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Comparison of capital budgeting methods: NPV, IRR, PAYBACK PERIOD

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Abstract

In the era of globalization, every company is required to have high competitive ability because the competition that must be faced by companies will be increasingly stringent. In this study discusses whether or not the investment that will be made by the company is feasible. Calculation of the feasibility of this investment using the Capital Budgeting method. Based on the application of Capital Budgeting, methods that are generally used to analyze an investment project include Net Present Value (NPV), Internal Rate of Return (IRR), Payback Period (PP). Capital budgeting analysis is very helpful for companies in conducting research and analysis regarding the feasibility of an investment project planned by the company.

Keywords: Capital Budgeting; NPV; IRR; PAYBACK PERIOD

1. Introduction

Investment decisions are one of the duties of a financial manager in allocating company funds. Investment is an investment in either fixed assets or non-fixed assets in order to obtain profits in the future. Before determining whether an investment plan is accepted or rejected, financial managers need analysis to assess the investment. Fixed asset investment is very important and necessary for goods or services companies. Fixed assets are the main capital in the establishment of a company. The company's fixed assets can be used for the company's production needs in order to increase the company's production activities. In companies that produce goods, fixed assets are machines used in the daily production process. For service companies, fixed assets can be tools to assist the production process. Other fixed assets owned by the company can be in the form of buildings, vehicles and other supporting facilities.

Over time, fixed assets will experience damage that cannot be used optimally. This will result in the production process not being optimal and disrupting the company's production process. Therefore, fixed assets require maintenance, repair, replacement or addition of fixed assets. The company will issue substantial funds to procure the company's fixed assets. Funds that are large enough to procure fixed assets issued by the company are funds with an uncertain payback period, therefore the company must carefully and accurately calculate how to invest funds for the company's fixed assets.

Capital budgeting is a business evaluation process to assess whether or not a project/company's big plan is implemented. Meanwhile, the notion of *capital budgeting* in financial management is the process of analyzing the inputs and outputs of a project from a financial perspective to ensure that the project achieves the expected profit. Among other business processes, *capital budgeting* is the most essential. If the *capital budgeting* process is not agreed upon, then the company's project, no matter how large, may not be initiated. When capital budgeting is carried out, the finance division usually considers 2 interests, namely 1) the interests of future profits, and 2) the interests of investors.

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The benefit of *capital budgeting* is to find out the funding requirements in more detail. This right is because the funds are bound for a period of more than one year. In addition, capital budgeting can prevent errors in decision making. For most companies, capital budgeting or capital budgeting is one of the main sources of company profits. With the existence of capital budgeting, companies can calculate the level of profit that will be obtained in the long term. Reporting from the Directorate General of Taxes website, capital budgeting is a complete process of analyzing projects and determining which projects are included in the capital budget. *Capital budgeting* is also defined as the process of planning and decision-making related to the payment of funds which in the refund period is more than one year. Capital budgeting decisions are considered important because they involve the use of relatively large amounts of money, long-term funding commitments, and the uncertainty caused by the length of time and difficulty in making *variable estimation decisions*.

2. Literature review

2.1. Capital Budgeting

Basically *Capital Budgeting* is a long-term investment decision-making process that involves allocating a company's financial resources for certain investment projects. This process includes evaluating, selecting, and controlling investment projects that are expected to provide financial benefits in the long term. *Capital Budgeting* is an important part of a company's financial decisions because it involves significant use of funds and has a long-term impact on the company. The main objective of *capital budgeting* is to maximize the value of the company by selecting investment projects that generate positive cash flow and provide a rate of return commensurate with the risks involved. According to Syamsuddin (2010) in research (Trianingsih, Mardani, & Wahono, 2018) "*Capital budgeting* is the entire process of planning, collecting, evaluating, selecting and determining investment alternatives that will provide income for the company for a period of more than a year".

Capital budgeting is very important because the plans that are managed will be carried out for a long period of time, which means that business actors have to wait for some time to come or a long time until all of the invested funds are recovered so that it will affect providers of funds for other purposes (Riyanto, 2016).

In making an investment, an evaluation is carried out on projects that are feasible or favorable to be implemented, before it is necessary to collect relevant information. In investment decisions there are two alternatives, namely rejecting or accepting the investment proposal. To evaluate these investment decisions, several methods are discussed (Musthafa, 2017), as follows: 1. *Average Rate of Return* (ARR) method 2. *Payback* (PB) method 3. *Net present value* (NPV) method 4. *Internal Rate of Return* (IRR) method 5. *Profitability Index* (PI) method

2.2. Net Present Value (NPV)

According to Sugiono (2014) *Net Present Value* (NPV) or net present value is a financial analysis used to measure whether a business is feasible or not seen from the present value of the net cash flows to be received compared to the present value of the total investment issued. In other words, NPV is calculated from net cash flow minus investment costs. According to (Fahmi, 2014) put forward the notion of NPV is the value of net profit or profit earned at the end of project/investment work. NPV calculations are often used as an aid in measuring whether a project is feasible or not. If *the present value of proceeds* is greater than or equal to *the present value* of the investment, the investment proposal is accepted. If *the present value of proceeds* is less than *the present value* of the investment, the investment proposal is rejected.

$$NPV = \sum_i^n \frac{CF}{(1+i)^n} - I_0$$

Where:

- NPV = net worth in the present
- CF = Cash flow = Proceeds = amount of money received
- i = Interest Rate
- n = Time Period
- I₀ = Value of initial investment (year 0)

2.3. Internal Rate Of Return (IRR)

The *Internal Rate of Return* (IRR) is a capital budgeting technique that reflects the rate of return that develops the current input value and the current output input value. Halim (2014) suggests that the internal rate of return (IRR) is an interest rate that can make the NPV equal to zero, because PV cash flows are at a level. This method also takes into account the time value of money, so that cash flows received are discounted on the basis of the cost of capital or interest rates. The advantage of this IRR is that the investment impact will be clearly visible in a calculation. Starting from incoming cash flows, the concept of time value of money, to investment risks that will occur in the future. Meanwhile, the weakness is that IRR assesses *needs* . based *cost of capital* , so that it cannot give maximum results in selecting projects in the form of ratios and is less able to make definite and precise decisions for *mutually exclusive projects* .

$$IRR = P1 - C1 \times \frac{P2 - P1}{C2 - C1}$$

Where:

- P1 = percentage value (i) which produces a positive NPV
- P2 = percentage value (i) which produces a negative NPV
- C1 = positive NPV
- C2 = negative NPV

2.4. Payback Period (PBP)

Payback Period is a method to find out how long it will take to return the funds invested in a project (Syahyunan, 2015). *Payback Period* is the time required to return the initial investment of the project through the cash flow generated. This concept gives an indication of the time period needed to reach the *break-even point* on an investment. The shorter the payback period, the better the project. *The Payback Period* is one of the simplest methods. This method calculates the time required to recover the initial investment costs based on cash flows. Simply put, PB is the length of time an investment reaches the break even point (*Break Even Point*). A short payback period means a more attractive investment. Mathematically the formula for calculating PBP is:

$$PBP = \frac{\text{Investasi Awal}}{\text{Arus Kas Masuk}} \times 1 \text{ tahun}$$

Criteria for decision: 1) If the Payback Period of an investment plan/project has a shorter time compared to the payback period method determined by the investor/company, then the investment/project plan can be accepted. 2) If the payback period of an investment plan/project is longer than the payback period determined by the investor/company, then the investment/project plan is rejected.

3. Research methodology

In this research using descriptive research method. Descriptive research method is a research approach that aims to describe, explain, and analyze certain phenomena or characteristics systematically and objectively.

4. Results and discussion

The NPV method calculates the present value of the expected future net cash flows using an appropriate discount rate. If the NPV is positive, the project is considered profitable because the present value of the cash flows received exceeds the initial investment. This method considers the time value of money and results in a value that is neutral to project size. The NPV method is considered to be the most accurate and widely used method in measuring the profitability of a project. NPV takes into account the time value of money and provides a more comprehensive picture of the project's value. If the NPV is positive, the project is considered profitable and acceptable.

IRR is the discount rate that results in an NPV equal to zero. This method measures the rate of return generated by an investment. If the internal rate of return exceeds the minimum set discount rate, the project is acceptable. IRR assumes that the generated cash flows will be reinvested at that internal rate of return. IRR measures the rate of return generated by a project. If the internal rate of return (IRR) exceeds the set discount rate, the project is acceptable. However, IRR has the disadvantage of multiple interpretations in the case of unconventional cash flows and varying discount rates.

Payback Period is a method that calculates the time needed to return the initial investment in a project. This method does not consider the time value of money or cash flows after the payback period. The shorter the payback period, the faster the initial investment can be returned. Payback Period provides information about the time needed to return the initial investment. This method is simpler and easier to understand. Payback Period does not consider the time value of money or cash flow after the payback period, so it can ignore long-term benefits.

The main difference between the three methods is the approach to the time value of money and the valuation of future cash flows. NPV provides a complete picture of the project's value taking into account the time value of money, while IRR provides the rate of return generated by the project. The payback period is simpler and focuses more on recovering the initial investment. In general, NPV provides the most comprehensive analysis and is recommended as the best method for making investment decisions. The IRR provides an overview of the expected rate of return, but does not provide as complete information as the NPV. Payback Period is simpler but less accurate and does not take into account the time value of money. In practice, a combination of the NPV and IRR methods is often used to evaluate investment projects as a whole.

Compliance with ethical standards

Disclosure of conflict of interest

No conflict of interest to disclosed.

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