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TARIFF OPTIMIZATION USING ACTIVITY BASED COSTING METHOD (A CASE STUDY OF TELKOM INFRASTRUCTURE ASSURANCE BANDUNG)

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Abstract. At the end of 2018, Infrastructure Assurance Unit (IAS), one of the many units under PT Telkom Indonesia, faced with an urge to revise their tariff formulation. Previously, IAS is not too concerned about tariff because as a support-oriented unit, funding is borne by the investment committee of the main company and IAS's revenue is enough to cover all of the expenses. But, there is an issue that makes IAS to become more aware of the tariff charged. After further analysis, it was found that IAS could make improvements to the formulation by using activity-based costing, which calculates the costs fairly based on the resources used, human labors, and time spent by the units. To assist in designing the formulation of the tariff calculation, internal analysis is carried out by looking at the resources and capabilities possessed, and external analysis using Porter's five-forces. From the two analyzes, it was found that the Infrastructure Assurance unit has the requirement and ability to succeed in implementing a strategy to be able to revise the tariff formulation. Lastly, by using the new formulation, the most updated tariff results are obtained against 26 types of telecommunications devices.

Keywords: Activity-Based Costing; Costs Calculation; Tariff Optimization; Telecommunication Devices Testing.

INTRODUCTION

In the world of telecommunication, developments and changes of the technologies are very fast causes a lot of telecommunications infrastructure that can be used by companies involved in the industry. PT Telkom Indonesia, which was founded in 1965, is one of the many companies that goes into telecommunication service provider industry. To maintain the good name of the company, the company requires infrastructure that is competent and have a high reliability to carry out its functions. To realize this, there is a unit called Infrastructure Assurance Unit (IAS) whose duty is to guarantee the feasibility of that telecommunication infrastructure used by the company. All this time, IAS was established as a unit that has a meaning to assist Telkom Indonesia in running its main business by sorting out the infrastructural equipment that can be used by Telkom, by testing the equipment and also certifying that exact equipment.

In 2018, there was a change in the orientation of the unit from the previously a completely support-oriented who had the task of assisting Telkom's by selecting the tools that would be used in running their business, to becoming a more business-oriented or profit-oriented. Previously, funding received by the IAS Unit was made through submissions to the investment committee. This type of funding method has problems where the IAS Unit is difficult to receive approval from the investment committee to buy new tools. Lately, the investment committee of Telkom wants to balance the company's cash flow expenditure by being more selective in sorting out subsidiary funding requests, the selection of funding investment focuses more on units, divisions, or subsidiaries that can guarantee to be more profitable if they got the funds. This makes the IAS Unit must be at least independent enough in carrying out its business without fund from the investment committee of main company, this also means that IAS unit must have more income to keep as an emergency fund or at least retained earnings to be able to continue its business. This issue is also made the IAS unit more aware about the tariff charged to the customers. Apparently, the prices listed or given by the IAS Unit for its customers has never been changed or revised since 2016, when the old test tariff calculation formula was made. Previously, as a support-oriented unit business, the IAS unit did not pay too much attention to the rates charged. Afterwards, the IAS unit also does not have a work unit that has a workload to renew the tariff. In fact, every year, there is an increase in costs incurred for consumables such as chemical substances that is caused by inflation and an increase in employee salary that have previously been set by regulation. This causes the formulation of tariffs that have been used to be irrelevant because they do not follow the increase in component costs incurred. Therefore, new tariff formulations that can be used and are easy to be renewed are needed for the IAS unit.

LITERATURE REVIEW

The new formulation will be using Activity-Based Costing method which is an approach to the costing and monitoring of activities which involves tracing resource consumption and costing final outputs. Resources are assigned to activities, and activities to cost objects based on consumption estimates. The latter utilize cost drivers to attach activity costs to outputs (The

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Chartered Institute of Management Accountants, 2018). To be able to implement the formulation method properly, the company or unit must: have complete data regarding the test equipment and data regarding testing procedure. In addition, users of the formulation must also have diverse end-products with the use of tools in the process more or less the same. According to Jiambalvo (2010), there are four steps to the Activity-Based Costing approach: identify major activities, group costs of activities into cost pools, identify measures of activities, and relate costs to products using the cost drivers.

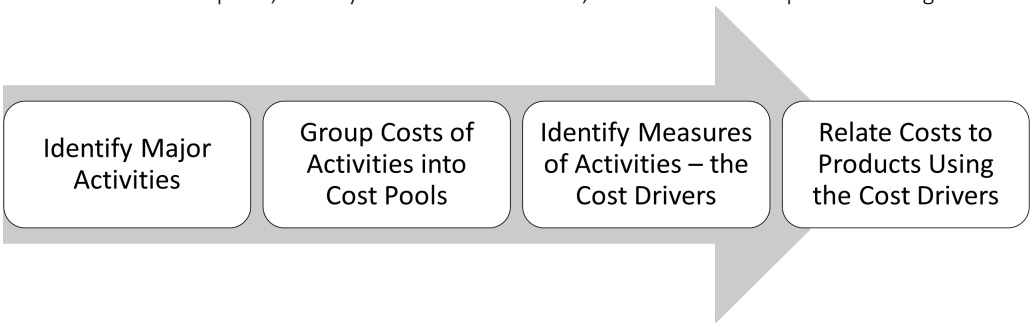

Figure 1. Conceptual Framework

In carrying out its business, the major activity carried out by IAS is to conduct test for the telecommunication infrastructure using testing equipment. From the major activity, several other cost components that can be included in the calculation are obtained. According to Standard AACE International Recommended Practice (2018), depending upon the cost model and job cost system used, cost to certain activity may include indirect costs as well as direct costs. Direct Cost is a cost of completing work that are directly attributable to its performance and are necessary for its completion, while Indirect Cost is a cost that are not directly attributable to the completion of an activity, which are typically allocated or spread across all activities on a predetermined basis. The classification for the costs that have been obtained for the execution of this project has been adjusted to the naming used in IAS.

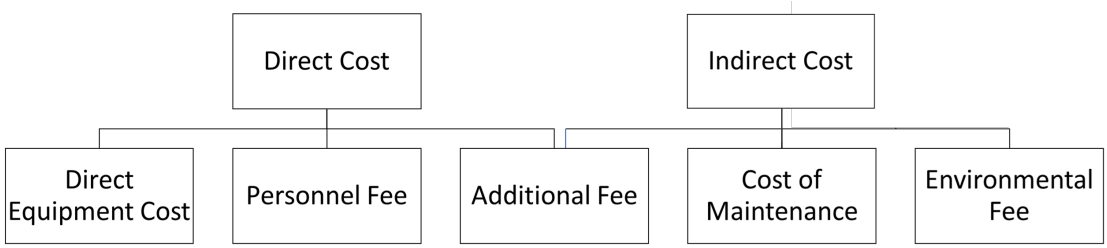

Figure 2. Costs Classification

Direct equipment cost is the cost imposed on each use of testing equipment or tools used in conducting telecommunication infrastructure testing. Later, the cost for each direct equipment will be calculated using the depreciation method. According to Damodaran (2002), depreciation is treated as an accounting expense, thus, the use of straight-line depreciation will result in lower expenses and higher income. The calculation of direct equipment fee can be done with the following equation:

$$Dt = \frac{B - S}{n}$$ where: Dt = annual depreciation charge; B = first cost or unadjusted basis; S = salvage value; n = recovery period.

Later, the results obtained from the above equation are in the form of annual costs, to change it so that it can be used into the Activity-Based Costing method, the value will be divided based on the assumption of tool usage per year which has been determined using expert judgment, which is 150 times.

Cost of maintenance is the cost obtained from the need to maintain direct equipment used for testing. There is a concern about maintenance fee, machines or equipment that have a higher age will also have a higher maintenance fee. Therefore, the maintenance fee is obtainable using the Annualized Investment Cost (AIC) method. According to Indonesia Ministry of Health (2008), maintenance budget planning will be more appropriate if using the AIC method as the basis for the calculation, it is because AIC is using the principle that the present value will be lower than the future value because of the inflation rate of the value of the money and also calculated by considering the equipment's age of service and the technical age of the equipment. So, when the maintenance cost is made based on the percentage of the AIC value, then the results of the maintenance budget plan will increase in accordance with the increasing age of the equipment. Annualized Investment Cost is calculated in the form of the following formula:

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$AIC = \frac{IIC(1+i)^t}{L}$ where: IIC = initial investment cost; i = inflation rate;
T = current age of the equipment (in year); L = technical age of the equipment (in year).

Later, same with direct equipment cost, annual maintenance costs will be divided by 150 to get the daily value.

Personnel fee, or commonly called direct labor fee, is a cost that is charged for each activity that requires human existence in the process. Here, the personnel fee is already determined back in 2016 based on the Regulation of Dir. HCM No. PR. 207.19/r.00/PS.560/COP-J000000/2015 and will be charged per day. Then, the calculation of the personnel fee will be calculated by using simple future value method. According to Weil, Schipper & Francis (2014), future value is the current value that is converted into value in the future with those that have been adjusted to the conditions or regulations that have been set. The calculation is done to find out the approximate value that will occur in the future, or it can also be used to calculate past values into the present ones. The equation for calculating future values is as follows:
$FV = PV(1+r)^t$ where: PV = the present value; r = rates, such as inflation rate, per period; and t = number of periods.

Environmental fee is the cost that will be charged to the customer by summing all of the indirect costs charged to the IAS Unit. Costs that are calculated into environmental fees including building electricity costs, building maintenance costs, document administration and printing costs, certification fees, member fees, and website development and maintenance costs. Later, the total cost will be further divided equally by the number of the testing equipment. That way, the environmental fee that is charged to the customer per measuring instrument per day has been obtained.

Additional fee is used for any kind of test that uses excessive power such as excessive use of electricity, the additional costs required for the disposal of large-scale used cables, heating equipment tested to a certain degree, the use of chemical equipment and devices that do not have asset numbers or need to be borrowed from others, and price excavation that is charged against testing done outside the testing site, are one of many examples of additional fees that can be charged to customers.. Furthermore, fees charged for additional fees are based on expert judgement from the manager of the laboratory.

METHODOLOGY

The initial stage that can be done to help IAS is to identify problems. Problem identification was carried out with a focus group discussion session involving several IAS employees. The results obtained from the interview include the story of the problems faced by the IAS Unit along with supporting data that can assist in the execution. In addition to problem identification, the discussions also provide information about the objectives desired by the IAS Unit. Seeing these conditions, there needs to be a preparation by planning related to the calculation method that will be used, which is Activity-Based Costing method, to be able to solve the problems that occur. Next, the analysis of the internal and external environment was carried out. The internal and external analysis is carried out in order to assist in designing the formulation of the tariff calculation, internal analysis is carried out by using resources and capabilities, while the external analysis using Porter's five-forces. Then, data collection is carried out regarding the details of the equipment used to run the test. Data collected is in the form of code, name, brand, type, serial number, condition (good, damaged, or already not used), year of purchase, technical age, and purchased price of the equipment. After the data of the equipment used to run the test collected, next is the data collection of steps needed in carrying out the test, equipment used in the test, time spent for each activity, and the number of personnel needed to do the work. Data is obtained by scanning the test procedure, in the form of a file called STEL, which was previously been done by the test engineers. Also, to complete the data needed for calculation, analysis and breakdown of each related component is done to make sure if there is a possibility of obtaining other costs that can affect the calculation of tariffs such as cost of maintenance, environmental fee, and also additional fees, are not missed. After that, data validation of the testing equipment and the test procedure is done by conducting interviews with the test engineers of the laboratory. After all the components of the cost have been obtained, the calculation of each cost is planned by using its respective equation: direct equipment cost using depreciation, maintenance cost using annualized investment cost, and adjusting personnel fee with simple future value. Lastly, the tariffs are carried out using the previously selected method, Activity-Based Costing method.

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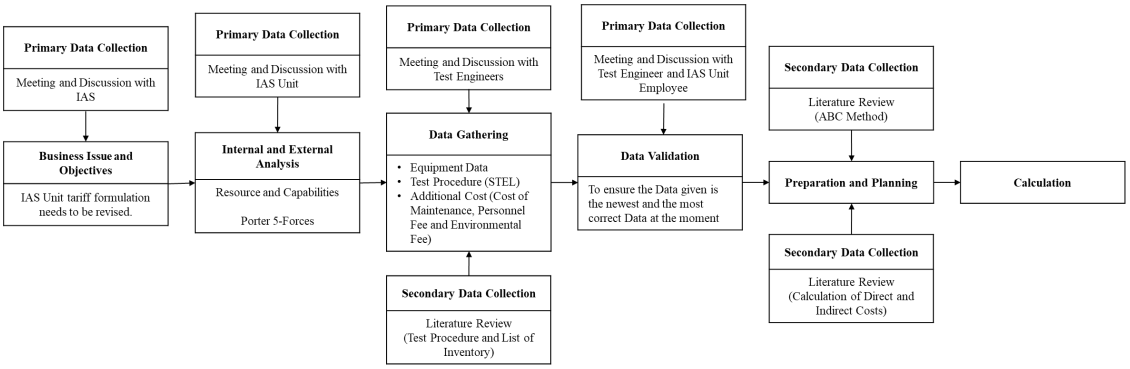

Figure 3. Research Methodology

FINDINGS AND ARGUMENT

To determine the results of direct equipment costs, it is determined that salvage value equals zero, and n value equals technical age that the data has already obtained from the data collection before. Below are the example list of direct equipment costs:

Table 1. Sample List of Direct Equipment Cost

Asset Number	Asset Name	Technical Age	Purchase Price	Annual Direct Equipment Cost	Daily Direct Equipment Cost
		(in year)		(in IDR)	
ASSET/001	Mesin Uji Bahan	5	350,000,000	70,000,000	466,667
ASSET/002	Milliohm Hi Tester	5	5,000,000	1,000,000	6,667
ASSET/003	High Resistance Meter	5	15,000,000	3,000,000	20,000
ASSET/004	Echo Meter	5	25,000,000	5,000,000	33,333
ASSET/005	Digital Multitester	3	750,000	250,000	1,667
ASSET/006	High Voltage Tester	10	9,000,000	900,000	6,000
ASSET/007	Drop Ball Impact Test	5	8,000,000	1,600,000	10,667
ASSET/008	Multi Meter	10	2,500,000	250,000	1,667
ASSET/009	Step up DC Voltage	5	10,000,000	2,000,000	13,333
ASSET/010	Electrical Balance	5	5,000,000	1,000,000	6,667

Next, to get the cost of maintenance, it is determined that the inflation rate equals to 4.5%. The following table can provide information about the fees that will be charged:

Table 2. Sample List of Cost of Maintenance

Asset Number	Asset Name	Year of Purchase	Technical Age	Current Age	Purchase Price	Annualized Investment Cost	Annual Maintenance Cost	Daily Maintenance Cost
			(in year)			(in IDR)		
ASSET/001	Mesin Uji Bahan	1995	5	24	350,000,000	201,320,968	30,198,145	201,321
ASSET/002	Milliohm Hi Tester	1985	5	34	5,000,000	4,466,362	669,954	4,466
ASSET/003	High Resistance Meter	1985	5	34	15,000,000	13,399,085	2,009,863	13,399
ASSET/004	Echo Meter	1990	5	29	25,000,000	17,920,182	2,688,027	17,920
ASSET/005	Digital Multitester	1996	3	23	750,000	688,042	103,206	688
ASSET/006	High Voltage Tester	1994	10	25	9,000,000	2,704,891	405,734	2,705
ASSET/007	Drop Ball Impact Test	1990	5	29	8,000,000	5,734,458	860,169	5,734
ASSET/008	Multi Meter	1997	10	22	2,500,000	658,413	98,762	658
ASSET/009	Step up DC Voltage	1992	5	27	10,000,000	6,564,019	984,603	6,564
ASSET/010	Electrical Balance	1985	5	34	5,000,000	4,466,362	669,954	4,466

Then, the personnel fee is calculated with simple future value equation, where *n* equals 3 because of the period difference between 2016 to 2019 and r equals 6% according to the agreement in the regulation.

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Table 3. Personnel Fee

Level	Daily Personnel Fee	
	(2016)	(2019)
BP II	2,075,758	2,472,261
BP III	1,438,114	1,712,817
BP IV	994,386	1,184,330
BP V	820,871	977,670
BP VI	503,545	599,730
BP VIII	347,591	413,986

After that, the calculation of the environmental fee, which combines all of the indirect costs and will be divided by the number of total working days and total testing equipment to get the daily environmental fee for each equipment. Later, it was found that the daily environmental fee for each equipment equals IDR 30,135.

Table 4. Environmental Fee

No.	List of Cost	Monthly Price	Annual Price
		(in IDR)	
1	IAS Unit Electricity Consumption	64,437,870	**773,254,438**
2	Building Maintenance		**300,000,000**
2a	*Cleaning Service Costs*	*22,000,000*	*264,000,000*
2b	*Cleaning Equipment Costs*	*3,000,000*	*36,000,000*
3	Administrative Costs and Printing	6,000,000	72,000,000
4	KAN Sertification Costs		**200,000,000**
4a	*Accomodation, Transportation, and Certification*	-	*100,000,000*
4b	*Surveillance Fees*	-	*100,000,000*
5	Community Member Costs	-	**100,000,000**
6	Website Development and Maintenance		**623,230,000**
6a	*Website Development (OTR & TTH)*	-	*500,000,000*
6b	*Website Maintenance (OTR & TTH)*	*1,102,500*	*13,230,000*
6c	*Service Helper Tools (Laptop, Printer)*	-	*100,000,000*
6d	*Website Feature Addition*	-	*10,000,000*
		Total	**2,068,484,438**
	Daily Environmental Cost per Equipment		**30,135**

After each component is calculated, then the final calculation of the appropriate tariff to be charged to the customer for each test or certification can be started using Activity-Based Costing method, which calculates costs fairly based on the use of tools, people and time. The sample of the final tariff calculation using ABC method can further be seen in the table below:

Table 5. Finall Tariff Calculation with Activity-Based Costing Method (1/2)

No	Equipment to be Tested	Test Procedure	Use of Test Equipment						
			Asset Name	Asset Number	Time (in days)	Cost (IDR) Equipment	Maintenance	Environmental	Total
1	Perangkat Kabel Serat Optik Single Mode Berkontruksi Loose Tube untuk Aplikasi Duct 4 s.d 96 Core	STEL K-015-2013 Ver.3.0 STEL K-016-2013 Ver.3.0 STEL K-017-2014 Ver.3.0	Mesin Uji Bahan	ASSET/001	2	466,667	201,321	60,271	1,396,246
			High Resistance Meter	ASSET/003	1	20,000	13,399	30,135	63,534
			High Voltage Tester	ASSET/006	1	6,000	2,705	30,135	38,840
			Alat Tembus	ASSET/015	1	6,667	4,466	30,135	41,268
			DC Dielectric Test Set	ASSET/016	1	80,000	39,384	30,135	149,519
	Perangkat Kabel Serat Optik Single Mode Berkontruksi Loose Tube untuk Aplikasi Tanam Langsung 4 s.d 96 Core		Carbon Content Block Tester	ASSET/020	1	17,333	8,533	30,135	56,002
			Electronic Balance	ASSET/043	1	53,333	22,017	30,135	105,486
			Video Fibre	ASSET/066	1	666,667	275,217	30,135	972,019
			Spetral Attenuator	ASSET/068	1	666,667	114,117	30,135	810,919
			Computer Fiber Tensile Squeeze Tester	ASSET/076	1	266,667	105,346	30,135	402,148
			Fiber Continuous Flexing Tester	ASSET/077	1	200,000	79,010	30,135	309,145
			Fiber Continuous Impact Tester	ASSET/078	1	200,000	79,010	30,135	309,145
			Fiber Continuous Impact Tester	ASSET/079	1	200,000	79,010	30,135	309,145
	Perangkat Kabel Serat Optik Single Mode Berkontruksi Loose Tube untuk Aplikasi Aerial 4 s.d 96 Core		Polaration Mode Desfertion	ASSET/099	4	233,333	70,783	120,541	1,337,006
			Digimatic Caliper	ASSET/101	1	2,000	826	30,135	32,961
			OTDR & Optical DWDM Analizer	ASSET/102	4	166,667	42,397	120,541	956,796
			Optical Coating Geometry	ASSET/106	1	500,000	127,191	30,135	657,326
			OTDR	ASSET/108	4	1,066,667	248,475	120,541	5,381,108
			Climatic Chamber	ASSET/126	5	300,000	49,141	150,676	1,896,382
			Single Wire & Cable Vertical Flame Test	ASSET/127	1	66,667	10,920	30,135	107,722
			High Temperature	-	1	-	-	30,135	30,135
					35				**15,362,852**

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Table 6. Finall Tariff Calculation with Activity-Based Costing Method (2/2)

Human Resource								Other	Total
BP III	BP IV	BP V	BP VI	BP VII	Time (in days)	Cost (IDR) Personnel	Cost (IDR) Total	Additional Fee	(IDR)
1					1	1,712,817	1,712,817	Cable Disposal	
	2				10	1,184,330	23,686,593		
		0			0	977,670	-		
			0		0	599,730	-		
				4	7	413,986	11,591,620	400,000	
					18		**36,991,030**	**400,000**	**52,753,882**

The calculation above results in the final tariff of IDR 52,753,882.

CONCLUSIONS

After the calculation was executed on 26 types of telecommunications equipment using activity-based costing method, the results obtained from the new formulation of the testing tariff is relevant to be used by IAS, because the new formulation considers the use of testing equipment used, human labors, time spent, and other additional costs such as environmental costs and cost of maintenance, thus makes it relevant to be used. Later, the generated tariffs which are still a figure of production costs, can be used with an adjustment by multiplying the results with profit-margin needed.

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