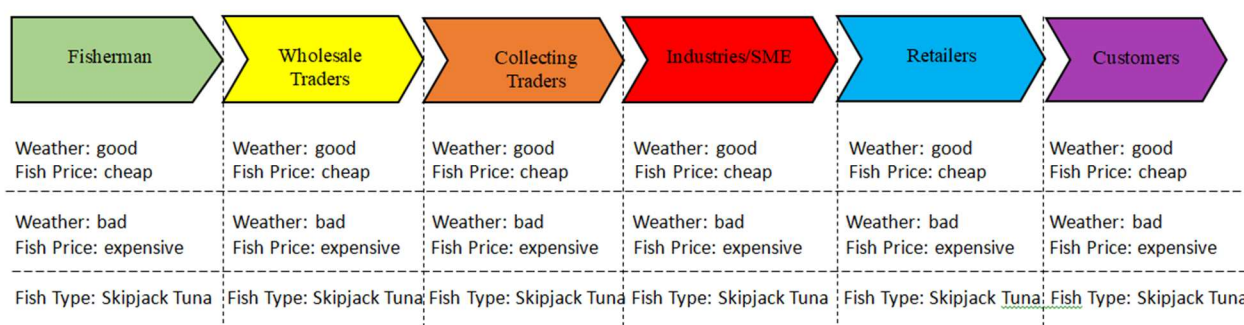


Figure 6 Information and knowledge transfer mapping in the value chain for smoked fish

In the figure above (Figure 6), information on weather conditions and fish prices is critical for business stakeholders. For SMEs, good weather conditions generally result in stable prices for fresh fish raw materials. However, poor weather conditions can have a significant impact on the difficulty and high price of fresh fish in the market. Therefore, SMEs can strategize accordingly in their production process. Regarding the type of fish, this

paper is limited to one type, namely skipjack. On the other hand, if fishers communicate that their catch is skipjack, then all stakeholders in the value chain, including consumers, can anticipate the costs they will incur, given that skipjack is generally more expensive than other types of fish.

Value chain model of the smoked fish industry in small island

Ariviana Lientje Kakerissa, Johanis Hiariey, James Abrahamsz, Yoisy Lopolalan

3.4 Value added analysis

The value-added concept is value-added analysis which begins from the procurement of raw materials through to the completion of the final product. This concept emphasizes the addition of product value during the process within the company. This also means that value-added analysis is a process to identify the percentage increase in the value of a product that has gone through post-harvest handling (processing) or transformation into a new product at each stage of the marketing channel.

The meaning of value added is the difference between the total revenue received by a company or industry from the sale of its output and the costs incurred for raw materials, components, or services purchased to produce those components. Value added can be identified by

observing the disparity between the overall output value and the input value of an industry. Thus, value added is the gap between the sales costs and the expenses incurred for raw materials and the purchase of supporting materials. By eliminating non-value-added costs, a company can focus its attention on aspects that truly contribute value to the product.

Based on cost data and fish prices in the value chain of smoked fish, value added by calculating the selling price of products in each chain and the expenditure on raw materials, indirect costs and overhead costs included in the total cost of goods produced. Meanwhile, the value-added ratio is calculated by taking the value added per product output value and multiplying it by 100% as shown in the tables below.

Table 3 Value-added marketing channel

Marketing Channel	Number of Actors	Production Cost (IDR)	Product Selling Price (IDR)	Total Value-Added (IDR)	Value-Added Ratio (%)
1	3	9.702	25.000	15.298	61,19
2	4	16.363	38.000	21.631	56,92
3	4	13.678	40.000	26.322	65,81
4	4	14.702	40.000	25.298	63,25
5	5	21.363	53.000	31.631	59,68
6	5	18.678	55.000	36.322	66,04
7	5	14.845	50.000	35.155	70,31
8	6	19.845	65.000	45.155	69,47

The table above (Table 3) indicates that the longer the marketing chain, the more smoked fish product's added value. However, after further analysis, it turns out that the added value does not affect the quality of the product but occurs because of the additional costs incurred by the actors involved in the marketing channel. A significant increase in added value with an increase in the selling price of smoked fish. However, the largest marketing margin is found in marketing channel 7 at 70.31% with an added value of IDR 35,155. This added value is said to be efficient because all costs incurred are fully utilized to provide added value to the fish product from fresh fish to smoked fish. This has an impact on the selling price, which is quite high at the end consumer level. On the other hand, the value-added ratio shows a high value because the average is above 40%. This aligns with [24] opinion on value-added ratio indicators, that if the value-added ratio falls below 15%, it is categorized as low. If the proportion of added value falls between 15% and 40%, it is considered moderate. When the ratio of added value surpasses 40%, it is categorized as high.

3.5 Implications of utilizing the value chain model for fisheries industry in small islands

Porter's value chain model comprises tasks that a company must execute to take a product or service from its initial development stage all the way to its final

consumption or utilization., recycling, or reuse [25]. Primary activities and secondary activities are the two types of activities. Secondary activities are those that Enhance value independently or through core operations and additional support functions [26]. Primary activities have a direct impact on product or service development, customer distribution, and post-sales service provision.

In contrast to previous decades where companies valued independence, the next decade will be filled with business alliances across competing value chains across the board. The value chains of companies as business alliance partners will compete fiercely as a unit for customers. This will also happen within the context of smoked fish industry. All actors within the value chain will compete to provide the best service through the products and services offered to attract as many customers as possible. One strategy that can be used is to reduce production costs as well as other less important costs, such as food and drink costs and transportation costs. On the other hand, small and medium-sized smoked fish industries as processors can also develop their products, for example by using liquid smoke and more aesthetic packaging. According to [27], the competitive strength of Small and Medium-sized Enterprises (SMEs) can be improved through the creation of exceptional local products oriented towards resource and environmental conservation; the development should exclusively encompass products crafted from local raw

Value chain model of the smoked fish industry in small island

Ariviana Lientje Kakerissa, Johanis Hiariyey, James Abrahamsz, Yoisy Lopolalan

materials and distinctive regional characteristics, with development facilitated by the local communities.

Ambon Island as a small island also has abundant potential for natural resources in the fisheries sector and local smoked fish products exhibits unique characteristic which should receive attention to be developed. The smoked fish value chain model formed on Ambon Island can be applied to the fisheries industry on small islands that also have abundant natural resources in the fisheries sector. Furthermore, the utilization of the value chain model for the fisheries industry has several important implications, including increased efficiency, business sustainability, improved quality, social sustainability, increased added value, market development, monitoring and supervision, and strategic planning.

Value chain models assist in pinpointing zones where enhancements in efficiency are possible, both in the fishery process itself, and in the management and distribution of fishery products. This can increase productivity and profitability. By optimizing activities with the highest added value, companies can manage production costs more efficiently [28]. This allows stakeholders to better understand the environmental impacts of fishing activities. With this information, strategic steps can be taken to ensure sustainable fishing practices. Incorporating sustainable practices into the value chain will increase added value, market accessibility and local economic development [29].

Value chain models can help improve quality control along the entire production chain. This is important to ensure that fishery products meet food safety and quality standards required for export or local consumption. In addition, in order to maintain the quality of fishery products and support government policies in the fish consumption improvement program, it is necessary to involve the role of the logistics industry as an important part of the fishery product/commodity distribution process [30]. This model also aids in identifying how the fisheries industry can provide greater social benefits to the local community. This includes increased income, job creation, and empowerment of the local community. There is added value and utility from every development implemented [31]. With an improved comprehension of the value chain, it will be possible to exploit opportunities to increase added value in fisheries production, such as processing and increasing derivative products through product diversification. This is also in line with the opinion of [32] that processing fishery products is very important for increasing product diversification and in creating added value.

Value chain models can help identify new market developments or opportunities. They can also help diversify the marketing of fishery products and reduce the risk of dependence on a single market. Value chain models enable better monitoring and surveillance of the entire production chain, which can help detect illegal practices. In addition, value chain models contribute to long-term strategic planning for the fishing industry in small islands.

This planning involves a better understanding of market trends and challenges faced by the fishing sector. The strategy's effectiveness hinges on the suitability of strategies employed within the fisheries sector to adapt to evolving environmental conditions and the intensity of business competition [33].

4 Conclusion

The outcomes of this research concluded that the participants engaged within the value chain for smoked fish on the island of Ambon are: fishermen, wholesalers, intermediary traders, industries/SMEs, retailers and consumers. The relationship created between each actor is that fishermen, wholesalers and small traders act as suppliers who provide fish raw materials for SMEs/smoked fish processing industries. In this case, the SMEs act as producers, as well as distributors who supply products to the market and retailers who sell products to end consumers. Meanwhile, retailers are entities that sell products directly to consumers. The final link in the sequence is the consumer who uses the product and influences demand and preferences in this value chain.

Based on the calculation results between the output value of smoked fish and the input value of fresh or frozen fish raw materials, at each node of the participants within the chain, the value-added analysis shows that all distribution channels have a high value-added ratio because it is $>40\%$. This means that all marketing channels have the potential to enhancing the value addition within the smoked fish industry.

The implications of the value chain model for the fisheries industry in small islands, which also have plentiful natural resources within the fisheries sector, include: increased efficiency, business sustainability, improved product quality, social sustainability for the community, increased added value, market development, strict monitoring and supervision, and careful strategic planning for business sustainability.

This study recommends several strategic policies to improve efficiency, business sustainability, product quality, positive social impact, added value, market development, strict supervision, and strategic planning that can be taken by the government and businesses in the smoked fish industry chain as follows:

- Implement training programs for businesses in the smoked fish industry to improve skills in fish processing and preservation and focus on technological innovation and environmentally friendly production methods.
- Set high quality standards for smoked fish and enforce strict certification, then encourage businesses to comply with these standards to improve product competitiveness in the market.
- Develop empowerment programs for local communities involved in the smoked fish supply chain and ensure community participation in business

Value chain model of the smoked fish industry in small island

Ariviana Lientje Kakerissa, Johanis Hiariy, James Abrahamsz, Yoisy Lopolalan

activities by providing equitable and sustainable benefits.

- Provide tax incentives to businesses that implement sustainable and environmentally friendly practices and consider subsidies for investments in modern technologies that can improve efficiency.
- Support active promotion of smoked fish products in domestic and international markets, and conduct market research to identify new opportunities and support product diversification.
- Enhance supervision and monitoring of the entire smoked fish supply chain to ensure compliance with applicable regulations and standards and apply strict sanctions for violations that could harm the sustainability of the industry.
- Engage stakeholders in strategic planning for the smoked fish industry and facilitate collaboration between government, businesses and research institutions to improve innovation and efficiency.

By implementing these measures, it is anticipated that an environment conducive to sustainable business practices, improved product quality, and value addition within the smoked fish industry will be created. Additionally, these policies aim to provide positive benefits to local communities and maintain market order through strict monitoring and oversight.

Acknowledgement

Gratitude is extended to all stakeholders and smoked fish consumers for their cooperation in distributing the questionnaires. Furthermore, this study would not have been successful without the valuable information contributed by the individuals who responded to the questionnaires. Thanks to all for their support.

References

- [1] PORTER, M.E.: *The Competitive Advantage: Creating and Sustaining Superior Performance*, NY, Free Press, 1985. (Republished with a new introduction, 1998).
- [2] HELLIN, J., MEIJER, M.: *Guidelines for value chain analysis*, Food and Agriculture Organization of the United Nations, Rome, Italy, 2006.
- [3] STRAKOVA, J., SIMBEROVA, I., PARTLOVA, P., VACHAL, J., ZICH, R.: The Value Chain as the Basis of Business Model Design, *Journal of Competitiveness*, Vol. 13, No. 2, pp. 135-151, 2021. <https://doi.org/10.7441/joc.2021.02.08>
- [4] KAKERISSA, A.L., HAHURY, H.D.: Identifikasi Potensi Klaster Industri Pembekuan Ikan Di Pulau Ambon, *Arika*, Vol. 16, No. 1, pp. 27-35, 2022. <https://doi.org/10.30598/arika.2022.16.1.27> (Original in Indonesian).
- [5] Badan Pusat Statistik Provinsi Maluku, Provinsi Maluku Dalam Angka, Ambon, Maluku, [Online], Available: <https://maluku.bps.go.id/> [24 Jul 2023], 2023. (Original in Indonesian).
- [6] Badan Pusat Statistik Kota Ambon, Kota Ambon Dalam Angka, Ambon, Maluku, [Online], Available: <https://maluku.bps.go.id/> [24 Jul 2023], 2023. (Original in Indonesian).
- [7] KAKERISSA, A.L., HAHURY, H.D., LOUHENAPESSY, F.H.: Potential of Smoked Fish Industrial Cluster in the Islands Area, *Acta logistica*, Vol. 9, No. 4, pp. 457-466, 2022. <https://doi.org/10.22306/al.v9i4.347>
- [9] FRIEDRICHSEN, MIKE, MÜHL-BENNINGHAUS W.: (ed.) *Handbook of Social Media Management: Value Chain and Business Models in Changing Media Markets*, Berlin/Heidelberg, Springer, 2013.
- [10] BANDASON, W., PARWADA, C., MUSHUNJE, A.: Macadamia nuts (*Macadamia intergrifolia*) value chain and technical efficiency among the small-scale farmers in Zimbabwe, *Research on World Agricultural Economy*, Vol. 3, No. 4, pp. 25-35, 2022. <http://dx.doi.org/10.36956/rwae.v3i4.700>
- [11] KIM, M., CHAI, S.: The Impact Of Supplier Innovativeness, Information Sharing And Strategic Sourcing On Improving Supply Chain Agility: Global Supply Chain Perspective, *International Journal of Production Economics*, Vol. 187, pp. 42-52, 2017. <https://doi.org/10.1016/j.ijpe.2017.02.007>
- [12] MISSIMER, M., ROBERT, K.H., BROMAN, G.: A Strategic Approach To Social Sustainability-Part 2: A Principle-Based Definition, *Journal of Cleaner Production*, Vol. 140, No. 1, pp. 45-52, 2017. <https://doi.org/10.1016/j.jclepro.2016.04.059>
- [13] KALMYKOVA, Y., SADAGOPAN, M., ROSADO, L.: Circular Economy - From Review of Theories and Practices to Development of Implementation Tools, *Resources, Conservation and Recycling*, Vol. 135, pp. 190-201, 2018. <https://doi.org/10.1016/j.resconrec.2017.10.034>
- [14] MCNEISH, D., KELLEY, K.: Fixed Effects Models Versus Mixed Effects Models for Clustered Data: Reviewing the Approaches, Disentangling the Differences, and Making Recommendations, *Psychological Methods*, Vol. 24, No. 1, pp. 20-35, 2019. <https://doi.org/10.1037/met0000182>
- [15] BHARGAVA, A., BAFNA, A., SHABARISHA, N.: A Review on Value Chain Analysis as a Strategic Cost Management Tool, *Account and Financial Management Journal*, Vol. 3, No. 3, pp. 1386-1393, 2018.
- [16] NGUNJIRI, J.N., RAGUI, M.: Effect of value chain on competitive advantage in the insurance industry in Kenya, *International Academic Journal of Human Resource and Business Administration*, Vol. 3, No. 8, pp. 172-193, 2020.
- [17] KUSDIANTORO, FAHRUDIN, A., WISUDO, S.H., JUANDA, B.: The economic impact of capture fisheries development in Indonesia, *AACL Bioflux*,

Value chain model of the smoked fish industry in small island

Ariviana Lientje Kakerissa, Johanis Hiariyey, James Abrahamsz, Yoisy Lopolalan

- Vol. 12, No. 5, pp. 1698-1709, 2019.
- [18] ZULKIPLI, UJANTO, ANDJARWATI, T.: The Effect Of Fisheries Productivity, Socioeconomic Factor, Non-Fisheries Business Opportunity On Vulnerability And Poverty: Small-Scale Fisheries In Riau Islands, Indonesia, *International Journal of Entrepreneurship and Business Development*, Vol. 4, No. 1, pp. 7-18, 2021.
- [19] SHAADIKIN, R., MASTU, L.O.K., ZUNARDIN, FITRIA, A., YADIR: Peran Pelabuhan Perikanan Terhadap Kemajuan Sosial Ekonomi Masyarakat Nelayan Di Wangi-Wangi Selatan Kabupaten Wakatobi, *Jurnal Kapalamada*, Vol. 1, No. 1, pp. 116-126, 2022. (Original in Indonesian)
- [20] SIRAJUDDIN, R.F., SALIM, A., SALEH, H.: Pengaruh Industri Perikanan Terhadap Sosial Ekonomi Masyarakat Di Kawasan Pesisir Kota Kendari, *Journal of Aquaculture and Environment*, Vol. 5, No. 1, pp. 29-33, 2022. <https://doi.org/10.35965/jae.v5i1.2022> (Original in Indonesian)
- [21] NGABALIN, A.M.: *Analisis Value Chain System dan Strategi Pemasaran Rumput Laut di Kabupaten Maluku Tenggara Provinsi Maluku*, IPB Bogor, Tesis, 2013. (Original in Indonesian)
- [22] PORTER, M.E.: *The competitive advantage of nations*, New York, The Free Press, 1990.
- [23] STRINGER, R.: *A Field Guide to Value Chain Studies for BPTP and BBP2TP Staff: How to develop and use value chain studies for market focused research*, 2009.
- [24] HUBEIS, M.: *Menuju Industri kecil Profesional di Era Globalisasi Melalui Pemberdayaan Manajemen Industri*, IPB Press, Bogor, 1997. (Original in Indonesian)
- [25] PONTE, S., GEREFFI, G., RAJ-REICHERT, G.: *Hanbook on Global Value Chain*, Edward Elgar Publishing, Cheltenham, UK., Northampton, USA, 2019.
- [26] RAO, C.A., RAO, B. P., SIVARAMAKRISHNA, K.: *Strategig Management and Business Policy: Text and Cases*, Excel Books, New Delhi, India, 2008.
- [27] MOHAMAD, N.U., KAUJAN, K., WIDYASTUTI, C.: Improving Competitiveness of Small and Medium Enterprises Based on Local Leading Products in Tarakan City, Indonesia, *Acta logistica*, Vol. 9, No. 1, pp. 303-314, 2022. <https://doi.org/10.22306/al.v9i1.271>
- [28] SWANDANI, DE' GRAVE, A., ALIMUDDIN, PONTOH, G.T.: *Value Chain Analysis to Cost Efficiency*, Advances in Economics, Business and Management Research, Proceedings of the 3rd International Conference on Accounting, Management and Economics 2018 (ICAME 2018), Vol. 92, 2018.
- [29] SYOFYA, H.: The Effect of Environmental Sustainability and Value Chain Concept in the Context of Local Economy on Value Added of Coffee Commodities in Kerinci, *West Science Business and Management*, Vol. 1, No. 3, pp. 107-117, 2023.
- [30] ALFAJRI, M.F., WASIQI, N.C.: Pengembangan Model Tracking and Tracing dalam Komoditi Rantai Pasok Perikanan di Indonesia, *Applied Information Systems and Management*, Vol. 1, No. 2, pp. 96-100, 2018.
- [31] HASAN, M., AZIS, M.: *Pembangunan Ekonomi dan Pemberdayaan Masyarakat: Strategi Pembangunan Manusia dalam Perspektif Ekonomi Lokal*, 2nd ed., Pembangunan Ekonomi, Edisi Kedua, 2018. (Original in Indonesian)
- [32] NURFIKA, R.: *The analysis of value added and development of micro-scale fishery processing businesses in the City of Makassar*, Thesis, Hasanuddin University, Makassar, 2022.
- [33] WASIK, Z., HANDRIANA T.: Strategy for sustainability of the fishery industry during the COVID-19 pandemic in Indonesia, *Cogent Social Sciences*, Vol. 9, No. 1, pp. 1-21, 2023. <https://doi.org/10.1080/23311886.2023.2218723>

Review process

Single-blind peer review process.