Investments Evaluation Model Case in Indonesian Hospital

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Abstract—**This study aims to evaluate the investment in purchasing CT Scan machines at Government Hospital, Government and corporate has a difference s to evaluate their investment Private Hospital, to assess whether the investment is feasible or not can be seen from the financial aspects without ignoring other aspects, for that in making an investment decision and evaluation, it is necessary to do a financial analysis on the cash flow seen from income, expenses, funding, taxes, and how to return capital. To be able to do an analysis of decisions and investment evaluations using the Capital Budgeting Technique, in the Capital Budgeting technique there are several methods of decision evaluation and investment evaluation. In this study, the Capital Budgeting technique used is the Pay Back Period and Net Present Value methods. Payback Period is a period or period of time needed to be able to recoup the investment. Whereas Net Present Value is intended to calculate the Absolute profit over the life of the Machine by using cash flow and the internal rate of return is to find the Return (Interest Rate) which equates to the Investment Value.**

Keywords: Net Present Value, Pay Back Period, investment, internal rate of return

I. INTRODUCTION

Along with the changing times, the condition of hospitals that were originally purely social aims has shifted to being socio-economic, this condition is due to the greater hospital spending every day that is not balanced with hospital revenue that is increasingly difficult to obtain. In managing a good hospital to avoid losses, professional management is needed. Hospital survival is based on revenue or revenue, the amount of revenue is intended to cover operational, maintenance and development costs and improve service quality. To be able to achieve more income levels, in order to cover operational, maintenance and development costs and improve service quality. The hospital management must arrange professionally the functions of the existing services and offer to consumers or patients. In the face of technological developments and competition, the management of the Indonesian Hospital invests in adding health support facilities, by purchasing Computed Tomography (CT SCAN) which is expected to increase revenue.

Investment is a sacrifice to get results in the future. In determining investment decisions, the Indonesian Hospital must conduct a feasibility study in order to obtain a rational decision base. Investment valuation can be viewed from several aspects, one of which is the financial aspect.

Investment in the health sector requires the use of large funds, of course also has a big risk. This financial aspect study must include an assessment of the current situation and conditions, and taking into account the conditions for the future, especially in anticipating changes that might occur due to technological development factors. The financial aspects of assessment are needed in estimating financial expenditure and revenue over the economic life of the investment.

Investment appraisal in terms of financial aspects is done by capital budgeting. Capital budgeting in practice is intended to conduct investment analysis of several available investment alternatives, then determine or choose the most profitable investment. Inaccuracy in determining investment choices will result in losses in both real losses and losses due to lost opportunities to obtain more profitable benefits (opportunity costs) that can actually be realized. Investment analysis will select the opportunities that exist so that investments can be chosen that provide the greatest benefits from each Rupiah of funds invested.

According to Schlagle Additional firms with larger revenues tend to favors NPV and IRR, whereas smaller firms favor non-DCF models. Due to the development of financial markets, shareholder maximization has gained in importance, which has pressured CFO of firms to use DCF methods over other simpler and less accurate alternatives [1].

Based on this the researcher will try to apply the Net Present Value and Payback Period methods in analyzing the CT Scan Machine/tool at Indonesian Hospital.

In investing it is important to consider the risk of investment opportunities and the time value of money, to see whether the investment made has a potential beneficial or detrimental value using the Net Present Value method. NPV calculation is done by calculating cash flow, which is obtained from profit after tax plus the depreciation of its fixed assets. NPV is obtained by means, the effective value over the life of the machine/tool that is discounted is reduced by reducing the initial investment.

The payback period method is done by calculating the net cash flow of an investment in a period so that it is known how long it takes to return the investment value that has been spent in funding the investment. Payback Period is obtained by dividing the investment value with cash flow that comes in every year, or by subtracting the investment value by cash flow every period.

IRR is an indicator of the level of efficiency of an investment. A project or investment can be done if the rate of return is greater than the rate of return if making other investments (interest on bank deposits, mutual funds and so on). The IRR function is used in determining whether an investment is carried out or not. Therefore, it is usually used as a reference that the investment must be higher than the Minimum Acceptable Rate of Return (MARR).

The problem formulation in this research is: How much investment is issued or invested by Indonesian Hospital in the purchase of CT Scan 'Can Net Present, Payback Period and Internal Rate of Return be used to evaluate investments, Can Net Present Value, Payback Period and Internal Rate of Return is used together to evaluate investments.

A. Investment

According to Musdalifah Azis, Sri Minta rti and Maryam Nadir [2] "Investment is the number of funds or resources others who performed at the time of this, with the purpose of obtaining a number of advantages the days of data ng".

Based on the understanding of the above, it can be synthesized that investment or planting stock is an expenditure or expenditure that can be kind of goods of capital, building, equipment capital, and goods inventory that is used to add the ability to produce goods and services to increase the productivity of labor that occurs increase in output generated.

B. The Method of Feasibility Analysis

Meanwhile, according to David Wijaya said that [3]: The method of feasibility analysis of an investment can be divided into two groups

a) *The conventional method is the method of analysis that has been recognized as a capital budgeting technique such as:*

1) Payback Period (PP)

2) Discounted payback period (DPP)

3) The rate of return (ARR)

4) Net present value (NPV)

5) Internal rate of return (IRR)

6) Modified internal rate of return (MIRR)

7) Profitability index (PI)

8) Cost / benefit ratio.

b) *Operational research method, which is a feasibility analysis method oriented to the optimization system, such as:*

1) Queuing theory (Waiting line model)

2) Monte Carlo simulation (Monte Carlo simulation)

3) Break even point (BEP)

4) Linear programming

II. METHODOLOGY

The method to be used is the Descriptive method using Net Present Value Analysis, Payback Period and Internal Rate of Return, while the Associative Method uses Correlation and Determination Coefficient.

A. Descriptitive Analysis

- The Net Percent Value (NPV) Method

- Payback Period (PP)

- Internal Rate of Return (IRR)

B. Associative Analysis

Associative research was conducted to determine Associative research was conducted to determine whether there was an influence of investment decisions, Net Present Value (NPV), Payback Period (PP) and Internal Rate of Return (IRR) in Indonesian hospitals.

1) Correlation analysis (single): Correlation analysis was used to find the relationship and prove the hypothesis relationship between two variables when a second data variabe L -shaped interval or ratio.

2) Determinant coefficient analysis: The coefficient of determination is a measure that shows the amount of contribution or percentage of explanatory variables to the response variable. In other words, the determinant coefficient shows the variance (variation) of the ups and downs of Y which is explained by the linear effect of X.

III. FINDINGS / RESULTS

A. Investment in Computed Tomography (CT Scan)

Investments made by the RSUD by purchasing CT Scan tools that aim to make operational activities run effectively and efficiently and the public get a more accurate diagnosis of a disease. From the financial statements in 2014 the RSUD purchased a unit of CT Scan tool known that the investment value of Rp. 12,000,000,000. with the useful life of the tool reaching 14 years and the remaining value of the tool is known to be 10% in the amount of Rp. 305,023,896, so that the depreciation of the tool is Rp. 835,355,436.

1) Calculation of CT scan depreciation: From the data obtained above it can be seen as follows:
Machine Price Rp. 12,000,000,000. - Machine life benefit (N) 14 years

Estimated residual value: Rp. 305,023,896.-

The following is the depreciation calculation using the straight-line method, CT Scan Depreciation Rp. 835,355,436/ year.

2) Calculation of the cost of capital (cost of capital): From the data obtained is known as follows:

- Percentage of own capital costs: 100%

- The tax rate: 10%

3) Calculation of EAT forecasting: CT Scan net profit data between 2015 and 2018.

Data on net profit after tax of CT Scan machines for 2015 to 2018 are as follows:

TABLE I.   NET PROFIT AFTER TAX CT SCAN MACHINE YEAR 2015 UNTIL 2028

YEAR	EAT (RUPIAH)
2015	120,172,110
2016	386,573,318
2017	436,331,060
2018	734,981,580
EAT Projection	
2019	837,329,160
2020	1,013,987,770
2021	1,190,646,380
2022	1,367,304,990
2023	1,543,963,600
2024	1,720,622,210
2025	1,897,280,820
2026	2,073,939,430
2027	2,250,598,040
2028	2,427,256,650

Source: using the time series Analysis method, namely trend analysis using the *POM QM for window 3.41software*

4) Calculation of cash flow investment in CT scan machines: Cash Flow calculation is obtained from the sum of income after tax (EAT), depreciation, because investment capital comes from own capital, the calculation is not summed with interest. The following is the Cash Flow from CT Scan during the useful life of the machine 14 years from 2015 to 2028.

TABLE II.   CT SCAN CASH FLOW TOOL 2015-2028

YEAR	EAT	DEPRESSION	CASHFLOW TERMINAL	CASHFLOW
2015	120,172,110	835,355,436		955,527,546
2016	386,573,318	835,355,436		1,221,928,754
2017	436,331,060	835,355,436		1,271,686,496
2018	734,981,580	835,355,436		1,570,337,016
2019	837,329,160	835,355,436		1,672,684,596
2020	1,013,987,770	835,355,436		1,849,343,206
2021	1,190,646,380	835,355,436		2,026,001,816
2022	1,367,304,990	835,355,436		2,202,660,426
2023	1,543,963,600	835,355,436		2,379,319,036
2024	1,720,622,210	835,355,436		2,555,977,646
2025	1,897,280,820	835,355,436		2,732,636,256
2026	2,073,939,430	835,355,436		2,909,294,866
2027	2,250,598,040	835,355,436		3,085,953,476
2028	2,427,256,650	835,355,436	305,023,896	3,262,612,086

Source: primary data that has been processed

TABLE III.   VARIABLE *CASH FLOW* Y INVESTMENT, NPV, PP, IRR IN INDRAMAYU DISTRICT HOSPITAL YEAR 2015 – 2028

Period	Investment	NPV	PP	IRR
2015	11,164,644,564	868,574,539	955,527,546	115.427.728
2016	10,329,289,128	1,009,313,150	1,221,928,754	147.608.993
2017	9,493,933,692	955,036,558	1,271,686,496	153.619.729
2018	8,658,578,256	1,072,540,181	1,570,337,016	189.696.712
2019	7,823,222,820	1,037,064,449	1,672,684,596	202.060.299
2020	6,987,867,384	1,043,029,568	1,849,343,206	223.400.659
2021	6,152,511,948	1,039,338,931	2,026,001,816	244.741.019
2022	5,317,156,512	1,026,439,758	2,202,660,426	266.081.379
2023	4,481,801,076	1,008,831,271	2,379,319,036	287.421.740
2024	3,646,445,640	984,051,393	2,555,977,646	308.762.100
2025	2,811,090,204	956,422,689	2,732,636,256	330.102.460
2026	1,975,734,768	925,155,767	2,909,294,866	351.442.820
2027	1,140,379,332	891,840,554	3,085,953,476	372.783.180
2028	305,023,896	774,602,742	3,262,612,086	342.007.648
∑	80,287,679,220	13,592,241,550	29,695,963,222	115.427.728

B. Associative Analysis

Correlation analysis is used to find the role and prove the hypothesis of the role of two variables if the two data variables are intervals or ratios. The results of a single correlation coefficient (r) can be calculated as follows:

$$r = \frac{n\Sigma XY - (\Sigma X)(\Sigma Y)}{\sqrt{((n\Sigma X^2 - (\Sigma X)^2)(n\Sigma Y^2 - (\Sigma Y)^2))}} \tag{1}$$

- Correlation Analysis of Net Present Value to Investment.

- the correlation coefficient (r) is 0.442, then the correlation is moderate, then between Net Present Value (X_1) and Investment tool (Y) in the same direction. In other words, an increase or decrease in a variable (Net Preset Value) occurs together with an increase or decrease in a variable Y (Investment tool).

- Payback Period Correlation Analysis on investment.

- Single correlation coefficient results (r) Payback Period (X_2) Against Investment (Y), Results r = 0.999 correlation of correlation is very strong or near perfect.

- Correlation Analysis of Internal Rate of Return to Investment.

- The results of a single correlation coefficient (r) Internal Rate of Return (X_3) Against Investment (Y), Results r = 0.9 88 correlation correlation is very strong or near perfect.

- Correlation Analysis of NPV , PP and IRR on Investment.

- Correlation results are close to perfect, then the correlation between NPV (X_1), PP (X_2) and IRR (X_3) to Investment tool (Y) r = 0.981 correlation correlation is very strong or near perfect.

C. Analysis of the Coefficient of Determination

1) Analysis of the net present value (X₁) determination coefficient on investment (Y): To measure the contribution of net present value to the investment, the calculation of the determinant coefficient is used, as follows:

$$Kd = r^2 \times 100\%$$
$$= (0.442)^2 \times 100\%$$
$$= 0.2\%$$

From the results of the above calculation, a coefficient of determination of 0.2% obtained the contribution given net present value to the investment of 0.2% and the rest is influenced by other variables not examined.

2) Analysis of payback period (X₂) determination coefficient on investment (Y): To measure how much the contribution of the influence of the payback period to investment, the calculation of the determinant coefficient is used, From the calculation of the coefficient of determination obtained Kd = 99.82 %.

From the results of the above calculation, a coefficient of determination of 99.82 % is obtained , the contribution given by the payback period to the investment is 99.82 % and the rest is influenced by other variables not examined.

3) Analysis of net present value determination coefficient, payback period and internal rate of return on investment: From the calculation of the coefficient of determination obtained Kd = 97.61%, the contribution given by the Internal Rate of Return to the investment is 97.61 % and the rest is influenced by other variables not examined.

4) Determination Coefficient Analysis of Net Present Value (X₁) , Payback Period (X₂) and Internal Rate of Return (X₃) on Investment (Y): From the results of the above calculation, a coefficient of determination of 96.41 % is obtained, the contribution given is Net Present Value (X₁), Payback Period (X₂) and Internal Rate of Return (X₃) of the investment of 96.41 % and the rest is influenced by variables others that are not researched.

IV. DISCUSSION

Based on calculations and analysis conducted by researchers regarding Investment, income, fund flows and returns using the Net Present Value (NPV) method and the Payback period method (PP) in the Investment Evaluation of Computed Tomography Equipment (CT Scan) at Indonesian Hospital, can be concluded as follows:

Based on the results of the study note that in 2014 the Hospital bought 1 unit of Computed Tomography Equipment (CT Scan) with an investment value of Rp. 12,000,000,000 with a source of cost of 100% own capital. Based on the calculations of Cash Flows that have been analyzed, the Payback period is obtained for the investment of implanted equipment for 7 years 7 months 27 working days. So that the investment decision to purchase a Computed Tomography Tool (CT Scan) is feasible because the investment payback period is fast (only 7 years), while the useful life of the Computed Tomography Tool (CT Scan) is 14 years.

Based on the NPV calculation results that are used to determine the feasibility of investment in the equipment carried out by Indramayu District Hospital. An investment is considered feasible if the outflow PV <the cash inflows. the results of research conducted that the investment value (PV outflow) is Rp. 12,000,000,000.00 while PV cash inflows of Rp. 13,592,241,550.00 so that the NPV value of Rp. 1,592,241,550.00, so that the investment decision Tool made by Indonesian Hospital is considered feasible. Based on the results of the IRR calculation used to determine the feasibility of investing in the equipment carried out by the Indramayu District Hospital. Investment is considered feasible if the IRR is above the bank loan interest rate, IRR is obtained with a value of 12, 08%, is declared feasible because the bank interest rate for large govern ment investments is 9%. Based on the calculations carried out it turns out that both the NPV, Payback Period Method and IRR together can be used to Evaluate the Investment made at Indonesian Hospital.

From the results of the research conducted, the researchers provide advice, as for suggestions from the results of the study as follows: With the positive role of the Net Present Value and Payback Period on the evaluation of investment in CT Scan tools, it is hoped that the management of Indonesian Hospital will utilize these relationships so that they can get maximum, effective, and efficient results. It is recommended that the Management of Indonesian Hospital maintain and improve the quality of services so that public confidence in the Indramayu Regency Regional Hospital is maintained and to make efficiency in the use of operational costs so that the results of the analysis of Computed T omography (CT Scan) tools can be achieved.

So that the results that have been analyzed are achieved if the management of the Indonesian Hospital carries out a contract of cooperation with the health centers throughout the Indramayu district and providers of services in Indramayu. NPV obtained from this study is quite minimal when compared with the initial investment value and economic life of the machine, presumably the management of the Indonesian Hospital reviewing the matter of CT Scan usage rates.

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