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POST PANDEMIC INVESTMENT FEASIBILITY ANALYSIS WITH FINANCIAL ASPECT OF LUBRICANT MACHINE

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ABSTRACT
The increasing demand for medical gloves during covid 19 pandemic has made PT. X decided to make an investment by buying a machine worth a total of 6.7 billion Rupiah for the business of producing lubricant gloves with particles of 100 nanometers in 2020. With the end of the pandemic, the need for lubricants has decreased dramatically in 2022, making PT. X faces a feasibility problem for the investment in the lubricant machine that has been made. This study aims to analyze the feasibility of financial aspects, namely the assessment with the Discounted Payback Period (DPP), Net Present Value (NPV), Benefit Cost Ratio (BCR) and Profitability Index (PI). The analysis was carried out with pessimistic, moderate and optimistic versions of probability. The results of research using the DPP, NPV, BCR, PI methods are not feasible for pessimistic probabilities and are feasible for moderate and optimistic probabilities.
Keywords: Feasibility, DPP, NPV, BCR, PI

PROEM

The emergence of 2019-CoV has attracted global attention, and on 30 January WHO declared Covid-19 a public health emergency of international concern (Wang et al., 2020; Rangayasami, et al., 2021). The Covid-19 outbreak is not only disturbing the community, but health services are the spearhead of handling Covid-19. The front line in dealing with Covid-19 are doctors and nurses as well as all human resources in hospitals and health services who are at risk of exposure to the virus. All medical practitioner in every medicalnfacilitiea, who have direct contact to the patients are the most vulnerable people (Putri, 2020). The work accident prevention and infection control strategy implemented by health workers is to place more emphasis on personal protective equipment (PPE) (Galanis, et al., 2021).

Covid-19 has succeeded in hitting the Indonesian economy right on two sides at once, the demand and supply sides. There are several business sectors that have actually

experienced an increase in market demand and are predicted to gain more profits during the pandemic (Priyono, et al., 2020). The high demand for medicines, personal protective equipment (PPE), medical equipment, ethanol, masks and gloves will also contribute to strengthening the trade balance (Ananda, 2020)

The Covid 19 pandemic and increasing awareness of the use of gloves and the implementation of stricter health protocols than before. The urgent need for PPE where one of them is gloves that are safe during a pandemic makes PT. X decided to add another business by producing the main material for gloves with 100 nanometer particles in 2020. Lubricant products for gloves making materials are not only marketed domestically, but also exported to foreign countries such as Malaysia. Lubricant machine investments carried out with price details are as follows:

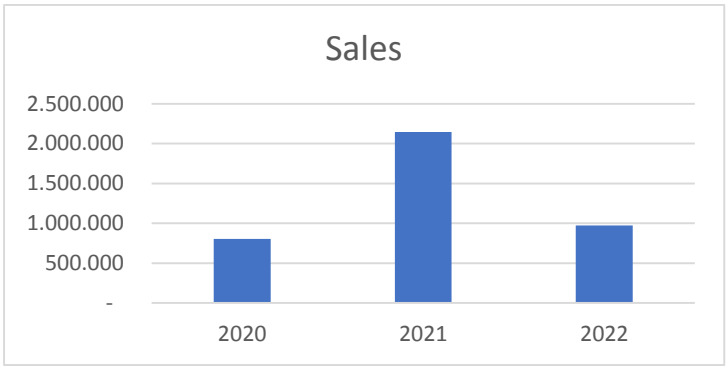
Table 1. Lubricant Machine Investment

Process	Machine	Price (Rp)
Melting	Melting Tank	80,000,000
	Contruction	22,500,000
Grinding	Horizontal Mill	2,095,200,000
	Grinding Media	474,121,667
	High Pressure Homogenizer	1,799,055,000
	Instalasi pipa	172,000,000
	Conctruction & Instalation	235,000,000
Coolling	Chiller	222,000,000
	Coolling Tower	139,500,000
	Conctruction	32,450,000
Quality Control	Partikel Size Analizer	1,058,000,000
Price Before Tax		6,329,826,667
Tax 10%		632982666.7
Price After Tax		6,962,809,333

Source: PT.X, 2020

In making investments, some conditions are often encountered outside of planning, as happened with PT.X, with a machine investment worth 6.9 billion for the production of lubricant material for medical gloves. In 2021 during the second wave of the Covid-19 virus with the Delta variant, PT. X experienced a surge in demand, but in 2022 with the start of the end of the Covid-19 pandemic sales experienced a significant decline, as shown in Figure 1.

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Source: PT.X, 2020

Figure 1. Glove Lubricant Sales Data

Based on the above conditions, it is necessary to carry out a feasibility analysis of machine investment to determine the extent in which the investment can be maintained. The valuation method that will be used later is the DPP, NPV, BCR, and PI, the analysis is carried out with optimistic, moderate and pessimistic versions of probability. Calculation of the pessimistic version in its sense is estimating sales within one year to be able to generate the lowest income that has been estimated by the business owner, then the moderate version is capital budgeting which estimates income within one year to be able to generate medium income, then the calculation of the optimistic version is estimate the income of a business within one year to be able to generate the highest income.

THEORETIC

According to (Arfah, 2021) states that investment can be interpreted as an investment in an activity that has a relatively long period of time in various business fields. Investments that are invested in a narrow sense are in the form of certain projects, both physical and non-physical. One of the most important things in investing is the ability to spend capital at this time to obtain benefits or benefits in the future. (Mavlutova, et al., 2021) states that the broader investment objective is to improve the welfare of investors. Welfare in this case is monetary well-being, which can be measured by adding up current income plus the present value of future income.

The financial aspect analyzes the amount of investment and working capital costs as well as the level of investment control of the business to be run, as well as to assess what costs will be incurred. Then also examine how much income will be received if the project is carried out. Then where the sources of business financing and what are the

prevailing interest rates, so that when calculated using the investment valuation formula it is very profitable. The valuation method that will be used later is the DPP, NPV, BCR, and PI.

1. Discounted Payback Period (DPP)

   Payback Period (PP) is the time period required to return the investment in the project. PP Criteria, there is no clear time limit, everything depends on the owner of the capital. But in general, a short payback period is preferred. The advantage of the PP method is that it is easy to calculate and understand. Meanwhile, the weakness of the PP method is that it ignores cash flows after the PP and the time value of money (Chiapello, 2020). In overcoming the weakness of the PP, the calculation of the Discounted Payback Period (DPP) is carried out. DPP is a refund period calculated using the discount factor. The DPP can be found by calculating how many years the net cash flow cumulative present value is estimated to be the same as the initial investment (Hidayat et al., 2019).

2. Net Present Value (NPV)

   NPV is one of the capital budgeting techniques that considers the most widely used time/money values. Thus, NPV is the difference between discounted cash inflow at the minimum interest rate or the company's cost of capital minus the investment value (Raharjo, 2022).

3. Benefit Cost Ratio (BCR)

   BCR is a method used to compare the level of benefits obtained with the total costs incurred. A stock can be said to be profitable if the BCR value is > 1. If the BCR value is greater, the greater the benefits that will be obtained from the business.

4. Profitability Index (PI)

   PI is the ratio between the present value of cash flow receipts and the present value of cash outflows.

Feasibility research with financial aspects has been carried out by several researchers such as Irmawati et al. (2018), Masnunah et al. (2020) and Wibowo et al. (2021). However, there has been no research conducting an analysis of the feasibility of investing in machines after the pandemic as a basis for making decisions on the feasibility of investing in machines that have been implemented. This research produces

something new in analyzing the feasibility of machine investment based on 3 sales probabilities.

METHOD

This research method is exploratory qualitative research, namely research that emphasizes more on data collection and input. This is done in the financial aspect feasibility analysis to determine the feasibility of machine investment with 3 probabilities namely pessimistic, moderate and optimistic. The stages in this study consist of 5 stages as follows:

1. Define the problem

   Problem identification is defining existing problems and making these problems measurable and testable.

2. Identify each alternative

   At this stage, each alternative is identified as a feasible solution

3. Analysis of financial aspects with 3 probabilities.

   At this stage analysis is based on data collection in the form of documentation, observations, interviews and literature study. With operational variables in Table 2 below:

Table 2. Operational Variables

No	Variable	Measurement	Reference
1	Discounted Payback Period (DPP)	$\text{PP} = \text{n} + \frac{(\text{a} - \text{b})}{(\text{c} - \text{b})} \text{x } 12 \text{ months}$	Bakar (2016)
2	Net Present Value (NVP)	$\text{NPV} = \frac{\text{Cash Flow 1}}{(1+\text{r})} + \frac{\text{Cash Flow 2}}{(1+\text{r})^2} + \frac{\text{Cash Flow 3}}{(1+\text{r})^n}$	Kasmir & Jakfar (2015)
3	Benefit Cost Ratio (BCR)	$\text{BCR} = \frac{\text{PV Benefit}}{\text{PV Cost}}$	Kasmir & Jakfar (2015)
4	Profitability Index (PI)	$\text{PI} = \frac{\Sigma \text{ PV Cash Flow}}{\Sigma \text{ PV Investation}} \text{x } 100\%$	Kasmir & Jakfar (2015)

Source: Research Data, 2022

Recommendations

At this stage it provides recommendations so that the investment in the lubricant machine is feasible to maintain.

RESULT

Sales proceeds are obtained from the lubricant machine with data from 2020 to 2022 as follows:

Table 3. Sales of Lubricant Gloves

Year	Sales (Kg)
2020	804,400
2021	2,144,800
2022	973,000

Source: PT.X, 2023

Based on the sales results of the last 3 previous years by conducting observations and in-depth interviews, sales predictions for 2023 and 2024 are set with a moderate probability of average sales for the last 3 years, pessimistic of 60% moderate and optimistic of 120% moderate. So that the probability of selling is obtained as follows:

Table 4. Glove Lubricant Sales Probability

Year	Sales (Kg)
Pessimistic	784,440
Moderate	1,307,400
Optimistic	1,568,880

Source: Processed Data, 2023

Analysis of the feasibility of investing in discounted machines that are used based on an average annual interest of 10% is expected before 5 years of return on investment issued. The results of the analysis with 3 probabilities are as follows:

DPP Analysis

Table 5. DPP

Proceeds	Pessimistic		Moderate		Optimistic	
	6,962,809,333		6,962,809,33		Rp6,962,809,333	
1st year	934,773,907	934,773,907	934,773,907	934,773,907	934,773,907	934,773,907
	6,028,035,427		6,028,035,427		6,028,035,427	
2nd year	2,904,244,732	3,839,018,638	2,904,244,732	3,839,018,638	2,904,244,732	3,839,018,638
	3,123,790,695		3,123,790,695		3,123,790,695	
3rd year	1,007,463,722	4,846,482,360	1,007,463,722	4,846,482,360	1,007,463,722	4,846,482,360
	2,116,326,973		2,116,326,973		2,116,326,973	
4th year	677,026,019	5,523,508,379	1,339,462,613	6,185,944,974	1,670,680,911	6,517,163,271
	1,439,300,954		776,864,359		445,646,062	
5th year	615,478,199	6,138,986,578	1,217,693,285	7,403,638,259	1,518,800,828	8,035,964,099
	823,822,755		(440,828,925)		(1,073,154,766)	
6th year	559,551,477	6,698,538,055				
	264,271,279					
7th year	1,006,440,221	7,704,978,276				
	(742,168,943)					
	DPP	6 Years, 3 months		4 Years, 10 months		4 Years, 6 months

Source: Processed Data, 2023

Based on Table 5, the results show that with a pessimistic probability of more than 5 years, this method is not a feasible investment, whereas with a moderate and

optimistic probability, the discounted payback period is considered feasible because it is less than 5 years.

NPV and PI Analysis

Table 6. NPV and PI

Year	DF (10%)	Pessimistic Proceeds (Rp)	Pessimistic PV of Proceeds (Rp)	Moderate Proceeds (Rp)	Moderate PV of Proceeds (Rp)	Optimistic Proceeds (Rp)	Optimistic PV of Proceeds (Rp)
1	0.9091	1,028,251,297	934,773,906	1,028,251,297	934,773,906	1,028,251,29	934,773,906
2	0.8264	3,514,136,125	2,904,244,731	3,514,136,125	2,904,244,731	3,514,136,125	2,904,244,731
3	0.7513	1,340,934,214	1,007,463,722	1,340,934,214	1,007,463,722	1,340,934,214	1,007,463,722
4	0.6830	991,233,794	677,026,018	1,961,107,212	1,339,462,613	2,446,043,921	1,670,680,910
5	0.6209	991,233,794	615,478,198	1,961,107,212	1,217,693,284	2,446,043,921	1,518,800,827
Total PV of proceeds			6,138,986,578		7,403,638,258		8,035,964,099
Total PV of outlays			6,962,809,333		6,962,809,333		6,962,809,333
NPV			- 823,822,755		440,828,925		1,073,154,765
PI			0.88		1.06		1.15

Source: Processed Data, 2023

Based on Table 6, the results show that the probability is pessimistic with NPV <0 and PI <1, so the investment in a lubricant machine is not feasible. Moderate and optimistic probability with NPV > 0 and PI > 1, investment in lubricant machine is feasible.

BCR Analysis

Table 7. BCR

Year	Pessimistic		Moderate		Optimistic	
	PV Benefit	PV Cost	PV Benefit	PV Cost	PV Benefit	PV Cost
0	-	6,962,809,333	-	6,962,809,333	-	1,058,000,000
1	11,992,872,727	11,058,098,821	11,992,872,727	11,058,098,821	11,992,872,727	11,058,098,821
2	29,070,016,529	26,165,771,797	29,070,016,529	26,165,771,797	29,070,016,529	26,165,771,797
3	11,988,880,541	10,981,416,819	11,988,880,541	10,981,416,819	11,988,880,541	10,981,416,819
4	8,786,842,429	8,109,816,410	14,644,737,381	13,305,274,768	17,573,684,858	15,903,003,947
5	7,988,038,572	7,372,560,373	13,313,397,619	12,095,704,334	15,976,077,143	14,457,276,315
Total	69,826,650,798	70,650,473,553	81,009,904,798	80,569,075,872	86,601,531,798	79,623,567,699
BCR	0.9883		1.0055		1.0876	

Source: Processed Data, 2023

Based on Table 7, the results show that the probability is pessimistic with BCR <1, so investment in a lubricant machine is not feasible. Moderate and optimistic probability with BCR > 1 then investment in lubricant machine is feasible.

CONCLUSION

Based on the results of the discussion above, it can be concluded that the feasibility analysis of machine investment using the DPP, NPV, BCR, PI methods is not feasible for pessimistic probabilities and is feasible for moderate and optimistic probabilities. Thus PT. X can maintain the investment in the lubricant machine if sales are achieved with moderate and optimistic probabilities.

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