

BUSINESS FEASIBILITY ANALYSIS OF FISH JELLY PROCESSING UNIT IN THE FISHERY PRODUCTS PROCESSING AND MARKETERS GROUP “TORANI SUMBER MAKMUR”, CIREBON CITY, WEST JAVA

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Abstract

The Fishery Products Processing and Marketers Group “Torani Sumber Makmur (TSM)” established in 2013 is one of the Fish Processing Units engaged in the post-harvest processing subsystem of agribusiness (agroindustry) through the production of various variants of fish jelly. Since its establishment in 2013, TSM perform its business manually, all records are still carried out manually, and the cost analysis is counted only based on the cost of procurement of raw materials, electricity, and labor without considering other cost components. Furthermore, TSM has never conducted a comprehensive feasibility and sensitivity analysis. Thus, TSM has never had complete figures on how the business runs both financially and non-financially. The purpose of this research is to analyze the business feasibility and sensitivity of the TSM based on non-financial analysis and financial analysis. The data used in this research includes primary data (interviews) and secondary data, then processed with qualitative and quantitative descriptive methods. The results showed TSM has feasible because it meets all aspects of feasibility analysis, both non-financial and financial analysis. Based

on the non-financial analysis, market analysis shows an increasing trend in demand especially in West Java, Jakarta, Banten, Central Java, and Papua Province. The production aspect is controlled; business licensing and product feasibility certification are adequate. TSM empowers surrounding communities and manage the waste, so it does not pollute the environment. Based on financial analysis, Net Present Value (NPV) > 0, Gross Benefit Cost Ratio > 1, Net Benefit Cost Ratio > 1, Internal Rate of Return (IRR) > Opportunity Cost of Capital (Discount Rate), and Break Event Point < Total Revenue. Furthermore, sensitivity analysis shows that with an increase in input price prices by 31%, TSM can still survive.

Keywords: business feasibility, fish jelly, fishery product processing and marketers' group

1 INTRODUCTION

Fisheries defined as all activities related to the management and utilization of fish resources and their environment from pre-production, production, processing to marketing carried out in a fishery business system [1]. The agribusiness system includes activities for procuring production facilities (upstream agribusiness subsystem), production (farming subsystem), post-harvest processing (processing subsystem), product marketing (marketing subsystem) and institutions (service and support subsystem). Subsystems in the agribusiness system should ideally be a series of interrelated activities in the process of producing quality and competitive agricultural products. The fisheries sector is a sector that has the potential to be developed, however the utilization of marine and fishery resources in West Java Province is still relatively low. The contribution of fisheries to Gross Regional Domestic Product (GRDP) to the agricultural sector is still low, namely 23,526.25 billion rupiahs or 12.47% of the GRDP of the agricultural sector, which is 188,617.98 billion rupiahs [2].

Some of the advantages of fishery products include: easy to digest by the body, high content of animal protein, unsaturated fatty acids with very low cholesterol levels, and a number of minerals that are very

useful to meet human needs [3]. However, fishery products also have several drawbacks, including: high water content, easy to digest so that it becomes a good medium for the growth of spoilage bacteria, and unsaturated fatty acid content which causes fish meat to be easily oxidized and so on. Therefore, it requires efforts to maintain the freshness and quality of fish meat through fish processing activities [4]. Furthermore, fish meat very quickly decays no matter how good the handling is done, it will not be possible to keep the fish fresh [5]. Therefore, a pickling and processing process is required. The main purpose of preservation and processing is to defend the fish from the process of decay so that it can be stored for a long time, increase marketing reach, carry out diversification of processing of fishery products, and increase revenue.

Fish processing is a series of activities and/or treatment from fresh fish to final products for human consumption, while the fish processing unit is a place and facility to carry out fish processing activities. The role of the fish processing unit in the fishery agribusiness system is very important, namely: (1) maintaining and extending the durability of the product so that it can be utilized by the wider community; (2) increasing product acceptance, with various variations of processed fishery products, making people have various alternative choices to consume them; (3) increasing the nutritional value, macronutrient components such as fat and protein, including components with large and long molecular weights; and (4) increasing the added value of fishery products.

The principle of fish processing basically aims to protect fish from spoilage or damage. Putrefaction occurs due to changes caused by microorganisms and other changes that are detrimental. Processing also aims to extend the durability and diversify processed fishery products, as well as to increase the added value of fishery products. The Marine and Fisheries Business Group especially the Fishery Product Processing and Marketer Group is very strategic to increase the production of processed fishery products, to socialize the fish eating movement program in order to increase the fish consumption

rate. In addition, Fishery product processing and marketer group is also expected to improve the welfare of fishery product processors and marketers and their families. Fishery product processing and marketer group is a collection of fishery product processors and/or marketers who carry out business activities in the field of processing and marketing fishery products together in a group.

The Fishery Product Processing and Marketer Group "Torani Sumber Makmur (TSM)" is one of the groups assisted by the Ministry of Marine and Fisheries Affairs, the Marine and Fisheries Service of West Java Province, and the Agriculture, Marine and Fishery Service of Cirebon City. The location is quite strategic considering that Cirebon City has a large fishery potential, as seen from the number of companies exporting consumption products, such as squid, snapper, crab, slug fish and others with a total number of products reaching 25 commodities that have penetrated several countries including, USA, China, Hongkong, Taiwan and other Asian countries [6].

The purpose of this research is to analyze the business feasibility and sensitivity of the TSM based on non-financial analysis and financial analysis because since its establishment in 2013, TSM perform its business manually, all records are still carried out manually, the cost analysis is counted only based on the cost of procurement of input prices, electricity and labor without taking into account other cost components. Furthermore, TSM has never conducted a comprehensive feasibility and sensitivity analysis. Thus, TSM has never had a complete figure on how business runs both financially and non-financially.

2 METHODOLOGY

The research was conducted at TSM which is located at Jalan Kalijaga 173 Pegambiran Village, Lemahwungkuk District, Cirebon City, West Java Province from April to May 2022. The data used in this research includes primary data (interviews) and secondary data, then processed with qualitative and quantitative descriptive methods. The feasibility analysis of fish jelly processing unit is based on non-financial

analysis, includes market aspects, technical aspects, management aspects, legal aspects, socio-economic and cultural aspects, and environmental aspects. Meanwhile, based on the financial analysis, includes Net Present Value (NPV), Gross Benefit – Cost Ratio, Net Benefit – Cost Ratio, Internal Rate of Return (IRR), Payback Period (PP), Break Event Point (BEP), and Sensitivity Analysis.

3 RESULTS

3.1 Non-Financial Analysis

3.1.1 Market Aspects

One of the obstacles experienced by micro, small and medium-scale fish processing businesses is market uncertainty which is the sales target. This uncertainty is caused by the lack of market information and market networks owned by the fish processing business. As a result of these market uncertainties, the production produced is not always sustainable and tends to fluctuate [7]. However, the potential and market share of TSM processed fish products have been well organized through the implementation of a good marketing strategy. The potential market is the total number of products that may be sold in a particular market or industry demand if the marketing efforts made by companies in that industry reach the optimal point. Several factors that influence the market potential are:

- a) Demand for Processed Fishery Products. The demand for fish jelly products is increasing every year. The demand for fish jelly products of TSM reaches an average of 250 kg (568 packs)/day or about 75,000 kg (170,455 packs)/year with product weights between 440–500 grams per pack. With limited capital, manpower and processing facilities, this demand has not been fulfilled.
- b) Price Stability. The price of fish jelly products of TSM is relatively stable. The price of the product at the final consumer level is Rp19,000 to Rp27,000 with a product weight of between 440-500 grams/pack. Meanwhile, at the agent/resellers level is Rp15,000 to Rp20,000 with the same product weight.

- c) Number of Products Sold. The product sold of fish jelly products of TSM reached 3,100 kg (6,960 packs)/month or 37,313.28 kg (83,520 packs)/year with product weights between 440–500 grams/pack.
- d) Consumer Characteristics. Consumers/buyers, both final and agents/resellers, come from companies (CV. Salimah Seafood), Offices (Government Agencies, Banking, Factories, Hospitals), Foundations/Islamic Boarding Schools (Husnul Khatimah and Nasrul Haq'sabilul Qur'an), Resellers (spread in several regencies/cities in West Java), and households/final consumers from the general public, civil servants/private sector and so on.

The market share of fish jelly products of TSM includes students of foundations/islamic boarding schools, catering, cafes and restaurants and consumers in West Java. In addition, its products have also penetrated the provinces of Jakarta, Banten, Central Java, and Papua. The Fishery Product Processing and Marketer Group “Nifari Food” is one of the competitors of TSM in Cirebon City. To increase market share, TSM increases sales more than its competitors by acquiring more new customers who may be consumers who have not purchased the product or customers of its competitors as well as encouraging existing customers to become resellers so that they can buy more products.

The marketing strategy used by TSM to achieve the market share mentioned above, namely: offline and online marketing. The offline marketing strategy is carried out to attract target consumers by making banners in front of/around the company and reseller shops. The disadvantage of this strategy is that the shop's visitors are only people who are in the surrounding area. The Company participates in exhibitions and bazaars held by the Government and the private sector to attract new customers and encourage more purchases by existing customers. In addition to selling directly at the exhibition and bazaars, the company also distributes business cards and brochures to visitors. Market absorption carried out offline for fish jelly products reaches 90%. While the online marketing strategy is carried out to

reach the target consumers of online marketing by using social media so that the customer coverage is wider. Market absorption conducted online for fish jelly products reaches 10%.

3.1.2 Technical Aspects

The business location used by TSM is land and buildings owned by the Cirebon Government based on the Operational Cooperation Agreement between the Cirebon Food, Agriculture, Marine and Fisheries Service and TSM.

a. Business Location

The input prices used are supplied from Muara Baru (Jakarta), Karangsong (Indramayu), Tegal (Central Java) and Surabaya (East Java) with adequate quality and quantity available throughout the year. In terms of quality, raw materials must meet the requirements, namely clean, intact, free from defects, fresh smell, elastic texture, compact and solid. The main raw materials used in making fish jelly consist of fresh fish and surimi swallowed tuna fish. Surimi is a Japanese term for meat and tissue to be washed [8]. The use of tuna swallow as a raw material for surimi is expected to reduce fishy odors due to the steaming process and the addition of seasonings [9].

The price of raw materials is relatively stable, but at certain times, such as Eid al-Fitr, it increases by around 2-5%. In addition, the price of raw materials is influenced by transportation costs. Delivery of raw materials from suppliers using truck transportation with fiber and hollow boxes that already contain ice with a temperature of 4°C. The target market consists of foundations/islamic boarding schools, catering, cafes and restaurants as well as consumers in West Java. In addition, the product marketing have also penetrated the provinces of Jakarta, Banten, Central Java, and Papua.

b. Operation Scale

The production capacity of Fish Jelly in TSM is an average of 125 kg (280 packs) per day, where the product has been tested and certified by the Technical Implementation Unit of the Marine and Fisheries Service of West Java Province in Cirebon City. Marketing of TSM product is still on a national scale, in the future, business actors hope that by obtaining the Indonesian National Standard Certificate and Good Manufacturing Practices (GMP) Certificate will be able to expand the market to the international level so that it will increase competitiveness and company turnover. This is supported by the availability of machine capacity which in this case is limited by technical capacity or economic capacity. The number of employees employed is seven peoples to produce fish jelly products as much as 125 kg per day or about 280 packs with product weights between 440-500 grams per pack. Thus, the ability of the production management workforce is around 40 packs/person/day.

c. Production Process

The fish jelly production process at TSM consists of: (1) receiving raw materials; (2) ice and water preparation; (3) melting; (4) weighing; (5) mixing; (6) steaming for nugget products; (7) printing; (8) provision of butter and bread flour; (9) boiling; (10) frying spring rolls; (11) cooling; (12) receipt and storage of packaging and labeling materials; (13) packaging, weighing and labeling; and (14) storage. At first, the procurement of raw materials depended on the availability of fresh fish in suppliers. However, with the increasing consumer demand for processed fish jelly-based products, TSM is combining the use of fresh fish and surimi raw materials. The application of "surimi" technology is an alternative solution to overcome the erratic availability of raw materials and ensure uniformity of raw material quality [10]. Surimi is ground fish meat that has been extracted with water and given anti-denaturation ingredients, then frozen. The advantage of using surimi when compared to fresh fish is that it can maintain

uniform quality, speed up processing and facilitate the storage of raw materials.

3.1.3 Management Aspects

The management team of TSM consist of chairman, procurement, production, quality control, and marketing division. The Chairman, as also head of marketing division is Mochamad Solechudin, procurement division is led by Ismail, while production is led by Dian Herdiana.

3.1.4 Legal Aspects

a. Product

Several certificates or quality standards held by TSM to improve and maintain the quality of the products it produces, namely: GMP Certificate from the Ministry of Marine Affairs and Fisheries; Certificate of Indonesian National Standard from the Product Certificate Institute; Inside Food Certification Permit from the Food and Drug Supervisory Agency; Home Industry Food for Low Risk Products from the District Health Office, and a Halal distribution permit which is mandatory in Indonesia from the Ministry of Religion through the Halal Product Guarantee Agency. Halal certificate is a written fatwa of the Indonesian Ulema Council that declares the halalness of a product in accordance with Islamic sharia [11]. The purpose of halal certification is the formal legal recognition that the products issued have met the halal requirements. However, based on the facts on the ground, there are still many producers who do not follow the rules set by the Indonesian Ulema Council and local governments [12]. In the long run, all food quality regulations and policies must conform to the International Codex Alimentarius and ISO 9000 series standards. Particularly important for Muslim-populated countries was the inclusion of the Codex General Guidelines for Use of the Term Halal (CAC/GL 24-1997) formulation by the Codex Alimentarius Commission at its 22nd meeting in 1997 [13].

GMP Certificate is a certificate given to business actors for each fish processing unit that has implemented good manufacturing practices and meets the requirements of standard sanitation operating procedures. Sanitation is an important part of fish processing that must be carried out properly, to prevent diseases by eliminating or regulating environmental factors related to the chain of transfer of the disease [14]. Meanwhile, the application of the Indonesian National Standard is a form of the Government's role in stemming poor quality food products, both domestically produced and products originating from abroad [15]. Whereas Hazard Analysis Critical Control Point (HACCP) Certificate is proof of effective implementation of HACCP issued by an independent certification body and is a guarantee of food safety through a system that is designed systematically and integrated.

b. Legal Entity

TSM is already a legal entity based on the Decree of the Minister of Law and Human Rights of the Republic of Indonesia Number AHU-0006729.AH.01.07-year 2017 Dated April 19, 2017, concerning the Ratification of the Establishment of a Legal Entity, the Fishery Product Processing and Marketer Group "TSM".

c. Business activities

In order to support its business activities, TSM already has several licensing documents in the form of: Fishery Business License for Fish Processing, Operational Cooperation Agreement, Business Identification Number, Taxable Entrepreneur Confirmation Letter, and Identification Number Taxpayer.

3.1.5 Socio-Economic And Cultural Aspects

The presence of the TSM in the Cirebon City caused a social change. This can be reflected in the adjustments made by the social system as a result of these changes, namely the achievement of the Fish Consumption Rate of 26.43 kg/capita equivalent to fresh whole fish in 2019 then increased to 31.10 kg/capita equivalent to fish. Fresh whole in 2020 with an increase of 17.67%. The need for fish in households in Cirebon City based on consumer preferences is dominated by

preserved milkfish, catfish and cooked [16]. Consumer preference for processed fishery products is whether someone likes or dislikes processed fishery products consumed [17].

Likewise, its influence on the development of fishery product processing technology in the community. In general, processed fish products produced by the community are in the form of salted fish, shrimp paste, meatballs, sweets (empek-empek), dumplings, chips and shredded. However, with the improvement of science and technology for processing fishery products, the diversification of processed products made from raw fish with various types and forms has been found in the community, such as: nugget, fishstick, fish roll, ekado, dragon leg and so on. With the development of fish processing businesses in TSM as well as among the community in Cirebon, it can create jobs, increase the income of fish processors and their families and can increase local revenue through retribution/taxes.

3.1.6 Environmental Aspects

Environmental aspects are very meaningful for the sustainability of the company, because the company cannot be separated from the environment in which it is located, so what must be considered is the local community, situation, conditions, and culture [18]. The business activities of processing fishery products carried out by TSM produce organic waste in the form of remains of meat, fish bones and other waste (fish entrails) that are not processed which can be utilized by others. Waste in the form of remains of meat and fish entrails can be used as an additional ingredient for animal feed, while fish bones can be processed into fish bone meal as an ingredient for making animal feed or fish feed.

In addition, fish bones have various functions other than being used as fish meal, which can be used as organic fertilizer. The advantages of organic fertilizer from fish waste include: (1) the fertilizer produced is an organic fertilizer with more complete nutrients than inorganic fertilizers; (2) make the leaves of ornamental plants more shiny, more flowers, and last longer; (3) the availability of abundant and cheap raw materials because it utilizes fish processing waste; (4) competitive

selling prices compared to very expensive imported products; (5) fulfill the concept of back to nature through organic farming [19].

3.2 Financial Analysis

3.2.1 Net Present Value (NPV)

Based on the NPV calculation in **Table. 1**, the fish jelly processing unit implemented by TSM is declared feasible because the NPV is greater than 0 ($NPV > 0$), which is Rp1,600,706,111 which means the business is profitable or provides benefits.

3.2.2 Gross Benefit – Cost Ratio (Gross B/C)

Based on the calculation of the Gross B/C in **Table. 2**, the Fish Jelly Processing Unit carried out TSM is declared feasible because the Gross Benefit – Cost Ratio is greater than 1 ($Gross\ B/C > 1$), which is 1.198, which means that each TSM increases production costs spent Rp1, then the benefits that will be received by TSM is Rp1,198.

3.2.3 Net Benefit – Cost Ratio (Net B/C)

Based on the calculation of the Net B/C in **Table. 3**, the Fish Jelly Processing Unit conducted by TSM is declared feasible because the Net Benefit – Cost Ratio is greater than 1 ($Net\ B/C > 1$), which is 11.702. This value is greater than the results of previous research on the development of a milkfish jelly fish business of 2.5615 [20].

3.2.4 Internal Rate of Return (IRR)

Based on the calculation of the Internal Rate of Return (IRR) in **Table. 4**, the Fish Jelly Processing Unit carried out by TSM is declared feasible because the IRR is greater than its Opportunity Cost of Capital ($DR=10\%$), which is 286.00%. This illustrates that the investment made will generate a greater return than previously planned.

3.2.5 Payback Period (PP)

Based on the calculation of the Payback Period (PP) in **Table. 5**, Fish Jelly Processing Unit carried out by TSM illustrates that the investment costs used for the business can be returned within a period of 3.18 years or 3 years and 2 months. Thus, the business is declared feasible because the period of return on investment is faster than the

period of return / payment of principal and interest on the loan (tenor) set by the creditor (BNI) which is 4 years.

3.2.6 Break Event Point (BEP)

Based on the calculation of Break Event Point (BEP) in **Table. 6**, the Fish Jelly Processing Unit carried out at TSM is 332,449, indicating that TSM is at breakeven or not profitable and does not lose if it only produces 332,449 units of fish jelly (332,449 packs) within a period of 10 years or an average of 33,244.9 packs per year. The BEP value mentioned above is smaller than the total production volume produced, which is 651,148 packs or an average of 65,114.8 packs per year. This value is greater than the results of previous research on the development of a milkfish jelly fish business of 9.203 packs [20]. Thus, the undertaking was declared viable and profitable.

3.2.7 Sensitivity Analysis

Based on the calculation of sensitivity analysis in **Table. 7**, the Fish Jelly Processing Unit carried out at TSM shows that with an increase in raw material/input prices by 31%, TSM can still survive.

Table 1. The Calculation of Net Present Value (NPV) of TSM in 2013 to 2022

Year		Cost	Benefit (Rp)	Net Benefit (Rp)	DF (10%)	PV Cost	PV Benefit	PV Net Benefit
		(a)	(b)	(c)=(b)-(a)	(d)	(e)=(a)(d)	(f)=(b)(d)	(g)=(c)(d)
0	2013	250.075.207	100.508.000	- 149.567.207	1,000	250.075.207	100.508.000	- 149.567.207
1	2014	1.155.446.853	1.674.704.000	519.257.147	0,909	1.050.301.190	1.522.305.936	472.004.746
2	2015	1.074.475.653	1.254.744.000	180.268.347	0,826	887.516.890	1.036.418.544	148.901.654
3	2016	1.089.729.667	1.183.080.000	93.350.333	0,751	818.386.980	888.493.080	70.106.100
4	2017	1.499.803.707	1.710.624.000	210.820.293	0,683	1.024.365.932	1.168.356.192	143.990.260
5	2018	1.477.130.187	1.710.624.000	233.493.813	0,621	917.297.846	1.062.297.504	144.999.658
6	2019	1.573.818.013	1.898.616.000	324.797.987	0,564	887.633.360	1.070.819.424	183.186.064
7	2020	1.618.043.207	1.916.233.000	298.189.793	0,513	830.056.165	983.027.529	152.971.364
8	2021	1.574.649.807	2.128.448.000	553.798.193	0,467	735.361.460	993.985.216	258.623.756
9	2022	1.656.229.167	2.070.120.000	413.890.833	0,424	702.241.167	877.730.880	175.489.713
Total		12.969.401.467	15.647.701.000	2.678.299.533		8.103.236.194	9.703.942.305	1.600.706.111

$$NPV = \sum_{t=0/1}^n \frac{B_t}{(1+i)^t} - \sum_{t=0/1}^n \frac{C_t}{(1+i)^t} = 9.703.942.305 - 8.103.236.194 = 1.600.706.111$$

or:

$$NPV = \sum_{t=0/1}^n \frac{B_t - C_t}{(1+i)^t} = 1.600.706.111$$

Table 2. Calculation of Gross Benefit – Cost Ratio of TSM in 2013 to 2022

Year		Cost	Benefit (Rp)	Net Benefit (Rp)	DF (10%)	PV Cost	PV Benefit
		(a)	(b)	(c)=(b)-(a)	(d)	(e)=(a)(d)	(f)=(b)(d)
0	2013	250.075.207	100.508.000	- 149.567.207	1,000	250.075.207	100.508.000
1	2014	1.155.446.853	1.674.704.000	519.257.147	0,909	1.050.301.190	1.522.305.936
2	2015	1.074.475.653	1.254.744.000	180.268.347	0,826	887.516.890	1.036.418.544
3	2016	1.089.729.667	1.183.080.000	93.350.333	0,751	818.386.980	888.493.080
4	2017	1.499.803.707	1.710.624.000	210.820.293	0,683	1.024.365.932	1.168.356.192
5	2018	1.477.130.187	1.710.624.000	233.493.813	0,621	917.297.846	1.062.297.504
6	2019	1.573.818.013	1.898.616.000	324.797.987	0,564	887.633.360	1.070.819.424
7	2020	1.618.043.207	1.916.233.000	298.189.793	0,513	830.056.165	983.027.529
8	2021	1.574.649.807	2.128.448.000	553.798.193	0,467	735.361.460	993.985.216
9	2022	1.656.229.167	2.070.120.000	413.890.833	0,424	702.241.167	877.730.880
Total		12.969.401.467	15.647.701.000	2.678.299.533		8.103.236.194	9.703.942.305

$$\text{Gross } B/C = \frac{\sum_{t=0/1}^n \frac{B_t}{(1+i)^t}}{\sum_{t=0/1}^n \frac{C_t}{(1+i)^t}} = \frac{9.703.942.305}{8.103.236.194} = 1,198$$

Table 3. Calculation of Net Benefit – Cost Ratio of TSM in 2013 to 2022

Year		Net Benefit (Rp)	DF (10%)	PV Benefit	
		(a)	(b)	(c)=(a)(b)	
0	2013	- 149.567.207	1,000	- 149.567.207	1.750.273.318
1	2014	519.257.147	0,909	472.004.746	
2	2015	180.268.347	0,826	148.901.654	
3	2016	93.350.333	0,751	70.106.100	
4	2017	210.820.293	0,683	143.990.260	
5	2018	233.493.813	0,621	144.999.658	
6	2019	324.797.987	0,564	183.186.064	
7	2020	298.189.793	0,513	152.971.364	
8	2021	553.798.193	0,467	258.623.756	
9	2022	413.890.833	0,424	175.489.713	
Total		2.678.299.533		1.600.706.111	

$$Net^{B/C} = \frac{\sum_{t=0/1}^n \frac{B_t - C_t}{(1+i)^t}}{\sum_{t=0/1}^n \frac{B_t - C_t}{(1+i)^t}} = \frac{1.750.273.318}{149.567.207} = 11,702$$

Table 4. Calculation of Internal Rate of Return (IRR) of TSM in 2013 to 2022

Year		Net Benefit	DF (10%)	PV Net Benefit (10%)	DF (30%)	PV Net Benefit (30%)	DF (286%)	PV Net Benefit (286%)	DF (287%)	Net Benefit (287%)
		(a)	(b)	(c)=(a)(b)	(d)	(e)=(a)(d)	(f)	(g)=(a)(f)	(h)	(i)=(a)(h)
0	2013	- 149.567.207	1,000	- 149.567.207	1,000	- 149.567.207	1,000	- 149.567.207	1,000	- 149.567.207
1	2014	519.257.147	0,909	472.004.746	0,769	399.308.746	0,259	134.522.577	0,258	134.174.973
2	2015	180.268.347	0,826	148.901.654	0,592	106.718.861	0,067	12.098.872	0,067	12.036.426
3	2016	93.350.333	0,751	70.106.100	0,455	42.474.402	0,017	1.623.132	0,017	1.610.583
4	2017	210.820.293	0,683	143.990.260	0,350	73.787.103	0,005	949.649	0,004	939.872
5	2018	233.493.813	0,621	144.999.658	0,269	62.809.836	0,001	272.483	0,001	268.980
6	2019	324.797.987	0,564	183.186.064	0,207	67.233.183	0,000	98.195	0,000	96.682
7	2020	298.189.793	0,513	152.971.364	0,159	47.412.177	0,000	23.355	0,000	22.936
8	2021	553.798.193	0,467	258.623.756	0,123	68.117.178	0,000	11.237	0,000	11.007
9	2022	413.890.833	0,424	175.489.713	0,094	38.905.738	0,000	2.176	0,000	2.126
Total		2.678.299.533		1.600.706.111		757.200.017		34.469	-	403.622

$$\begin{aligned}
 IRR &= t_1 + \frac{NPV_1}{NPV_1 - NPV_2} x (i_2 - i_1) \\
 &= 286\% + \frac{34.469}{(34.469) - (-403.622)} x (287\% - 286\%) \\
 &= 286\% + \frac{34.469}{438.091} x 1\% \\
 &= 286\% + \frac{344,69}{438.091} = 286,00079 = 286,00
 \end{aligned}$$

Table 5. Calculation of Payback Period (PP) of TSM in 2013 to 2022

Description	Year										Total	Average
	0 2013	1 2014	2 2015	3 2016	4 2017	5 2018	6 2019	7 2020	8 2021	9 2022		
1 Total Inflow	100.508.000	1.674.704.000	1.254.744.000	1.183.080.000	1.821.888.000	1.710.624.000	1.898.616.000	1.916.233.000	2.128.448.000	2.070.120.000	15.758.965.000	1.575.896.500
2 Total Outflow	250.075.207	1.155.446.853	1.074.475.653	1.089.729.667	1.499.803.707	1.477.130.187	1.573.818.013	1.618.043.207	1.574.649.807	1.656.229.167	12.969.401.467	1.296.940.147
3 Net Benefit	- 149.567.207	519.257.147	180.268.347	93.350.333	322.084.293	233.493.813	324.797.987	298.189.793	553.798.193	413.890.833	2.789.563.533	278.956.353
4 Discount Factor (10%)	1,000	0,909	0,826	0,751	0,683	0,621	0,564	0,513	0,467	0,424		
5 PV Net Benefit (NPV)	- 149.567.207	472.004.746	148.901.654	70.106.100	219.983.572	144.999.658	183.186.064	152.971.364	258.623.756	175.489.713	1.676.699.423	167.669.942
6 Total Investment	132.250.000	169.000.000	12.215.000	36.150.000	4.265.000	50.100.000	34.065.000	91.275.000	1.515.000	1.550.000	532.385.000	53.238.500

$$\begin{aligned}
 \text{Payback Period} &= \frac{I}{Ab} \\
 &= \frac{\text{Total Investment}}{\text{Average Net Cash Flow per Year}} \\
 &= \frac{532.385.000}{167.669.942} \\
 &= 3,18 \text{ Years} \quad (3 \text{ years and 2 months})
 \end{aligned}$$

Table 6. Calculation of Break Event Point (BEP) of TSM in 2013 to 2022

Year	Fixed Cost (FC)	Variable Cost (VC)	Total Cost (TC)	Production (Pack)	Value of Production (Rp)	AVC (Rp/Pack)	P (Rp/Pack)	P - AVC	BEP (Unit)	
0	2013	55.923.667	59.784.000	115.707.667	4.468	100.508.000	13.380	22.495	9.115	6.136
1	2014	263.700.333	676.483.000	940.183.333	51.216	1.174.704.000	13.208	22.936	9.728	27.108
2	2015	294.065.333	720.091.600	1.014.156.933	54.888	1.254.744.000	13.119	22.860	9.741	30.189
3	2016	325.508.667	678.885.600	1.004.394.267	51.768	1.183.080.000	13.114	22.854	9.739	33.421
4	2017	354.573.667	1.087.145.600	1.441.719.267	79.008	1.821.888.000	13.760	23.060	9.300	38.128
5	2018	357.521.667	1.033.745.400	1.391.267.067	74.016	1.710.624.000	13.967	23.112	9.145	39.095
6	2019	359.038.333	1.144.011.600	1.503.049.933	82.056	1.898.616.000	13.942	23.138	9.196	39.042
7	2020	367.089.167	1.123.155.000	1.490.244.167	80.712	1.862.808.000	13.916	23.080	9.164	40.057
8	2021	364.014.167	1.185.268.400	1.529.282.567	83.520	1.928.448.000	13.952	23.090	9.138	39.837
9	2022	362.384.167	1.247.734.400	1.610.118.567	89.496	2.070.120.000	13.942	23.131	9.189	39.436
Total		3.103.819.168	8.936.304.600	12.040.123.768	651.148	15.005.540.000	13.630	22.975	9.345	332.449

$$BEP (Unit) = \frac{TFC}{(P - AVC)}$$

Table 7. Calculation of Sensitivity Analysis of TSM in 2013 to 2022

No.	Description	Raw Material Price (Fixed)	Changes in Raw Material Prices								
			Inflation 4,02%	5,00%	10,00%	15,00%	20,00%	25,00%	30,00%	31,00%	32,00%
1	Average Cost (Rp)	-	1.332.473.359	1.341.135.685	1.385.331.223	1.429.526.761	1.473.722.299	1.517.917.837	1.562.113.375	1.570.952.482	1.579.791.590
2	Average Cost of Raw Materials (Rp)	883.910.760	919.443.973	928.106.298	972.301.836	1.016.497.374	1.060.692.912	1.104.888.450	1.149.083.988	1.157.923.096	1.166.762.203
3	Average Costs other than Raw Materials (Rp)	- 883.910.760	413.029.387	413.029.387	413.029.387	413.029.387	413.029.387	413.029.387	413.029.387	413.029.387	413.029.387
4	Revenue (Rp)	29.072.917	1.575.896.500	1.575.896.500	1.575.896.500	1.575.896.500	1.575.896.500	1.575.896.500	1.575.896.500	1.575.896.500	1.575.896.500
5	Profit (Rp)	29.072.917	243.423.141	234.760.815	190.565.277	146.369.739	102.174.201	57.978.663	13.783.125	4.944.018	- 3.895.090

4 CONCLUSIONS

The results showed TSM has a feasible because it meets all aspects of feasibility analysis, both non-financial and financial aspect. Based on non-financial analysis, market analysis shows increasing trend on demand especially in West Java, Jakarta, Banten, Central Java, and Papua Province. Production aspect is controlled; business licensing and product feasibility certification are adequate. Based on financial analysis, the research found that TSM meets all financial feasibility requirements standard, which consists of i) NPV > 0, ii) Gross B/C > 1, iii) Net B/C > 1, iv) IRR > Opportunity Cost of Capital (DR), v) PP is faster than the period of return/payment of principal and interest on the loan (tenor) set by the creditor, and vi) BEP < Total Revenue. This conclude that fish processing business run by The Fishery Products Processing and Marketers Group is potential and feasible. Furthermore, sensitivity analysis shows that with an increase in raw material prices by 31%, TSM can still survive. This rate of sensitivity indicates that the processing business is resilient of input price changes.

REFERENCES

- [1] Law of the Republic of Indonesia Number 45 of 2009 concerning Amendments to Law Number 31 of 2004
- [2] Central Bureau of Statistics of West Java Province (2022). *West Java in Figures 2022*. Catalog: 1102001.32
- [3] Agustini, T. W., & Swastawati, F. (2003). *Pemanfaatan Hasil Perikanan Sebagai Produk Bernilai Tambah (Value-Added) dalam Upaya Penganekaragaman Pangan*. Jurnal. Teknol. Dan Industri Pangan, 14(1).
- [4] Jusnita, N. (2018). *Pengawetan Ikan Secara Alami*. Jurnal BERDIKARI, 1.
- [5] Ndahawali, D. H. (2016). *Mikroorganisme Penyebab Kerusakan Pada Ikan dan Hasil Perikanan Lainnya*. Buletin Matric, 13(2).
- [6] Hamid Ali, 2015. *6 Perusahaan Ini Akhirnya Bisa Ekspor Hasil Laut*. Jitunews.com
- [7] Zamroni, A., & Purnomo, A. H. (2017). *Identifikasi Kebutuhan Modal Usaha Berskala Kecil dan Menengah Dalam Industri*

- Pengolahan Perikanan*. Jurnal Penelitian Perikanan Indonesia, 11(3). <https://doi.org/10.15578/jppi.11.3.2005.41-50>
- [8] Moniharapon, A. (2014). *Teknologi surimi dan produk olahannya*. Jurnal Majalah Biam, 10(1).
- [9] Lalopua, V. M. N., & Onsu, A. (2021). *Karakteristik Kimia dan Organoleptik Kamaboko Surimi Tetelan Ikan Tuna*. AGRITEKNO: Jurnal Teknologi Pertanian, 10(2). <https://doi.org/10.30598/jagritekno.2021.10.2.74>
- [10] Tawali, A. B., Sukendar, N. K., Mahendaradatta, M., & Asfar, M. (2018). *Ipteks Bagi Kreativitas dan Inovasi Kampus ; Produk Olahan Ikan Berbasis Surimi*. Jurnal Panrita Abdi, 2(1).
- [11] Debbi, N. (2018). *Implementasi Sertifikasi Halal Pada Produk Pangan*. Qiyas, 3(1).
- [12] Lubis, M., Ahmatnijar, A., & Dalimunthe, D. (2021). *Sertifikasi Halal pada Produk Makanan*. Jurnal El Thawalib, 2(3).
- [13] Nuryanti, F., & Lili, W. (2017). *Analisis Sanitasi dan Higiene Unit Pengelolaan Ikan KEP.01/MEN/2007 Studi Kasus Pengolahan Otak-Otak Bandeng Di Ukmp Juwita Food Bandung*. Jurnal Perikanan Dan Kelautan, VIII(2).
- [14] Sulistyو Prabowo, A. A. R. (2016). *Sertifikasi Halal Sektor Industri Pengolahan Hasil Pertanian Halal Certificate in the Agricultural Products Processing Industry*. Forum Penelitian Agro Ekonomi, 34(1).
- [15] Nilanto (2016, dalam Indopos.co.id, 2016). *Produk Pangan Wajib Tersertifikasi Mutu dan Aman*. Badan Standardisasi Nasional, bsn.go.id.
- [16] Dinas Kelautan dan Perikanan Provinsi Jawa Barat (2021). *Capaian Angka Konsumsi Ikan Provinsi Jawa Barat Tahun 2021*. Dinas Kelautan dan Perikanan Provinsi Jawa Barat.
- [17] Aiman, A., Handaka, A. A., & Lili, W. (2017). *Analisis Preferensi Konsumen dalam Pengambilan Keputusan Membeli Produk Olahan Perikanan di Kota Tasikmalaya (Studi Kasus di Pasar Tradisional Cikurubuk, Kec Mangkubumi)*. Jurnal Perikanan dan Kelautan, 8((1)).
- [18] Suradi, S., Haslindah, A., & Jamilah, J. (2017). *Analisis Kelayakan Pendirian Usaha Nugget Ikan Bandeng dengan Metode Net Present Value (NPV) di Kabupaten Maros*. ILTEK: Jurnal Teknologi, 12(02). <https://doi.org/10.47398/iltek.v12i02.374>.

- [19] Infoakuakultur. (2016). *Raup Untung dari Pupuk Organik Berbahan Limbah Ikan*. Raup Untung dari Pupuk Organik Berbahan Limbah Ikan | KKP News
- [20] Fitri, M., Santi, A., Arfini, F., & Tartar, S. U. (2017). *Pengembangan Usaha Fish Jelly (Bakso, Nugget, Kaki naga, Otak-otak) Ikan Bandeng Chanos-chanos Forks*. Jurnal Dinamika Pengabdian Vol.2 No.2.