



Analysis of the Financial Feasibility of Potential Post-Pandemic Businesses Using the Net Present Value (NPV), Internal Rate of Return (IRR), and Payback Period (PP) Methods (Case Study: MSME Environmentally Friendly Bioplastic Products)

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ABSTRACT

MSMEs play a strategic role as a driver of post-pandemic economic growth. MSME bioplastic products have the potential to contribute to economic growth and environmental sustainability. This study aims to determine the financial feasibility of MSME bioplastic products based on NPV, IRR, and PP values. The method uses evaluative research types with data processing and financial data analysis. Research shows the results of initial calculations such as 1) Investment costs of IDR 5,567,000; 2) Projected net cash flow of IDR 4,887,936 per year; 3) Determination of a discount of 6%. Based on these calculations, the results obtained are an NPV value of IDR 15,022,764.59, an IRR value of 84%, and a PP value in the 2nd year of production. Based on these three analyses, it can be concluded that the business potential of post-pandemic MSME bioplastic products can be said to be financially feasible

INTRODUCTION

The COVID-19 pandemic has had various impacts on aspects of human life. One of them is the economic aspect as a result of limited mobility and human activity. The increase in COVID-19 cases in major countries such as America, Italy and Spain has contributed to worsening the world economic situation. During the pandemic, the International Monetary Fund IMF predicted that the economy would end in weak global economic growth at minus 3%. This economic phenomenon is felt globally and the World Bank stated that Indonesia also experienced a weakening of economic growth during the COVID-19 pandemic (Jufra, 2020; Widiastuti & Silfiana, 2021).

The government has been promoting economic recovery in post-pandemic Indonesia through the formulation of a policy strategy. Communities and business actors then play a strategic role as actors in the movement of economic growth. One of the roles of business actors is through Micro, Small and Medium Enterprises (MSMEs). MSMEs have a major influence on Indonesia's economic growth as shown by the contribution of Gross Domestic Product (GDP) reaching 57.24% in 2018. The Ministry of Cooperatives and Small and Medium Enterprises stated that in 2018 there were 64 million MSME units which constituted 99.99% of the total business in Indonesia (Jufra, 2020).

Efforts to increase economic growth are realized by increasing economic activity. However, economic activities such as development and industrialization processes produce outputs that have an impact on environmental degradation. This decline is related to the resulting pollution and depletion of natural resources which threatens economic growth itself. Research by Udemba and Keles (2022) in (Addai et al., 2023) shows one example of the effect of economic activity on environmental damage. Namely in the Black Sea Region, Turkey which has shown clear evidence of the accumulation of by-products from economic activities in the form of solid waste. This waste has covered agricultural land and threatens food production and reduces the resources of economic activity. Not only on land, and trash in the Black Sea area, Turkey also pollutes its waters. Researchers say that part of the sea in the area has died due to the large accumulation of industrial waste.

Indonesia as a country that is struggling to increase post-pandemic economic growth also shows its problems with waste. Data from the National Waste Management System shows that in 2022 waste generation in Indonesia will reach 20 million tonnes per year with plastic waste in second place with the largest composition of 18.5%. Traditional markets and trade centers as centers of economic development simultaneously contribute 37.2% to waste.

MSME bioplastic products show their potential in this matter as a body that contributes to economic growth and environmental sustainability. Bioplastics produced from this business can be an alternative solution to the use of plasticizers, especially in the realm of economic activity. The potential possessed by these MSMEs needs to be balanced with the value of their business feasibility. The analysis is carried out with a financial feasibility analysis to find out whether the business is feasible or not to run. Instruments that can be used in financial analysis are Net Present Value (NPV), Internal Rate of Return (IRR) and Payback Period (PP). Therefore, researchers intend to determine the financial feasibility of MSME bioplastic products through the NVP, IRR, and PP methods.

METHODS

The method used in this research is as follows:

A. Type of Research

This research is included in the type of evaluative research, which assesses or measures the success of a business opportunity. The business in question is in the form of MSME Bioplastic Products. The research direction is to analyze and provide information regarding the financial feasibility of MSME bioplastic products as a post-pandemic business opportunity.

B. Data Collection

The preparation comes from data related to financial feasibility studies which are divided into 2 data sources, namely :

1. Primary Data

It consists of observations made by researchers by observing the conditions of strategic production sites, calculating the price of products and tools on the market, as

well as other matters related to the analysis of development financial feasibility studies.

2. Secondary Data

Literature sources were obtained such as books, journals, and reports on "financial feasibility analysis" in the field of business opportunities and MSMEs.

C. Data Processing

Based on the data that has been collected, it will be reviewed and processed through the following steps :

1. Budget Plan

Calculation of the Planned Budget (RAB) for bioplastic product opportunities. The RAB estimation method is carried out regarding the schedule for using funds, financing funds, and initial working capital.

2. Net Cash Flow Projection

Prepare projections of net cash flow by adjusting profits and losses that have been prepared based on production results.

3. Discount Rate

In determining the Discount Rate, data on the capital structure of business financing and the cost of bank loan capital are needed. Then the estimated discount rate is calculated using the Weighted Average Cost of Capital (WACC).

D. Financial Feasibility Analysis

In the financial feasibility analysis stage, Bumi Kanjuruhan housing development was tested with 4 assessment analysis methods, as follows :

1. Net Present Value (NPV)

Net Present Value is the use of a method to determine the difference between future development values converted into present values (using a discount rate). According to (Sari et al., 2018) the NPV formula is as follows:

$$NPV = \sum_{t=0}^n \frac{(C)t}{(1+i)^t} - \sum_{t=0}^n \frac{(Co)t}{(1+i)^t}$$

(1)

Information :

NPV = net present value

(C)t = cash flow in t-year

(Co)t = cash outflow t-year

n = investment age (years)

i = return current (ROR)

t = year

The development project will be said to be feasible if the NPV value is positive (+) and not feasible if it is negative (-).

2. Internal Rate of Return (IRR)

Internal Rate of Return is the method used to calculate the value of the Discount Rate (DR) or Cost of Capital (CC) in conditions where the NPV is zero (0). According to (Wahyudi, 2019) the IRR formula is as follows :

$$IRR = i1 + (i2 - i1) \times \frac{NPV1}{(NPV1 - NPV2)}$$

(2)

Information :

i1 = interest value NPV1 (Positive)

i2 = interest value NPV2 (Negative)

The development project will be said to be feasible if the IRR value is greater than the specified CC value.

3. Payback Period (PP)

The Payback Period is used to know the payback period of MSME opportunities for bioplastic products based on net cash flow. According to (Febriyan et al., 2017) the PP formula is as follows :

$$PP = n + \left(\frac{a-b}{c-b} \right) \times 1 \text{ tahun}$$

(3)

Information :

n = last year when net cash has not covered investment costs

a = investment amount

b = cumulative amount of net cash in the nth year

c = cumulative amount of net cash in year n+1

RESULTS AND DISCUSSION

Bioplastic which is a potential for SMEs is made from orange peel waste. This is because orange peel contains cellulose and hemicellulose of 12.9% and 8.8% (Bicu & Mustata, 2013). The cellulose has the potential to become a natural plastic compound, with the help of a plasticizer in the form of polyvinyl acetate (PVAc). The composition of the bioplastic is

120 ml of skin extract and 20 ml of PVAc. The results of this study are as follows:

1. Determination of the Budget Plan (RAB)

The breakdown of costs in the MSME business opportunity for orange peel

bioplastic products is divided into several, namely:

a. Investment Cost

Investment costs can be in the form of production equipment that is fixed and can be used on an ongoing basis.

Table 1. Details of Investment Costs

No.	Equipment	Amount	Unit price	Total price
1.	Plastic printing/press machine	4 units	Rp. 120.000,00-	Rp. 480.000,00-
2.	Custom tray size 80 cm x 30 cm	120 units	Rp. 25.000,00-	Rp. 3.000.000,00-
3.	Blender / mashed material	4 units	Rp. 300.000,00-	Rp. 1.200.000,00-
4.	Filter filter mesh 18	8 units	Rp. 41.000,00-	Rp. 328.000,00-
5.	10 liter volume container	4 units	Rp. 45.000,00-	Rp. 180.000,00-
6.	5 liter volume container	4 units	Rp. 30.000,00-	Rp. 120.000,00-
7.	1 liter measuring cup	4 units	Rp. 42.000,00-	Rp. 168.000,00-
8.	Large stirrer	4 units	Rp. 20.000,00-	Rp. 80.000,00-
9.	Spoon	1 dozen	Rp. 11.000,00-	Rp. 11.000,00-
Investment Cost Amount			Rp. 5.567.000,00-	

Source: Hasil Analisis Penulis (2023)

Based on the calculation, the investment cost is IDR 5,567,000.00-. The investment cost is used as one of the materials for calculating financial feasibility analysis in this study. Investment costs are costs incurred to obtain fixed assets that the company will use to carry out its business activities.

b. Production Cost

Production costs in the MSME business potential of orange peel bioplastic products are as follows:

Orange Peel

4 kg of orange peel mixed with 14 liters of water can produce 14.4 liters of crude orange peel extract. The amount of extract is by the production of bioplastics which has been determined as many as 120 pieces/day. That's because:

$$\text{Kebutuhan Kulit Jeruk Per Hari} = 120 \frac{\text{buah}}{\text{hari}} \times 120 \frac{\text{ml}}{\text{buah}} = 14.400 \frac{\text{ml}}{\text{hari}}$$

So if the production for 1 month (24 days) is:

$$\text{Kebutuhan Kulit Jeruk Per Bulan} = 14.400 \frac{\text{ml}}{\text{hari}} \times 24 \frac{\text{hari}}{\text{bulan}} = 345.600 \frac{\text{ml}}{\text{bulan}}$$

The required amount of orange peel waste is obtained free of charge or Rp.0.00-. The production cost for orange peel material is free because it can be found and collaborated with orange drink shops and factory companies in the fields that produce this waste.

Polyvinyl Acetate (PVAc)

The need for PVAc as a bioplastic plasticizer is 20 ml for each fruit. Daily production is 120 pieces/day, it is found that:

$$\text{Kebutuhan PVAc Per Hari} = 120 \frac{\text{buah}}{\text{hari}} \times 20 \frac{\text{ml}}{\text{buah}} = 2.400 \frac{\text{ml}}{\text{hari}}$$

So if production for 1 month (24 days) is:

$$\text{Kebutuhan PVAc Per Bulan} = 2.400 \frac{\text{ml}}{\text{hari}} \times 24 \frac{\text{hari}}{\text{bulan}} = 57.600 \frac{\text{ml}}{\text{bulan}}$$

If the market price of PVAc or wood glue is Rp.24,000.00-/liter, then the acetate production cost is:

$$\text{Biaya PVAc Per Bulan} = 57.600 \frac{\text{ml}}{\text{bulan}} \times \frac{\text{Rp. 24.000}}{1000 \text{ ml}} = \text{Rp. 1.382,400/bulan}$$

1) Water

Based on the results of the calculations, the production cost for polyvinyl acetate in a month is IDR 1,382,400.00-.

The need for water in one production operation every day is as much as 14 liters/day. So that the monthly water requirement is:

c. Operating Costs

Operational costs in the MSME business potential of orange peel bioplastic products are as follows:

$$\text{Kebutuhan Air Per Bulan} = 14.000 \frac{\text{ml}}{\text{hari}} \times 24 \frac{\text{hari}}{\text{bulan}} = 336.000 \frac{\text{ml}}{\text{bulan}}$$

If the market price of water is IDR 100.00-/liter, then the operational costs for water are:

$$\text{Biaya Air Per Bulan} = 336.000 \frac{\text{ml}}{\text{bulan}} \times \frac{\text{Rp. 100}}{1000 \text{ ml}} = \text{Rp. 33.600/bulan}$$

2) Electric

Based on the results of the calculation stated that the operational cost of water in a month is IDR 33,600.00-.

The need for electricity in one production operation every day is as follows:

Table 2. Details of Electricity Operational Costs

Goods	Watt	Use	Watts/Hour	kWh
Plastic pressing machine	240 Watt	3 Hours	720 Wh	0,72 kWh
Blender	230 Watt	2 Hours	460 Wh	0,46 kWh
Light	20 Watt x 2	8 Hours	320 Wh	0,32 kWh
Number of kWh				1,50 kWh

Source: Hasil Analisis Penulis (2023)

If the price of electricity in a 900 VA building is IDR 1,352.00-/kWh, then the electricity operating costs per day are:

$$Biaya Listrik Per Hari = 1,50 kWh \times \frac{Rp. 1.352}{kWh} = Rp. 2.028/Hari$$

So, if per month (24 days) is:

$$Biaya Listrik Per Bulan = Rp. \frac{2.028}{hari} \times 24 \frac{hari}{Bulan} = Rp. 48.672/Bulan$$

Based on the results of the calculation, it is stated that the operational cost of electricity in a month is Rp.48,672.00-.

2. Determination of Net Cash Flow Projection

The projected net cash flow is obtained based on the formula for income minus expenses. The daily production of orange peel bioplastic is 120 pieces/day, so if a month with 6 working days/week is:

$$Produksi Bioplastik per Bulan = 120 \frac{buah}{hari} \times 24 \frac{hari}{Bulan} = 2.880 buah/Bulan$$

If the price of bioplastics per fruit is Rp. 750.00 - with a classification of bioplastic bags measuring

40 cm x 22 cm, then the income obtained per month is:

$$Pemasukan per Bulan = 2.880 \frac{buah}{bulan} \times Rp. \frac{650}{buah} = Rp. 1.872.000/Bulan$$

So that the calculation of net cash flow is obtained as follows:

Table 3. Details of Net Cash Flow Per Year

No.	Cost of Cash Flow	Amount
1.	Income:	Rp. 2.160.000,00-
2.	Sales of Bioplastics	Rp. 1.382,400,00-
		Rp. 82.272,00-
	Total Profit Per Month	Expenditure:
	Total Profit Per Year	Production cost

Source: Hasil Analisis Penulis (2023)

3. Determination of the Discount Rate (Discount Rate)

The amount of benefits and operational costs required in the future are discounted to their present value. Therefore, a discount reference is used based on Bank Indonesia's interest rate in April 2023 of 5.75% ((BI 7-Day Reverse Repo Rate Fixed 5.75%: Synergy to Maintain Stability and Drive Growth,

t.t.). In anticipation of an increase in interest rates in the future, the discount used is increased to 6%.

4. Results of Net Present Value (NPV)

Based on the calculation of Net Cash Flow in (Table 3.) it can be calculated the NPV of MSME bioplastic products in 5 years using (Equation 1.). The results of the NPV calculation are presented below

Table 4. Calculation of Net Present Value

Year N	Costflow	Present Value	Interest
0	-Rp 5.567.000,00	-Rp 5.567.000,00	6%
1	Rp 4.887.936,00	Rp 4.611.260,38	
2	Rp 4.887.936,00	Rp 4.350.245,64	
3	Rp 4.887.936,00	Rp 4.104.005,32	
4	Rp 4.887.936,00	Rp 3.871.703,13	
5	Rp 4.887.936,00	Rp 3.652.550,12	
NPV		Rp	15.022.764,59

Source: Hasil Analisis Penulis (2023)

In (Table 4) it is known that the NPV value for 5 years is IDR 15,022,764.59.

5. Results of the Internal Rate of Return (IRR)

The MSME IRR value for bioplastic products is calculated using (Equation 2). The results of the IRR calculation are presented in (Table 5) below:

Table 5. Calculation of the Internal Rate of Return (IRR)

Year N	Costflow	Present Value	Interest
0	-Rp 5.567.000,00	-Rp 5.567.000,00	6%
1	Rp 4.887.936,00	Rp 4.611.260,38	
2	Rp 4.887.936,00	Rp 4.350.245,64	
3	Rp 4.887.936,00	Rp 4.104.005,32	
4	Rp 4.887.936,00	Rp 3.871.703,13	
5	Rp 4.887.936,00	Rp 3.652.550,12	
IRR			84%

Source: Hasil Analisis Penulis (2023)

Based on (Table 5) above it can be seen that the IRR value is 84%.

6. Payback Period (PP) Results

The payback period value is calculated using (Equation 3.) with the calculation results presented in (Table 6) below:

Table 6. Payback Period Calculation

Year N	Costflow	Nilai PP
0	-Rp 5.567.000,00	-Rp 5.567.000,00
1	Rp 4.887.936,00	-Rp 679.064,00
2	Rp 4.887.936,00	Rp 4.208.872,00
3	Rp 4.887.936,00	Rp 9.096.808,00
4	Rp 4.887.936,00	Rp 13.984.744,00
5	Rp 4.887.936,00	Rp 18.872.680,00
PP		Tahun Ke-2 Produksi

Source: Hasil Analisis Penulis (2023)

Based on (Table 6) above it can be seen that the time needed to return the investment capital of IDR 5,567,000.00 is in the 2nd year of production.

DISCUSSION

Bioplastic products are formed from natural ingredients in the form of Siamese orange peels (Citrus sp.). Siamese orange peel (Citrus sp.) contains polymer in it in the form of cellulose. This polymer is used as a basic material in the manufacture of bioplastics with the help of polyvinyl

acetate (PVAc) in the formation of the monomer. The cellulose can be extracted from orange peel by a refining process followed by the addition of polyvinyl acetate (PVAc) as a plasticizer. The addition of plasticizer aims to provide elastic properties to bioplastics.



Figure 1. Orange Peel Bioplastic Bag
Source: Dokumentasi Penulis (2023)

Bioplastics produced from this business can be an alternative solution to the use of plasticizers, especially in the realm of economic activity. The potential possessed by these MSMEs needs to be balanced with the value of their business feasibility. The analysis is carried out with a financial feasibility analysis to find out whether the business is feasible or not to run. The analysis was carried out using the Net Present Value (NPV), Internal Rate of Return (IRR), and Payback Period (PP) methods.

1. *Net Present Value (NPV)*

The Net Present value method is used in analyzing financial feasibility by determining whether a business can provide benefits in a certain period with a certain interest rate. This method is based on the principle that benefits and costs are discounted to present value so that a discount is required based on the current relevant interest rate (Herliani & Paris, 2022). Bank Indonesia (2023) states that in April 2023 the interest rate is 5.75%. However, in anticipation of an increase in interest rates in the future, the interest rate used was increased to 6%.

The calculation of the NPV method shows a result of IDR 15,022,764.59. A business can be said to be financially feasible if it has a positive NPV value. So it can be stated that MSME bioplastic products are feasible.

2. *Internal Rate of Return (IRR)*

The IRR method shows the results of how big the net cash flow ability is for the investment given and the number of obligations that must be fulfilled. An

IRR value that is greater than the current return or IRR > The interest rate can be an indication that a business is feasible to run (Fasih, 2023). The results of the IRR calculation show a result of 84%. This figure is above the interest rate used, which is 6%. So that the effort made can be said to be feasible.

3. *Payback Period (PP)*

The payback period or payback period is used in financial feasibility analysis to determine the speed of a business being run to return the initial investment (Initial Cash Investment). PP calculations can provide an overview of the length of investment capital turnover used by comparing it with the profits generated (Yurian et al., 2020). PP of an investment can be determined by dividing the amount of investment (Outlays) by the cash inflows each year if each year the amount of cash inflows is the same. If the amount of cash inflow varies each year, then the accumulated cash inflow must be calculated first (Giatman, 2006). Based on the calculation results, it is known that PP occurs in the 2nd year of production. (Yurian et al., 2020) states that there are several criteria for calculating the payback period as follows:

- a. PP is classified as fast if the payback period for investment or venture capital is less than 3 years
- b. PP is classified as moderate if the payback period for investment or business capital is 3-5 years

- c. PP is classified as slow if the payback period for investment or business capital is more than 5 years.

The explanation above shows that the return on investment given to MSMEs in the bioplastic business is classified as fast because the timeframe is under 3 years. Analysis using the Net Present Value (NPV), Internal Rate of Return (IRR), and Payback Period (PP) methods shows results that MSME bioplastic production is feasible to run with a short payback period. The eligibility opportunities owned by MSMEs are in line with the various positive impacts they have obtained. MSME production of bioplastics has a positive impact on various aspects, including:

- a. Environmental Aspect

The resulting bioplastic product is the result of orange peel organic waste so that it can contribute to reducing environmental pollution. In addition, this bioplastic product is environmentally friendly and can be degraded quickly in the environment. This can be an alternative solution to the high amount of plastic waste, especially in the realm of trade centers and traditional markets. Data from the National Waste Management Information System or SIPSN (2022) shows that the current plastic waste is dominated by organic waste and plastic waste is in second place simultaneously at 59%. Where is the source of sampah originating from traditional markets and trade centers reaching 37%.

- b. Social Aspect

MSME bioplastic products that are run can have a positive impact on the surrounding environment. One of them is to make it easier for the public and other business entities to

fulfill their plastic needs. In addition, the existence of environmentally friendly plastic products can be a turning point in changing people's lifestyles to care more about the environment and reduce disease transmission due to environmental pollution.

- c. Economic Aspect

In the post-pandemic era, there has been a decline in economic growth. This decline is inseparable from the loss of MSMEs as businesses are affected by large-scale social restrictions in society. MSMEs are a part of the economy that contributes the largest GDP, with a total of 57.24% in 2018 (Jufra, 2020). So that the existence and development of MSMEs can certainly contribute to increasing economic growth in post-pandemic Indonesia. In addition, MSME bioplastic products have the potential to open new jobs if the business being run can grow rapidly in the future. The presence of new jobs will be able to bring up new businesses around these MSMEs.

CONCLUSION

Based on the results and discussion, it can be concluded that in the form of an analysis of the financial feasibility of the MSME business potential for bioplastic products, the NPV value for 5 years is IDR 15,022,764.59, the IRR value is 84%, and the PP value in the 2nd year of production. Because of these three analyses, this study concludes that the business potential of MSME for orange peel bioplastic products can be said to be financially feasible.

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