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Investment Feasibility Analysis On The Addition Of Fixed Assets At PT X Using Scenario Analysis

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A B S T R A C T

PT X, a company engaged in producing plastic packaging, wants to invest in purchasing fixed assets to accommodate the increasing demand for plastic packaging. However, PT X has not yet conducted an investment feasibility analysis on the fixed asset purchase plan. This study analyzes the feasibility of investing in the planned addition of fixed assets at PT X. The research method used is a case study with quantitative methods. Case studies conducted in investment feasibility are measured by capital budgeting methods, namely Net Present Value (NPV), Internal Rate of Return (IRR), Payback Period (PBP), and Discounted Payback Period (DPP). In addition, an analysis was also carried out using three scenarios, namely, most likely, optimistic, and pessimistic, to see the financial performance in three different conditions. With a discount rate of 9.36%, the research results show that all capital budgeting methods provide sustainable results, and the plan to add fixed assets to PT X is feasible in the most likely and optimistic scenario but not in the pessimistic scenario.

Keywords: Investment Feasibility, Capital Budgeting, Scenario Analysis

INTRODUCTION

Since being designated a Public Health Emergency of International Concern (PHEIC) or pandemic, COVID-19 has had an extensive impact, not only in the world of health but also in various aspects globally (WHO, 2020). Indonesia confirmed the first case of COVID-19 in March 2020, and since then, the government has begun to limit community activities in the form of a lockdown to contain the spread of the virus (Rizal, 2020). The restrictions on community activities cause a decrease in economic activity and impact the decline in financial stability in various sectors.

One sector that is immensely impacted is the manufacturing industry, especially plastic producers for packaging. According to the Ministry of Industry (2020), the Rubber, Rubber, and Plastic Goods Industry experienced the fourth-largest growth contraction in Indonesia. At the end of 2020, the industry experienced a decline in growth of 5.61% (YoY). Likewise, its export performance recorded a drop of 14.19% (YoY). This decline occurred due to a decrease in people's purchasing power, reducing domestic demand. In addition, the deteriorating economy of the United States and other importing countries has also caused a decline in growth in the Rubber, Rubber, and Plastic Goods Industries (Ministry of Industry, 2020).

However, in 2021, the condition has gradually improved. People's online consumption patterns have increased the need and demand for plastic packaging. The increase in the market for plastic packaging is indicated by the industrial GDP growth of 3.84% in the first quarter of 2021 from the previous year in 2020 of -5.61%. Then in the second quarter, the growth increased significantly to 11.72%. Although in the third and fourth quarters, the growth rate decreased again; namely -2.80% and -7.51%, overall GDP growth for the rubber, Rubber, and Plastic Goods Industry experienced an increase of 1.08% at the end of 2021. (Central Bureau of Statistics, 2021).

One of the companies engaged in the Rubber, Rubber, and Plastic Goods Industry is PT X. PT X is a company engaged in the industry and marketing of plastic goods that sells its products both domestically and abroad. Unlike the growth of the plastic industry in general, PT X was still able to maintain its financial performance in 2020. Although its sales decreased, it was not too significant. PT X could also preserve and increase its year profit and equity in 2020.

In 2021, PT X experienced a significant increase in financial performance. In line with the GDP growth rate in its industry, PT X recorded a substantial increase in economic performance. PT X's sales increased by about 20% from 2020. Likewise, its equity increased by approximately 12%. In addition, the profit for the year also increased by two times or by 120%. There are restrictions on activities and community mobilization due to the implementation of the lockdown, making the demand for daily necessities increase online. Of course, these products require packaging, and plastic is one of the most widely used materials.

Table 1. PT X Partial Financial Report

(in Million Rupiah)	2021	2020	2019	2018
Sales	2,702	2,230	2,251	2,387
Current Year Profit	147	66	54	64
Equity	1,463	1,313	1,245	1,234

Source: PT X's Financial Statements (2021)

Based on financial performance in 2021 and improving economic conditions, PT X plans to invest in additional fixed assets in the form of machinery. The machine will later produce exceptionally flexible plastic packaging to accommodate the increasing demand for plastics to increase sales and operating profits.

In running its business, every company or organization needs to invest in supporting its operational activities. Investment is a commitment to place several funds or other resources at this time to obtain benefits or profits in the future (Tandelilin, 2010). Fundamentally, investment is a commitment to profit in the lot at the expense of current consumption.

According to (Tandelilin, 2010), there are two types of investment based on the type: investment in tangible assets and investment in financial assets. Investments in real assets are investments made by buying tangible assets such as land, machinery, or buildings. Investments in tangible assets are generally caused by companies or organizations that do not want to have a high risk. In contrast, an investment in financial assets is an investment that can be made in the money market or capital market by buying shares, bonds, options, warrants, certificates of deposit, and others. Companies or organizations can choose the type of investment they want according to their individual needs.

According to Emery, Finnerty, & Stowe (2007), investments made by a company can be classified into several types. Including:

- **Cost Saving/Revenue Enhancement**
Investments are made to reduce costs or increase profits for the company. For example: developing technology to make the company more effective and efficient.
- **Capacity Expansion in Current Business**
Investments are made to increase the current production capacity. For example: buying new machines to increase production and sales capacity.
- **New Products and New Business**
Investments are made by developing new products or establishing a business in a different field from the current one.
- **Meeting Regulatory and Policy Requirements**
Investments are made to meet the government's rules or standards, even if they do not add value to the company.

An asset is something owned or controlled by a company that is expected to provide economic benefits in the future. In comparison, fixed assets are tangible assets used in the production or supply of goods and services, rented out to other parties, or for administrative purposes and can be used for more than one period (Kieso, Weygandt, & Warfield, 2019). Fixed asset investment is one-way companies can use to help improve their operations.

In investing in fixed assets, companies need to consider several things, one of which is the costs incurred to obtain these fixed assets. The company must assume that the costs taken into account are not only the costs incurred when buying the asset. The company must also prepare for the expenses that will arise afterward, namely depreciation costs. Therefore, a feasibility analysis must be carried out to make these investments. Moreover, to determine whether the investment plan is feasible, PT X should do the calculations in advance on his capital budgeting.

Investment feasibility analysis is carried out to provide an overview of future financial opportunities and risks so that the financial decision-making process can be carried out more precisely. Companies can use the capital budgeting method to conduct an investment feasibility analysis. According to Ross, Westerfield, & Jaffe (2015), capital budgeting is a method that aims to identify and analyze long-term investments that are expected to provide benefits or benefits in the future.

There have been quite several studies that have analyzed the feasibility of investment. These studies use a variety of methods that have been adapted to the needs of each company/organization. Elisa, Wiksuana, & Artini (2014) researched to determine the feasibility of developing investments in the form of building construction and other supporting facilities at the University of Dili. This study uses the Payback Period (PBP), Net Present Value (NPV), and Internal Rate of Return (IRR) methods. The results of the research show that investment development is feasible. The same results were also shown in Ain's research (2016) to find out about the feasibility of online payment systems. This study used the NPV and IRR methods. The study results show that the NPV is positive and the IRR is greater than the loan interest rate, so the investment is feasible.

Other research was also conducted by Normal (2017), which analyzed creative ceramic product testing services using the PBP, NPV, Profitability Index, IRR, and Break-even Points (BEP) methods. The research results show that the investment is feasible because it meets the investment feasibility criteria. In addition, research was also conducted by Sabirah (2015) to calculate the feasibility of investing in the IPC Logistic Center project development using capital budgeting. The method used is Adjusted Present Value, IRR, BEP, and the sensitivity of each assumption. The results of the research show that the development project is feasible.

Siziba & Hall (2021) researched to find out the evolution of the application of the capital budgeting method. The research shows that six methods are often used in capital budgeting, namely Net Present Value (NPV), Internal Rate of Return (IRR), Payback Period (PBP), Accounting Rate of Return (ARR), Return on Investment (ROI), and Real Option Valuation (ROV). This research is in line with the theory expressed by Ross et al. (2013) that the most frequently used capital budgeting methods in assessing investment feasibility are NPV, IRR, and PBP.

Based on that previous research, this research was conducted with the hope of helping PT X to analyze the feasibility of investing in the addition of fixed assets. This study also offers the most appropriate method proposal for PT X in assessing the feasibility of the investment. This feasibility analysis is carried out using capital budgeting techniques. Based on this analysis, it is expected that PT X can evaluate his investment plans and be considered for decision-

making.

RESEARCH METHODS

Research Strategy and Approach

The research strategy used in this research is a case study because the purpose of this research is to explore the phenomenon (Yin, 2014). At the same time, the research approach used in this study is a qualitative approach with mixed-method research by combining qualitative and quantitative methods to understand better research problems and complex phenomena than using only the two methods individually (Creswell & Plano Clark, 2009). In this study, a case study was conducted by analyzing PT X, who plans to add fixed assets. This study was conducted to determine the feasibility of investing in the addition of fixed assets and provide recommendations for the appropriate calculation method for PT X.

Data Collection

The types of data used in this research are primary and secondary data. The primary data in this study are the results of interviews with PT X. Interviews were conducted with PT X, especially the finance department, to find out the main activities and business processes of PT X. Interviews were conducted to find out sources of income and operational costs. This semi-structured interview will be used in the next stage, namely data analysis. At the same time, the secondary data in this research is in the form of PT X's financial statements, data regarding the costs incurred by PT X to invest in its fixed assets, and other documents related to research. After that, document analysis is carried out by reviewing the data/documents that have been collected. This document can be in the form of softcopy or hardcopy.

Data Analysis

The data analysis used in this research is descriptive. Descriptive analysis is a method that aims to describe or provide an overview of the object of research through data or samples collected without analyzing and making conclusions that apply to the public (Sugiyono, 2017). This study will conduct an in-depth analysis of the problems that occurred as they were at the time this research took place. Data analysis in this study was to conduct interviews to find out the main activities and business processes run by PT X. In addition, interviews were also conducted to obtain permits to collect data in the form of financial statements and other related data such as the amount of capital for purchase the machine, working capital, and target income from the purchase of the machine. Furthermore, the documents and information that have been collected will be processed using existing assumptions, then tested for investment feasibility using capital budgeting, namely Net Present Value (NPV), Internal Rate of Return (IRR), Payback Period (PBP), and Discounted Payback Period (DPP). After that, conclusions will be drawn by comparing the investment project acceptance criteria with the calculation results of each method.

Analysis Units

The unit of analysis for this research is a single case study. A single case study is a case study whose research focuses on only one issue or center of attention. This study uses a single case study to ensure that the data obtained from the object to be studied can be more detailed. This statement is in line with (Tellis, 1997), which states that a single case study is ideal for hidden

cases where researchers may have access to previously inaccessible phenomena.

The object of this research is PT X in its plan to invest in fixed assets in the form of machinery to accommodate the increasing demand for plastic and increase its sales.

RESULTS & DISCUSSION

Financial Assumptions

To conduct an investment feasibility analysis, it is necessary to use financial assumptions to prepare cash flows. This action is done to assist the calculation and research to reflect the near-real condition in the future. The economic assumptions are industry growth projections, inflation, interest rates, and taxes. Furthermore, there are three conditions/scenarios in projecting cash flows: pessimistic, most likely, and optimistic.

Suppose classified according to the Ministry of Industry; overall, PT X is included in the Rubber, Rubber, and Plastic Products Industries. However, because the machine to be purchased is specifically for producing flexible plastic packaging, the assumption of industrial growth used in this research is based on market research reports on plastic packaging in Indonesia. There are several market research reports on the plastic packaging industry in Indonesia. Later, the growth assumptions from these reports will be used for each of the most likely, optimistic, and pessimistic scenarios.

Based on the Premium Market Research Report (2022), the plastic packaging market in Indonesia will grow by 2.50% per year from 2021-2026. The growth assumption will project cash flows at the most likely condition. In addition, to determine the growth assumptions that will be used in the optimistic scenario, this study also uses a report from Mordor Intelligence (2022), which states that the plastic packaging industry in Indonesia will experience growth of 4.74% per year from 2022-2027. Meanwhile, for the pessimistic scenario, it is assumed that there is no growth in the plastic packaging industry in Indonesia due to competitors or alternative products to replace plastic, namely paper and aluminum foil.

In contrast to the assumption of industrial growth, the inflation rate assumption is obtained based on calculating the average historical data from the Central Statistics Agency. Based on Table 5.1, the average calculation of historical data on the inflation rate for 2011-2021 is 4.02%. These assumptions will be used for calculations in the most likely scenario. The inflation assumption in the optimistic and pessimistic scenarios will be calculated using the standard deviation.

Based on Table 2, the standard deviation of the historical inflation rate data is 2%. Then this standard deviation will increase and decrease the average inflation rate so that the assumptions for the optimistic and pessimistic scenarios are obtained. In optimistic conditions, an average of 4.02% will be added with a standard deviation of 2% to become 6.20%. As for the pessimistic condition, the average of 4.02% will be reduced by the standard deviation of 2% to become 1.84%. This assumption applies to the income calculation because the more significant the income, the more optimistic the condition.

In contrast to calculating costs, the greater the cost to be paid, the more pessimistic the condition. Therefore, for calculating costs, the assumption used for the optimistic condition is 1.84%, and the assumption used for the pessimistic condition is 6.20%.

Table 2. Inflation Category

Inflation	
2011	3.79%
2012	4.30%
2013	8.38%
2014	8.36%
2015	3.35%
2016	3.02%
2017	3.61%
2018	3.13%
2019	2.72%
2020	1.68%
2021	1.87%
Mean	4.02%
Standar Deviation	2%

Source: Badan Pusat Statistik (2021)

Discount Rate Assumptions

The cost of capital relates long-term investment decisions to the wealth of the owners of the company. This is used to decide whether the investment will increase or decrease the company's value in the form of returns received from the investment. In investing in fixed assets in the form of machinery, PT X's capital is entirely sourced from bank loans, so the discount rate used in discounted cash flow and as a consideration for decision-making is through the cost of debt.

The investment credit facility is proposed in Rupiah with an annual interest rate of 12% from the bank for 12 years. In addition, the tax on income used is 22% by the regulations in force in 2022. Then the calculation of the cost of debt after tax is as follows:

$$\text{Cost of debt} = R_B \times (1 - t)$$

$$\text{Cost of debt} = 12\% \times (1 - 22\%)$$

$$\text{Cost of debt} = 9,36\%$$

Initial Investments

The initial capital for purchasing fixed assets came from bank loans, amounting to Rp 3,500,000,000. This initial capital was intended to procure fixed assets, namely the Bruckner BOPP machine. The machine purchase includes transportation costs, import duties, and installation costs. This machine has a useful life of 12 years.

In addition to initial capital, there is working capital, namely the difference between current

assets and liabilities. PT X requires a working capital of Rp 220,037,500 in the year the machine was purchased. In calculating working capital, the following assumptions are used:

- Accounts receivable for one month (0.083 years)
- Inventory for one month (0.083 years)
- Accounts payable for three months (0.25 years)

Debt Payment

Funding for the purchase of fixed assets in the form of machinery entirely came from a bank loan of Rp 3,500,000,000. Debt repayment will be paid in installments for 12 years, with payments of four times a year. With an interest of 12% and a total of 48 installments, the results of the installment calculation are Rp. 138,522,208 for each installment payment.

Cash Flow Projections

After determining the assumptions to be used, the next step is to make cash flow projections. The cash flow component consists of income, expenses, depreciation, taxes, and changes in working capital. In calculating cash flows, the detailed assumptions used in each scenario are as follows:

	Most Likely Scenario	Optimistic Scenario	Pesimistic Scenario
Revenue:			
Production (kg)	Using the assumption of growth of 2.50%	Using the assumption of growth of 4.74%	Using the assumption of growth of 0.00%
Selling price	Using the inflation assumption of 4.02%	Using the inflation assumption of 6.20%	Using the inflation assumption of 1.84%
Variable cost:			
Quantity (kg)	Using the assumption of growth of 2.50%	Using the assumption of growth of 4.74%	Using the assumption of growth of 0.00%
Purchase price	Using the inflation assumption of 4.02%	Using the inflation assumption of 1.84%	Using the inflation assumption of 6.20%
Fixed cost:			
- Electricity cost:			
Quantity (kWh)	Using the assumption of growth of 2.50%	Using the assumption of growth of 4.74%	Using the assumption of growth of 0.00%
Cost/kWh	Using the inflation assumption of 4.02%	Using the inflation assumption of 1.84%	Using the inflation assumption of 6.20%
- Salary expense	Using the inflation assumption of 4.02%	Using the inflation assumption of 1.84%	Using the inflation assumption of 6.20%
- Depretiation expense (Fiscal)	Constant Rp437,500,000 per year		
- Maintenance expense	Using the inflation assumption of 4.02%	Using the inflation assumption of 1.84%	Using the inflation assumption of 6.20%

Figure 1. Summary of Assumptions

Based on the target set by management, it is assumed that the revenue and costs used in the first year the machine is operated for the three scenarios are the same. Then for the calculation of subsequent years, assumptions will be used for each scenario, as shown in Table 3. The calculation of each cash flow component for each scenario will be explained in more detail in the following points. After including all the components, it will show the free cash flow, which will be used as the basis for projecting cash flows for 12 years of the useful life of fixed assets. Principal debt and interest principal are not included in the cash flow projection because they have been calculated as the total initial project cost and included in the cost of capital (discount rate). It happens because the financing for this investment comes entirely from bank loans.

Operating Income

The income generated from the machine is to be purchased, focused on three types of plastic film, namely Type A, Type B, and Type C. Each type has a proportion of 25% for Type A, 25% for Type B, and 50% for Type C. The machine has a maximum capacity of 91,250

annually and will operate 24 hours a day for an entire year.

In the most-likely scenario, it is assumed that for the first year of operation, the production capacity for the machine is 73,000 kg/year and is projected to increase by 2.50% annually. However, in the 11th and 12th years, the increase in production capacity exceeded the engine capacity of 91,250 kg/year. Therefore, for both periods, it is assumed that the production capacity is the same as the capacity in the 10th year; in other words, there has been no production growth since the 10th year. It is assumed that the production capacity in years 10 to 12 is the same, namely 91,167 kg/year. It happens because the machine's maximum capacity is 91,250 kg/year, so production growth cannot occur anymore. However, for the selling price, it is projected that there will still be an increase of 4.02% in accordance with the assumption of the inflation rate.

In the optimistic scenario, it is assumed that the production capacity is 73,000 kg/year and is projected to increase by 4.74% annually. After doing the calculations, it is known that in the 6th to 12th years, the production capacity exceeds the engine capacity, which is 91,250 kg/year. Therefore, for these periods, it is assumed that the growth that occurs is up to the maximum capacity limit of the machine. Same as in the most-likely scenario, the production capacity in years 6 to 12 is the same, namely 91,250 kg/year, or in other words, there is no production growth because the maximum engine capacity limit has been reached. However, for the selling price, it is projected that there will still be an increase of 6.20% per year, in accordance with the inflation rate assumption.

In the pessimistic scenario, it is assumed that the production capacity for the first year is 73,000 kg. However, in this scenario, it is projected that there will be no growth in production capacity for the following years. The selling price is projected to increase by 1.84% in accordance with the assumed inflation rate.

Production cost

Production costs consist of variable costs, namely material costs, and fixed costs, namely electricity costs, salary costs, depreciation (fiscal), and maintenance costs. For the first year the machine is operated, all costs in each scenario are assumed to be the same.

For variable costs, it is assumed that there will be an increase of 2.50% for the quantity of the material and 4.02% for the purchase price of the material. Then for fixed costs, the quantity of electricity kWh will increase by 2.50% annually, in line with the increase in production. The price per kWh of electricity is also assumed to increase by 4.02% annually.

In addition, there is a salary expense. In one day, there are three work shifts, each shift of 8 hours. One shift takes 3-4 machine operators, and one day takes one supervisor. So in one day, it takes one supervisor and 9-10 workers. The salary for one supervisor is Rp5,300,000/month, and for one machine operator, the minimum wage is Rp4,300,000/month. Salary costs and maintenance costs are assumed to increase by 4.02% annually. Meanwhile, the depreciation expense will be constant, namely Rp437,500,000, until the 8th year. For years 9 to 12, the depreciation of fixed assets is 0 because, according to fiscal calculations, their useful life will expire in the 8th year.

In the optimistic scenario, for variable costs, it is assumed that the quantity of material will

increase by 4.74% and the purchase price will increase by 1.84% annually. Then for the fixed costs, the quantity of electricity kWh will also increase by 4.74%, and the price per kWh will increase by 1.84% annually. It is also assumed that salaries and maintenance costs will increase by 1.84% annually. Like the most likely scenario, the depreciation expense will be constant, namely Rp437,500,000 up to year eight, and for years 9 to 12, the depreciation of fixed assets is 0.

Then in the pessimistic scenario, for variable costs, it is assumed that the quantity of material will not increase in the following years. However, the purchase price of these materials is projected to increase in line with the inflation rate of 6.20%. Then for fixed costs, the quantity of electricity kWh will not increase in the following years because the growth assumption is 0%. However, the price per kWh will increase by 6.20% annually. It is also assumed that salaries and maintenance costs will increase by 6.20% annually. Same with the most-likely and optimal scenario, the depreciation expense will be constant, namely IDR 437,500,000 up to year eight, and for years 9 to 12, the depreciation of fixed assets is 0.

Income Tax Expense

PT X's annual income tax expense is assumed to be 22% of net income before tax each year, following the regulations in force in 2022.

Depreciation

The calculation of machine depreciation is carried out using the straight-line method according to its useful life. Based on the Regulation of the Minister of Finance of the Republic of Indonesia Number 11/PMK.010/2020, the depreciation of tangible assets is divided into two methods, namely, the straight-line method (Article 11 paragraph 1) and the declining balance method (Article 11 paragraph 2). This study uses the straight-line method, and the machine's useful life is 12 years to calculate the company's cash flows with tax payment obligations. Based on the table above, the tariff charged on PT X machines is 12.5%.

Capital Budgeting

In analyzing the feasibility of purchasing fixed assets, the methods of Net Present Value (NPV), Internal Rate of Return (IRR), Payback Period (PBP), and Discounted Payback Period (DPP) are used. The discount rate used in purchasing fixed assets is the cost of debt, which is 9.36%. Sensitivity analysis was carried out on three scenarios (pessimistic, most likely, and optimistic) based on the projection of each cash flow.

Net Present Value (NPV)

Net present value (NPV) is the added value generated from a company's project or activity. NPV calculates the present value of future cash flows minus investment costs. When the NPV of the investment is greater than or equal to zero, the investment is acceptable. On the other hand, if the NPV of the investment is less than zero, then the investment is rejected.

- Using the assumption in the most likely condition, the NPV shows an Rp2,147,233,748 at the end of the 12th period. This result indicates that with the new machine, the company gets positive results, and the machine provides added value for PT X, amounting to Rp2,147,233,748. Therefore, based on the NPV rules, machine

investment in PT X is feasible. The NPV calculation in the most-likely conditions can be seen in the following:

Periode	Cash Flow	Accumulation of Cashflow	Discount Factor	Discounted Cash Flow	Accumulation of Discounted Cashflow
0	-Rp 3,500,000,000	-Rp 3,500,000,000	1.0000	-Rp 3,500,000,000	-Rp 3,500,000,000
1	Rp 376,106,700	-Rp 3,123,893,300	0.9144	Rp 343,916,149	-Rp 3,156,083,851
2	Rp 628,324,871	-Rp 2,495,568,429	0.8361	Rp 525,372,392	-Rp 2,630,711,459
3	Rp 677,750,433	-Rp 1,817,817,996	0.7646	Rp 518,196,290	-Rp 2,112,515,169
4	Rp 731,018,698	-Rp 1,086,799,298	0.6991	Rp 511,086,582	-Rp 1,601,428,588
5	Rp 788,406,985	-Rp 298,392,313	0.6393	Rp 504,031,821	-Rp 1,097,396,766
6	Rp 850,211,896	Rp 551,819,583	0.5846	Rp 497,022,635	-Rp 600,374,131
7	Rp 916,750,623	Rp 1,468,570,206	0.5346	Rp 490,051,477	-Rp 110,322,654
8	Rp 988,362,354	Rp 2,456,932,559	0.4888	Rp 483,112,398	Rp 372,789,744
9	Rp 969,159,769	Rp 3,426,092,328	0.4470	Rp 433,180,466	Rp 805,970,209
10	Rp 1,052,030,636	Rp 4,478,122,964	0.4087	Rp 429,975,164	Rp 1,235,945,374
11	Rp 1,058,752,667	Rp 5,536,875,631	0.3737	Rp 395,686,287	Rp 1,631,631,661
12	Rp 1,508,747,921	Rp 7,045,623,552	0.3417	Rp 515,602,086	Rp 2,147,233,748
NPV =					Rp 2,147,233,748

Figure 2. NPV Calculation of Most-likely Conditions

- Using the assumption in optimistic conditions, the NPV shows a value of Rp5,252,745,553 at the end of the 12th period. This result indicates that with the new machine, the company gets positive results, and the machine provides added value for PT X, amounting to Rp5,252,745,553. Therefore, based on the NPV rules, machine investment in PT X is feasible. The NPV calculation in the optimistic conditions can be seen in the following:

Periode	Cash Flow	Accumulation of Cashflow	Discount Factor	Discounted Cash Flow	Accumulation of Discounted Cashflow
0	-Rp 3,500,000,000	-Rp 3,500,000,000	1.0000	-Rp 3,500,000,000	-Rp 3,500,000,000
1	Rp 376,106,700	-Rp 3,123,893,300	0.9144	Rp 343,916,149	-Rp 3,156,083,851
2	Rp 704,053,373	-Rp 2,419,839,927	0.8361	Rp 588,692,605	-Rp 2,567,391,247
3	Rp 858,750,957	-Rp 1,561,088,971	0.7646	Rp 656,586,168	-Rp 1,910,805,079
4	Rp 1,034,162,629	-Rp 526,926,341	0.6991	Rp 723,027,530	-Rp 1,187,777,549
5	Rp 1,232,792,861	Rp 705,866,520	0.6393	Rp 788,129,535	-Rp 399,648,014
6	Rp 1,437,463,535	Rp 2,143,330,054	0.5846	Rp 840,322,180	Rp 440,674,167
7	Rp 1,564,560,996	Rp 3,707,891,050	0.5346	Rp 836,340,231	Rp 1,277,014,397
8	Rp 1,675,893,954	Rp 5,383,785,004	0.4888	Rp 819,178,455	Rp 2,096,192,853
9	Rp 1,698,000,992	Rp 7,081,785,996	0.4470	Rp 758,946,960	Rp 2,855,139,812
10	Rp 1,823,803,031	Rp 8,905,589,028	0.4087	Rp 745,406,057	Rp 3,600,545,870
11	Rp 1,957,495,701	Rp 10,863,084,728	0.3737	Rp 731,572,378	Rp 4,332,118,248
12	Rp 2,693,927,294	Rp 13,557,012,022	0.3417	Rp 920,627,305	Rp 5,252,745,553
NPV =					Rp 5,252,745,553

Figure 3. NPV Calculation of Optimistic Conditions

- Using the assumption of a pessimistic condition, the NPV shows a value of -Rp1,499,367,835 at the end of the 12th period. This result indicates that with the new machine, the company gets negative results and does not add value to PT X. Therefore, based on the NPV rules, investing in machines in PT X is not feasible. The NPV calculation in the pessimistic conditions can be seen in the following:

Periode	Cash Flow	Accumulation of Cashflow	Discount Factor	Discounted Cash Flow	Accumulation of Discounted Cashflow
0	-Rp 3,500,000,000	-Rp 3,500,000,000	1.0000	-Rp 3,500,000,000	-Rp 3,500,000,000
1	Rp 376,106,700	-Rp 3,123,893,300	0.9144	Rp 343,916,149	-Rp 3,156,083,851
2	Rp 552,480,177	-Rp 2,571,413,123	0.8361	Rp 461,955,027	-Rp 2,694,128,825
3	Rp 502,128,867	-Rp 2,069,284,256	0.7646	Rp 383,919,070	-Rp 2,310,209,755
4	Rp 447,209,478	-Rp 1,622,074,778	0.6991	Rp 312,663,362	-Rp 1,997,546,393
5	Rp 387,412,265	-Rp 1,234,662,513	0.6393	Rp 247,674,251	-Rp 1,749,872,142
6	Rp 322,407,800	-Rp 912,254,712	0.5846	Rp 188,475,338	-Rp 1,561,396,804
7	Rp 251,845,741	-Rp 660,408,972	0.5346	Rp 134,624,809	-Rp 1,426,771,995
8	Rp 175,353,522	-Rp 485,055,449	0.4888	Rp 85,712,958	-Rp 1,341,059,038
9	-Rp 3,715,023	-Rp 488,770,472	0.4470	-Rp 1,660,485	-Rp 1,342,719,523
10	-Rp 93,281,144	-Rp 582,051,616	0.4087	-Rp 38,124,912	-Rp 1,380,844,435
11	-Rp 190,042,730	-Rp 772,094,346	0.3737	-Rp 71,024,428	-Rp 1,451,868,862
12	-Rp 138,990,859	-Rp 911,085,205	0.3417	-Rp 47,498,973	-Rp 1,499,367,835
NPV = -Rp					1,499,367,835

Figure 4. Calculation of Pessimistic Conditions

Internal Rate of Return (IRR)

Internal Rate of Return (IRR) is the discount rate that makes the present value of a project's cash flows equal to zero. When the initial cash flow is negative and the afterward cash flow is positive, the project acceptance criteria are accepted if the IRR value exceeds the cost of capital. On the other hand, the project is rejected if the IRR value is less than the cost of capital.

- Using the most likely assumption, the result of the IRR calculation shows a value of 18.41%. Compared with the desired rate of return, which is 9.36%, the internal rate is higher than the desired rate. Based on the IRR rule, it can be concluded that the machine investment in PT X is feasible in the most likely condition.
- Using the assumption in optimistic conditions, the results of the IRR calculation show a value of 26.77%. Compared with the desired rate of return, which is 9.36%, the internal rate is higher than the desired rate. Based on the IRR rules, it can be concluded that investment in machines at PT X is feasible under optimistic conditions.

- Using the assumption of a pessimistic condition, the results of the IRR calculation show a value of 0.00%. Compared with the desired rate of return, which is 9.36%, the internal rate is smaller than the desired rate. Based on the IRR rule, it can be concluded that investment in machinery at PT X is not feasible under pessimistic conditions.

Payback Period (PBB)

This method determines the period used as the return-on-investment limit. The rules for accepting investment in PBP are that the investment is accepted when the payback period for the project or investment is less than the specified time limit. Conversely, when the payback period of the investment exceeds the specified period, the investment will be rejected.

- Using the most likely assumption, the result of the PBP calculation shows a positive result of 5.351. This result indicates that investment in fixed assets will be able to return business capital less than the machine's useful life, which is five years and four months. Based on the PBP rules, it can be concluded that the machine investment in PT X is feasible in the most likely condition. The PBP calculation in the most-likely conditions can be seen in the following table:

$$\text{Payback Period} = 5 + \frac{Rp298.392.313}{Rp850.211.896}$$

$$\text{Payback Period} = 5.351$$

$$\text{Payback Period} = 5 \text{ years } 4 \text{ months}$$

- Using the assumption under optimistic conditions, the results of the PBP calculation show a positive result of 4.427. This result indicates that investment in fixed assets will be able to return business capital less than the machine's useful life, which is four years and five months. Based on the PBP rules, it can be concluded that the machine investment in PT X is feasible under optimistic conditions. The PBP calculation in the optimistic conditions can be seen in the following table:

$$\text{Payback Period} = 4 + \frac{Rp526.926.341}{Rp1.232.792.861}$$

$$\text{Payback Period} = 4.427$$

$$\text{Payback Period} = 4 \text{ years } 5 \text{ months}$$

- Using the assumption of a pessimistic condition, the results of the PBP calculation show results in over 12 years. This shows that investment in fixed assets will not be able to return business capital less than the machine's useful life. Based on the PBP rules, it can be concluded that machine investment in PT X is not feasible under a pessimistic condition.

Discounted Payback Period (DPP)

Discounted Payback Period (DPP) is a modification of the PBP method. This method determines the payback period based on discounted cash flows. The rule for accepting a project/investment based on this method is that if the discounted payback period of the project

or investment is less than the specified period, then the project or investment is accepted. On the other hand, when the discounted payback period exceeds the specified time limit, the project or investment will be rejected.

- Using the assumption of the most likely condition, the results of the DPP calculation show a positive result of 7,228. This shows that investment in fixed assets can return business capital less than the machine's useful life, which is seven years and two months. Based on the DPP rules, it can be concluded that the machine investment in PT X is feasible in the most likely condition. The DPP calculation in the most-likely conditions can be seen in the following table:

$$\text{Discounted Payback Period} = 7 + \frac{\text{Rp}110.322.654}{\text{Rp}483.112.398}$$

$$\text{Discounted Payback Period} = 7,228$$

$$\text{Discounted Payback Period} = 7 \text{ years } 2 \text{ months}$$

- Using the assumption of optimistic conditions, the results of the DPP calculation show a positive result of 5,476. This shows that investment in fixed assets will be able to return business capital less than the machine's useful life, which is five years and five months. Based on the DPP rules, it can be concluded that the machine investment in PT X is feasible under optimistic conditions. The DPP calculation in the optimistic conditions can be seen in the following table:

$$\text{Discounted Payback Period} = 5 + \frac{\text{Rp}399.648.014}{\text{Rp}840.322.180}$$

$$\text{Discounted Payback Period} = 5,476$$

$$\text{Discounted Payback Period} = 5 \text{ years } 5 \text{ months}$$

- Using the assumption of a pessimistic condition, the DPP calculation results show that more than 12 years old. This shows that investment in fixed assets will be able to return less working capital after the machine's useful life expires. Based on the DPP rules, it can be concluded that machine investment in PT X is not feasible under pessimistic conditions.

Scenario Selection

After getting the calculation results above, the calculation is given to the management for further discussion to select scenarios the company can implement.

Scenario	Weight	NPV	NPV Weighting
Most Likely	0,67	Rp 2,147,233,748	Rp 1,431,489,165
Optimistic	0,17	Rp 5,252,745,553	Rp 875,457,592
Pessimistic	0,17	-Rp 1,499,367,835	-Rp 249,894,639
Total	1,00	Rp 5,900,611,466	Rp 2,057,052,118

Figure 5. Weighting of the Three Scenarios

Based on the results of discussions with management, weighting is carried out to combine the calculations of the three scenarios. The weighting is done based on the probability of its occurrence. Management considers that the most likely scenario has a greater occurrence rate

than the optimistic and pessimistic scenarios. The most likely scenario is given a weight of 0.67, the optimistic scenario is given a weight of 0.17, and the pessimistic scenario is given a weight of 0.17. After each scenario is known for its weight, the weight is multiplied by the value of each NPV. For the most likely scenario, the figure is Rp1,431,489,165, the optimistic scenario is Rp875,457,592, and the pessimistic scenario is -Rp249,894,639. Furthermore, the results of each NPV weighting are added up to produce one combined figure, which is Rp2,057,052,118. Thus, the investment plan in the form of adding fixed assets by PT X is feasible because it provides positive results.

CONCLUSION & SUGGESTION

Conclusion

Based on the analysis that has been carried out to assess the feasibility analysis in the investment plan for additional fixed assets at PT X using the capital budgeting method, the following conclusions can be obtained:

- In the most likely condition, the NPV shows a positive number of IDR 2,147,233,748 and an IRR of 18.41%, which is greater than the discount rate of 9.36%. In addition, when viewed from the cash flow projections for 12 years or during the useful life of the fixed assets, this investment can return capital for five years and four months after the machine is operated. In line with this, when viewed from the cash flow projections discounted using a discount rate, this investment can also return business capital for seven years and two months after the machine is operated. So, it can be concluded that this investment is feasible in the most likely condition.
- In the optimistic conditions, the NPV also shows a positive number of Rp5,252,745,553 and an IRR of 26.77%, greater than the discount rate of 9.36%. In addition, when viewed from the cash flow projections for 12 years or during the useful life of the fixed assets, this investment can return capital for four years and five months. In line with this, when viewed from the cash flow projections that are discounted using a discount rate, this investment can also return business capital for five years and five months after the fixed assets are purchased. So, it can be concluded that this investment is feasible under optimistic conditions.
- In a pessimistic condition, the NPV shows a negative number of -Rp1,499,367,835 and an IRR of 0.00%, which is smaller than the discount rate of 9.36%. In addition, when viewed from the cash flow projections for 12 years or during the useful life of the fixed assets, this investment cannot return capital before its useful life ends. In line with this, when viewed from the cash flow projections discounted using a discount rate, this investment also cannot return the business capital before its useful life expires. So, it can be concluded that this investment is not feasible under pessimistic conditions.

Suggestion

Based on the conclusions above, it can be seen that the investment plan for adding fixed assets is feasible. However, this study has limitations; the analysis only uses financial aspects such as financial reports, inflation rates, industrial growth rates, and taxes. Therefore, the advice that can be given is that the company should also carry out an investment feasibility analysis

by considering factors other than financial aspects, such as internal company factors (the environment and culture of the company), market aspects such as competitors, and economic conditions more thoroughly. In addition, future research can also conduct further research on risk analysis using a wider range of respondents related to the selection of scenarios to produce conclusions and decision-making closer to reality.

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