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Measuring the Feasibility of Catfish Farming Business

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Abstract:

This study aims to determine the business feasibility of Pak Dayat's catfish farming, the feasibility of the business from the aspect located in RW VI, Bulusan Village, Tembalang District, Semarang. The study was conducted in June 2024 with data collection techniques in the form of observation, interviews, and documentation. The analysis tools used for the financial aspect use Payback Period (PP), Net Present Value (NPV), Internal Rate of Return (IRR), Average Rate of Return (ARR), Profitability Index (PI), The results of the study are that the Payback Period of the business is more than 2 years and 3 months. it can be concluded that when viewed from the Payback Period, the catfish farming business is declared feasible to run. The NPV analysis produces a value greater than 0. Thus, when viewed from the NPV value, the catfish farming business is feasible to run. The results of the study obtained an IRR value greater than the desired level of profit. Namely the IRR value of 67.5, thus the catfish farming business is declared feasible to run. The ARR value is 33% higher than the requirement, so it can be said that this business is feasible to run. The Profitability Index figure shows a figure of 2.96> 1, so it can be said that the catfish farming business is feasible to run.

Keywords: *PP, NPV, IRR, ARR, PI*

1. Introduction

Entrepreneurship development is the right way to reduce unemployment in Indonesia. This is because it allows people to build their own businesses and create jobs. Entrepreneurship in the current administration is very important and is the main focus to be developed and continued to be boosted in order to increase the growth of the number of entrepreneurs in this country (Maulana & Fitriani, 2022). This will help reduce unemployment and improve people's welfare. In addition, entrepreneurship will also increase people's income and increase their purchasing power. Entrepreneurship can also help improve the Indonesian economy. With new businesses, there will be an increase in demand and production, which will drive economic growth. This will help reduce unemployment in Indonesia. In addition, entrepreneurship can also help create new jobs, so that more people will have the opportunity to get jobs. Entrepreneurship will also help strengthen the economy as a whole. By expanding economic activities throughout Indonesia, there will be more jobs and opportunities for people to increase their income. This will help reduce unemployment in Indonesia.

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Investment decisions taken by a company are crucial to its survival (Nasir, 2023). This is because these decisions relate to the funds used for investment, the type of investment chosen, the expected return, and the risks that may arise. Investment is an investment of funds made by a company into a set (asset) with the hope of obtaining income in the future (Ediwodjojo & Ginting, 2018). Investment decisions aim to generate income that is able to cover the cost of the investment itself (Ningsih et al., 2017). The income obtained is based on cash flow projections from the investment, not profit, because the profit recorded in the financial statements is not always in cash. A company's long-term investments can include various things, such as investments in fixed assets, land, factories, or equipment. Investment decisions (capital budgeting) and financing decisions are usually discussed separately (Sudana, 2015), with the cost of capital as the discount rate that links the two decisions. Once the investment decision is approved, the financial manager will determine the most appropriate financing method. Both new and established companies are certainly faced with the challenge of choosing the right and profitable investment for the long term, such as expanding production capacity, buying other companies, or renovating existing facilities. Purnatiyo. (2022), the larger the scale of investment, the more important this study is carried out because the larger the scale of investment, the greater the amount of funds invested. A business feasibility study is an analysis to assess whether a business is feasible or not (Rosita. & Saptomo, 2023). This study includes various important ideas related to the selection and general ways of determining business activities that can generate financial and social benefits. Feasibility refers to in-depth research that aims to determine whether the business to be started is profitable. This means that the business being run is expected to provide benefits, both financially and non-financially, in accordance with the expected goals. According to Kriegner and Berger (2016), a feasibility study is a process used to predict the results of a planned investigation, as well as the potential benefits that may be obtained. Meanwhile, according to Purnomo, Riawan, and Sugianto (2017), a feasibility study is a consideration in assessing whether to accept or reject a planned project.

One of the efforts that can be done to reduce unemployment and if pursued will generate income is raising catfish. This is because the prospects for the catfish business in the country are still bright and profitable. The Ministry of Maritime Affairs and Fisheries (KKP) in 2021 also noted that catfish production in the country reached 1.06 million tons with a profit of IDR 18.93 trillion. The first advantage of the catfish farming business is the high number of enthusiasts and the market share is quite large. This is because catfish can be processed into a variety of delicious Indonesian dishes. Such as fried catfish, grilled catfish, crispy catfish, catfish bothok, catfish floss, chips, frozen food, and so on. Therefore, the estimated demand for catfish will never be quiet. Moreover, the population in Indonesia increases every year, which means that the number of catfish consumption is also increasing. The purpose of this research is to determine the business feasibility of Pak Dayat's catfish cultivation, the feasibility of the business from the aspects located in RW VI, Bulusan Village, Tembalang District, Semarang.

2. Theoretical Background

Investment Feasibility

According to PSAK, investment is an asset used by a company for wealth growth (accretion of wealth) through the distribution of investment returns (such as interest, royalties, dividends and rent) for the appreciation of investment value, or for other benefits for the investing company such as benefits obtained through trade relations (Sanjaya, 2018). According to Tandelilin (2010), investment is defined as "a commitment to a number of funds or other resources made at this time, with the aim of gaining profit in the future." The method used to assess investment feasibility is using an interest-based method (discounting model) such as the NPV method and the IRR method (Hasibuan, 2020). In addition to these two methods, there is another method that is often referred to as a non-interest-based method (non-discounting model).

Feasibility refers to the ability of a business to generate financial and non-financial profits in accordance with predetermined objectives. This is possible because the business provides benefits not only to the company, but also to investors, creditors, government, and society. The purpose of the feasibility study is not only to find the optimal solution to each problem related to the design and layout of the business unit, but also to provide an overview of the desired achievement of success (Shen et al., 2010). The approach used involves an internal company approach. As expressed by Rizal (2017), this internal approach is related to how the business unit can achieve its vision and mission to continue to grow.

Present Value Analysis (NPV)

Adi et al. (2016), stated that Present Value Analysis (NPV) is based on the concept of equality, where all cash inflows and outflows are calculated by referring to the current value, using the minimum desired rate of return (Minimum Attractive Rate of Return-MARR). Net Present Value (NPV) is used to assess whether an investment is feasible or not. NPV is calculated by considering the present value of the investment, where the relevant interest rate must be determined first. If the NPV result is positive, the investment is considered feasible and profitable. As Warren Buffet said in (Rosita & Saptomo, 2023)., Price is what you pay, value is what you get," illustrates the importance of calculating the future value of an investment to ensure its profitability.

Payback Period

Rosita & Saptomo (2023) stated that the Payback Period in fixed asset investments, such as land, buildings, machinery, and equipment, is one of the methods in *capital budgeting*, namely the process of planning and making decisions related to spending funds that exceed one year. This technique aims to find out how long it will take for the investment value to return through the cash flow generated. Wijayanto (2012), PP is the period required to recoup investment expenditures (initial cash investment). This method estimates the payback period, where alternatives with faster payback times are the main choices. This technique is usually used as additional data to measure how quickly the invested capital can be returned.

Internal Rate of Return (IRR) Analysis
Adi et al. (2016), stated that the Internal Rate of Return (IRR) analysis is used to determine the relevant interest rate based on a series of cash inflows and outflows from an investment alternative. The interest rate (i) can be calculated through several analysis methods such as present worth, future worth, or annual worth. Internal Rate of Return (IRR) is a method that calculates the interest rate that equates the present value of an investment with the present value of net cash receipts in the future (Rachadian et al., 2013)

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Internal Rate of Return (IRR) Method.
Giatman (2006) in Saputra (2019) stated that the Internal Rate of Return (IRR) method is the rate of return that makes the Net Present Value (NPV) of an investment zero. However, not all cash flows generate IRR, and the resulting IRR is not always single, sometimes more than one IRR value can be found

3. Methodology

Type of Research
This research is a type of field research. This research was conducted at Mr. Hidayat's catfish farming business, which is located in Bulusan Village, Tembalang District, Semarang. The data sources used are: primary data and secondary data. Data collection methods used by researchers include: observation, interviews and documentation. Data Analysis Techniques Data Analysis Techniques applied in the study are using Financial analysis with calculations using the Payback Period (PP), Net Present Value (NPV), Internal Rate of Return (IRR) and Profitability methods

Place and Time of Research
Place of research: Catfish Owners and Entrepreneurs in Bulusan Village
Time of research: Research starts on March 1, 2024 until June 1, 2024
Equipment used: Questionnaires and voice recorders

Data Collection Methods
Based on the source of data collection, in this study the researcher uses primary data, namely data obtained directly from the object being studied through procedures and data collection techniques in the form of: a). direct observation techniques, b). in-depth interview techniques by conducting questions and answers with catfish owners

in Semarang City and c) documentation techniques specifically designed according to the researcher's objectives.

Theoretical Framework

The conceptual framework or theoretical thinking is made by considering the descriptions that have been explained previously, so in this section, several things will be described that are used as a basis for future research. The basis in question will direct the research more to find data and information in this research in order to solve the problems that have been explained previously.

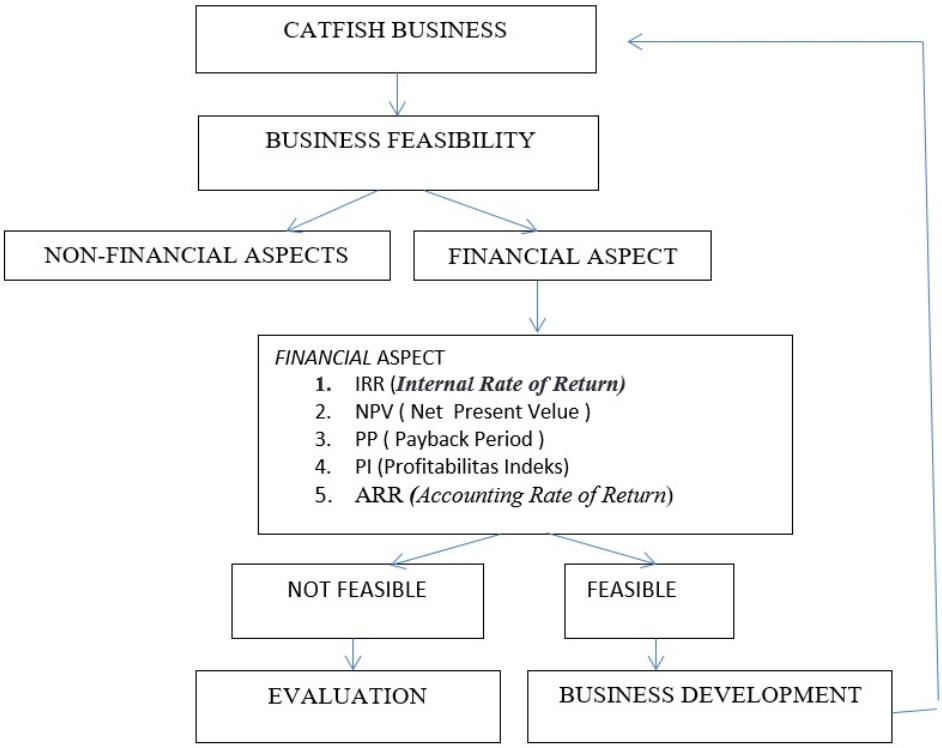

Figure 1. Theoretical Framework of Thought

4. Empirical Findings/Result

Analysis of Financial Feasibility Assessment of Business Development

The financial aspect plays an important role in determining whether or not a business can be run

• Benefit Flow (Inflow)

Benefit flow (Inflow) can increase the income of the business being run. In developing a catfish business, inflow is obtained from catfish sales revenue. The following is the amount of income obtained by the catfish business from 2021 to 2024 where for 2021 (1 harvest), 2022 (4 harvests), 2023 (4 harvests) and 2024 (3 harvests) or 12 harvests:

Table 2. Income per Harvest

Harvest Time	Quantity / Kg	Price/Kg	Income
Harvest-1	1.810	Rp 22.000	39.820.000
Harvest-2	1.830	Rp 22.000	40.260.000
Harvest-3	1.835	Rp 22.000	40.370.000
Harvest-4	1.845	Rp 23.000	42.435.000
Harvest-5	1.850	Rp 23.000	42.550.000
Harvest-6	1.863	Rp 23.000	42.849.000
Harvest-7	1.870	Rp 23.000	43.010.000
Harvest-8	1.875	Rp 24.000	45.000.000
Harvest-9	1.880	Rp 24.000	45.120.000
Harvest-10	1.888	Rp 24.000	45.312.000
Harvest-11	1.913	Rp 24.000	45.912.000
Harvest-12	1.920	Rp 24.000	46.080.000

Source: Primary data (2024)

Table 3. Initial Investment Requirement

No	Information	Cost
1	**Fixed Cost**	
	1. Tarpaulin 22 X @1.100.000	24.200.000
	2. Scales 2 X @ 50.000	100.000
	3. Catfish Sorting Basket 3 X @ 45.000	135.000
	4. Fish Scoop 2 X @ 30.000	60.000
	5. Water pump machine 1 X @450.000	450.000
	6. Pipe and stopcock	500.000
	7. Paving	1.000.000
	8. Warehouse Construction	10.500.000
	9. Electrical installation	1.000.000
	10. Licensing	5.000.000
	Total Fixed Assets	**42.945.000**

Table 4. Net Income

Information	Harvest-1	Harvest-2	Harvest-3	Harvest-4
Sales	39.820.000	40.260.000	40.370.000	42.435.000
CGS	30.570.000	30.570.000	31.310.000	31.325.000
Gross Profit	**9.250.000**	**9.690.000**	**9.060.000**	**11.110**
Cost :				
Variable Cost				
Catfish Seeds	4.500.000	4.500.000	5.250.000	5.250.000
Feed	15.600.000	15.600.000	15.600.000	15.600.000
Medicines and vitamins	50.000	50.000	40.000	55.000
Water	5.520.000	5.520.000	5.520.000	5.520.000
Employee salary	4.900.000	4.900.000	4.900.000	4.900.000
Total Variable Cost	***30.570.000***	***30.570.000***	***31.310.000***	***31.325.000***
Fixed Cost				
Electricity	300.000	300.000	300.000	300.000
Depreciation	2.147.250	2.147.250	2.147.250	2.147.250
Total Biaya Tetap	***2.447.250***	***2.447.250***	***2.447.250***	***2.447.250***
TOTAL COST	33.017.250	33.017.250	33.757.250	33.772.250

Earning Before Taxes	6.802.750	6.802.750	6.612.750	8.662.750
Taxes	340.137,5	340.137,5	330.637,5	433.137,5
Earning After Taxes	6.462.612,50	6.462.612,50	6.282.112,50	8.229.612,50
Information	Harvest-5	Harvest-6	Harvest-7	Harvest-8
Sa[es	42.550.000	42.849.000	43.010.000	45.000.000
CGS	33.880.000	33.870.000	33.860.000	33.275.000
Gross Profit	8.670.000	8.979.000	9.150.000	11.725.000
Cost :				
Variable Cost				
Catfish Seeds	6.000.000	6.000.000	6.000.000	6.000.000
Feed	17.400.000	17.400.000	17.400.000	16800.000
Medicines and vitamins	60.000	50.000	40.000	55.000
Water	5.520.000	5.520.000	5.520.000	5.520.000
Employee salary	4.900.000	4.900.000	4.900.000	4.900.000
Total Variable Cost	*33.880.000*	*33.870.000*	***33.860.000***	***33.275.000***
Fixed Cost :				
Electricity	300.000	300.000	300.000	300.000
Depreciation	2.147.250	2.147.250	2.147.250	2.147.250
Total Fixed Cost	***2.447.250***	***2.447.250***	***2.447.250***	***2.447.250***
TOTAL COST	36.327.250	36.317.250	36.307.250	35.722.250
Earning before Taxes	6.222.750	6.531.750	6.702.750	9.277.750
Taxes	311137,5	326587,5	335137,5	463887,5
Earning after Taxes	5.911.613	6.205.163	6.367.613	8.813.863
Information	Harvest-9	Harvest-10	Harvest-11	Harvest-12
Sales	45.120.000	45.312.000	45.912.000	46.080.000
CGS	34.470.000	35.220.000	35.210.000	35.225.000
Gross Proit	**10.650.000**	**10.092.000**	**10.702.000**	**10.855.000**
Cost :				
Variable Cost :				
Catfish Seeds	6.000.000	6750000	6750000	6750000
Feed	18000000	18000000	18000000	18000000
Medicines and vitamins	50.000	50.000	40.000	55.000
Water	5.520.000	5.520.000	5.520.000	5.520.000
Employee salary	4.900.000	4.900.000	4.900.000	4.900.000
Total Biaya Variabel	***34.470.000***	***35.220.000***	***35.210.000***	***35.225.000***
Fixed Cost :				
Electricity	300.000	300.000	300.000	300.000
Depreciation	2.147.250	2.147.250	2.147.250	2.147.250
Total Fixed Cost	***2.447.250***	***2.447.250***	***2.447.250***	***2.497.250***
TOTAL Cost	36.917.250	37.667.250	37.657.250	37.722.250
Earnig Before Taxes	8.202.750	7.644.750	8.254.750	8.357.750
Taxes	410137,5	382237,5	412737,5	417887,5
Earning After Taxes	7792612,5	7262512,5	7842012,5	7939862,5

Cash Flow = CF
NI = Net Income
CF = NI + Depreciation

Tabel 5. Cash Flow

Harvest	Net Income	Depreciation	Cash Flow
Harvest-1	6.462.612,50	2.147.250	8.609.862,50
Harvest-2	6.462.612,50	2.147.250	8.609.862,50
Harvest-3	6.282.112,50	2.147.250	8.429.362,50
Harvest-4	8.229.612,50	2.147.250	10.376.862,50
Harvest-5	6.222.750	2.147.250	8.370.000,00
Harvest-6	6.205.163	2.147.250	8.352.413,00
Harvest-7	6.367.613	2.147.250	8.514.863,00
Harvest-8	9.277.750	2.147.250	11.425.000,00
Harvest-9	7792612,5	2.147.250	9.939.862,50
Harvest-10	7262512,5	2.147.250	9.409.762,50
Harvest-11	7842012,5	2.147.250	9.989.262,50
Harvest-12	7939862,5	2.147.250	10.087.112,50

Payback Period (PP) Method

From the analysis that has been done, the Payback Period of the business is more than

2 years and 3 months. From the results of the analysis, it can be concluded that in terms of the Payback Period, the catfish farming business is declared feasible to run.

Initial Investment		Rp **42.945.000,00**
Cash flow	Harvest -1	Rp 8.609.862,50
		Rp 34.335.137,50
Cash flow	Harvest -2	Rp 8.609.862,50
		Rp 25.725.275,00
Cash flow	Harvest - 3	Rp 8.429.362,50
		Rp 17.295.912,50
Cash flow	Harvest -4	Rp 10.376.862,50
		Rp 6.919.050,00
Cash flow	Harvest -5	Rp 8.370.000,00

Because the remainder cannot be reduced by the harvest proceeds-5, the proceeds from the 4th year are divided by the proceeds from the 5th harvest, is

$$\frac{\text{Rp } 6.919.050,00}{\text{Rp } 8.370.000,00} \times 3 \text{ mount} = 2,479946237 \text{ year}$$

Then Payback Period = 2 years, 5 months

Net Present Value (NPV) Method

A business is declared feasible to run if it has an NPV value greater than zero. From the analysis conducted, NPV produces a value greater than zero. Thus it can be concluded that seen from the NPV value, the catfish farming business is feasible to run

Table 6. Net Present Value

Harvest Period	Cash Flow	DF (20 %)	Present Value
Harvest-1	8.609.862,50	0,833	7172015,463
Harvest-2	8.609.862,50	0,833	7172015,463
Harvest-3	8.429.362,50	0,833	7021658,963
Harvest-4	10.376.862,50	0,833	8643926,463
Harvest-5	8.370.000,00	1,528	12789360
Harvest-6	8.352.413,00	1,528	12762487,06
Harvest-7	8.514.863,00	1,528	13010710,66
Harvest-8	11.425.000,00	1,528	17457400
Harvest-9	9.939.862,50	2,140	21271305,75
Harvest-10	9.409.762,50	2,140	20136891,75
Harvest-11	9.989.262,50	2,140	21377021,75
Harvest-12	10.087.112,50	2,140	21586420,75
NET CASH PV TOTAL			170.401.214,1

Total Net Cash PV	Rp	170.401.214,1
Total PV Investment	Rp	42.945.000

NPV	Rp	127.456.214

IRR Method
The desired profit level of the business owner is 20%. From the results of the study, IRR produces a value greater than the desired profit level. Thus it can be concluded that seen from the IRR value of 67.5 (using a financial calculator) the catfish farming business is declared feasible to run.

ARR Method (Average Rate of Return)
A business is declared feasible to run if it has an ARR value of more than 0%, then the investment instrument is feasible to choose. Conversely, if the ARR value is less than 0%, then the investment instrument is not feasible to choose., Based on the analysis obtained, the ARR value is 33% higher than required, so it can be said that this business is feasible to run.

$$ARR = \frac{\text{Average EAT (Earning after Tax)}}{\text{Average Investment}}$$

$$\text{Average EAT} = \frac{85.572.202,00}{12} = 7131016,833$$

$$\text{Average Invesment} = \frac{42.945.000}{2} = 21472500$$

$$ARR = \frac{7131016,833}{21472500} = 0,332099981 = 33\ \%$$

Profitability Index (PI) Method
Profitability index is the present value of cash flow compared to the investment value. If the profitability index value is above 1, then the investment value is worthy of being accepted.

Current Value of Net Cash Flow	Rp 127.456.214
Initial Investment	Rp 42.945.000

$$\text{Provitability Indeks} = \frac{\text{PV Cash Flow}}{\text{Initial Investment}}$$

$$\text{Provitability Indeks} = \frac{\text{Rp } 127.456.214}{\text{Rp } 42.945.000} = 2,96$$

The Profitability Index figure shows a figure of 2.96 which means above 1, so we can say that catfish farming is feasible to run

Investment Feasibility of Catfish Farming Business

The calculation results of the investment feasibility criteria including Payback Period (PP), Net Present Value (NPV), Internal Rate of Return (IRR), Average Rate of Return (ARR) and Profitability Index (PI) are shown in the following table

Table 7. Investment Feasibility

No	Analysis Tools	Result	Information	Criteria
1	*Payback Period (PP)*	2 yaer, 5 months	Feasible	< 5 year
2	*Net Present Value* (NPV)	Rp 127.456.214	Feasible	> 0
3	*Internal Rate of Return* (IRR)	67, 5 %	Feasible	> 20 %
4	A*verage Rate of Return (* ARR)	33 %	Feasible	> 0 %
5	*Profitabilitas Index* (PI)	2,96	Feasible	> 1

Based on the results of the financial feasibility analysis in Table 5.7 above, it states that this business has a Payback Period (PP) of 2 years, 5 months which is smaller than 5 years (Depreciation of Fixed Assets), Net Present Value (NPV) of Rp 127,456,214 which is positive (greater than 0), Internal Rate of Return (IRR) 67.5% which is greater than 20% (desired profit level) and the Average Rate of Return (ARR) value of 33% which is greater than 0%, and the Profitability Index (PI) obtained a figure of 2.96 more than 1. Five financial analyzes that can indicate whether or not a business is feasible, it is concluded that the cultivation of Pak "Dayat" catfish is feasible.

5. Conclusions

Business Feasibility in Financial terms which includes Payback Period (PP), Net Present Value (NPV), Internal Rate of Return (IRR), Average Rate of Return (ARR) and Profitability Index (PI) are:

1. The Payback Period of the business is more than 2 years and 3 months. From the results of the analysis, it can be concluded that in terms of the Payback Period, the catfish farming business is declared feasible to run.
2. From the analysis carried out, NPV produces a value greater than zero. Thus it can be concluded that in terms of the NPV value, the catfish farming business is feasible to run.
3. From the results of the study, IRR produces a value greater than the desired level of profit. Thus it can be concluded that in terms of the IRR value of 67.5 the catfish farming business is declared feasible to run.
4. Based on the analysis obtained, the ARR value is 33% higher than required, so it can be said that this business is feasible to run.
5. The Profitability Index figure shows a figure of 2.96 which means it is above 1, so we can say that catfish farming is feasible to run

In terms of financial feasibility, it can be suggested that this catfish farming business is feasible, so it can be used to solve the unemployment problem by starting a catfish farming business.

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