Implementation of Activity-Based Costing Method in Calculating Production Cost of Coffee Powder Manufacturing Company In Aceh

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Abstract. The purpose of this research is to study how the calculation and comparing the application of the traditional system method with the Activity Based Costing system method in the coffee manufacturing industry in Aceh. The result of the calculation can be concluded that the comparison cost between the calculation of the cost of goods produced by the traditional system and the calculation of the price of staple goods production has difference price amount in PT. Indo Cufco about Rp.603/kg (undercost), CV. Kupi Lampineung Rp.4.004/kg (undercost), UD. Kupi Teungku Aceh Rp.60,42/kg (overcost), UD. Degood Gayo Coffee Rp.3.042,6/kg (overcost), and UD. Raya Coffee Arabica Rp.9/kg (undercost).

Keywords: *Cost of Goods Manufactured, Traditional Method, Activity Based Costing*

1 Introduction

The industry is one of the drivers of the world economic turnaround. The industry is required to maintain the life-sustainability of its business in order to operate in accordance with the objectives set by the company and always generate profits for its owners. The development of the powder processing industry in Aceh province increasingly rapidly. The production of coffee commodities in Aceh Province is huge, with a total area 121,226 Ha, and producing about 46,828 tons per year. The processing of coffee powder using modern technology becomes one of the efficiency indicators and can improve the quality of the production process. Technological developments also have a complex impact on the industry. With the utilization of these technologies resulted in increased operating costs generated by the company that will impact on the high cost of production.

Calculation of manufacturing cost of the product is all costs used to process raw materials to be finished goods in a certain period of time either fixed or variable costs. The inaccuracy in the calculation of cost of goods manufactured has an adverse effect on the company, because the cost of production serves as the basis for setting the selling price and profit, as a tool to measure the efficiency of the production process implementation as well as the basis for decision making for the management of the company. Therefore, there is a new method in the calculation of the cost of production known as activity-based costing (ABC).

Purpose of the research is to find out the calculation and comparison of cost of production in the coffee processing industry in Aceh Province using traditional system and activity-based costing.

2 Literature Review

2.1 Management Accounting and Cost Accounting

The definition of management accounting by Horngren, Datar, & Rajan [1] is the process of identification, measurement and accumulation, analysis and preparation, interpretation, and communication of information that helps each executive to meet organizational goals. Management accounting also includes preparing financial statements for non-management groups such as shareholders, creditors, regulatory agencies. financial and non-financial means used by management to make decisions.

While, Horngren, Datar, & Foster [2] states "Cost Accounting provides the information needed for management accounting and financial accounting. Cost accounting measures and reports any financial and non-financial information related to the cost or utilization of resources within an organization". While the definition of costs according to Bustami & Nurlela [3] cost is the sacrifice of economic resources as measured in units of

IGC 2018, October 03-05, Banda Aceh, Indonesia

DOI 10.4108/eai.3-10-2018.2284352

money that have occurred or are likely to occur to achieve certain goals. In addition, Mardiasmo [4] defined manufacturing cost as "the manufactured cost of a product or service is an accumulation of the costs imposed on products or services produced by the company".

2.2 Traditional System Method vs Activity-Based Costing

Hansen & Mowen [5] state that the traditional system is a cost accounting system which assumes that all are classified as fixed or variable related to changes in units or volumes of manufactured products. While activity-based costing according to Raiborn & Kinney [6] is a cost accounting system that focuses on organizational activities and collection of costs based on the underlying nature of the underlying level of some predetermined overhead and then calculated using a variety of cost drivers in the activities of an organization.

2.3 Previous Research

The results of research by Rahmaji [7] entitled "Implementation of Activity Based Costing System to Determine the Cost of Products of PT. Celebes Mina Pratama". PT. Celebes Mina Pratama is a company that produces 3 kinds of product ikan kayu, hana katsuo and fish meal. The research concludes that with activity based costing system able to give a calculation of the cost of production more accurate. The results showed that activity-based costing system when compared with traditional methods then gives greater results. The difference that occurs due to the overhead cost of each product. The differences of this research is the object of research by Rahmaji on fish processing industry, while in research conducted by researchers in the coffee powder processing industry. The similarity of research conducted by Rahmaji with this research is on the subject of research. The company under study still uses Traditional System in calculating the cost of production so it is necessary to do research by using activity based costing system to evaluate the accuracy of calculation done at this time.

The result of the research of Suratinoyo [8] entitled "Application of ABC system for determining the cost of goods manufactured in Build Wenang Beverage". PT. Build Wenang Manado is a manufacturing company engaged in the manufacture of soft drinks. The calculation of the cost of production using the ABC method when compared with the method used by the company there is a difference of Rp.416.242.174 where the total cost of production using the ABC method is Rp.41.667.875.470. When compared with the traditional system of Rp.42.129.053.094. The differences of this research are the object of his research where Suratinoyo in the manufacture of soft drinks, while researchers in the coffee powder processing industry. The equation of research is to have similarity in using the traditional system to charge product cost so that need to be done by using an activity based costing system to calculate the cost of goods production.

The results of Rotikan [9], entitled "Application of activity-based costing method in determining the cost of production at PT. Tropica Cocoprima ". PT. Tropica Cocoprima is a company engaged in the production of coconut flour. The research yields the conclusion that calculation of the cost of production by ABC method shows undercost condition for ordinary coconut flour product and overcost condition for fine coconut flour.

The differences of this research are that in research undertaken by Rotikan choose coconut flour processing company, where researchers using coffee powder processing company as the subject of his research. The similarity of this research is to have similarities in using Activity-based costing to perform calculations and evaluate the accuracy of the calculations performed today.

3 Research Methods

3.1 Subject and Object of Research

The research subjects in this research are five coffee processing industry units in Aceh Province (PT Indo Cufco, CV Kupi Lampineung, UD Coffee Tgk Aceh, UD Degood Gayo Coffee, UD Raya Coffee Arabica). The object of research in this research is the data related to the determination of the cost of production. The data consists of: (1) Qualitative data, is data in the form of letters, pictures, diagrams and so forth (not numbers) that describe something or words. In this case, the required data is data about the history of PT. Indo Cufco, CV. Kupi Lampineung, UD. Coffee Tgk. Aceh, UD. Degood Gayo Coffee, UD. Raya Coffee Arabica and the development of these companies, company location, organizational structure, marketing area, production system, etc. (2) Quantitative data, is data in the form of numbers or data that can be calculated by unit count. These data are all

data related to the production of PT. Indo Cufco, CV. Kupi Lampineung, UD. Coffee Tgk. Aceh, UD. Degood Gayo Coffee, UD. Raya Coffee Arabica in 2016.

3.2 Operational Definition of Research Variable

Operational Definition of Research Variable of this research is: (1) Cost of production is all costs used to process raw materials to be finished goods within a certain period of time. (2) The traditional system is a system of determining the cost of production that uses the basis of charging costs in accordance with changes in unit or volume of products produced. (3) Activity-based costing is a cost calculation that emphasizes activities that use more cost driver to measure the resources used by the product more accurately and relevant.

3.3 Research Design, Data Collection Method and Data Analysis Method

This research is descriptive research. Descriptive research aims to describe the facts that currently apply. Descriptive research is categorized in the study of the object of past and present variables and describes the variables being studied [10].

Data collection conducted in this research is field study. Field study is a data collection steps taken author directly from PT. Indo Cufco, CV. Kupi Lampineung, UD. Coffee Tgk. Aceh, UD. Degood Gayo Coffee, UD. Raya Coffee Arabica which became the object of this research by:

1. Interviews with the company manager, this interview is a data collection technique that is done with parts that concerned and directly involved with the discussed and associated with the data required.
2. Direct observation of the work system, especially related to the activity-based costing process.
3. Observing procedures or policies implemented by the company.

Data analysis techniques used to calculate the cost of production with Activity-based costing are as follows:

1. Calculating the cost of production with the traditional system.
2. Calculating the cost of production using Activity-based costing, with the following ways:
   a. Identifying activity to each level activity (Unit, Batch, Product, and Facility).
   b. Determining the homogenous cost pool.
   c. Determining the pool rate per units of each cost pool.
   d. Allocating pool rate based on cost driver has consumed by each level activity.
   e. Arranged the cost of the product by activity-based costing method.
3. Compare the calculation of the cost of production based on traditional system and activity-based costing then calculate the difference.
4. Analyzing a more precise system in determining the cost of production in PT. Indo Cufco, CV. Kupi Lampineung, UD. Coffee Tgk. Aceh, UD. Degood Gayo Coffee, UD. Raya Coffee Arabika.

4 Result and Discussion

ABC implementation study on 5 coffee powder processing companies in Aceh Province with different types of products, and different production capacity, in order to obtain various results from each type of product. At PT. Indo Cufco there are 4 types of products (arabica coffee specialty, longberry / peaberry, Luwak, and wine), CV. Kupi Lampineung Utama there are 3 types of products (robusta coffee, arabica coffee, and robusta jagung), UD. Kupi Teungku Aceh has 2 types of products (super robusta coffee and standard robusta coffee), UD. Degood Gayo Coffee has 5 types of products (arabica specialty coffee, long berry, peaberry, Luwak, and wine), and UD. Raya Coffee Arabica produces 2 types of products (specialty arabica and roasted bean coffee). There are several stages in the processing of coffee beans. The first stage, freshly harvested coffee beans were washed and stripped of the outer shell using a depulper machine, clean coffee beans were dried until the humidity was reduced by 30%, after the dry coffee beans were stripped from the coffee beans using a huller machine, the next stage was dried again to get the coffee beans with 12% moisture content, the last stage is sorting the beans by type and quality.

The dried green beans are then roasted using a roasting machine until they reach the desired level of maturity; there are two commonly used roasting tools, automatic machines, using heat power from gas fuel, and manuals are still done traditionally using fire heat from firewood. After the roasting process is complete then the coffee

beans are smoothed using a grinding machine to obtain coffee powder and then packed to maintain the taste quality of the coffee into several packing sizes. Powdered coffee ready for market.

The process of processing the coffee beans is not difficult, but requires a lot of manpower if still done manually, the company conducted research has combined with the use of production machinery to support production efficiency and suppress the use of labor, so the five companies have met the criteria for the calculation of price principal production using activity-based costing system.

The calculation of the cost of goods manufactured using activity-based costing system specifies the calculation of overhead costs into 4 activity levels and charges the cost according to the capacity of each product produced. Activity-based costing not only to charge the cost of accurate but also as a tool of cost control, from every activity we do will find out how much the cost incurred. The traditional method of calculation cannot be performed cost control because all costs are charged with the production unit.

Companies that do research still use the calculation of the traditional model, because the application is general and the calculation is simple. But responses from company owners assessed the activity-based costing system is helpful to companies in controlling costs because the activity-based costing system details the calculation of factory overhead cost according to the capacity of each product. So inflate the cost can be easily traced and taken control steps.

4.1 Specific Data

The production data of PT. Indo Cufco, CV. Kupi Lampineung, UD. Coffee Tgk. Aceh, UD. Degood Gayo Coffee, and UD. Raya Coffee Arabica in 2016 is presented in Table 1 – 5 as follows:

Table 1. Production Data of PT Indo Cufco in the Year 2016

Product Type	Production Unit (Kg)	Cost Of Good Sold (Rp)	Labour Cost (Rp)
Specialty	5.000	1.000.000.000	85.200.000
Longberry/ Peaberry	2.500	620.500.000	42.600.000
Wine	100	40.000.000	2.840.000
Luwak	700	245.000.000	11.360.000
Total	8.300	1.910.000.000	142.000.000

Source: PT Indo Cufco

Table 2. Production Data of CV Kupi Lampineung in the Year 2016

Product Type	Production Unit (Kg)	Cost Of Good Sold (Rp)	Labour Cost (Rp)
Robusta (Original)	972	29.191.000	3.575.000
Arabica (Original)	1.450	115.999.000	5.200.000
Robusta (Mixed with Corn)	6.217	162.892.500	23.725.000
Total	8.639	308.012.500	32.500.000

Source: CV Kupi Lampineung

Table 3. Production Data of UD Kopi Teungku Aceh in the Year 2016

Product Type	Production Unit (Kg)	Cost Of Good Sold (Rp)	Labour Cost (Rp)
Super	1.000	45.000.000	6.338.028
Standard	70.000	210.000.000	443.661.972
Total	71.000	255.000.000	450.000.000

Source: UD Kopi Teungku Aceh

Table 4. Production Data of UD Degood Gayo in the Year 2016

Product Type	Production Unit (Kg)	Cost Of Good Sold (Rp)	Labour Cost (Rp)
Specialty	1.000	200.000.000	37.800.000
Longberry	500	75.000.000	18.900.000
Peaberry	300	54.000.000	10.800.000
Wine	70	28.000.000	3.600.000
Luwak	500	500.000.000	18.900.000
Total	2.370	875.000.000	90.000.000

Source: UD Degood Gayo

Table 5. Production Data of UD Raya Coffee Arabica in the Year 2016

Product Type	Production Unit (Kg)	Cost Of Good Sold (Rp)	Labour Cost (Rp)
Roasted Bean	1.500	157.500.000	14.760.000
Specialty	2.100	241.500.000	21.240.000
Total	3.600	399.000.000	36.000.000

Source: UD Raya Coffee Arabica

PT. Indo Cufco, CV. Kupi Lampineung, UD. Kopi Tgk. Aceh, UD. Degood Gayo Coffee, dan UD. Raya Coffee Arabika has overhead costs of production used in 2016 to produce the above products is presented in table 6 as follows:

Table 6. Overhead of the Year 2016 (in Rp)

Cost	PT Indo Cufco	CV Kupi Lampineung	UD Kupi Teungku Aceh	UD Degood Gayo	UD Raya Coffee Arabica
Electricity	23.985.450	9.700.000	12.000.000	54.000.000	8.400.000
Vehicle Fuel	5.000.000	3.800.000	5.000.000	1.500.000	1.700.000
Machine Fuel	1.200.000	20.000.000	325.000	500.000	504.000
Vehicle Sparepart	3.000.000	500.000	400.000	5.000.000	300.000
Vehicle Maintenance	2.400.000	300.000	1.000.000	3.000.000	750.000
Machine Maintenance	500.000	200.000	300.000	3.000.000	800.000
Pickup Cost	0	700.000	0	0	0
Employee Salary	0	0	40.000.000	0	0
Factory Equipment	2.000.000	2.000.000	200.000	5.000.000	200.000
Cleaning Service	1.500,000	0	0	300.000	500.000
Employee Training	4.500.000	0	0	2.000.000	0
Fix Assets Maintenance	2.000.000	200.000	2.000.000	5.000.000	0
Labor Assurance	12.000.000	0	0	12.000.000	0
Vehicle Depreciation	30.000.000	5.595.000	5.000.000	6.000.000	3.333.000
Machine Depreciation	23.333.000	16.785.000	1.912.000	4.000.000	2.000.000
Factory Depreciation	5.428.000	9.000.000	7.500.000	2.000.000	1.666.000
Packaging	50.000.000	1.500.000	36.000.000	200.000.000	20.000.000
Shipping Cost	80.000.000	0	0	0	0
Marketing	0	0	150.000	10.000.000	1.000.000
Total	246.846.450	70.280.000	111.787.000	313.300.000	41.153.000

Source: Secondary Data Processed

In addition to the above data, other data used to support the implementation of Activity-Based Costing System, among others:

1. Total electricity consumption
2. Number of hours of the inspection
3. Area of the area used

The quantity of the data can be presented in table 7 to table 11 as follows:

Table 7. Cost Driver of PT Indo Cufco

Cost Driver	Product Variants				Total
	Specialty	Longberry/ Peaberry	Wine	Luwak	
Total unit production (kg)	5.000	2.500	100	700	8.300
Total KWH	9.810	4.905	327	1.308	16.350
Total production hours	1.725	863	58	230	2.876
Area width (m^2)	1.080	540	36	144	1.800

Source: PT Indo Cufco

Table 8. Cost Driver of CV Kupi Lampineung

Cost Driver	Product Variants			Total
	Robusta (Original)	Arabica (Original)	Robusta (Mixed with Corn)	
Total unit production (kg)	972	1.450	6.217	8.639
Total KWH	735,7	1.070,3	4.882	6.689
Total production hours	592	861	3.927	5.380
Area width (m^2)	165	240	1.095	1.500

Source: CV Kupi Lampineung

Table 9. Cost Driver of UD Kopi Teungku Aceh

Cost Driver	Product Variants		Total
	Super	Standard	
Total unit production (kg)	1.000	70.000	71.000
Total KWH	736,1	36.066,9	36.803
Total production hours	85	2.411	2.496
Area width (m^2)	13	603	616

Source: UD Kopi Teungku Aceh

Table 10. Cost Driver of UD. Degood Gayo Coffee

Cost Driver	Product Variants					Total
	Specialty	Longberry	Peaberry	Wine	Luwak	
Total unit production (kg)	1.000	500	300	70	500	2.370
Total KWH	3.434	1.717	2.453	327	1.717	8.178
Total production hours	819	409	234	78	409	1.950
Area width (m^2)	1.050	525	300	100	525	2.500

Source: UD Degood Gayo

Table 11. Cost Driver of UD Raya Coffee Arabica

Cost Driver	Product Variants		Total
	Roasted Bean	Specialty	
Total unit production (kg)	1.500	2.100	3.600
Total KWH	2.347	3.377	5.725
Total production hours	885	1.275	2.160
Area width (m^2)	164	236	400

Source: UD Raya Coffee Arabica

4.2 Discussion

4.2.1 Calculation cost of the product by traditional methods

The calculation cost of the product by traditional methods is presented in Table 12 – 16 as follows.

Table 12. Production cost calculation with the traditional method of PT Indo Cufco

Product 1 - Specialty

Cost Element	Total Cost (Rp)	Quantity (Kg)	Cost per Unit (Rp)
Primary cost	1.085.200.000	5.000	217.040
Overhead cost = 29.740,5 x 5.000	145.432.801	5.000	29.085,5
Total			**246.127**

Product 2 – Longberry/Peaberry

Cost Element	Total Cost (Rp)	Quantity (Kg)	Cost per Unit (Rp)
Primary cost	663.100.000	2.500	265.240
Overhead cost = 29.740,5 x 2.500	72.716.250	2.500	29.085,5
Total			**29.325**

Product 3 – Wine

Cost Element	Total Cost (Rp)	Quantity (Kg)	Cost per Unit (Rp)
Primary cost	42.840.000	100	428.400
Overhead cost = 29.740,5 x 100	2.908.650	100	29.085,5
Total			**457.485**

Product 4– Luwak

Cost Element	Total Cost (Rp)	Quantity (Kg)	Cost per Unit (Rp)
Primary cost	256.360.000	700	366.228,5
Overhead cost = 29.740,5 x 700	20.360.200	700	29.085,5
Total			**395.314**

Source: Secondary Data Processed

Table 13. Production cost calculation with the traditional method of CV Kupi Lampineung

Product 1 – Robusta (original)

Cost Element	Total Cost (Rp)	Quantity (Kg)	Cost per Unit (Rp)
Primary cost	32.696.000	972	33.637,8
Overhead cost = 8.135,2 x 972	7.907.415	972	8.135,2
Total			**41.773**

Product 2 – Arabica (original)

Cost Element	Total Cost (Rp)	Quantity (Kg)	Cost per Unit (Rp)
Primary cost	121.199.000	1.450	83.585,5
Overhead cost = 8.135,2 x 1.450	11.796.040	1.450	8.135,2
Total			**91.720,7**

Product 3 – Robusta (mixed with corn)

Cost Element	Total Cost (Rp)	Quantity (Kg)	Cost per Unit (Rp)
Primary cost	186.617.000	6.217	30.017,2
Overhead cost = 8.135,2 x 6.217	50.575.295	6.217	8.135,2
Total			**38.152,4**

Source: Secondary Data Processed

Table 14. Production cost calculation with the traditional method of UD Kupi Teungku Aceh

Product 1 – Super

Cost Element	Total Cost (Rp)	Quantity (Kg)	Cost per Unit (Rp)
Primary cost	51.338.028	1.000	51.338,02
Overhead cost = 4.412,67 x 1.000	4.412.676	1.000	4.412,67
Total			**55.750,70**

Product 2 – Standard

Cost Element	Total Cost (Rp)	Quantity (Kg)	Cost per Unit (Rp)
Primary cost	653.661.972	70.000	9.338,028
Overhead cost = 4.412,67 x 70.000	308.887.320	70.000	4.412,67
Total			**13.750,70**

Source: Secondary Data Processed

Table 15. Production cost calculation with the traditional method of UD Degood Gayo Coffee

Product 1 - Specialty			
Cost Element	**Total Cost (Rp)**	**Quantity (Kg)**	**Cost per Unit (Rp)**
Primary cost	237.800.000	1.000	237.800
Overhead cost = 47.167,5 x 1.000	47.167.510	1.000	47.167,5
Total			**284.967**

Product 2 – Longberry			
Cost Element	**Total Cost (Rp)**	**Quantity (Kg)**	**Cost per Unit (Rp)**
Primary cost	93.900.000	500	187.800
Overhead cost = 47.167,5 x 500	23.583.750	500	47.167,5
Total			**234.967**

Product 3 – Pieberry			
Cost Element	**Total Cost (Rp)**	**Quantity (Kg)**	**Cost per Unit (Rp)**
Primary cost	64.800.000	300	216.000
Overhead cost = 47.167,5 x 300	14.150.250	300	47.167,5
Total			**263.167**

Product 4– Wine			
Cost Element	**Total Cost (Rp)**	**Quantity (Kg)**	**Cost per Unit (Rp)**
Primary cost	31.600.000	70	451.428,5
Overhead cost = 47.167,5 x 70	3.301.690	70	47.167,5
Total			**498.596**

Product 5– Luwak			
Cost Element	**Total Cost (Rp)**	**Quantity (Kg)**	**Cost per Unit (Rp)**
Primary cost	518.900.000	500	366.228,5
Overhead cost = 47.167,5 x 500	23.583.750	500	47.167,5
Total			**1.084.967**

Source: Secondary Data Processed

Table 16. Production cost calculation with the traditional method of UD Raya Coffee Arabica

Product 1 – Roasted Bean			
Cost Element	**Total Cost (Rp)**	**Quantity (Kg)**	**Cost per Unit (Rp)**
Primary cost	172.260.000	1.500	114.840
Overhead cost 11.431 x 1.500	17.147.083	1.500	11.431
Total			**126.271**

Product 2 – Specialty			
Cost Element	**Total Cost (Rp)**	**Quantity (Kg)**	**Cost per Unit (Rp)**
Primary cost	262.740.000	2.100	125.114
Overhead cost 11.431 x 2.100	24.005.100	2.100	11.431
Total			**136.545**

Source: Secondary Data Processed

4.2.2 Calculation cost of the product by Activity Based Costing

4.2.2.1 The First Stage Procedure

The first stage determines the cost of production based on the activity-based costing system is to trace the cost of the Source power to the activities that consume it. This stage can be seen in Table 17 as follows:

Table 17. The classification of costs into various activities in the year 2016

Activity Level	**Cost**	**PT Indo Cufco**	**CV Kupi Lampineung**	**UD Kupi Teungku Aceh**	**UD Degood Gayo**	**UD Raya Coffee Arabica**
Unit	Electricity	23.985.450	9.700.000	12.000.000	54.000.000	8.400.000
	Vehicle Fuel	5.000.000	3.800.000	5.000.000	1.500.000	1.700.000
	Vehicle Sparepart	3.000.000	500.000	400.000	5.000.000	300.000

	Vehicle Maintenance	2.400.000	300.000	1.000.000	3.000.000	750.000
	Vehicle Depreciation	30.000.000	5.595.000	5.000.000	6.000.000	3.333.000
Batch	Machine Fuel	1.200.000	20.000.000	325.000	500.000	504.000
	Machine Maintenance	500.000	200.000	300.000	3.000.000	800.000
	Pickup Cost	0	700.000	0	0	0
	Employee Salary	0	0	40.000.000	0	0
	Labor Assurance	12.000.000	0	0	12.000.000	0
	Employee Training	4.500.000	0	0	2.000.000	0
	Machine Depreciation	23.333.000	16.785.000	1.912.000	4.000.000	2.000.000
Facility	Factory Equipment	2.000.000	2.000.000	200.000	5.000.000	200.000
	Cleaning Service	1.500,000	0	0	300.000	500.000
	Fix Assets Maintenance	2.000.000	200.000	2.000.000	5.000.000	0
	Factory Depreciation	5.428.000	9.000.000	7.500.000	2.000.000	1.666.000
Product	Packaging	50.000.000	1.500.000	36.000.000	200.000.000	20.000.000
	Shipping Cost	80.000.000	0	0	0	0
	Marketing	0	0	150.000	10.000.000	1.000.000
	Total	246.846.450	70.280.000	111.787.000	313.300.000	41.153.000

Source: Secondary Data Processed

After determining the homo- geneous cost pool, then determine the rate per unit cost driver. Pool rate at PT. Indo Cufco, CV. Kupi Lampineung, UD. Degood Gayo Coffee, UD. Coffee Tgk Aceh, UD. Raya Coffee Arabica in 2016 can be seen in Table 18 to table 22 as follows:

Table 18. Pool rate activity of PT Indo Cufco

Cost pool unit level	**Overhead**	**Amount (Rp)**
Cost pool 1	Electricity cost	23.985.450
Total cost		23.985.450
Total KWH (KWH)		16.350
Pool rate 1		1.467,14
Cost pool unit level	**Overhead**	**Amount (Rp)**
Cost pool 2	Vehicle fuel cost	5.000.000
	Vehicle spare parts cost	3.000.000
	Vehicle maintenance cost	2.400.000
	Vehicle depreciation	30.000.000
Total cost		40.400.000
Total production unit (Unit)		8.300
Pool rate 2		4.867,5
Cost pool batch level	**Overhead**	**Amount (Rp)**
Cost pool 3	Machine fuel cost	1.200.000
	Machine maintenance cost	500.000
	Machine depreciation	23.333.000
Total cost		25.033.000
Operate hours (hour)		2.876
Pool rate 3		8.704
Cost pool batch level	**Overhead**	**Amount (Rp)**
Cost pool 4	Employee training cost	4.500,000
	Labor assurance cost	12.000.000
Total cost		16.500.000
Operate hours (hour)		2.375
Pool rate 4		6.947
Cost pool product level	**Overhead**	**Amount (Rp)**
Cost pool 5	Packaging cost	50.000.000
	Distribution cost	80.000.000

Total cost		130.000.000
Product unit (unit)		8.300
Pool rate 5		15.663
Cost pool facility level	**Overhead**	**Amount (Rp)**
Cost pool 6	Factory equipment cost	2.000.000
	Sanitation cost	1.500.000
	Fix asset maintenance	2.000.000
	Building depreciation	5.428.000
Total cost		10.928.000
Area width (m^2)		1.800
Pool rate 6		6.071

Source: Secondary Data Processed

Table 19. Pool rate activity of CV Kupi Lampineung

Cost pool unit level	**Overhead**	**Amount (Rp)**
Cost pool 1	Electricity cost	9.700.000
Total cost		9.700.000
Total KWH (KWH)		6.689
Pool rate 1		1.450,14
Cost pool unit level	**Overhead**	**Amount (Rp)**
Cost pool 2	Vehicle fuel cost	3.800.000
	Vehicle spare parts cost	500.000
	Vehicle maintenance cost	300.000
	Vehicle depreciation	5.595.000
Total cost		10.195.000
Total production unit (unit)		8.639
Pool rate 2		1.180,11
Cost pool batch level	**Overhead**	**Amount (Rp)**
Cost pool 3	Machine fuel cost	20.000.000
	Machine maintenance cost	200.000
	Machine depreciation	16.785.000
Total cost		36.985.000
Operate hours (hour)		5.380
Pool rate 3		6.874,53
Cost pool product level	**Overhead**	**Amount (Rp)**
Cost pool 4	Packaging cost	1.500.000
Total cost		1.500.000
Product unit (unit)		8.639
Pool rate 4		173,63
Cost pool facility level	**Overhead**	**Amount (Rp)**
Cost pool 5	Factory equipment cost	2.000.000
	Fix asset maintenance	200.000
	Building depreciation	9.000.000
Total cost		11.200.000
Area width (m^2)		1.500
Pool rate 5		7.466,6

Source: Secondary Data Processed

Table 20. Pool rate activity of UD Kupi Teungku Aceh

Cost pool unit level	**Overhead**	**Amount (Rp)**
Cost pool 1	Electricity cost	54.000.000
Total cost		54.000.000
Total KWH (KWH)		36.803
Pool rate 1		1.467,27
Cost pool unit level	**Overhead**	**Amount (Rp)**
Cost pool 2	Vehicle fuel cost	1.500.000
	Vehicle spare parts cost	5.000.000
	Vehicle maintenance cost	3.000.000
	Vehicle depreciation	6.000.000
Total cost		15.500.000
Total production unit (unit)		71.000
Pool rate 2		218,30

Cost pool batch level	Overhead	Amount (Rp)
Cost pool 3	Machine fuel cost	500.000
	Machine maintenance cost	3.000.000
	Machine depreciation	4.000.000
Total cost		7.500.000
Operate hours (hour)		17.752
Pool rate 3		422,48
Cost pool batch level	**Overhead**	**Amount (Rp)**
Cost pool 4	Employee training cost	2.000,000
	Labor assurance cost	12.000.000
Total cost		14.000.000
Operate hours (hour)		38.040
Pool rate 4		368,03
Cost pool product level	**Overhead**	**Amount (Rp)**
Cost pool 5	Packaging cost	200.000.000
	Distribution cost	10.000.000
Total cost		210.000.000
Product unit (unit)		71.000
Pool rate 5		2.957,74
Cost pool facility level	**Overhead**	**Amount (Rp)**
Cost pool 6	Factory equipment cost	5.000.000
	Sanitation cost	300.000
	Fix asset maintenance	5.000.000
	Building depreciation	2.000.000
Total cost		12.300.000
Area width (m^2)		2.106
Pool rate 6		5.840,45

Source: Secondary Data Processed

Table 21. Pool rate activity of UD Degood Gayo

Cost pool unit level	Overhead	Amount (Rp)
Cost pool 1	Electricity cost	12.000.000
Total cost		12.000.000
Total KWH (KWH)		8.178
Pool rate 1		1.467,14
Cost pool unit level	**Overhead**	**Amount (Rp)**
Cost pool 2	Vehicle fuel cost	5.000.000
	Vehicle spare parts cost	400.000
	Vehicle maintenance cost	1.000.000
	Vehicle depreciation	5.000.000
Total cost		11.400.000
Total production unit (unit)		2.370
Pool rate 2		4.810
Cost pool batch level	**Overhead**	**Amount (Rp)**
Cost pool 3	Machine fuel cost	325.000
	Machine maintenance cost	300.000
	Machine depreciation	1.912.000
	Employee Salary	40.000.000
Total cost		42.537.000
Operate hours (hour)		1.950
Pool rate 3		21.814
Cost pool product level	**Overhead**	**Amount (Rp)**
Cost pool 4	Packaging cost	36.000.000
	Marketing cost	150.000
Total cost		36.150.000
Product unit (unit)		2.370
Pool rate 4		15.253
Cost pool facility level	**Overhead**	**Amount (Rp)**

Cost pool 5	Factory equipment cost	200.000
	Fix asset maintenance	2.000.000
	Building depreciation	7.500.000
Total cost		9.700.000
Area width (m^2)		2.500
Pool rate 5		3.880

Source: Secondary Data Processed

Table 22. Pool rate activity of UD Raya Coffee Arabica

Cost pool unit level	**Overhead**	**Amount (Rp)**
Cost pool 1	Electricity cost	8.400.000
Total cost		8.400.000
Total KWH		5.725
Pool rate 1		1.467,14
Cost pool unit level	**Overhead**	**Amount (Rp)**
Cost pool 2	Vehicle fuel cost	1.700.000
	Vehicle spare parts cost	300.000
	Vehicle maintenance cost	750.000
	Vehicle depreciation	3.333.000
Total cost		6.083.000
Total production unit		3.600
Pool rate 2		1.689
Cost pool batch level	**Overhead**	**Amount (Rp)**
Cost pool 3	Machine fuel cost	504.000
	Machine maintenance cost	800.000
	Machine depreciation	2.000.000
Total cost		3.304.000
Operate hours		2.160
Pool rate 3		1.530
Cost pool product level	**Overhead**	**Amount (Rp)**
Cost pool 4	Packaging cost	20.000.000
	Distribution cost	1.000.000
Total cost		21.000.000
Product unit		3.600
Pool rate 4		5.834
Cost pool facility level	**Overhead**	**Amount (Rp)**
Cost pool 5	Factory equipment cost	200.000
	Fix asset maintenance	500.000
	Building depreciation	1.666.000
Total cost		2.366.000
Area width		400
Pool rate 5		5.915

Source: Secondary Data Processed

4.2.2.2 The Secondary Stage Procedure

The cost of product calculation with activity-based costing system at PT. Indo Cufco, CV. Kupi Lampineung, UD. Degood Gayo Coffee, UD. Coffee Tgk Aceh, UD. Raya Coffee Arabica is presented in Table 23 – 27 as follows:

Table 23. Allocation Overhead by ABC Method in PT Indo Cufco

Activity Level	**Cost Driver**	**Allocation**	**Specialty**	**Longberry/ Peaberry**	**Wine**	**Luwak**
Unit	KWH	1.467 x 9.810	14.391.270			
		1.467 x 4.905		7.195.635		
		1.467 x 327			479.709	
		1.467 x 1.308				1.918.836
	Total unit	4.867,5 x 5.000	24.337.500			
		4.867,5 x 2.500		12.167.500		
		4.867,5 x 100			486.700	
		4.867,5 x 700				3.406.900

Batch	Operate hours	8.704 x 300	2.611.200			
		8.704 x 150,3		1.308.211		
		8.704 x 10			87.040	
		8.704 x 40				348.160
	Operate hours	6.947 x 1.425	9.899.475			
		6.947 x 712,5		4.949.737		
		6.947 x 47,5			329.982	
		6.947 x 190				1.319.930
Product	Total unit	15.663 x 5.000	78.135.000			
		15.663 x 2.500		39.157.500		
		15.663 x 100			1.556.300	
		15.663 x 700				10.964.100
Facility	Area width	6.071 x 1.080	6.556.680			
		6.071 x 540		3.278.340		
		6.071 x 36			218.556	
		6.071 x 144				874.224
Total Overhead			**136.111.125**	**68.056.923**	**3.158.287**	**18.832.150**

Source: Secondary Data Processed

Table 24. Allocation Overhead by ABC Method in CV Kupi Lampineung

Activity Level	Cost Driver	Allocation	Robusta (original)	Arabica (original)	Robusta (mixed with corn)
Unit	KWH	1.450,14 x 735,7	1.066.868		
		1.450,14 x 1.070,3		1.552.084,84	
		1.450,14 x 4.882			7.079.583,48
	Total unit	1.180,11 x 972	1.147.067		
		1.180,11 x 1.450		1.711.159,5	
		1.180,11 x 6.217			7.336.743,87
Batch	Operate hours	1.883 x 207,1	389.969,3		
		1.883 x 301,3		567.348	
		1.883 x 1.374,6			2.588.372
Product	Total unit	173,63 x 972	168.739,2		
		173,63 x 1.450		251.720	
		173,63 x 6.217			1.079.271,2
Facility	Area width	7.466,6 x 165	1.231.989		
		7.466,6 x 240		1.7791.984	
		7.466,6 x 1.095			8.175.927
Total Overhead			**4.004.632,5**	**5.874.296,34**	**26.259.879,6**

Source: Secondary Data Processed

Table 25. Allocation Overhead by ABC Method in UD Kupi Teungku Aceh

Activity Level	Cost Driver	Allocation	Super	Standard
Unit	KWH	1.407,27 x 518,35	760.559,40	
		1.407,27 x 38.284,64		53.239.363,7
	Total unit	218,30 x 1.000	218.300	
		218,30 x 70.000		15.281.000
Batch	Operate hours	422,48 x 250	226.449,28	
		422,48 x 17.502		7.394.244,96
	Operate hours	368,03 x 536	197.264,08	
		368,03 x 37.504		13.802.597,1
Product	Total unit	2.957,74 x 1.000	2.957.740	
		2.957,74 x 70.000		207.041.800
Facility	Area width	5.840,45 x 29,66	173.225,90	

			5.840,45 x 2.076,34				12.126.747,7
		Total Overhead			**4.533.540,51**		**308.885.754**

Source: Secondary Data Processed

Table 26. Allocation Overhead by ABC Method in UD Degood Gayo

Activity Level	Cost Driver	Allocation	Specialty	Longberry	Peaberry	Wine	Luwak
Unit	KWH	1.467 x 3.434	5.037.678				
		1.467 x 1.717		2.518.839			
		1.467 x 2.453			3.598.551		
		1.467 x 327				479.709	
		1.467 x 1.717					2.518.839
	Total unit	4.810 x 1.000	4.810.000				
		4.810 x 500		2.405.000			
		4.810 x 300			1.443.000		
		4.810 x 70				336.700	
		4.810 x 500					2.405.000
Batch	Operate hours	21.814 x 819	17.865.666				
		21.814 x 409		8.934.196			
		21.814 x 234			5.104.476		
		21.814 x 78				1.701.492	
		21.814 x 409					8.934.196
Product	Total unit	15.253 x 1.000	15.253.000				
		15.253 x 500		7.626.500			
		15.253 x 300			4.575.900		
		15.253 x 70				1.067.710	
		15.253 x 500					7.626.500
Facility	Area width	3.880 x 1.050	4.074.000				
		3.880 x 525		2.037.000			
		3.880 x 300			1.164.000		
		3.880 x 100				388.000	
		3.880 x 525					2.037.000
Total Overhead			**47.040.344**	**23.521.535**	**15.885.927**	**3.973.611**	**23.621.535**

Source: Secondary Data Processed

Table 27. Allocation Overhead by ABC Method in UD Raya Coffee Arabica

Activity Level	Cost Driver	Allocation	Roasted Bean	Specialty
Unit	KWH	1.467,14 x 2.347	3.443.377	
		1.467,14 x 3.377		4.954.531
	Total unit	1.689 x 1.500	2.533.500	
		1.689 x 2.100		3.546.900
Batch	Operate hours	1.530 x 885	1.354.050	
		1.530 x 1.275		1.950.750
Product	Total unit	5.834 x 1.500	8.751.000	
		5.834 x 2.100		12.251.400
Facility	Area width	5.915 x 164	970.060	
		5.915 x 236		1.395.940
Total Overhead			**17.051.987**	**24.099.521**

Source: Secondary Data Processed

The calculation of the cost of production by using the activity-based costing system at PT. Indo Cufco, CV. Kupi Lampineung, UD. Degood Gayo Coffee, UD. Coffee Tgk Aceh, UD. Raya Coffee Arabica in 2016 can be presented in Table 4.28 – 4.32 as follows:

Table 28. Calculation cost of the product by activity-based costing system of PT. Indo Cufco

Component	Specialty	Longberry/ Peaberry	Wine	Luwak
Raw materials	1.000.000.000	620.500. 000	40.000.000	245.000.000
Labor	85.200. 000	42.600.000	2.840.000	11.360.000
Overhead	136.111. 125	68.056.923	3.158.287	18.832.150
Cost of product	1.221.311.125	731.156.923	45.998.287	275.192. 150
Unit product (Kg)	5.000	2.500	100	700
Cost per unit	**244.262**	**292.463**	**459.983**	**393.131**

Source: Secondary data processed

Table 29. Calculation cost of the product by activity-based costing system of CV. Kupi Lampineung

Component	Robusta (original)	Arabica (Original)	Robusta (mixed with corn)
Raw materials	29.121.000	115.999.000	162.892.500
Labor	3.575.000	5.200.000	23.725.000
Overhead	4.004.632.5	5.874.296,34	26.259.879,6
Cost of product	36.700.632,5	127.073.296	212.874.380
Unit product (Kg)	972	1.450	6.217
Cost per unit	**37.757,85**	**87.636,75**	**34.240,7**

Source: Secondary data processed

Table 30. Calculation cost of the product by activity-based costing system of UD Kupi Teungku Aceh

Component	Super	Standard
Raw materials	45.000.000	210.000.000
Labor	6.338.028	443.661.972
Overhead	4.533.540	308.885.754
Cost of product	55.871.568	962.547.726
Unit product (Kg)	1.000	70.000
Cost per unit	**55.871,56**	**13.750,68**

Source: Secondary data processed

Table 31. Calculation cost of the product by activity-based costing system of UD Degood Gayo

Component	Specialty	Longberry	Peaberry	Wine	Luwak
Raw materials	200.000.000	75.000.000	54.000.000	28.000.000	500.000.000
Labor	37.800.000	18.900.000	10.800.000	3.600.000	18.900.000
Overhead	47.040.344	23.521.535	15.885.927	3.973.611	23.621.535
Cost of product	284.840.344	117.421.535	80.685.927	35.573.611	542.521.535
Unit product (Kg)	1.000	500	300	70	500
Cost per unit	**284.840**	**234.843**	**268.953**	**508.194**	**1.085.043**

Source: Secondary data processed

Table 32. Calculation cost of the product by activity-based costing system of UD Raya Coffee Arabica

Component	Roasted Bean	Specialty
Raw materials	157.500.000	241.500.000
Labor	14.760.000	21.240.000
Overhead	17.051.987	24.099.521
Cost of product	189.311.987	286.839.521
Unit product (Kg)	1.500	2.100
Cost per unit	**126.208**	**136.590**

Source: Secondary data processed

4.2.2.3 The Tertiary Stage Procedure

Comparing traditional systems with activity-based costing system in determining the cost of production. Comparison of cost of production of traditional system with activity-based costing system is presented in Table 33 – 37 as follows:

Table 33. Comparison of cost of production by traditional system and activity-based costing system of PT. Indo Cufco

Method	Specialty (TC/kg)	Longberry/ Peaberry (TC/kg)	Wine (TC/kg)	Luwak (TC/kg)
Traditional System	1.230.635.000/ 246.127	733.312.500/ 293.325	45.748.500/ 457.485	276.719.800/ 395.314
ABC System	1.221.311.125/ 244.262	731.156.923/ 292.463	45.998.287/ 459.983	275.192.150/ 393.131
Difference	9.323.875/ 1.865	2.155.577/ 862	-249.787/ -2.498	1.527.650 / 2.183
Value	Overcost	Overcost	Undercost	Overcost

Source: Secondary data processed

Table 34. Comparison of cost of production by traditional system and activity based costing system of CV. Kupi Lampineung

Method	Robusta Original (TC / kg)	Arabika Original (TC / kg)	Robusta Mixed with Corn (TC/ kg)
Traditional System	40.603.415/ 41.773	132.995.040/ 91.720,7	237.192.295/ 38,152,4
ABC System	36.700.632,5/ 37.757,85	127.073.296/ 87.636,75	212.874.380/ 34.240,7
Difference	3.902.783/ 4.015	5.921.744/ 4.083	24.317.915/ 3.911,5
Value	Overcost	Overcost	Overcost

Source: Secondary data processed

Table 35. Comparison of cost of production by traditional system and activity-based costing system of UD Kupi Teungku Aceh

Method	Super (TC / kg)	Standard (TC / kg)
Traditional System	55.750.704/ 55.750,70	962.549.280/ 13.750,70
ABC System	55.871.568/ 55.871,56	962.547.725/ 13.750,68
Difference	120.860/ 120,86	1.555/ 0,02
Value	Undercost	Overcost

Source: Secondary data processed

Table 36. Comparison of cost of production by traditional system and activity-based costing system of UD Degood Gayo

Method	Specialty (TC/kg)	Longberry (TC/kg)	Peaberry (TC/kg)	Wine (TC/kg)	Luwak (TC/kg)
Traditional System	284.967.000/ 284.967	117.483.500/ 234.967	78.950.100/ 263.167	34.901.720/ 498.596	542.483.500/ 1.084.967
ABC System	284.840.000/ 284.840	117.421.535/ 234.843	80.685.927/ 268.953	35.573.611/ 508.194	542.521.535/ 1.085.043

Difference	126.656/ 126	61.965/ 123	-1.735.827/ -5.786,09	-671.891/ -9.598	-38.053/ -76,07
Value	Overcost	Overcost	Undercost	Undercost	Overcost

Source: Secondary data processed

Table 37. Comparison of cost of production by traditional system and activity based costing system of UD Raya Coffee Arabica

Method	Super (TC / kg)	Syandard (TC / kg)
Traditional System	189.406.500/ 126.271	286.744.500/ 136.545
ABC System	189.311.987/ 126.208	286.839.521/ 136.590
Difference	94.513/ 63	-95.021/ -45,24
Value	Overcost	Undercost

Source: Secondary data processed

5 Conclusion, Limitation, And Suggestion

5.1 Conclusion

Based on the results of research and discussion conducted by the author at PT. Indo Cufco, CV. Kupi Lampineung, UD. Degood Gayo Coffee, UD. Coffee Tgk Aceh, UD. Raya Coffee Arabica, it can be concluded as follows:

1. The results of the five study subjects get the result of calculating the cost of production of different activity-based costing, that the company that specifies the complete overhead component of the factory tends to be more efficient when using the cost of production activity-based costing. This is evidenced in the company PT. Indo Cufco and CV. Kupi Lampineung.
2. In a company that incompletely informs the cost component of the factory overhead cost, the cost of production of the traditional method is more efficient.
3. Based on these conclusions, the difference between the cost of production by using traditional system and activity-based costing is caused by the overhead of factory overhead cost for each product. In traditional systems, the cost of each product is only charged to one cost driver only. As a result, there tends to be a distortion in the loading of factory overhead costs. In the activity-based costing method, the factory overhead cost for each product is charged to many cost drivers according to the use of production capacity, so that activity-based costing is able to allocate activity cost to each product type appropriately based on the consumption of each activity.

5.2 Limitation

This study has several limitations that can be considered for further research to be refined to obtain better results in the future. Limitations contained in this study include:

1. In this study, the data used is not completely real according to the conditions of consumption Source power companies in production, due to limited access and recording company financial statements have not been maximized.
2. The results of the calculation of the cost of production using this activity-based costing system cannot be generalized to other coffee powder processing industries in Aceh

Province, because each company has a difference in the component overhead cost of the manufacturer, so not all companies are more efficient using the activity method based costing.

5.3 Suggestion

To examine the reference for further research, there are several suggestions that can be put forward, among others:

1. For the PT. Indo Cufco, CV. Kupi Lampineung, UD. Degood Gayo Coffee, UD. Coffee Tgk Aceh, UD. Raya Coffee Arabica
   a. Cost of production at PT. Indo Cufco, CV. Kupi Lampineung, UD. Degood Gayo Coffee, UD. Coffee Tgk Aceh, UD. Raya Coffee Arabica with activity-based costing shows results largely higher than the cost of production to the traditional system, but preferably for UD. Degood Gayo Coffee, UD. Coffee Tgk Aceh, UD. Raya Coffee Arabica should provide details of the Overhead Cost of the manufacturer component in accordance with the number of activities according to established standards and re-evaluate the system determines the cost of production because it will greatly affect the purchasing power of products on the market.
   b. PT. Indo Cufco, CV. Kupi Lampineung, should apply the calculation of the cost of production using activity-based costing method, while the UD. Degood Gayo Coffee, UD. Coffee Tgk Aceh, UD. Raya Coffee Arabica is still efficient if using a traditional system because the calculation of the cost of production is cheaper than the ABC method, so it can compete with the market price. If the company produces an increasingly varied product then the company can adopt an activity-based costing system for more accurate cost loading.
2. For the next researcher

For further research, it is better to use other research objects, apart from manufacturing companies. Researchers may use service companies such as insurance companies, hospitals, hotels or consulting firms to obtain more varied information.

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