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# Comparative Analysis of Procurement of Blood Examination Equipment of Hospital Laboratory in Bantul Area

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**ABSTRACT**

There is a positive upward trend for 2014 from every month there is an increase in the number of patient visits for hematology. With these tools in Hospital constrained technical problems because the tool can not do quickly so that some problems and contracts will expire this year. It Hospital laboratory in Bantul area in the future want to increase service and do the development of laboratory with the modernization of tools in the hope will solve the problem. This type of research is a case study with a holistic single case study design. Selected case study strategies because the research is intended to track contemporary events, investigating phenomena in real-life contexts by utilizing multiple sources of evidence. The business feasibility analysis value Net Preasent Value of Positif, Internal Rate Of Return of 106%, Payback Period Of 1 Year 1 Mount, Accounting rate of Return of 202%, Provitability Index Of 20,8 % on this research for the purchase of Hematology Analizer Equipment and According to Cash Flow comparison in this research then the most appropriate choice is the purchase of hematological Analizer tool because it is more profitable. Based on the business feasibility analysis on this research for the purchase of Hematology Analizer Equipment and According to Cash Flow comparison in this research then the most appropriate choice is the purchase of hematological Analizer tool because it is more profitable.

**KEYWORDS:** Comparison, Quantitative Analysis, Investment Worthiness

## INTRODUCTION

Bantul Regency is one of five regencies in the Special Province of Yogyakarta with an area of 50.85 km2. The population of Bantul District with the total population of 927,951 / 938,433 (BPS Yogyakarta, 2012) consists of 470,929 female (50.2%) Male 467,504 (49.8%) (Health Profile of Bantul, 2014). The degree of public health which is a reflection of the health of individuals, groups and communities can not be achieved optimally. This is indicated by the high maternal mortality rate (1.52 / 100.000).

The basic health service facilities in Bantul District have 27 Puskesmas, where each kecamataan has one to two Puskesmas and some laboratory services that are not standardized or do not have modern laboratory equipment. Besides, there is also a special treatment center for lung disease. In the private sector, basic health services are provided in the form of practicing physicians (228), public hospitals (14), special hospitals (4), practice midwives (192), and 46 clinics or clinics and maternity homes (Dinkes, 2013).

It is known that there has been a positive upward trend for 2014 from every month there is an increase in the number of patient visits for hematology and blood chemistry and if compared to the growing number of patients for examination from 2012-2014 which continues to increase, there is an opportunity to improve the quality of existing services . Currently the laboratory at Nurhidayah Hospital for blood chemistry check tool is owned Hospital with kind of tool is semi automatic.

Currently in the laboratory Nurhidayah Hospital for the ownership of hematology examination equipment that is still working together with the providers while for the blood chemistry of Nurhidayah Hospital with semi-automatic tools. With these tools in Hospital constrained technical problems because the tool can not do quickly so that there are several problems. It Hospital in the future want to increase service and do the development of laboratory with the modernization of tools in the hope will solve the problem.

Hospital is a class D-type public hospital in the year 2014 and has a classroom improvement program to become a Class C General Hospital in 2016-2027, so to achieve that goal needs to be adjusted from the aspects of Human Resources, Services, Facilities and Infrastructure . Of the

three aspects of the laboratory section is necessary to do the modernization of tools, as well as service improvement.

## METHODOLOGY

His type of research is a case study with a single holistic case study design. Selected case study strategies because the research is intended to track contemporary events, investigating phenomena in real-life contexts by utilizing multiple sources of evidence. This study includes a unit of analysis and examines the general nature of a program in order to use a single holistic design (Yin, 2003).

The study consists of two stages. First examines the feasibility of the investment plan for the development of hematology laboratory at Nurhidayah Hospital from the financial aspect by using quantitative analysis. The second phase examines which options are most appropriate and profitable from the financial aspect as well as other aspects. thus providing the choice of whether to cooperate with operational or purchasing tools.

The first stage of the study was conducted at the hospital in the laboratory, the finance and administration officer, the provision of hematology laboratory equipment. Supporting data on data on the number of Public Health Service, PLN. The evidence or data for the purposes of the case study can come from six data sources: documents, records, interviews, direct observation, participant observation and physical devices (Yin, 2003).

The use of multiple sources of evidence in case studies provides the advantage of developing inquiry unity, a process of traingulasi. Thus any finding in a case study would be more convincing and appropriate if based on several different sources of information following its support form. An analysis shows that case studies using multiple sources of evidence have been rated higher in terms of their overall quality, than those based solely on single source information.

In the first phase of this study secondary data were collected through documentation and archival records. Cash flow data of Rumas Sakit Nur Hidayah, services, number of patients and number of days of care at Hospital 2012 until 2014 were obtained by interview & Discussion Group Forum to the staff of Head of Laboratory Installation, Administration and Finance Department at Hospital . Primary data obtained through interviews and direct observation. Related prices of medical and medical equipment comes from interviews with some related parties and recapitulation of the archive of offer letters that enter at Hospital in 2014. Direct observation is done to see the physical aspects of medical equipment in Hospital Laboratory.

Primary and secondary data. In the second stage, the primary data was obtained by interviews and group discussion forums to the Laboratorim installation to explore data and information to support the development of the Hematah Hospital's hematology laboratory and provide the option of operational or self-employment through a feasibility test or business plan. Interview records are written in records relating to prices of medical equipment etc. The interview was conducted by the researcher himself and the Team consisted of 2 people; an accountant in charge of finance, head of laboratory installation at Nurhidayah Hospital

Data Processing in This first stage research focuses on financial analysis to assess the feasibility of investment. In the process of collecting and analyzing the data required various tools that include: Hospital profile, Number of Patients conducting Laboratory examination, Bed Occupation Rate (BOR), and Hospital cash flow data used in initial fund calculation and operation. The collected data is analyzed on a continuous basis. Quantitative, investment valuation is performed using Net Present Value (NPV), Internal Rate of Return (IRR), Profitability Index (PI), Pay Back Period (PP), and Accounting Rate of Return (ARR).

## RESULT AND DISCUSSION

The financial analysis for the development plan of the hematology examination laboratory is carried out with the following stages: 1) initial calculation 2) Projected number of patients for 10 years 3) Projected income 4) Cost of Production 5) projection of operational cost 6) Projection report Gross profit 7) Estimation cash flow 7) Investment Rating and 8) Sensitivity analysis.

### 1) Initial Calculation

In the initial calculation if choosing the option of purchasing tools then the required initial investment in use for the purchase of hematological examination is Rp. 148.720.000, -. This fund is used for the purchase of hematology analizer tool, if the selection through this research is done for the choice of operational cooperation then there is no budget for the purchase of the tool

because the operational cooperation has included the tool, and subsequently calculated Cost of Production, Operational costs either the operational cooperation or overall purchase and financial analysis.

### 2) Projected number of Patients Period time 10 Years

The number of hematologic examination patients The calculation of estimation or projection of hematology examination using forecasting with linear trend method and also in the auxiliary data processing through POM QM program on the estimation of hematology examination patients consisting of hemoglobin, routine hematology, leucocytes, leukocyte count, platelets, hematocrit of patient visits from outpatient or inpatient and using linear trend method because the position of saha is still in the growth phase (Husnan and Muhammad, 2000).

The proportion of each examination is obtained from the average number of each examination (data by 2014). In the income calculation, the number of patients is considered to be fixed after the 8th year because it is assumed that the

optimal number of visits has been reached. Based on the above table in the next get estimated the number of patients 10 years. In this linear trend method the tendency of demand demand in the future will be realized in the form of a straight line. The result of Hematology Check Projection based on this method is as per the picture below.

**Table 1.** Examination Projection in Year

| Year | Examination Projection in Year | Projection Of Income in Rupiah |
|---|---|---|
| 1 | 13947 | Rp. 439.941.014 |
| 2 | 15342 | Rp. 483.935.115 |
| 3 | 16722 | Rp. 584.370.291 |
| 4 | 18227 | Rp. 636.963.618 |
| 5 | 19686 | Rp. 754.979.467 |
| 6 | 21064 | Rp. 807.828.029 |
| 7 | 22538 | Rp. 950.955.580 |
| 8 | 23890 | Rp. 1.008.012.915 |
| 9 | 23890 | Rp.1.115.877.356 |
| 10 | 23890 | Rp. 1.115.877.356 |

**3) Revenue Projection (Omzet)**

The above invetation results are expected to be able to improve services to the people of Bantul and surrounding areas. The above invetation results are expected to be able to improve services to the people of Bantul and surrounding areas. From the development of this laboratory service can be projected the number of hematological examination every year for 10 years later multiplied by the examination price already set and the type of examination such as hemoglobin, routine hematology, leucocytes, calculate the type of leukocytes, platelets, hematocrit for the complete is in the appendix, then obtained the amount of turnover of each acceptance either alternative purchases of equipment or operational cooperation is the same because based on the projection of hematological examination.

**Table 2.** Projection of Income

| Year | Examination Projection in Year | Projection Of Income in Rupiah |
|---|---|---|
| 1 | 13947 | Rp. 439.941.014 |
| 2 | 15342 | Rp. 483.935.115 |
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| 9 | 23890 | Rp.1.115.877.356 |
| 10 | 23890 | Rp. 1.115.877.356 |

Estimated increase in the amount of income or turnover in accordance with the projection with the number of patients increase 10% in the second year and the decrease periodically, on the calculation of income, the number of patients is considered to remain after the 8th year.

Because it is assumed to have reached the optimal number of visits with the consideration that the year achieved optimum waiter effectiveness in the laboratory unit. The increase in income figures is due to the assumption of a tariff increase policy, due to the rising prices of reagents and other goods.

**4) Cost of Goods Manufactured**

Cost of Production in this study includes the cost of each inspection such as the purchase of Reagents and Out of Use Materials (BHP), for consumables such as EDTA, Spuit, Needle, Nacl, Hipafix, cotton alkoho tubes in this study the use of BHP is equally good for the selection purchase of tools or Cooperation of Operations. For Reagents there is a difference if the research is selected by Operational Cooperation then the purchase of reagents using the package system in accordance with the provider of the tool is multiplied by the projection of the patient's examination needs but if the choice of purchasing the tool then adjusted and calculated its needs with projection examination. or complete calculation is in the attachment at the back of this study, the following table below if cumulative every year until 10 years.

**5) Projected Operational Costs**

The estimated increase in my number corresponds to the projected number of Patients with an average increase of 5% per year and settled in the sixth year onwards with the consideration that in that year has achieved optimal service effectiveness in the laboratory unit for hematological examination.

The increase in cost figures is assumed to be due to rising prices of reagents and other goods. There is a need to fund all routine ministerial activities in the laboratory unit. he cost is required for service within a period of 10 years is estimated as follows: The fund is used to purchase electricity costs, water costs, depreciation costs, analyst services, equipment maintenance and other costs if any, these costs arise for the purchase of the equipment, if in the Operational Cooperation the cost which is not included is the cost of depreciation and maintenance of equipment because it includes the operational cooperation.

**Table 3.** Operational Cost from Purchase

| Year | Operational Cost |
|---|---|
| 1 | Rp. 135.315.591 |
| 2 | Rp.151.956.079 |
| 3 | Rp.225.158.092 |
| 4 | Rp.248.015.255 |
| 5 | Rp.337.020.032 |
| 6 | Rp.397.907.280 |
| 7 | Rp.511.374.563 |
| 8 | Rp.540.915.296 |
| 9 | Rp.646.893.807 |
| 10 | Rp.644.890.954 |

**Table 4.** Operational Cost for KSO

| Year | Operational Cost |
|---|---|
| 1 | Rp 92.703.456 |
| 2 | Rp102.434.153 |
| 3 | Rp112.154.628 |
| 4 | Rp122.795.363 |
| 5 | Rp133.209.899 |
| 6 | Rp143.166.503 |
| 7 | Rp153.864.082 |
| 8 | Rp163.812.492 |
| 9 | Rp164.529.192 |
| 10 | Rp165.245.892 |

**6) Project Cash Flow Project**

The development plan of the hematology examination tool would expect to obtain the benefit or profit from each period during its economic life. Prior to the assessment whether the investment is profitable or not, the information needed is the cash flow.

The importance of cash flow in the calculation of investments is that earnings in the sense of accounting are not the same as net cash inflows, which are more relevant to investors, not profit.

Practitioners in finance argue that however important is cash, not profit. Because with cash it can be invested, and with cash also financial obligations paid (Husnan and Muhammad, 2000). From the projected income statement it can be estimated that the net cash flow of the hospital development project for a period of 10.

**Table 5.** Cashflow from Purchase

| Year | Cashflow from Purchase |
|---|---|
| 1 | Rp 134.461.381 |
| 2 | Rp 157.257.663 |
| 3 | Rp 215.819.274 |
| 4 | Rp 234.105.004 |
| 5 | Rp 305.308.826 |
| 6 | Rp 318.325.824 |
| 7 | Rp 409.099.650 |
| 8 | Rp 432.732.237 |
| 9 | Rp 517.515.046 |
| 10 | Rp 515.912.763 |

**Table 6.** Cashflow from KSO

| Tahun | Cashflow from KSO |
|---|---|
| 1 | Rp 58.919.745 |
| 2 | Rp 61.581.861 |
| 3 | Rp 171.492.763 |
| 4 | Rp 186.408.524 |
| 5 | Rp 235.271.184 |
| 6 | Rp 244.280.997 |
| 7 | Rp 272.858.588 |
| 8 | Rp 327522.775 |
| 9 | Rp 390.798.190 |
| 10 | Rp 391.198.760 |

years is as follows. It is known that the investment in the development of this hematological inspection is partially in debt, the net cash flow is calculated based on the sum of net income, depreciation plus savings tax on interest on debt (Sartono, 2001).

The need to add one minus tax is multiplied by interest because it is not desirable to mix mix of investment decisions with funding decisions. Husnan and Muhammad (2000) argue that if interest deductions have been made in advance of cash flow flows and then consider the cost of capital in double counting. In order not to happen it needs to be adjusted net cash flow with interest on loan. For tax calculations, because the taxes are proportionally different, there are 10%, 15% and 30%, hence can be used on a balanced average, ie 20% (Suratman, 2001)

**7) Investment Assessment**

After all financial data are summarized and arranged in the form of project cash flow, an analysis can be conducted to assess whether the proposal or plan is feasible from the financial aspect. This investment valuation can be done by Net Present Value (NPV) method, Internal Rate of Return (IRR), Provitability Index (PI), Payback Period (PP), and Accounting Rate of Return (ARR).

**a) NPV (Net Present Value)**

This method calculates the difference between the present value of investment and the present value of net cash receipts (operational and cashflow terminals) in the future (Husnan and Muhammad, 2000). If the NPV is positive, the project is accepted, while the project's NPV is negatively rejected.

To determine the present value of operating cash flows and terminals based on cost of capital as a cut off rate or discount factor. Because in this research the investment is partially financed by own capital and partly by borrowing, so the calculation uses capital cost weighted average, that is: 1) Calculation of long-term debt costs = interest (1 -t) assuming 10% interest and Assuming the rate of return that investors want is equal to the loan interest rate that is around 11%, Cost for Hematology Analize Unit = Rp. 148.720.000,- .

Thus, the cost of capital is 11%, this value which will be used as a cut off rate in assessing the proposed investment project developers. NPV calculations performed with the help of the present value table with discount factor 8% are as follows: From the table above looks the difference between the total between present value of cash of cash flow with positive value of invesment through microsoft excel calculation, it means the proposed project is feasible held.

**Table 7.** Net Present Value

| Year | Cash flow from Purchase | |
|---|---|---|
| 0 | -148.720.000 | Initial Invesment |
| 1 | 129.073.273 | |
| 2 | 142.385.663 | |

| | | |
|---|---|---|
| 3 | 200.947.274 | |
| 4 | 219.233.004 | |
| 5 | 290.436.826 | |
| 6 | 303.453.824 | |
| 7 | 394.227.650 | |
| 8 | 417.860.237 | |
| 9 | 502.643.046 | |
| 10 | 501.040.763 | |
| | NPV | Rp 1.577.179.394 |
| | IRR | 106% |
| | d.f.r | 11% |

**b) Internal Rate of Return (IRR)**

In get the value of IRR of 106% through microsoft excel calculations, while the interest rate in the hint is 11%. Based on the results of this calculation, the IRR value is greater than the relevant interest rate (interest rate in the hint) then the investment is said to be profitable (Husnan and Muhammad, 2000) and for the best option is the purchase.

**c) Provitability Index (PI)**

he profitability index is also called the benefit cost ratio (B / c Ratio) analysis technique, used to measure feasibility of the proposed investment project by comparing the present value of the project cash flows with the present value (initial investment). Calculations for the development project of this hematological examination are: PI = 20.8, The value of PI is greater than 1, so the planned purchase of a hematological analizer tool is said to be viable or profitable for the best choice of research is purchasing.

**d) Payback Period (PP)**

Payback Period is used to find out how long the business / project done can return the investment. This method has several disadvantages such as:

1) Not paying attention to the concept of money value, because the rupiah received in the first year is the same as in the following years;

2) Not paying attention to net cash flow after pay back, so if faced with multiple investment with equal value and pay backnya same then the decision taken can be misleading. To overcome the first weakness, discounted pay back is used, in which the operational cash flows and cash flow terminals are discounted or present value with the relevant interest rate.

PP = 1 year + 0.381 months The time limit in this calculation indicates that within 1 year 1 month there may be return of investment, as long as it does not happen beyond the capability of the hospital.

**e) Accounting Rate of Return (ARR)**

This technique is used to determine the feasibility of a proposed project by comparing the average rate of return with the required rate of return. If the ARR value is greater than the required profit level of 8% then the investment is said to be feasible or profitable. In this case we do not calculate ARR.

The ARR value is 202%, while the profit rate is 8%. Based on the results of this perhtungan, ARR value greater than the required level of profit, then the investment is considered feasible (Husnan and Muhammad, 2000).

**Table 8.** Sensitivity Analize

| Scenario | Value NPV (In Rupiah) |
|---|---|
| Optimistic | Rp 1,813,756,303 |
| Reasonable | Rp 1,577,179,394 |
| Pesimis | Rp 1,340,602,485 |

**E. Sensitivity Analize**

One way to determine the risk of invetation was raised by Brigham and Houston (2001) using sensitivity analysis, a technique that shows how much NPV will change as a result of variable change, while other things remain constant. In the sensitivity analysis, each variable changes by a certain percentage above and below the expected value, then the NPV is calculated using each value. Sensitivity analysis in this study used pessimistic and optimistic estimation of 15% with key variable of patient number. Called pessimistic means the number of patients reaches 85% is expected, while optimistic reach 115%, meaning that the number of patients exceeds the expected. Value of 15% is determined with the assumption that seen from the basic data on the number of patients in the laboratory hematology analysis of the hospital nur hidayah hence the less likely achievement below 85%, especially with the addition of various hematologic examination.

The figures in the table above show a positive NPV score in all scenarios, at a pessimistic level, reasonable or optimistic. This means that the development project of the hematology analizer lab is a low risk investment.

## CONCLUSION

Based on the results of research and discussion that has been implemented can be concluded & suggestion that:

Based on the business feasibility analysis on this research for the purchase of Hematology Analizer Equipment is feasible to do and According to Cash Flow comparison in this research then the most appropriate choice is the purchase of hematological Analizer tool because it is more profitable.

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