Available online at https://e-journal.unair.ac.id/TIJAB

TIJAB (The International Journal of Applied Business)

e-ISSN: 2599-0705

Vol. 8 No. 1, April 2024, pp. 01-14

Activity-Based Costing Implementation for Capturing the Complexity of Manufacturing Process: The Case of CV XYZ

Wahyu Firmandani [a 1], Arizendy Dewi Fortuna [a], Mochammad Nurul [a]

[a] *Accounting, Department Business, Faculty of Vocational Studies, Universitas Airlangga, Indonesia*

APA Citation:

Firmandani, W., Fortuna, A. D., & Nurul, M. (2024). Activity-Based Costing Implementation for Capturing the Complexity of Manufacturing Process: The Case of CV XYZ. *TIJAB (The International Journal of Applied Business), 8*(1), 01–14.

Submission Date: 08/07/2023

Revision Date: 29/07/2023

Acceptance Date: 16/08/2023

Published Dae: 01/04/2024

Abstract

Background: In manufacturing companies, determining the cost of goods manufactured is more complex than in service and trading companies, considering that the production cost structure consists of direct raw material costs, direct labor costs, and factory overhead. In identifying the imposition of three components of production costs, the most difficult component to trace is factory overhead because, in determining factory overhead, various approaches and assumptions must be chosen as cost drivers, so it needs the right approach and assumptions for CV XYZ to achieve company performance.

Objective: This study seeks to analyze the intricacies of factory overhead calculations under activity-based costing in comparison to the traditional plantwide rate approach used by CV XYZ, which utilizes production units as cost drivers.

Method: The method used in this research is a case study on CV XYZ with interviews and documentation as data collection techniques. Interviews were conducted with accounting staff and heads of accounting departments through unstructured interviews. Documentation is carried out based on 2020 financial information.

Results: The results of the analysis explain that the calculation of factory overhead applied, production costs, cost of goods manufactured (COGM), and cost of goods sold (COGS) calculated using the plantwide rate approach (production units as cost drivers) shows undercosts when compared to the activity-based costing system, so that the recognized profit is greater than it should be. The implications of undercosts cause information on the income statement to be unreliable, considering that the company has a variety of products and activities related to the production process

Conclusion: The activity-based costing system uses more than one cost driver; thus, the activity-based costing system is a more accurate method to be applied by CV XYZ, which has product diversification.

Keywords: Factory overhead applied, plantwide rate, activity-based costing system, profit and loss.

[1] Corresponding author.
E-mail address: wahyu.firmandani@vokasi.unair.ac.id

1. Introduction

Due to the fast growth of the trade industry, corporate management is interested in getting accurate information to make choices about planning, controlling, and evaluating performance (Hilton & Platt, 2019), especially for manufacturing companies, which are companies whose activities convert raw materials into finished goods so that there is a complex production process. The complexity of the process means the company must be able to control its costs well. Controlling costs is important for businesses because it helps them avoid spending money they don't need to. If a successful business can reduce its costs, it can sell its product at a lower price than its competitors without lowering its quality, making the most money possible (Lawal, 2017). Manufacturing companies have more intricate activities compared to service and trading companies, the processing involved, results in complex calculations for production costs, cost of goods produced, cost of goods sold, and profit (loss). The components of production costs charged by CV XYZ are direct raw material costs and direct labor costs using actual value, while factory overhead charges use budgeted or predetermined rates. For factory overhead rate determination, CV XYZ uses a plantwide rate with product units as the base (cost driver). The application of this method is the simplest because it directly charges factory overhead for the units produced. This method is only suitable for companies that produce a single type of product due to the potential for cost distortion, making it unsuitable for companies with product diversification like CV XYZ.

Cost calculation (or costing) approaches are different ways to measure cost entries and give them to a calculation unit. Finding the right method depends on the nature of the performances and the conditions in which the processes are done. The method of costing relies on the subject of the calculation, the necessary cost structure, the method of cost assignment, and the method of cost conversion to a cost calculation unit (Droździel et al., 2014; Gašparík et al., 2017; Nash & Matthews, 2002). Along with the development of manufacturing companies, the Activity-Based Costing (ABC) system emerged. It charges factory overhead based on several activities, including unit-level activity, batch-level activity, product-level activity, and facility-sustaining-level activity. ABC was created because the business world was changing and there was a need for useful knowledge to help people make decisions (Morgan MJ & Bork HP., 1993). This research contributes to the application of the ABC system to XYZ manufacturing companies in order to provide accurate production cost calculations.

2. Literature Review

The traditional system involves the calculation of product costs by charging raw material and labor costs directly on the product, and overhead costs are charged using unit activity drivers (Mowen et al., 2022). Drivers of unit activity are factors that cause changes in costs along with changes in the number of units produced. To calculate the price per unit of product, add up all costs incurred, then divide by the number of units produced. Traditional cost accounting, which mostly used one single cost driver like direct labor or output amount to divide up overhead costs, couldn't give an accurate cost for running a business well. In this way, the way indirect costs are split is the most important difference between ABC and other methods. In this method, costs are divided up based on the tasks that need to be done to get the product. So, ABC focuses on figuring out how much activities cost and how well they work based on three basic ideas: goods need activities, activities use resources, and resources cost money (Cooper & Kaplan, 1988).

Activity-based costing (ABC) is a method of calculating product costs that allocates costs to products and services according to the resources consumed by activities. The premise of this cost calculation system is that the products and services produced by the organization are carried out through these activities, and these activities use resources that cause costs. Activity-based costing (ABC) is an alternative cost calculation method to obtain relevant and more accurate accounting information (Blocher, 2005). Activity-Based Costing (ABC) is a way to estimate costs based on the activities used in the production process per cost object. Costs are especially estimated for activities that lead to by-products (Leitner, 2007) or the production-related tasks per cost object (Jezic et al., 2020) in order to figure out how much the most important activities in the production cycle cost (Zeuner, 2012). Tsai

(1996) says that this method can be used to help managers make decisions. It is used to learn about costs and gain control over how costs are split up. This helps a company make better strategic and operational decisions (Gosselin, 1997; Hashim, 2019).

Some advantages of using the Activity-Based Costing (ABC) cost system over the traditional costing system (Lievens et al., 2003; Soekardan, 2016; Sohal & Chung, 1998; Tunggal, 1992):

a. The ABC system uses activities as cost drivers to determine how much overhead each product consumes. While the traditional costing system allocates overhead costs arbitrarily based on one or two non-representative allocation bases,.
b. The ABC system focuses on cost, quality, and time factors. Traditional costing systems focus on short-term financial performance, such as profits. Where traditional costing systems are used for pricing and product profitability, the figures are unreliable.
c. The ABC system requires input from all departments; these requirements lead to better organizational integration and provide a cross-functional view of the organization.

The improved flexibility of the ABC system's cost features enhances user decision-making in response to the new business environment and global competition (Towati et al., 2018). Nevertheless, Rahmat (2009) found in the prior research that there is no significant difference in the calculation of factory overhead cost allocation between the conventional system and the ABC system. Therefore, this study will fill the gap between the application of ABC as one of the cost systems that is considered most suitable for manufacturing companies with a variety of products to answer the accuracy of FOH applied and production costs.

3. **Method**

This study employs quantitative descriptive methods through a case study approach. Descriptive research involves collecting data to describe or confirm a phenomenon, symptom, or concept (Wirartha & Hardjono, 2006). It also addresses questions about the current status of research subjects, such as their treatment or opinions. The study utilized data from two sources: primary data obtained through interviews with accounting staff and heads of accounting departments (CV XYZ), and secondary data in the form of company-owned financial documentation. Unstructured interviews were conducted, and documentation was completed on financial information from 2020. To strengthen the company's financial quantitative data, interviews were conducted to understand the production flow at XYZ and what departments are involved in the production process.

3.1. *The ABC Methodology*

Cooper and Kaplan (1988) came up with the activity-based costing (ABC) system as a way to deal with the problem that secondary fixed costs are becoming a bigger part of a product's cost structure. This is because production processes are becoming more industrialized and automated. The ABC costing system calculates the cost of utilizing resources in a process, consisting of activities, to produce goods or services. It is believed in this system that the activities required to produce goods or services deplete resources. In the first step, resources are given to activities, and in the second step, activities are given to goods. In both cases, the way this is done is through cost forces. A company should have two reporting systems: the traditional financial reporting system, which gives information about how much the company's activities cost in each period, and the ABC costing system, which gives information about how many activities were used effectively in a given period and estimates how much they cost (Cooper & Kaplan, Robert S., 1992). In a word, ABC is a way to figure out how much something costs and how well it works. In this way, it is based on three main ideas: activities are needed to make goods, activities use resources, and resources cost money. Through resource drivers, resources are linked to activities, and through activity drivers, actions are linked to cost objects. From the point of view of the process, it is possible to look at what causes the prices of activities and how well they work. From the point of view of management, this is an added value (Pember, 2012).

A few steps are important for putting ABC into place (Capusneanu et al., 2021; Ionescu, 2018): (i) Identifying the activities that the economic body does: you need to make a map of the activities; (ii) Identifying the cost drivers for each type of action: At the activity level, it's important to figure out what causes resource use. (iii) Put jobs together in a grouping center that has the same indicator; (iv)

Determination of unit cost per inductor: Using cost inductors, it is necessary to figure out how much each group center spent so that the exact amount can be credited to that center. (v) Determining the unit cost of the products: For each product, the activities done and the cost drivers related to those activities must be figured out. The unit cost of a product should include both the direct costs and the costs of activities that the product uses.

3.2. *Case study*

CV XYZ is a company based in Surabaya that specializes in manufacturing various building equipment such as blade hills, ship feathers, super feathers, cable ties, Fischer imundex, gasper, grinding wheel, kapi, cable clamps, roll brushes, iron meters, new Fischer imundex, pipes, strapping ropes, and thousand hills. The costs for each finished product are allocated based on the percentage of resource consumption. The breakdown is as follows: 2% blade hills, 6% ship feathers, 7% super feathers, 8% cable ties, 15% Fischer imundex, 3% gasper, 2% grinding wheel, 11% kapi, 13% cable clamps, 8% brush roll, 9% iron meter, 4% new Fischer imundex, 5% pipe, 3% strapping rope, and 4% thousand hill. CV XYZ has found that the plantwide calculations using traditional methods are irrelevant due to the diverse activities and products involved. Therefore, implementing activity-based costing is deemed appropriate to better reflect the complexity of the company's production process.

4. **Results**

4.1 *Factory Overhead Applied Using ABC*

First stage

a. Identification and Classification of Activities and Resources

Table 1. Level of Activities and Resources

Level of activity	Resources
Unit level activity	Cost of ordering and purchasing auxiliary materials
	Assembly Cost
	Painting Cost
	Withholding Cost
	Milling Cost
	Import Cost of Auxiliary Materials
Product level activity	Product Testing Cost
	Product Design Cost
Batch level activity	Machine Setup Cost
	Supervision Fees
	Inspection Cost
	Machine Maintenance Cost
	Machine Maintenance Cost
	Lubricating Oil Cost
Facility level activity	Depreciation Cost
	Factory Electricity Cost
	Factory Foreman Cost
	Factory Manager Fee

Table 1 describes the types of activities that exist within a company and the resources contained in those activities. The resource represents the entire factory overhead cost budget in Table 2. The author rearranged the factory overhead cost budget based on activities that are suitable for calculating factory overhead.

Unit-level activity costs are expenses directly tied to the production of each unit, such as ordering and purchasing materials, assembly, painting, cutting, milling, and importing costs. Product-level activity costs are the costs associated with developing a product and how to maintain the product in the market, consisting of product testing costs and product design costs. Batch-level activity costs are costs

that are influenced by and related to the number of batches of products produced, consisting of machine tuning costs, supervision costs, inspection costs, machine maintenance costs, and lubricating oil costs. Meanwhile, the cost of facility-level activity (facility-level activities) is the cost associated with activities to maintain the capacity owned, including depreciation costs, factory electricity costs, factory foreman costs, and factory manager fees.

b. Resource Cost Applied to Activities

Table 2. Resource Cost

Level of activity	Resources	Foh (budget)
Unit-Level Activity	Cost of ordering and purchasing auxiliary materials	311.775.079
	Assembly Cost	12.429.435
	Painting Cost	17.208.873
	Withholding Cost	19.747.890
	Milling Cost	9.076.183
	Import Cost of Auxiliary Materials	11.752.809
	Total	381.990.269
Product Level Activity	Product Testing Cost	22.664.937
	Product Design Cost	7.855.621
	Total	30.520.557
Batch Level Activity	Machine Setup Cost	9.995.094
	Supervision Fees	23.243.670
	Inspection Cost	18.767.748
	Machine Maintenance Cost	12.532.247
	Machine Maintenance Cost	8.401.227
	Lubricating Oil Cost	11.855.621
	Total	84.795.607
Facility Level Activity	Depreciation Cost	222.474.204
	Factory Electricity Cost	23.415.255
	Factory Foreman Cost	16.547.186
	Factory Manager Fee	19.694.620
	Total	282.131.265
	Total	779.437.697

The total cost at unit level activity is IDR 381,990,269, product level activity is IDR 30,520,557, batch level activity is IDR 84,795,607, and facility level activity is IDR 282,131,265 so that the total cost of all factory overhead budgets divided into several activities in table 4.2 is IDR 779,437,697. The calculation of costs according to the grouping of these activities will make it easier to calculate further factory overhead charges with the ABC system.

c. Determination of Cost Pool and Cost Driver

Table 3. Cost Pool and Cost Driver

Type of pool	Level of activity	Resources	*Cost Driver*	*Cost pool*
Pool 1	*Unit Level Activity*	Cost of ordering and purchasing auxiliary materials	Production Unit	311.775.079
		Assembly Cost		12.429.435
		Painting Cost		17.208.873
		Withholding Cost		19.747.890
		Milling Cost		9.076.183
		Import Cost of Auxiliary Materials		11.752.809
		Total		381.990.269
Pool 2	*Product Level Activity*	Product Testing Cost	Production Unit	22.664.937
		Product Design Cost		7.855.621
		Total		30.520.557
Pool 3	*Batch Level Activity*	Machine Setup Cost	Machine Hour	9.995.094
		Supervision Fees		23.243.670
		Inspection Cost		18.767.748
		Machine Maintenance Cost		12.532.247
		Machine Maintenance Cost		8.401.227
		Lubricating Oil Cost		11.855.621
		Total		84.795.607
Pool 4	*Facility Level Activity*	Depreciation Cost	Machine Hour	222.474.204
		Total		222.474.204
Pool 5	*Facility Level Activity*	Factory Electricity Cost	Electric Power (KWh)	23.415.255
		Total		23.415.255
Pool 6	*Facility Level Activity*	Factory Foreman Cost	Direct Labor Hour	16.547.186
		Factory Manager Fees		19.694.620
		Total		36.241.806
		Total		779.437.697

A cost pool is used to facilitate the grouping of costs based on the same activity and cost driver, while cost drivers are cost triggers that cause costs to arise in the company. Pool 1 with activity level unit and production unit as cost driver produces Rp 381,990,269, pool 2 with product level activity and production unit as cost driver produces Rp 30,520,557, pool 3 with batch level activity and engine hours as cost driver produces Rp 84,795,607, pool 4 with facility level activity and engine hours as cost driver produces Rp 222,474,204, pool 5 with facility level activity and electric power as cost driver generates Rp 23,415,255, and pool 6 with facility level activity and direct labor hours as cost driver generates Rp 36,241,806.

d. Pool Rate Calculation

The pool rate is used to determine the factory overhead for each product. The details of the pool rate calculation are located in Table 4. The pool rate calculation is obtained from the total cost pool according to the type of pool divided by the cost driver budget. Pool rate 2.07 obtained from ((IDR 381,990,269 + IDR 30,520,557): 199,424,208), pool rate 13,560.01 obtained from ((IDR 84,795,607 + IDR 222,474,204): 22,660), pool rate 1175.90 obtained from IDR 23,415,255 divided by 19,913, and pool rate 1379.43 obtained from IDR 36,241,806 divided by 26,273.

Table 4. Pool Rate

Type of pool	Total *cost pool*	*Cost driver*	Budget	*Pool rate*
Pool 1	381.990.269			
Unit Level Activity		Production Unit	199.424.208	2,07
Pool 2	30.520.557			
Product Level Activity				
Pool 3	84.795.607			
Batch Level Activity		Machine Hour	22.660	13.560,01
Pool 4	222.474.204			
Facility Level Activity				
Pool 5	23.415.255	Electric Power (KWh)	19.913	1175,90
Facility Level Activity				
Pool 6	36.241.806	Direct Labor Hour	26.273	1379,43
Facility Level Activity				
Total	779.437.697			

Second Stage

a. Charging Activity Cost to Cost Objects

The calculation of charging activity costs to cost objects is described in Table 5. The charge to the cost object is obtained from the pool rate multiplied by the actual cost driver to produce a total factory overhead charged of IDR 783,420,354, which will be used in the calculation of production costs. Charging activity costs to products is the last stage in determining factory overhead applied using Activity Based Costing (ABC).

Table 5. Charging Activity Cost to Cost Objects

Type of pool	*Pool rate*	*Cost driver* Actual		Cost Objects
Pool 1 *Unit Level Activity* *Pool* 2 *Product Level Activity*	2,07	Production Unit	198.706.876	411.027.019
Pool 3 *Batch Level Activity* *Pool* 4 *Facility Level Activity*	13.560,01	Machine Hour	23.010	312.015.814
Pool 5 *Facility Level Activity*	1175,90	Electric Power (KWh)	20.320	23.894.315
Pool 6 *Facility Level Activity*	1379,43	Direct Labor Hour	26.448	36.483.206
Total				783.420.354

4.2 *Production Cost Calculation Using ABC*

After knowing all the cost components, the next step is to calculate production costs. The production costs amount to IDR 15,530,377,756, calculated by summing the actual costs of direct materials (DM) of IDR 14,080,457,402, the actual costs of direct labor (DL) of IDR 666,500,000, and factory overhead costs of IDR 783,420,354. Table 6 displays the computation of production expenses per unit utilizing Activity Based Costing (ABC) with factory overhead applied.

Table 6. Production Cost Using ABC

Product	Dm cost (actual)	Dl cost (actual)	Foh applied	Production cost
Blade Hill (2%)	281.609.148	13.330.000	15.668.407	310.607.555
Ship Feathers (6%)	844.827.444	39.990.000	47.005.221	931.822.665
Super Feathers (7%)	985.632.018	46.655.000	54.839.425	1.087.126.443
Cable Ties (8%)	1.126.436.592	53.320.000	62.673.628	1.242.430.220
Fischer Imundex (15%)	2.112.068.610	99.975.000	117.513.053	2.329.556.663
Gasper (3%)	422.413.722	19.995.000	23.502.611	465.911.333
Grinding Wheel (2%)	281.609.148	13.330.000	15.668.407	310.607.555
Kapi (11%)	1.548.850.314	73.315.000	86.176.239	1.708.341.553
Cable Clamps (13%)	1.830.459.462	86.645.000	101.844.646	2.018.949.108
Brush roll (8%)	1.126.436.592	53.320.000	62.673.628	1.242.430.220
Iron Meter (9%)	1.267.241.166	59.985.000	70.507.832	1.397.733.998
New Fischer Imundex (4%)	563.218.296	26.660.000	31.336.814	621.215.110
Pipe (5%)	704.022.870	33.325.000	39.171.018	776.518.888
Strapping Rope (3%)	422.413.722	19.995.000	23.502.611	465.911.333
Thousand Hill (4%)	563.218.296	26.660.000	31.336.814	621.215.110
Total	14.080.457.402	666.500.000	783.420.354	15.530.377.756

4.3 *Cost of Goods Manufactured (COGM) Calculation Using ABC*

COGM IDR 15,530,377,756 is obtained from the production cost of IDR 15,530,377,756 plus the beginning work in process inventory, then minus the ending work in process inventory. Because CV XYZ does not have the beginning work in process inventory and the ending work in process inventory, the value of the cost of goods manufactured will be equal to the production cost, which is IDR 15,530,377,756.

4.4 *Cost of Goods Sold (COGS) Calculation Using ABC*

The cost of goods sold is calculated as IDR 14,972,287,048 by subtracting the ending finished goods value of IDR 684,599,708 from the sum of the cost of goods manufactured (IDR 15,530,377,756) and the beginning finished goods value (IDR 126,509,000). The cost of goods sold amounting to IDR 14,972,287,048 is subtracted from net sales to calculate gross profit.

Table 7. Cost of Goods Sold (COGS) Using ABC

Product	Cogm	Beginning finish good	Ending Finish good	Cogs
Blade Hill (2%)	310.607.555	2.530.180	13.691.994	299.445.741
Ship Feathers (6%)	931.822.665	7.590.540	41.075.982	898.337.223
Super Feathers (7%)	1.087.126.443	8.855.630	47.921.980	1.048.060.093
Cable Ties (8%)	1.242.430.220	10.120.720	54.767.977	1.197.782.964
Fischer Imundex (15%)	2.329.556.663	18.976.350	102.689.956	2.245.843.057
Gasper (3%)	465.911.333	3.795.270	20.537.991	449.168.611
Grinding Wheel (2%)	310.607.555	2.530.180	13.691.994	299.445.741
Kapi (11%)	1.708.341.553	13.915.990	75.305.968	1.646.951.575
Cable Clamps (13%)	2.018.949.108	16.446.170	88.997.962	1.946.397.316
Brush roll (8%)	1.242.430.220	10.120.720	54.767.977	1.197.782.964
Iron Meter (9%)	1.397.733.998	11.385.810	61.613.974	1.347.505.834
New Fischer Imundex (4%)	621.215.110	5.060.360	27.383.988	598.891.482
Pipe (5%)	776.518.888	6.325.450	34.229.985	748.614.352
Strapping Rope (3%)	465.911.333	3.795.270	20.537.991	449.168.611
Thousand Hill (4%)	621.215.110	5.060.360	27.383.988	598.891.482
Total	15.530.377.756	126.509.000	684.599.708	14.972.287.048

4.5 *Profit and Loss Calculation Using ABC*

Gross profit of IDR 3,378,258,095 was obtained from net sales of IDR 18,350,545,143 minus the cost of goods sold of IDR 14,972,287,048. The gross profit of IDR 3,378,258,095 is reduced by general and operational expenses of IDR 779,501,257 and other income of IDR 23,500,839 to calculate the profit before tax as IDR 2,622,257,678. The calculation of income tax payable of IDR 501,446,503 is obtained from the total income tax that gets facilities and income tax that does not get facilities. The profit obtained from the facility was obtained from IDR 4,800,000,000 divided by IDR 18,350,545,143 then multiplied by IDR 2,622,257,678 resulting in IDR 685,910,787, while the profit that did not receive the facility was obtained from IDR 2,622,257,678 reduced by IDR 685,910,787 to produce IDR 1,936,346,891. Thus, income tax that gets facilities is IDR 75,450,187 (22% × 50% × IDR 685,910,787), while income tax that does not get facilities is IDR 425,996,316 (22% × IDR 1,936,346,891). If IDR 75,450,187 is added with IDR 425,996,316, it will generate a total income tax payable of IDR 501,446,503 which will be used as a deduction from profit before tax so that the total net profit after tax is IDR 2,120,811,175 (IDR 2,622,257,678 – IDR 501,446,503).

Table 8. Profit and Loss Using ABC

CV XYZ Income statement Period: 01 january 2020 - 31 december 2020		
	SUBTOTAL	TOTAL
Net Sales		18.350.545.143
COGS		(14.972.287.048)
GROSS PROFIT		3.378.258.095
Operation and General Expenses		
Salary Expense	234.200.000	
Consultation Expense	10.500.000	
Vehicle maintenance and repair Expense	18.857.003	
Utilities Expense (Water)	2.190.840	
Supplies Expense	2.236.200	
Legal Expense	3.900.000	
Equipment Repair and Maintenance Expense	792.500	
Other Expense	1.362.518	
Office Supplies Expense	175.829.364	
Telephone Expense	2.725.047	
Vehicle depreciation expense	48.875.000	
Equipment depreciation expense	1.224.375	
Machine depreciation expense	220.474.203	
Local tax fee,balek nama,STNK Expense	10.000.000	
Household Expenses	2.500	
Inventory repair and maintenance Expense	400.000	
Utilities Expense (Electric)	362.420	
Business Travel Expense	45.569.287	
Total Operation and General Expenses		(779.501.257)
Other Revenues and Expenses		
Current Account Service Revenue	9.328.151	
Bank administration fee	(7.364.501)	
Foreign Exchange Gain and Loss	23.402.820	
Current Account Service Income Tax	(1.865.630)	
Total Other Revenues and Expenses		23.500.839
EARNING BEFORE TAX		2.622.257.678
INCOME TAX		501.446.503
EARNING AFTER TAX		2.120.811.175

4.6 *Comparison of Company Plantwide Rate and Activity Based Costing*

The company charges CV XYZ factory overhead using a plantwide rate with production units as cost drivers, while this study uses activity-based costing. The discrepancy in computation arises from the allocation of factory overhead costs, both on a per-unit basis and in total. Not only does it affect the calculation of factory overhead applied, but the influence of comparing the method used by the company with the author's calculation also lies in production costs, cost of goods produced, cost of goods sold, and profit (loss).

Table 9. Comparison FOH Applied, Production Cost, COGM, COGS using Plantwide Rate and ABC

Product	FOH Applied		Production Cost and COGM		COGS		Difference
	Plantwide Rate	Activity Based Costing	Plantwide Rate	Activity Based Costing	Plantwide Rate	Activity Based Costing	(Plantwide Rate - ABC)
Blade Hill (2%)	15.532.681	15.668.407	310.471.829	310.607.555	299.310.015	299.445.741	-135.726
Ship Feathers (6%)	46.598.043	47.005.221	931.415.487	931.822.665	897.930.045	898.337.223	-407.178
Super Feathers (7%)	54.364.383	54.839.425	1.086.651.402	1.087.126.443	1.047.585.052	1.048.060.093	-475.041
Cable Ties (8%)	62.130.724	62.673.628	1.241.887.316	1.242.430.220	1.197.240.059	1.197.782.964	-542.904
Fischer Imundex (15%)	116.495.107	117.513.053	2.328.538.718	2.329.556.663	2.244.825.111	2.245.843.057	-1.017.945
Gasper (3%)	23.299.021	23.502.611	465.707.744	465.911.333	448.965.022	449.168.611	-203.589
Grinding Wheel (2%)	15.532.681	15.668.407	310.471.829	310.607.555	299.310.015	299.445.741	-135.726
Kapi (11%)	85.429.745	86.176.239	1.707.595.060	1.708.341.553	1.646.205.082	1.646.951.575	-746.493
Cable Clamps (13%)	100.962.426	101.844.646	2.018.066.889	2.018.949.108	1.945.515.096	1.946.397.316	-882.219
Brush roll (8%)	62.130.724	62.673.628	1.241.887.316	1.242.430.220	1.197.240.059	1.197.782.964	-542.904
Iron Meter (9%)	69.897.064	70.507.832	1.397.123.231	1.397.733.998	1.346.895.067	1.347.505.834	-610.767
New Fischer Imundex (4%)	31.065.362	31.336.814	620.943.658	621.215.110	598.620.030	598.891.482	-271.452
Pipe (5%)	38.831.702	39.171.018	776.179.573	776.518.888	748.275.037	748.614.352	-339.315
Strapping Rope (3%)	23.299.021	23.502.611	465.707.744	465.911.333	448.965.022	449.168.611	-203.589
Thousand Hill (4%)	31.065.362	31.336.814	620.943.658	621.215.110	598.620.030	598.891.482	-271.452
Total	776.634.049	783.420.354	15.523.591.450	15.530.377.756	14.965.500.742	14.972.287.048	

Factory overhead applied, production costs, COGM and COGS using activity-based costing have a greater value than the company's calculation (plantwide) because activity-based costing does not only use one single rate but there are several activity-based rates.

4.7 *Analysis of the Effect on Profit (Loss)*

Profit or loss is a key indicator of a company's progress. The activity-based costing system has a lower net profit because the ABC has high production costs, cost of goods produced, and cost of goods sold. Table 10 is a detailed calculation of the comparison of the company's plantwide rate and the activity-based costing.

Table 9. Comparison COGS and Profit (Loss) using Plantwide Rate and ABC

Product	COGS		Profit (Loss)		Difference
	Plantwide Rate	*Activity Based Costing*	*Plantwide Rate*	*Activity Based Costing*	*(Plantwide Rate - ABC)*
Blade Hill (2%)	299.310.015	299.445.741	42.525.995	42.416.224	109.771
Ship Feathers (6%)	897.930.045	898.337.223	127.577.985	127.248.671	329.314
Super Feathers (7%)	1.047.585.052	1.048.060.093	148.840.983	148.456.782	384.201
Cable Ties (8%)	1.197.240.059	1.197.782.964	170.103.980	169.664.894	439.086
Fischer Imundex (15%)	2.244.825.111	2.245.843.057	318.944.963	318.121.676	823.287
Gasper (3%)	448.965.022	449.168.611	63.788.993	63.624.335	164.658
Grinding Wheel (2%)	299.310.015	299.445.741	42.525.995	42.416.224	109.771
Kapi (11%)	1.646.205.082	1.646.951.575	233.892.973	233.289.229	603.744
Cable Clamps (13%)	1.945.515.096	1.946.397.316	276.418.968	275.705.453	713.515
Brush roll (8%)	1.197.240.059	1.197.782.964	170.103.980	169.664.894	439.086
Iron Meter (9%)	1.346.895.067	1.347.505.834	191.366.978	190.873.006	493.972
New Fischer Imundex (4%)	598.620.030	598.891.482	85.051.990	84.832.447	219.543
Pipe (5%)	748.275.037	748.614.352	106.314.988	106.040.559	274.429
Strapping Rope (3%)	448.965.022	449.168.611	63.788.993	63.624.335	164.658
Thousand Hill (4%)	598.620.030	598.891.482	85.051.990	84.832.447	219.543

5. Discussion

The company's factory overhead was IDR 776,634,049, while according to activity-based costing was IDR 783,420,354 resulting in undercosting of IDR 6,786,305. Since the company's factory overhead applied is lower than ABC, the production costs, cost of goods manufactured, and cost of goods sold will also be lower than the ABC system. The company's cost of goods manufactured was IDR 15,523,591,450, but according to activity-based costing, it was IDR 15,530,377,756, resulting in undercosting of IDR 6,786,305. The cost of goods manufactured by the traditional system is undercost than the ABC system. This means that the cost of goods manufactured with the ABC system provides a higher amount than the cost of goods manufactured by the traditional system even though the difference is insignificant (Agustami, 2014). The company reported the cost of goods sold as IDR 14,965,500,742, but activity-based costing revealed it to be IDR 14,972,287,048, resulting in an undercosting of IDR 6,786,305. The company's current profit is higher when using the plantwide rate compared to the ABC system.

CV XYZ calculates factory overhead applied using a plantwide rate based on the production unit as the cost driver. This rate is determined by dividing the factory overhead budget by the unit budget produced and then multiplying it by the actual production units. Although the application of this method is relatively simple because it directly charges the unit produced, the plantwide rate (traditional system) is only suitable for use if the company only produces one type of product. Since CV XYZ has a variety of products, this can cause cost distortions in factory overhead applied, which will affect production costs, the cost of goods manufactured, the cost of goods sold, and profit (loss).

6. Conclusions

Management should pay more attention to calculations from companies that may lead to cost distortions and consider implementing the activity-based costing system. The activity-based costing system is more accurate and reduces cost distortion by using multiple factory overhead rates based on actual activities and cost drivers in the company, rather than a single rate according to the cost driver. This study is limited to the application of activity-based costing, whereas numerous costing approaches are currently being developed. Future research may develop costing models that provide information for next-level decision-making.

References

Agustami, S. (2014). ANALISIS PERBANDINGAN SISTEM TRADISIONAL DENGAN SISTEM ACTIVITY BASED COSTING DALAM PERHITUNGAN HARGA POKOK PRODUKSI DI PT. PINDAD (PERSERO). Jurnal Riset Akuntansi Dan Keuangan, 2, 261. https://doi.org/10.17509/jrak.v2i1.6579

Blocher, E. (2005). Cost Management: A Strategic Emphasis. McGraw-Hill/Irwin.

Capusneanu, S., Constantin, C. O., Oncioi, I., Topor, D. I., Rakos, I. S., Coman, D. M., & Ionescu, C. A. (2021). Managementul costur-ilor- cost management. Universitara.

Cooper, R., & Kaplan, R. S. (1988, September 1). Measure Costs Right: Make the Right Decisions. Harvard Business Review.

Cooper, R., & Kaplan, Robert S. (1988). How Cost Accounting Systematically Distorts Product Costs.

Cooper, R., & Kaplan, Robert S. (1992). Activity-based Systems: Measuring the Costs of Resource Usage. Accounting Horizon.

Droździel, P., Komsta, H., & Krzywonos, H. (2014). AN ANALYSIS OF UNIT REPAIR COSTS AS A FUNCTION OF MILEAGE OF VEHICLES IN A SELECTED TRANSPORT COMPANY. Transport Problems.

Gašparík, J., Ľupták, V., Kurenkov, P., & Mesko, P. (2017). Methodology for Assessing Transport Connections on the Integrated Transport Network. Communications - Scientific Letters of the University of Zilina, 19, 61–67. https://doi.org/10.26552/com.C.2017.2.61-67

Gosselin, M. (1997). The effect of strategy and organizational structure on the adoption and implementation of activity-based costing. Accounting, Organizations and Society, 22(2), 105–122. https://doi.org/10.1016/S0361-3682(96)00031-1

Hashim, J. H. (2019). Activity Based Costing (Abc) Model for Higher Education Institutions: A Basic Guide to the Model Development. Partridge Publishing Singapore.

Hilton, R. W., & Platt, D. E. (2019). Managerial Accounting: Creating Value in a Dynamic Business Environment.

Ionescu, C. A. (2018). Contabilitate de gestiune- managementaccounting. Prouniversitaria.

Jezic, G., Chen-Burger, J., Kusek, M., Sperka, R., Howlett, R. J., & Jain, L. C. (2020). Agents and Multi-Agent Systems: Technologies and Applications 2020: 14th KES International Conference, KES-AMSTA 2020, June 2020 Proceedings. Springer Nature.

Lawal, B. (2017). Effect of Cost Control and Cost Reduction Techniques in Organizational Performance. 14, 1–8.

Leitner, A. (2007). Activity Based Costing. GRIN Verlag.

Lievens, Y., van den Bogaert, W., & Kesteloot, K. (2003). Activity-based costing: A practical model for cost calculation in radiotherapy. International Journal of Radiation Oncology, Biology, Physics, 57(2), 522–535. https://doi.org/10.1016/s0360-3016(03)00579-0

Morgan MJ, & Bork HP. (1993). Is ABC really a need, not an option? Manag Acc. 26–27.

Mowen, M. M., Hansen, D. R., & Heitger, D. L. (2022). Managerial Accounting: The Cornerstone of Business Decision-Making. Cengage Learning.

Nash, C., & Matthews, B. (2002). Implementing Marginal Cost Pricing of Rail Infrastructure-Barriers and Solutions.

Pember, A. (2012). Measuring and Managing Environmental Sustainability: Using Activity-Based Costing/Management (ABC/M).

Soekardan, D. (2016). An Analysis Of Activity Based Costing: Between Benefit And Cost For Its Implementation. International Journal of Scientific & Technology Research.

Sohal, A. S., & Chung, W. (1998). Activity based costing in manufacturing: Two case studies on implementation. Integrated Manufacturing Systems, 137–147.

Towati, N. O. M., Soon, N. K., Ahmad, A. R., & Elmabrok, A. A. (2018). A Review of Traditional Cost System versus Activity Based Costing Approaches. Journal of Computational and Theoretical Nanoscience, 24(6), 4688–4694.

Tsai, W.-H. (1996). A technical note on using work sampling to estimate the effort on activities under activity-based costing. International Journal of Production Economics, 43(1), 11–16. https://doi.org/10.1016/0925-5273(95)00189-1

Tunggal, A. W. (1992). Activity Based Costing. RINEKA CIPTA.

Wirartha, I. M., & Hardjono, D. (2006). Metodologi Penelitian Sosial Ekonomi. ANDI.

Zeuner, P. (2012). Activity-Based Costing. GRIN Verlag.