

Financial Feasibility Analysis of *Ilisha elongata* Cracker Processing Businesses at Fish Processing Unit in Bengkalis, Riau

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Abstract. This study analyzes the financial feasibility of fish cracker processing trades in Bengkalis Regency, Riau Province. The short-term and long-term feasibility analysis were used to determine the business feasibility. The data collected consists of primary and secondary data obtained through interviews, observations, and documentation. The analysis showed that the fish crackers processing business is profitable with an average monthly profit of Rp. 9,599,700. Therefore, the *Ilisha elongata* crackers processing business at the fish processing unit in Bengkalis is worth continuing.

1 Introduction

Bengkalis Regency is situated on the east coast of the Island of Sumatra. It is one of the 11 regencies in the Riau Province, with Bengkalis as its Capital. The area covers 30,646.83 km², encompassing both land and oceanic territories. Bengkalis Regency lies on the edge of the international shipping channel between the Strait of Malacca. It is positioned within the Indonesia-Malaysia-Singapore economic growth triangle, rendering it a strategically important area. This geographical advantage has propelled Bengkalis Regency to possess substantial potential for marine resources, leading to most of its residents working as fishermen. At the same time, some housewives pursue secondary occupations as fishery product processors [2].

The puput fish, scientifically known as *Ilisha elongata*, is a pelagic fish with considerable economic value due to its high protein content of 77.46% [16]. Characterized by cycloid-like scales, a torpedo-shaped body, a beard and fish-like mouth, a fork-shaped tail, and fins, the puput fish inhabits brackish and coastal waters. Puput fish is one of the endemic fish species

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in Bengkalis Regency, so the prospect of developing puput fish is very promising to be developed.

Puput fish has promising prospects for the fishery business, one of which is by processing puput fish meat into fish crackers. This cracker processing business can be developed nationally and internationally considering Bengkalis borders the Malacca Strait, which is close to Malaysia and Thailand.

Several studies related to business feasibility analysis in fisheries have been conducted previously, such as Business analysis of fish sauce from Goldspotted Anchovy (*Coilia dussumieri*) in Bagansiapiapi, Riau Province [6]; Feasibility analysis of the patin (*Pangasius* sp.) fishing business in Kampar district, Riau province [18]; The business potential of "Indofishme" as a nutrient-rich, healthy instant noodle alternative [3]; Financial analysis of purse seine fisheries business (Case Study of KM Daya Cipta) in The Nusantara Fishing Port of Sibolga, North Sumatera [13]; The financial business characteristics of hand line fisheries in the SAP Area of Raja Ampat Islands and the surrounding sea [1]; Social inclusion and SMEs: The case of creative SMEs in Hackney Wick and Fish Island, London [12]; COVID-19's effects and adaptation strategies in fisheries and aquaculture sector: An empirical evidence from Bangladesh [10]; and Understanding fish production and marketing systems in North-western Nigeria and identification of potential food safety risks using value chain framework [5].

The fisheries business undertaken by entrepreneurs must generate sustainable profits. Therefore, it is necessary to conduct a business feasibility analysis. Business feasibility analysis is used to determine whether the business is profitable or not. The profit obtained by a company can be a measure of the company's success. Business analysis in the fisheries business is very necessary, because there is considerable uncertainty in the business, especially in the fishing and fish processing business, which is strongly influenced by the fishing season [6].

2 Materials and methods

2.1 Location and time research

This research was conducted from January to March 2023 at the Fish Processing Unit (UPI) in Bengkalis Regency, Riau Province. This research has been conducted in 9 sub-districts in Bengkalis District. To see the map of the research location can be seen in Figure 1.

2.2 Research methods

The method used in this research is the survey method, namely by directly observing the field. The data collected consists of primary and secondary data. Primary data is a type of data obtained by carrying out direct observations in the field, namely at the UPI business in Bengkalis Regency and conducting interviews with UPI owners using a questionnaire. Secondary data is a type of data obtained from related agencies, namely the Marine and Fisheries Service of Bengkalis Regency.

Respondents in this study were 80 UPI owners in Bengkalis District. Data taken from respondents is done by non probability sampling technique or non random by using purposive sampling method which is sampling technique with certain consideration.

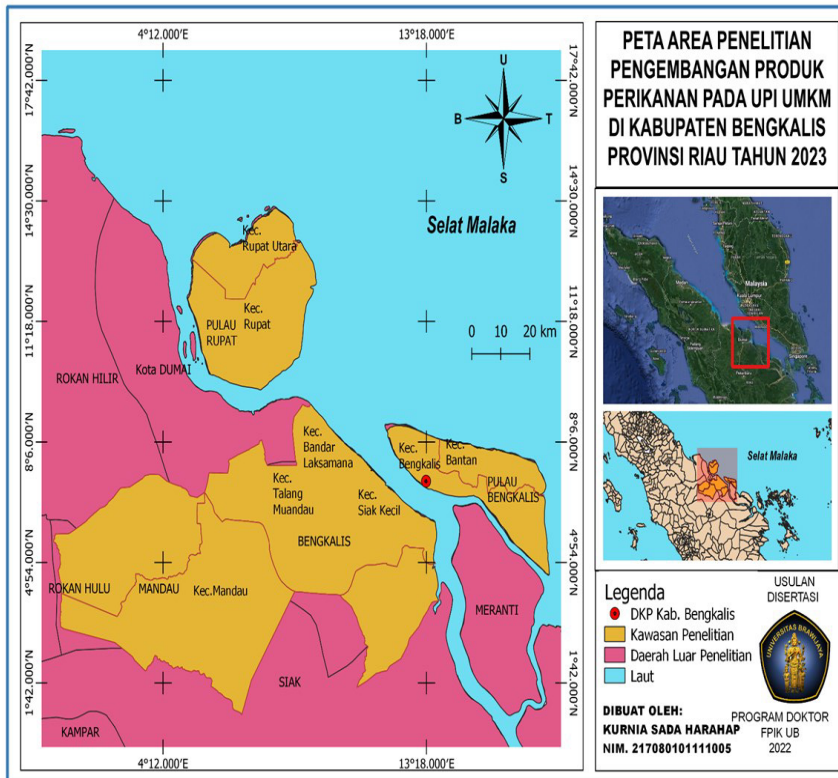


Fig. 1. Research location map.

2.2.1 Data analysis

Data analysis used is short-term business feasibility analysis and long-term business feasibility analysis. Short-term business feasibility analysis includes R/C Ratio, Rentability, and Break Even Point (BEP). Long-term business feasibility analysis includes Net Present Value (NPV), Internal Rate of Return (IRR), Net Benefit Cost Ratio (Net B/C Ratio), and Payback Period (PP).

2.2.2 R/C Ratio

The revenue-cost ratio analysis compares total revenue and costs [15]. The formula used equation (1) where TR = Total Revenue (Revenue) and TC = Total Cost (Cost). The criteria are $R/C < 1$: the business suffers a loss, $R/C > 1$: the business is making a profit, $R/C = 1$: the business has a breakeven point (no profit, no loss).

$$R/C \text{ Ratio} = TR/TC \tag{1}$$

2.2.3 Profitability

Profitability is the ability of a company with working capital to generate profits. The profitability formula can be obtained by using the following formula [17] used equation (2) where Operating Profit (L) is Total profit earned during a certain period, and Operating Capital (M) is Capital or assets used to generate the profit.

$$\text{Profitability} = [(Operating Profit)/(Operating Capital) \times 100\%] \quad (2)$$

2.2.4 Break Even Point (BEP)

BEP is a point in the amount of production or sales that must be made so that the costs incurred can be covered again or the value where the profit received by a business is zero [11]. The BEP formula used equation (3) and (4) where FC: Fixed Cost (Fix Cost), P: Selling Price per unit, and VC: Variable Cost per unit (Variable Cost).

$$BEP (unit) = FC/[P-VC] \quad (3)$$

$$BEP (sales) = FC/[(1-VC/P)] \quad (4)$$

2.2.5 Net Present Value (NPV)

Net Present Value is the difference between the investment and the present value of net cash receipts in the coming period [20]. The advantage of using the NPV method is as a measure of the profit of a business because this method focuses on the company's contribution to the level of prosperity of the shareholders. According to [14], Net Present Value can be calculated using the following formula (5).

Where B_t is Gross revenue of year t , N is Economic age, C_t is Gross cost of year t , and I is Interest rate. The criteria are $NPV > 0$ for the business is worth continuing its activities, $NPV < 0$ for the company is not able to continue its activities, and $NPV = 0$ for the business experiences BEP. That is, the benefits obtained are only enough to cover production costs.

$$NPV = \sum + (n \cdot B_t - C_t) / \{t = 1 \cdot [(1-i)^{-t}]\} \quad (5)$$

2.2.6 Internal Rate of Return (IRR)

The Internal Rate of Return (IRR) measures the rate of return on yields. Internal Rate of Return (IRR) is the interest rate between cash outflows and expected cash inflows [7]. This method considers the time value of money, so cash flows are discounted at the interest rate. According to [20], mathematically, IRR can be calculated using the following formula (6). Where i_1 is the average discount rate that results in NPV_1 and i_2 is the average discount rate that results in NPV_2 . The criteria are $IRR > \text{interest rate}$: the business is feasible and $IRR < \text{interest rate}$: the business is not feasible

$$IRR = i_1 + \left[\frac{NPV_1}{NPV_1 + NPV_2} \right] (i_1 - i_2) \quad (6)$$

2.2.7 Net Benefit Cost Ratio (Net B/C ratio)

The Net Benefit-Cost Ratio determines the benefit amount and how many times the cost and investment to gain profit. The Net benefit-cost ratio is the comparison between the positive

NPV and the negative NPV. The value of the Net benefit-cost ratio shows the level of contrast between benefits and costs incurred by a business [4]. According to [14], the Net benefit-cost ratio can be calculated using the following formula (7). With the criteria $Net\ B/C < 1$: the business is not feasible to continue and $Net\ B/C > 1$: the business is feasible to continue

$$Net\ B/C = (\sum PV\ Net\ Benefit)/(\sum PV\ Investment) \times 100 \quad (7)$$

2.2.8 Payback Period (PP)

The Payback Period is a period required to recoup investment expenditures (initial cash investment) using cash flow; in other words, the Payback Period is the ratio between the initial cash investment and the cash inflow, the result of which is a unit of time [7]. The payback period (PP) can be found in 2 ways are (8) and (9), namely:

- The Payback Period formula if the cash flow of the investment project is the same every

$$Payback\ Period = \frac{Initial\ Investments}{Cash\ Flow} \times 1\ year \quad (8)$$

- The payback period formula if the cash flow of the investment project is different every year where n = Last year, when the amount of cash flow still could not cover the initial investment, a = Initial investment amount, b = Cumulative total cash flow in the year $-n$, and c = Cumulative total cash flow for the year in $n+1$. According to [9], the payback period criteria are as follows: $PP < 3$ year is fast returns, PP 3-5 year is medium returns, and $PP > 5$ year is slow returns.

$$Payback\ Period = n + \frac{a-b}{c-b} \times 1\ year \quad (9)$$

3 Results and discussion

3.1 Short-term feasibility analysis

3.1.1 Capital

In the realm of business, Capital assumes a pivotal role, serving as a fundamental determinant for the operations of a company. Capital, or financial resources, stands as the linchpin determining a company's functioning feasibility. Despite fulfilling all the prerequisites for initiating a business endeavor, the absence of adequate Capital can impede the seamless and anticipated progression of the enterprise.

1. Investment capital

Business investment capital in Fish Crackers in Parapat Tunggal Village, Bengkalis District, namely sealers, fly scales, basins, para-para, steamer screens, brushes, freezers, and kneading machines. Details of the calculation can be seen in Table 1.

2. Depreciation (per year)

Within the fish cracker processing business in the Bengkalis Sub-district, situated in the jurisdiction of Bengkalis Regency, Riau Province, a notable expenditure pertains to the depreciation of equipment utilized within this business framework. The method employed to calculate the depreciation of each item used in the production process involves dividing the overall purchase cost by its respective technical lifespan. Elaborated calculations can be referenced in Table 2 for further insight.

Table 1. Investment capital of fish crackers processing.

No	Investment Type	Quantity (Unit)	Price (Rp/Unit)	Total Price (Rp)
1	Para-para	4 pieces	400.000	1.600.000
2	Streamer	One piece	1.500.000	1.500.000
3	Mixing machine	Two pieces	3.500.000	7.000.000
4	Freezer	Three pieces	3.500.000	10.500.000
5	Sealer	One piece	170.000	170.000
6	Weighing scale	Two pieces	125.000	250.000
7	Basin	Two pieces	30.000	60.000
8	Brushes	Two pieces	10.000	20.000
	Total			21,100,000

Table 2. Depreciation of investment capital of fish crackers processing business.

NO	Investment Type	Quantity (Unit)		Price (Rp/Unit)	Total Price (Rp)	Technical Life(Years)	Depreciation in 1 Year
1	Para-para	4	pieces	400000	1,600,000	5	320,000
2	Streamer	1	pieces	1500000	1,500,000	5	300,000
3	Mixing machine	2	pieces	3500000	7,000,000	5	1,400,000
4	Freezer	3	pieces	3500000	10,500,000	5	2,100,000
5	Sealer	1	pieces	170000	170,000	5	34,000
6	Laying scales	2	pieces	125000	250,000	5	50,000
7	Basin	2	pieces	30000	60,000	1	60,000
8	Brushes	2	pieces	10000	20,000	1	20,000
	Total				21,100,000		4,284,000

3. Fixed cost

Fixed costs in fish cracker processing are depreciation, electricity, maintenance, and employee salaries (3 people). Detailed calculations can be seen in Table 3.

*) depreciation costs per year of 4,284,000, - if per month means divided by 12, it becomes Rp.357,000. Maintenance costs per year amounted to 1,000,000, - if per month means divided by 12 so that it becomes Rp.83,300,-.

4. Variable cost

Fish cracker processing costs include puput fish, tapioca flour, salt, flavoring, food coloring, garlic, and pp plastic. The details of the calculation can be seen in Table 4.

*) The total variable cost of processing fish crackers in 1 day is Rp.442,000, - if in 1 month it means multiplying by 30 days to be: Rp.13,260,000,-.

Table 3. Fixed cost of fish crackers processing business.

No	Description	Value (Rp)
1	Depreciation	357.000
2	Electricity	150.000
3	Care	83.300
4	Employee salary (4 people)	2.800.000
	Total	3.390.300

Table 4. Average total cost of fish crackers processing business.

No	Data	Value (Rp)
1	Fixed Cost	3.390.300
2	Variable Cost	13.260.000
	Total Cost	16.650.300

5. Total cost

Total costs are obtained from the sum of fixed costs and variable costs. Details of the calculation can be seen in Table 5.

The largest percentage of total costs is non-fixed costs, and this is because non-fixed costs greatly affect the production capacity of the fish cracker processing business. The fixed costs that have the largest percentage are depreciation costs. Both costs are very influential in running a fish cracker processing business and must still be incurred for the smooth running of the business.

Table 5. Variable cost of fish crackers processing business.

No	Description	Unit	Unit Price	Total Price
1	Puput Fish	5 kg	20.000	100.000
2	Tapioka flour	25 kg	10.000	250.000
3	Salt	Eight ons	6.000	6.000
4	Flavoring	0,5 kg	25.000	25.000
5	Food coloring	One pack	3.000	3.000
6	Garlic	0.5 kg	14.000	14.000
7	PP plastic	1,5 kg	44.000	44.000
	Total			442.000

Table 6. Revenue of fish crackers processing business.

Revenue	1x Production (Day)	1 Month
Production (kg)	25 kg	750 kg
Selling price (Rp/kg)	35.000	35.000
Amount (Rp)	875.000	26.250.000

6. Business income

Calculations must be made in analyzing income by multiplying the price per unit by the total products produced. Based on the results of the analysis with a price of Rp.35,000 per kg of fish crackers and total sales of 25 kg of crackers per day, the revenue of the fish cracker processing business is Rp.875,000 per day. Details of the calculation of fish cracker processing business revenue can be seen in Table 6.

The number of fish crackers produced in 1 day:

= 25 kg of fish crackers

Total revenue = 25 kg x Rp.35.000,-

= Rp.875.000,-

According to [19], revenue is the total value of products produced in a specific time, where revenue depends on the price and amount of products made. Revenue is obtained by multiplying the amount of production by the cost per unit.

3.2 Business feasibility analysis

Business feasibility analysis is a study that analyzes a business or project by providing a feasibility assessment to consider whether the business/project is feasible. Business feasibility analysis consists of short-term analysis and long-term analysis. The short-term analysis includes the R/C Ratio, profit, Rentability, and Break Event Point. The long-term analysis consists of Net Present Value (NPV), Internal Rate of Return (IRR), Net Benefit Cost Ratio (Net B/C Ratio), and Payback Period (PP).

3.2.1 Short-term Analysis

1. R/C Ratio

$$\begin{aligned} R/C \text{ Ratio} &= \frac{TR}{TC} \\ &= \frac{26.250.000,-}{16.650.300,-} \\ &= 1,57 \end{aligned}$$

Based on the calculation of the RC Ratio in the fish cracker processing business, a value of 1.57 is obtained, which means that the business is said to be profitable to run because the RC Ratio value is > 1, which follows the RC Ratio provisions.

2. Advantages

Profits are calculated to determine how much profit the fish cracker processing business makes. According to [19], business profit or net income is the amount of revenue after deducting the costs that have been incurred for business activities so that profits can be formulated:

$$\begin{aligned} \text{Profit} &= \text{Revenue}(TR) - \text{Total Cost} (TC) \\ &= \text{Rp.26.250.000,-} - \text{Rp.16.650.300,-} \\ &= \text{Rp.9.599.700,-} \end{aligned}$$

So, the profit/profit obtained in 1 month of this fish cracker processing business is Rp. 9,599,700,-

3. Profitability

$$\begin{aligned} \text{Profitability} &= \frac{\text{profit}}{\text{capital business}} \times 100\% \\ &= \frac{\text{Rp.9.599.700,-}}{\text{Rp.16.650.300,-}} \times 100\% = 57,66\% \end{aligned}$$

Profitability is the ability of a business with the Capital that works in it to generate profits in a certain period. The results of the profitability of the fish cracker processing business obtained a profit of 57.66% of the Capital spent on operational activities. This 57.66% retability can be interpreted that every time there is an addition of 100 rupiah, the UPI processing business will generate a profit of 57.66 rupiah.

4. Break Event Point (BEP)

$$BEP (sales) = \frac{FC}{(1 - \frac{VC}{P})}$$

$$BEP (sales) = \frac{Rp. 3.390.300}{(1 - \frac{Rp. 13.260.000}{26.250.000})}$$

= Rp.3.390.299,49 per month

Based on the Break Event Point calculation results, the total BEP result is Rp. 3,390,299.49 per month, meaning that this fish cracker processing business will reach an equilibrium point (breakeven point) after obtaining a sales level of fish crackers in the market of Rp.3,390,299.49 per month.

3.2.2 Long-term feasibility analysis

Long-term analysis is a way to analyze the sustainability of the business, whether in 5 or 10 years it will experience an increase or even experience bankruptcy. Long-term analysis of the fish crackers processing business includes Net Present Value (NPV), Net B/C Ratio, Internal Rate of Return (IRR), and Payback Period (PP). The values of NPV, Net B/C Ratio, IRR, and PP for fish cracker processing are presented in Table 7.

Table 7. NPV, Net B/C Ratio, IRR, and payback period of fish crackers processing business.

Description	NPV	Net B/C Ratio	IRR	Payback Periode
Value	76.133.000	3,66	52%	1,54

The value of NPV, IRR, B / C Ratio, and Payback period depends on the size of the income and expenses of the fish cracker processing business. If the NPV value is significant, the IRR is large, the Net B / C Ratio is large, and the return is fast. Meanwhile, if the NPV value is small, the IRR is small, the B / C Ratio is small, and the recovery is slow. Interest rates, expenses, and income highly influence the size of the IRR value. If the profit earned is small, the IRR value is small, and if the profit earned is significant, the IRR value is immense. Net B / C Ratio depends on the size of income and expenses; the lower the costs and the higher the payment, the greater the Net B / C Ratio value and vice versa. The faster or slower a capital can return depends on income and expenses; the higher the income and the lower the costs, the return of Capital will be, and the more down the payment, the longer the payback period.

a. Net Present Value (NPV)

Net Present value is the difference between income and expenditure that has been present valued at more than zero. This method uses a discount rate of 10% following the current microcredit interest rate. Based on the calculation of the NPV value of the fish cracker processing business of Rp.76,133,000, - The value of this revenue is more than 0, so the company is said to be feasible and profitable. This follows [14], which states that if the present value of future net cash receipts is greater than the current value of the investment, then this project is said to be profitable so that it is accepted, while if it is smaller (negative NPV), the project is rejected because the project is considered unprofitable.

b. Net B/C Ratio

The Net B / C Ratio analysis technique measures whether or not a business is feasible by comparing the net benefits of the years concerned with the net costs in the year that have been presented value-kan. The fish cracker processing business's Net B / C Ratio value is 3.66. The company is feasible because the Net B / C Ratio value is more than 1. This is following [14]: if the Net B / C Ratio value > 1, the project is considered profitable or feasible, but if the Net B / C Ratio value < 1, the project is declared not viable.

c. Internal Rate of Return (IRR)

Internal Rate of Return shows the ability of a business to generate a return or the level of profit it achieves. The Internal Rate of Return of the fish cracker processing business is 52%. This Internal Rate of Return calculation assumes each rupiah's return on investment value in one business year. The company will remain profitable if the interest is still below 52%. An investment is said to be beneficial if its value is greater than the relevant interest rate; from the calculation of the fish cracker processing business, it is said to be profitable or feasible because the IRR value is greater than the required interest of 10%. According to [8], the Internal Rate of Return (IRR) method calculates the interest rate that equates the present value of the investment with the current value of future net cash receipts. If this interest rate is greater than the relevant interest rate (the required profit rate), then the investment is said to be profitable; if it is smaller, it is said to be detrimental.

d. Payback Period (PP)

The Payback Period for fish crackers processing business investment is 1.54 or 1 year, five months, and four days. Return of Capital is included in the fast category because the return of Capital is in the range of less than three years. In contrast, according to [9], the payback period value of less than three years of return on business capital is categorized as fast.

4 Conclusion

The fish crackers processing business conducted by UPI owners in Bengkalis District has good prospects to be developed in the future. The conclusion that can be drawn is that the average profit of the fish crackers processing business in the Bengkalis District is Rp.115,196,400,- / year or Rp.9,599,700,- / month. The fish cracker processing business analysis in the Bengkalis District has an NPV value of Rp.76,133,000, a Net B / C Ratio value of 3.66, an IRR value of 52%, and a Payback Period value of 1.54. Therefore, it can be concluded that the fish cracker processing business at UPI in Bengkalis Regency is very feasible to develop.

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