



# Evaluation in Procurement of Diagnostic Supporting Tools CT-SCAN at PKU Muhammadiyah Bantul Hospital

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**Abstract:** Background: PKU Muhammadiyah Bantul Hospital as type C hospitals serve as referral hospitals so they must provide more complete health service facilities, such as laboratory services with higher specifications. The PKU Muhammadiyah Bantul Hospital is one of the private hospitals of Muhammadiyah Organisation, operating with the spirit of missionary, helper of the du'afa misery. Seven years ago, PKU Muhammadiyah Bantul Hospital made a purchase of Radiology Supervision in the form of CT SCAN but it has never been evaluated from the purchase of the tool. The purpose of this study is to evaluate whether the decision is appropriate and how the future strategy so that the benefits of the tool can be maximized in terms of financial and hospital income. Methods: Measuring or computing the revenue components and cost components of the CT SCAN tool and then analyzed by the NPV and PBP methods to find out whether purchasing from the equipment is beneficial for the hospital. Then a comparison analysis of real income analysis is compared to income if pricelist uses unit cost calculation. Results: The results show that the losses from the utilization of CT SCAN from the initial purchase amounted to Rp1,241,264,799. The smallest losses are in 2016 with the number Rp7,181,630, with the number of patients examined CT SCAN as many as 1623 patients. Conclusions: The use of CT SCAN for seven years was not considered to have the maximum impact of hospital exposure. Investigations show a greater potential loss in 2018 if no pricelist changes are made.

## 1 INTRODUCTION

Hospital is a field which has characteristic full of work, full of modal, full of conflict and full of science. The circumstance of hospital which form complex work culture is the first point of changing. The changing in hospital will make some obstacles because of the characteristic of hospital that full of work and modal (Chimberengwa et.al, 2012). In this globalization era, company work slowly in creating new product, it will fastly be left by people that more choosing in other product because of the modernity in technology, efficiency, and having high prestige.

But in the same time, there is a developing of new product that has enough high risk. A reasearch

find that failure level for developing in consumption product is 40%, industry product is 20% and services is 18%. Some factors that cause the failure include the leadership of the company or director that force their ideas to develop new product even market study shows a small number in the success of emerge the market, didn't desgin the product based on demand, companies are too optimistic in estimating market size, products are not placed precisely in the market, products are not advertised effectively, product prices are too expensive, product development costs are greater than previous planning, or attacks from competitors are greater than those that have been calculated (Kotler, 2005).

## 2 METHOD

This study is qualitative study case by using retrospective time approach that is analysing for taking decision of purchasing CT-SCAN tool as insourcing in the past that will be evaluated based on the tariff, profit, and future strategy. The calculation that done is investigation income and tariff for outcome from the using of the tool. After the income data and tariff for evaluating Radiology by using CTSCAN tool known so it can be done investment analysis by using Net Present (NPV) and Payback Period (PP) method. The calculation of the outcome cost by using unit cost method in every year is considered as implemented tariff for the next to know the number of the income that must be obtained than the real income (Donald and Neville, 2009).

Analysis of income ration is based on the unit cost factor. Some factor influence the calculation of the unit cost: the number of investigation actions, tube prices, consumables and equipment maintenance and the purchase of CT SCAN equipment itself (Trisnantoro, 2004).

Future strategy is made by some alternative from economic side that based on the result of the difference between obtained income and income in unit cost. Next, choose some alternative strategy in order to the buying of CT-SCAN can be maximized.

## 3 RESULT

Radiology Services in PKU Muhammadiyah Bantul that is one of the health facilities services in hospital is part of health resources that are indispensable in supporting the implementation of health efforts. The delivery of radiology services in hospitals has very complex characteristics and organizations. Various types of radiology personnel with diverse scientific devices interact with each other. Radiology science and technology are developing very rapidly which need to be followed by radiology personnel in order to provide standard quality services, making the problems more complex at radiology installations (Denise, 2015).

### 3.1 Feasibility Analysis

Cashflow Analysis with Income Simulation is obtained through interviews and observation of data from the financial section of PKU Muhammadiyah Bantul Hospital. This data was made at the time before the CT SCAN was purchased and calculations were made by using many ways of purchasing dan for knowing the real

of the cahflow that will be gotten by PKU Muhammadiyah Bantul Hospital if hospital supply CTSCAN by purchasing.

Based on table 1, it can be seen that cashflow scenary made by reffered to CTSCAN purchasing investment that needed investment 3.5 billion.

Based on the table above, it can be assumed that the income from CTSCAN will increase in every year in the mount of 10% with the assumption that the number of patient in the mount of 4 patients in each day and the price is 450.000 for each patient. The investment fund of CTSCAN is 3.5 billion by using debt purchasing from banking for 60 months or 5 years. So in the 5 years the cashflow investment will be negative and will be positive in the 6th year and subsequently the accumulated investment of CT SCAN can provide a positive return in the 9th year with an economic life of 10 years in the using of CT SCAN.

Payback analysis period calculated at the beginning of CT-SCAN purchase using assumptions such as table 2 based on the cashflow analysis above with an initial investment value of 3.5 billion. From the above calculation it can be concluded that the Payback period of investment will return in the 10th year over 9.5 months. The calculation is obtained without taking into account installments to the bank for 5 years (Mishan,2007).

Visiting data for whole can be seen in appendix that show the number of each part of investigation that is done by Radiological unit PKU Muhammadiyah Bantul Hospital. From the above data, it can be seen that all of the investigation carried out in the radiology unit from 2011 to 2017 were 114573 investigations with an average investigation for USG totaling 2783 investigation, while the X-rays were 12299 investigation and investigation with CT-SCAN Tools in the mount of 1286 checks each year. It can also be seen that the comparison of investigation using CT-SCAN tools is compared with the overall investigation in each year as in 2017 examination with CT-SCAN reached 8% or with an average annual known CT-SCAN use of 7.8% annually.

From the data table 3, it can be seen that the income from investigation by using CT-SCAN equipment has increased every year, and with an average annual income of 780,219,286. From the data of visitation and data on the number of CT-SCAN checks above obtained data that visits from the beginning of the purchase of CT-SCAN to experience damage from the TUBE-CT-SCAN of 7315 examination.

**Table 1. Analysis Feasibility of CT-SCAN Investment Worthiness in PKU Muhammadiyah Bantul Hospital (2010)**

No	Year													
		0	1	2	3	4	5	6	7	8	9	10	11	
	Investment	3.500.000.000												
1	Revenue	1		648.000.000	712.800.000	784.080.000	862.488.000	948.736.800	1.043.610.480	1.147.971.528	1.262.768.681	1.389.045.549	1.527.950.104	1.680.745.114
2	Less : expenses	2		609.200.000	635.120.000	663.632.000	694.995.200	729.494.720	767.444.192	809.188.611	855.107.472	905.618.220	961.180.042	672.298.046
3	Net Income	3	1-2	38.800.000	77.680.000	120.448.000	167.492.800	219.242.080	276.166.288	338.782.917	407.661.208	483.427.329	566.770.062	1.008.447.068
4	Add depreciation expenses	4		350.000.000	350.000.000	350.000.000	350.000.000	350.000.000	350.000.000	350.000.000	350.000.000	350.000.000	350.000.000	350.000.000
5	Net operating cash flow	5	3-4	388.800.000	427.680.000	470.448.000	517.492.800	569.242.080	626.166.288	688.782.917	757.661.208	833.427.329	916.770.062	1.008.447.068
6	Bank Installments	6		1.007.917.106	972.917.106	972.917.106	972.917.106	972.917.106	0	0	0	0	0	0
7	Remnant after installments	7	5-6	-619.117.106	-545.237.106	-502.469.106	-455.424.306	-403.675.026	626.166.288	688.782.917	757.661.208	833.427.329	916.770.062	1.008.447.068
8	Accumulation after installments			-619.117.106	-1.164.354.212	-1.666.823.318	-2.122.247.624	-2.525.922.650	-1.899.756.362	-1.210.973.445	-453.312.237	380.115.093	1.296.885.155	2.305.332.223
9	Present factor value			0,9091	0,8264	0,7513	0,6830	0,6209	0,5645	0,5470	0,5132	0,4665	0,4224	0,3875
10	Annual PV of cash flow			0	0	0	0	0	0	0	-232.639.840	177.323.691	547.804.289	893.316.237

Source: Financial Department of PKU Muhammadiyah Bantul Hospital.

From the expulsion cost data, it can be seen in the table below by calculating some of the constituent components of the CTCAN unit cost at PKU Muhammadiyah Bantul Hospital starting from 2011-2017. Cost data is calculated by the data obtained from interviews, observation and

processing of the basic data obtained. This cost data then becomes the basis for determining profit and loss so that it can be known the benefits obtained by the Hospital after being compared with the real data of hospital income from the use of CT SCAN tools.

**Table 2. Analysis of Payback Periode (PP)**

No	Cashflow	Cum Cashflow	Payback Periode
0	38.800.000	38.800.000	
1	77.680.000	116.480.000	
2	120.448.000	236.928.000	
3	167.492.800	404.420.800	
4	219.242.080	623.662.880	
5	276.166.288	899.829.168	
6	338.782.917	1.238.612.085	
7	407.661.208	1.646.273.293	
8	483.427.329	2.129.700.623	
9	566.770.062	2.696.470.685	
10	1.008.447.068	3.704.917.753	
11	1.109.291.775	4.814.209.529	
			803.529.315
			1.008.447.068
12	Payback Periode in	10+	0,796798702

Source: Financial Department of PKU Muhammadiyah Bantul Hospital

**Table 1. Numbers of Radiological Examination in PKU Muhammadiyah Bantul Hospital in Period 2011-2017**

No	Investigation	Year						
		2011	2012	2013	2014	2015	2016	2017
1	CT-SCAN	761	1012	1213	1076	1636	1623	1679
2	USG	1849	2223	2373	2695	3083	3714	3542
3	X-ray	9578	9889	10113	11891	13626	15243	15754
4	Number	12188	13124	13699	15662	18345	20580	20975
5	Investigation by using CT-SCAN (%)	0,062	0,077	0,089	0,069	0,089	0,079	0,080

Source: Radiological Department PKU Muhammadiyah Bantul Hospital

**Table 2 . Radiological Department Income by using CT SCAN in period 2011-2017**

No	Kind of Investigation	2011	2012	2013	2014	2015	2016	2017	TOTAL
1	CONTRAS TOP BUTTOM ABDOMEN MSCT	2	2	11	2	2	1	3	23
2	CONTRAS TOP/BUTTOM ABDOMEN MSCT	7	12	4	9	9	11	13	65
3	CONTRAS TOP/BUTTOM ABDOMEN MSCT	3	2	0	2	4	0	2	13
4	INJECTOR UPPER LOWER ABDOMEN MSCT	10	17	12	3	12	14	1	69
5	TOP/BUTTOM MULTIFASE ABDOMEN MSCT	0	2	0	2	0	0	0	4
6	CONTRAS INJECTOR FEMUR MSCT	2	1	0	1	0	0	0	4
7	CONTRAS SPUIT FEMUR MSCT	2	0	0	0	0	0	0	2
8	HEAD MSCT	667	891	1102	974	1380	1327	1561	7902
9	CONTRAS INJECTOR HEAD MSCT	1	1	10	0	1	0	0	13
10	SPUIT INJECTOR HEAD MSCT	55	66	49	55	92	80	59	456
11	NASOPHARING MSCT	1	1	3	5	6	2	5	23
12	CONTRAS, SPUIT NASOPHARING MSCT	1	0	1	0	19	53	7	81
13	NON CONTRAST PELVIS MSCT	0	0	1	0	0	0	0	1
14	SPN MULTI SLICE MSCT	1	1	5	2	18	16	9	52
15	CONTRAS INJECTOR THORAX MSCT	4	6	4	9	38	41	14	116
16	NON CONTRAS MTHORAX MSCT	0	3	6	5	1	1	1	17
17	NON CONTRAS VERTEBRATA MSCT	4	4	5	4	6	14	0	37
18	NON KONTRAS EXTREMITY	1	1		3	48	19	1	73
19	CONTRAS SPN WITH MSCT		2				37	1	40
20	NON CONTRAS ABDOMEN MSCT						1	2	3
	INVESTIGATION TOTAL	761	1012	1213	1076	1636	1617	1679	8994
	INCOMING TOTAL	361.489.000	597.870.000	783.882.000	700.213.000	890.035.000	1.069.261.000	1.058.785.000	5.461.535.000

Source: Financial Department PKU Muhammadiyah Bantul Hospital

**Table 3. Indirect Resources Overhead Cost Muhammadiyah Bantul Hospital in Year 2011-2017**

No	KIND OF COST	COST(Rp) / YEAR						
		2011	2012	2013	2014	2015	2016	2017
1	LABOUR RELATED							
	Employee salaries	10.897.367.846	12.786.356.777	11.418.176.192	19.776.683.464	17.878.900.566	18.103.977.500	18.361.585.443
2	EQUIPMENT RELATED							
	Depreciation of medical and non-medical equipment	2.019.886.662	2.130.318.905	2.351.183.391	2.240.751.148	2.361.615.634	2.272.047.877	1.955.352.498
3	SPACE RELATED							
	Maintenance costs for repairing tools	221.963.501	286.191.271	199.772.000	393.712.347	278.971.826	301.780.300	378.777.811
	Deprecion of Building	380.412.164	380.412.164	380.412.164	380.412.164	380.412.164	380.412.164	380.412.164
4	SERVICE RELATED							
	Electric Cost	770.920.356	799.537.817	828.155.278	856.772.739	885.390.200	914.007.661	1.327.771.380
	Sanitation Cost	397.219.861	402.765.437	437.718.900	506.557.965	575.397.030	604.236.095	601.170.888
	Water Cost	2.378.976	2.560.090	2.955.130	3.825.520	4.695.910	5.566.300	6.436.690
	Stationary Cost	379.643.523	487.392.178	242.011.332	735.029.119	701.732.467	558.541.900	403.784.810
	Telephone Cost	23.346.654	34.853.091	46.359.528	57.865.965	69.372.402	80.878.839	125.719.320
5	TOTAL	15.093.139.543	17.310.387.730	15.906.743.915	24.951.610.431	23.136.488.199	23.221.448.636	23.541.011.004

Source: Financial Department PKU Muhammadiyah Bantul Hospital

### 3.2 Unit Cost Analysis

#### 3.2.1 Indirect Resources Overhead Cost in PKU Muhammadiyah Bantul Hospital in Year 2011-2017

Overhead Indirect Resources Costs PKU Muhammadiyah Bantul Hospital 2011-2017 can be seen in the table 5. This table data reflects all operational funds of PKU Muhammadiyah Bantul Hospital during 2011-2017. From the data it can be concluded that the largest contributor to the costs of employee salaries which always increases every year by 12%. Indirect Resource Overhead Cost in PKU Muhammadiyah Bantul Hospital in every year and the next it will be burned to functional unit in PKU Muhammadiyah Bantul Hospital by using proportional income from each functional unit in each year.

#### 3.2.2 Direct Resource Overhead Cost

Calculation of Direct Resource Overhead costs can be seen in table 6, in this table Direct

Resource Overhead costs is done by calculating the cost of Direct Resource Overhead in the radiology unit specifically the CT SCAN section of PKU Muhammadiyah Bantul Hospital .

Resource Overhead costs that is part of CT SCAN in PKU Muhammadiyah Bantul Hospital has fluctuated every year and became the lowest price in 2015 at 231,255 while the highest value was in 2011 or at the beginning of CT SCAN operations at a price of 423,163.

#### 3.2.2 Direct Cost of CT-SCAN PKU Muhammadiyah Bantul Hospital

Direct Cost is fee that directly appears when the CT SCAN is examined. Direct costs are charged directly to service products. This cost is charged as a service product cost through activities that produce the product or service in question. Total Direct Cost CT-SCAN in 2011-2017 can be seen in table 7. In the table can be seen the most expensive cost is the CT-SCAN-Tube.

**Table 6. Data on Indirect Resource Cost for PKU Muhammadiyah Bantul Hospital in 2011-2017**

No	Year	Income	Proportion	Cost
1	2011	361.489.000	0,91%	136.725.286
2	2012	597.870.000	1,29%	223.293.380
3	2013	783.882.000	1,54%	244.607.817
4	2014	700.213.000	1,48%	370.490.368
5	2015	890.035.000	1,17%	270.453.670
6	2016	1.069.261.000	1,20%	279.183.536
7	2017	1.058.785.000	1,0%	230.027.541

Source : Primary Data processed, 2018

**Table 7 . Direct Cost of CT SCAN PKU Muhammadiyah Bantul Hospital at Standard Examination (CT SCAN Head / Brain Non Contrast) 2011-2017**

No	Cost Item	Cost (Rp) / Tahun						
		2011	2012	2013	2014	2015	2016	2017
1	Film Cost	80.000	80.000	80.000	80.000	80.000	80.000	80.000
2	Tube CT SCAN Cost	68.353	68.353	68.353	68.353	68.353	68.353	176.655
3	Medical Doctor Services	93.000	93.000	93.000	93.000	93.000	93.000	93.000
4	Handsocon	400	400	400	400	400	400	400
5	Masker	500	500	500	500	500	500	500
	<b>TOTAL</b>	<b>242.253</b>	<b>242.253</b>	<b>242.253</b>	<b>242.253</b>	<b>242.253</b>	<b>242.253</b>	<b>350.555</b>

Source : Primary Data processed, 2018

### 3.2.3 Unit Cost Total of CT SCAN in PKU Muhammadiyah Bantul Hospital

Unit Cost in every year get varies fluctuation that can seen in table 8, it appears the highest unit cost in 2011 and this is in contrast to the number of patients who carried out CT SCAN examinations in 2011 totaling 761 at the same time with the lowest number of examinations. While the lowest unit cost is in 2017 and this is in contrast to the number of patients who were examined by CT SCAN in 2017 totaling 1679 at the same time with the highest number of examinations. This unit cost data, which is then multiplied by the number of patients each year, will be compared with real income data so that the financial profit of the hospital will be seen

### 3.3.4 Data of Difference on Real Income and Expenditure Costs based on Unit Cost in year 2011-2017

From the table 9 below, it can be concluded that for 7 years operational of CT SCAN get negative difference or loss with an average of 177,323,543.

## 4 DISCUSSION

### 4.1 Investment Analysis of Net Present Value (NPV) Method, Internal Rate of Return (IRR) and Payback Period (PP)

The results of the calculation of investment analysis using the Payback Period (PP) method without discount at the beginning of the purchase of procurement of CT SCAN is 10 years 9.5 months. From the results of the analysis, it can be seen that the investment of CT SCAN that NPV, IRR and PP experience the results of calculation of cash flow calculation is negative because at the time of cashflow calculation based on unit cost compared to real cost experiencing a loss that varies in each year.

### 4.2 Analysis of Profit-Loss Cashflow based on Cost Unit in year 2011-2017

The cost structure contained in Direct resource overhead and direct cost that has the greatest influence so the unit cost of the fee will be very high each year.

**Table 8. Unit Cost of CT SCAN Head/ Brain Non Kontras Examination in PKU Muhammadiyah Bantul Hospital year 2011-2017**

No	Cost Structure	Cost (Rp) /Tahun						
		2011	2012	2013	2014	2015	2016	2017
1	Overhead Indirect Resource RS PKU	179.665	220.646	201.655	344.322	165.314	172.017	137.003
2	Overhead Direct Resource	423.163	330.157	292.187	344.283	231.255	248.973	251.620
3	Direct Cost/ Pasien	242.253	242.253	242.253	242.253	242.253	242.253	350.555
4	Unit Cost	845.081	793.055	736.095	930.858	638.821	663.243	739.178

Source : Primary Data processed, 2018

**Table 9. Income and Outcome Cost Based on Cost Unit In Year 2011-2017**

No	Year	Riil Income	Biaya (Unit Cost*Pasien)	Aliran Kas
1	2011	361.489.000	643.106.750	(281.617.750)
2	2012	597.870.000	802.572.058	(204.702.058)
3	2013	783.882.000	892.883.666	(109.001.666)
4	2014	700.213.000	1.001.603.168	(301.390.168)
5	2015	890.035.000	1.045.111.658	(155.076.658)
6	2016	1.069.261.000	1.076.442.630	(7.181.630)
7	2017	1.058.785.000	1.241.079.868	(182.294.868)
	TOTAL	5.461.535.000	6.702.799.799	(1.241.264.799)
	AVERAGE	780.219.286	957.542.828	(177.323.543)

Source : Primary Data processed, 2018



From the overhead direct radiology section specifically CT SCAN has a fairly high CT SCAN depreciation. From the purchasing total data of CT SCAN equipment as much as 3,004,063,000 with details of the cost in the form of as much CT SCAN 2,504,063.000 dan Tube CT SCAN cost in amount of 500.000.000.

Set-CT SCAN has a long economic period because the maintenance can be done easily enough without requiring a lot of money. This is opposite with the Tube-CT SCAN which have a specific economical period that is in accordance with the specifications of the tool and the Toshiba Asteion Super 4 has a limit usage of 200,000 rotations with 1 rotation and can do 4 slice checks so the maximum capacity will be able to do as many checks 800,000 slices.

While whole total of the investigation done by using CT SCAN since the first purchasing until getting broken on October 2016 CT SCAN in PKU Muhammadiyah has amount 7315 activities of investigation with average in every investigation using 150 slices so if it is seen from maximum amount of the tool that is just 800.000 slices, PKU Muhammadiyah Bantul Hospital has gotten more beneficial value.

Whereas the direct cost of Tube CT SCAN costs in 2017 has a much greater number than in year 2011-2016 due to the CTSCAN tube price details at the beginning of 2010 purchase of 500,000,000 with economic value that can be used for 7315 checks while Tube purchase which The latest CT SCAN in October 2016 was worth 1,767,479,330. if it is assumed that the tube with the same brand will be able to have the same economic period with a target of around 7000 CT SCAN checks.

Based on the calculation above, since the beginning of the purchase, CTSCAN has not gotten a profit until in the 7th year of the using. Based on the unit cost, the resulting loss is 1,389,116,450 with the lowest loss rate in 2016 with 1623 patients. For this reason, in order to minimize losses, a strategy must be developed in order to optimize the use of CT SCAN that has value of advantages and benefits

### **4.3 Evaluation and Strategy for Optimalizing Income from the CT-SCAN Examination in PKU Muhammadiyah Bantul Hospital**

Based on the data, the accumulation of losses reaching which 1,389,116,450 must be carried out in the future strategy to improve and optimize

revenue from the use of CT SCAN tools. Some alternatives that must be immediately carried out by managers at PKU Muhammadiyah Bantul Hospital can increase tariffs according to logical cost around Bantul, increase the overall CT SCAN investigation achievement targets, establish cooperation with network hospitals to maximize revenue and perform efficiency of several parts that have large cost value so it can reduce the operational costs of the hospital.

From the table above, there is some alternatives in strategical adjustment in some thing, they are tariff adjustments with various conditions in the future according to field conditions. If the hospital wants a loss for the past 6 years to be closed within the next 1 year, the latest tariff for non-contrast CT brain scans will be 1,652,994. Whereas if the hospital wants a profit of 100-200 million every year then it must increase tariffs from 847,297 to 909,797.

Another alternative in tariff adjustment is to adjust the logical number of CT SCAN prices based on the same investigation price at competing hospitals. The next is a price list of CT SCAN examinations in several hospitals around Yogyakarta and Central Java without seeing the CT SCAN tool specifications used.

Establishing an MOU with other hospitals or hospitals that already have CT SCAN devices can be an alternative to increase the number of CT SCAN checks so that it can cover the costs incurred. Starting cooperation with other relation on special examinations such as CT SCAN Abdomen by giving a price discount if the patient being examined is another hospital reference so it will increase the income of CT SCAN from other types of examinations.

Doing some efficiency in all fields can reduce overall hospital costs. But for the efficiency of the CT SCAN section, it can be done on employee salaries, in this unit cost calculation still does not take into account the detailed salary of employees who specifically conduct CT SCAN checks. If the value can be reduced will be able to significantly reduce unit cost costs (Giuseppe et.al, 2011).

Efficiency in other parts can be saved with some parts that are included in related service so it can reduce the cost of unit cost while in the calculation of this study related service costs are calculated by using the proportion of costs on the CT SCAN unit (Carr and Smeltzer, 1999) .

While the other efficiency that can be done, the most important is the unit cost calculation can reduce the tool depreciation by increasing the

economic number of the device so the device depreciation rate will decrease and then the value of unit cost will also decrease.

The value from the purchase of CT SCAN can be used as an indicator of benefits as a purchase of CT SCAN wherein the purchase of a sophisticated tool can provide indirect benefits by adding a positive image value during the promotion of hospital facilities and then the public will see that the hospital has added value. Other disses of scientific benefits, it can be felt by medical personal with the existence of supporting examinations so tracking the diagnosis of a disease can be more accurate then on the other hand lead to the benefits of reducing referral of patients who can be treated at PKU Muhammadiyah Bantul Hospital (Robinson, 2005) .

The table 10 shows that there are several alternatives in adjusting the strategy in several ways, namely tariff adjustments with various conditions in the future according to field conditions. If the hospital wants a loss for the past

6 years to be closed within the next year, the latest pricelist for non-contrast brain CT-SCAN will be 1,652,994. Whereas if the hospital wants a profit of 100-200 million every year then it must increase pricelist from 847,297 to 909,797.

If the hospital only targets hospitals not to lose money and assuming the number of patients on the index is 4.6 times a day, the rate can be adjusted to 784,797.

Another assumption is that if the hospital experiences a decrease in the number of CT-SCAN examination and the hospital has a 100 million profit target each year there must be a Pricelist adjustment to 968,339 to 1,355,675.

Another alternative in Pricelist adjustment is to adjust the logical number of CT SCAN prices based on the same inspection price at competing hospitals. The following is a price list of CT SCAN examinations in several hospitals around Yogyakarta and Central Java without seeing the CT SCAN tool specifications used that can seen in table 11.

**Table 10. Alternatif Strategi Penyesuaian Tarif CT SCAN RS PKU Muhammadiyah Bantul**

No	Condition	Income (Rp)	Numbers patient	Pricelist (Rp)
1	Target Income To reduce Losses seven years ago	2.644.790.957	1600	1.652.994
2	Profit income Rp 200.000.000	1.455.674.507	1600	909.797
3	Profit income Rp 100.000.000	1.355.674.507	1600	847.297
4	Balance (Normal no negative income)	1.255.674.507	1600	784.797
5	The number of patients dropped iv 1400 patient (Profit income targets Rp 100.000.000)	1.355.674.507	1400	968.339
6	The number of patients dropped in 1200 patient (Profit income targets Rp 100.000.000)	1.355.674.507	1200	1.129.729
7	The number of patients dropped 1000 patient (Profit income targets Rp 100.000.000)	1.355.674.507	1000	1.355.675

Source : Primary Data processed, 2018

**Table 11. Hospital Pricelist Around Yogyakarta and Central Java in 2018**

No	Pricelist CT-SCAN other Hospital	PRICELIST CT-SCAN HEAD	
		NON-CONTRAST(Rp)	CONTRAST(Rp)
1	PKU Gamping Hospital	702.000	1.500.000
2	PKU Kota Yogyakarta Hospital	740.000	1.490.000
3	Panembahan Senopati Bantul Hospital	480.000	1.420.000
4	Wirosaban Yogyakarta Hospital	980.000	1.530.000
5	JIH Yogyakarta Hospital	830.000	1.200.000

Source : Primary Data processed, 2018

## 5 CONCLUSIONS

The conclusion of this study for the first is the purchasing of CT SCAN Radiology equipment is not optimal to increase hospital income. Furthermore, the investigation shows that there is a greater potential loss in 2018 if a strategy investigation is not conducted to increase the revenue of the CT SCAN section.

## REFERENCES

- Carr, A.S., & Smeltzer, L.R. (1999). *The relationship of strategic purchasing to Supply Chain Management*. European Journal of Purchasing & Supply Management, v.5, p.43-51.
- Chimberengwa PT, Masuka N, Gombe NT, Tshimanga M and Bangure D. (2012). *Procurement Processes at Gwanda Provincial Hospital, Matebeleland South Province, Zimbabwe*. Austin J Public Health Epidemiol. 2015;2(1): 1018.
- Denise Atwood, Pete Larose, Randy Uttley. (2015). *Strategies for Success in Purchasing Medical Technology*. Biomedical Instrumentation & Technology: March/April 2015, Vol. 49, No. 2, pp. 93-98.
- Donald, Don Mc. Neville. (2009). *Evaluating the Implementation of Picture Archiving and Communication Systems in Newfoundland and Labrador—a Cost Benefit Analysis*. Journal of Digital Imaging. Volume 23, Issue 6, pp 721–731.
- Giuseppe, Turchetti, Iliaria, Palla, Francesca, Pierotti, Alfred, Cuschieri . (2011). *Economic Evaluation Of Da Vinci-Assisted Robotic Surgery: A Systematic Review*. Surgical Endoscopy Journal. March 2012, Volume 26, Issue 3, pp 598–606
- Mishan, E.J. Euston, Quah, (2007). *Cost Benefit Analysis*, 5th Edition, Routledge Taylor & Francis Group.
- Robinson, James. (2015). *Purchasing Medical Innovation: The Right Technology, For The Right Patient, At The Right Price*. California: University of California Press.
- Trisnantoro, L. 2004. *Memahami Penggunaan Ilmu Ekonomi dalam Manajemen Rumah Sakit*. Yogyakarta : Gadjah Mada University Press