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The Economics of Precision: Comparing Attribute and Activity-Based Costing for Strategic Gain

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Abstract:

This study aims to compare the effectiveness of Attribute Based Costing (ABC II) and Activity-Based Costing (ABC) methods in increasing the competitive advantage of Coffee Shop. A qualitative case study was conducted on three featured menus (Marine Ford, Alabasta, and So So Beer) at a Coffee Shop in Mataram. Data were collected through interviews, observations, and analysis of financial documents. The ABC method allocates costs based on production activities, including raw material, labor, and overhead costs, while ABC II focuses on product attributes to calculate raw material costs. The results show that ABC produces more accurate cost information with an average profit margin of IDR6,238.61 per product, while ABC II reduces raw material costs by 13-15%, resulting in an average profit margin of IDR15,348.94. However, ABC II does not take into account labor and overhead costs, making it less comprehensive. The combination of the two methods can improve the efficiency of raw material costs (ABC II) without neglecting the accuracy of comprehensive costs (ABC). This study concludes that ABC is more suitable for competitive pricing strategies, while the integration of ABC II within the ABC framework has the potential to optimize cost management. The implication of the study recommends the hybrid use of both methods to increase the profitability of coffee shops in a competitive market.

Keywords: *Attribute Based Costing; Activity Based Costing; Competitive Advantage; Cost of Goods Manufactured; Coffee Shop*

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1. Introduction

In an era of increasingly intense business competition, particularly in the Food and Beverage (F&B) sector such as coffee shops, gaining a competitive advantage is essential for every business owner. Most businesses face stiff competition, and therefore, entrepreneurs must improve their performance to produce high-quality products at competitive prices (Alsayegh, 2020; Anyadiegwu & Ifurueze, 2020; Putri et al., 2023). Competitive advantage can be achieved through attractive product innovations, superior customer service, and the implementation of appropriate costing methods to manage resources efficiently.

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As part of the F&B industry, coffee shops have evolved into more than just places to enjoy a cup of coffee. They have become social and cultural spaces that attract a wide range of customers. Coffee shops that effectively manage their costs can enhance operational performance and better adapt to market changes, leading to sustainable competitive advantage (Vetchagool et al., 2020; Munandar et al., 2024).

To achieve this advantage, coffee shops often use the Activity Based Costing (ABC) method. ABC emerged to meet management's need for more accurate accounting information regarding how resources are consumed in various activities. It is not only used for accurate product cost calculation but also for cost control by providing insights into cost-driving activities (Cidav et al., 2020; Horngren et al., 2021). ABC helps management present more accurate cost calculations and identify inefficiencies in departments, products, or activities (Kaplan & Cooper, 1998; Gunasekaran & Sarhadi, 1998).

Despite its effectiveness in allocating resources and identifying inefficiencies, the complexity of implementing ABC in some situations has encouraged the exploration of alternative methods. One such method is Attribute Based Costing (ABC II), which offers a simpler approach by focusing on product attributes as the basis for cost allocation (Al Dafaiy & Al Kalaf, 2021; Lefebvre & Romero-Mosquera, 2023). ABC II emphasizes analyzing the relationship between cost and profit for each product unit (Al-Saadi et al., 2021; Zamrud & Abu, 2020). However, the transition to ABC II does not eliminate the trade-off between simplicity and accuracy. Therefore, it is important for management to consider the business context when selecting the most appropriate method.

The Attribute Based Costing method aims to identify and measure product costs as accurately as possible by providing information that supports rational decision-making. It is called Attribute Based Costing because it relies on product specifications as the basis for determining and allocating costs (Al Dafaiy & Al Kalaf, 2021; Alsayegh, 2020). This method is simple because it allocates costs based on certain product or service attributes. However, despite its simplicity, it is often less accurate in reflecting the true cost of each product, potentially leading to incorrect pricing and suboptimal decisions (Nikmah, 2023; Waruwu et al., 2024).

Choosing between Activity Based Costing (ABC) and Attribute Based Costing (ABC II) is a crucial decision for coffee shop businesses. ABC can help identify high-cost and non-value-added activities, allowing for cost reductions (Darudiato & Widjaja, 2022; Ittner, 1999). While ABC II is easier to implement, it may produce less accurate cost information. Nonetheless, ABC II offers certain advantages, including its potential to better meet customer needs and assist in cost management (Puspita et al., 2023; Yahya et al., 2024). Cost reduction without sacrificing product quality can contribute to achieving competitive advantage.

In today’s competitive environment, selecting the right costing method is vital to the sustainability and profitability of coffee shops. ABC can assist in setting competitive and efficient selling prices and in providing a deeper understanding of cost structures.

However, a more thorough study is needed to achieve a competitive advantage—one such approach is comparing different costing methods applicable to coffee shops. Coffee shop owners must carefully consider the strengths and weaknesses of each method in the context of their business (Zamrud & Abu, 2020; Zu'bi & Khamees, 2014).

From previous studies, various advantages and disadvantages of each costing method have been identified, yet there is still a lack of research that directly compares Activity Based Costing with other costing methods, such as Attribute Based Costing—especially in the context of coffee shops. Therefore, this study seeks to explore the following research questions: Is the Attribute Based Costing method more effective in gaining a competitive advantage for coffee shops? And does it lead to a higher profit margin compared to ABC? Based on these questions, this study is titled "Attribute Versus Activity: Comparing Two Costing Methods that Provide Competitive Advantage."

The puIDRose of this study is to compare these two costing methods within the context of coffee shops to determine which provides greater competitive advantage. By better understanding how each method affects business strategy and cost management, coffee shops can take appropriate actions to increase profitability and competitiveness in the coffee market.

2. Theoretical Background

Attribute-Based Costing (ABC II)
Attribute-Based Costing (ABC II) is a cost management system that focuses on understanding how each product unit's characteristics or specifications affect its cost and benefits. This system helps in determining the price levels and usage of each product by summing up the costs and profits related to the specifications required for the product (Al Dafaiy & Al Kalaf, 2021). This method simplifies the process of data collection and cost analysis, enabling businesses to make more informed decisions about their pricing strategies and production processes. Al-Saadi, Al-Doori, and Al Samuria (2021) found that the use of ABC II could significantly reduce costs while improving product quality, by offering more accurate cost data that can better inform pricing decisions. Additionally, Alsayegh (2020) noted that ABC II plays a crucial role in identifying and managing costs effectively, especially when dealing with complex products or services with multiple attributes.

Further research by Cidav et al. (2020) showed that using time-driven activity-based costing (TDABC), a variant of ABC II, could be particularly effective in industries where production processes are time-dependent. This approach allows organizations to optimize resources and control costs by tracking the time spent on specific activities, ensuring more efficient use of time and resources.

Activity-Based Costing (ABC)
Activity-Based Costing (ABC) is a well-established system that provides a more accurate method for allocating indirect costs compared to traditional costing methods. Blocher (2007) emphasized the importance of linking costs to activities that use resources, enabling managers to allocate costs based on the activities that drive them, thus providing a clearer picture of the actual cost of production. This allocation process involves identifying the cost drivers for each activity, ensuring that costs are assigned based on the actual consumption of resources rather than on simplistic volume-based measures. According to Horngren et al. (2021), the ABC system improves the cost allocation process by recognizing that costs are not always proportional to volume, and indirect costs need to be assigned based on the resources consumed by each product or service.

In a study by Prawira (2020), it was found that adopting ABC enables businesses to identify inefficiencies and reduce waste, leading to better cost control and improved financial performance. Nikmah (2023) further explored how ABC provides businesses with the necessary insights to manage resources effectively and allocate costs accurately, particularly in industries where overhead costs form a significant part of the total cost structure.

ABC in Competitive Advantage
The application of ABC methods can significantly enhance competitive advantage by allowing firms to identify cost-saving opportunities and pricing strategies based on accurate cost data. Anyadiegwu and Ifurueze (2020) analyzed how Nigerian manufacturing firms used ABC to gain a competitive edge by reducing costs and improving operational efficiency. Their research demonstrated that ABC could not only lead to better cost control but also enhance the quality of decision-making, ultimately contributing to a firm's competitive advantage.

In a similar vein, Vetchagool et al. (2020) provided evidence from Thailand, showing how ABC led to improvements in organizational performance by providing management with more granular insights into cost behavior. This detailed cost analysis helps organizations make strategic decisions that align with their long-term competitive goals, enhancing profitability and operational effectiveness.

Time-Driven Activity-Based Costing (TDABC)
The time-driven variant of ABC, known as TDABC, has gained traction for its simplicity and practicality, especially in settings with standardized processes. As discussed by Lefebvre and Romero-Mosquera (2023), TDABC helps businesses measure production costs more accurately by estimating the time taken for each activity and multiplying it by the cost per time unit. This method streamlines the cost allocation process and is particularly useful for industries with repetitive tasks.

Waruwu et al. (2024) also highlighted the effectiveness of TDABC in improving cost calculation accuracy compared to traditional methods. Their research demonstrated that TDABC is not only more efficient in managing costs but also provides insights

into resource utilization and capacity planning, making it an essential tool for organizations aiming to optimize performance.

Cost Leadership and Strategic Benefits
The integration of ABC methods, particularly ABC II and TDABC, aligns with strategic management principles such as cost leadership. Darudiato and Widjaja (2022) examined the application of ABC in production cost control and its impact on achieving cost leadership. They found that firms employing ABC methods were able to streamline operations and significantly reduce unnecessary overheads, thus positioning themselves for cost leadership in competitive markets.

Additionally, Zamhar et al. (2021) reviewed the impact of ABC systems on the cost of goods produced, noting that ABC allows for more precise control over production costs, making it easier for companies to maintain competitive pricing and improve market position. Their findings reinforce the idea that detailed cost information leads to better decision-making in both pricing and operational strategies.

3. Methodology

This research uses a qualitative case study approach with a focus on the application of Attribute Based Costing (ABC II) and Activity Based Costing (ABC) methods at one of the Coffee Shops on Tulip Street No. 1, Mataram Barat Village, Mataram City, Selaparang Sub-district, West Nusa Tenggara. According to (Denzin & Lincoln, 1994) research is research that uses a natural setting with the intention of inteIDRreting phenomena that occur and is carried out by involving various existing methods. The object of research focused on comparing the implementation of ABC II and ABC on three superior menus, namely Marine Ford, Alabasta, and So So Beer, which were chosen because of their contribution to revenue and the complexity of the production process. According to (Surokim et al., 2016) the object is what will be investigated in research activities. Some issues we need to understand in order to determine and compile the research object in our research method properly, namely related to what is a research object in qualitative research, what are the research objects in qualitative research, and what criteria are worthy of being the object of our research.

Primary data is obtained through in-depth interviews with Coffee Shop owners and observation of the production process, while secondary data includes financial statement documents, cost records, and menu price lists. Interviews are used as a data collection technique if you want to do a preliminary to find the problems that must be researched and also if the researcher wants to know things from respondents that are more in-depth and the number of respondents is small (Sugiyono, 2017). Researchers will conduct interviews with the owner or owner of the Coffee Shop by asking questions related to the application of the costing method at the Coffee Shop so that a comparison can be made with two costing methods, namely ABC II and ABC. Data triangulation is carried out to ensure validity by combining the results of interviews, document analysis and field observations.

4. Empirical Findings/Result

Production Flow Calculation

Raw Material Cost

The following is data on raw material costs, direct labor costs, and factory overhead costs from Coffe Shop X that we have obtained. Table 1 shows the raw material cost data for the Marine Ford, Alabasta, and So So Beer menus at Coffe Shop X.

Tabel 1. Calculation of Total Raw Material Costs for 3 Main Menus at Coffee Shop X

"Marine Ford"						
Item	**Price (IDR.)**	**Total**		**Average/portion (gram/ml)**		**Cost/portion (IDR.)**
		Quantities	**Unit**	**Quantities**	**Unit**	
Coffee	250.000	1.500	Gram	25	Gram	4.166,67
Peanut Syrup	110.000	700	mL	5	mL	785,71
Chocolate Syrup	100.000	700	mL	5	mL	714,29
Irish Syrup	100.000	700	mL	5	Gram	714,29
Granola	85.000	1.000	Gram	3	Gram	255,00
Sweetened Condensed Milk	20.000	370	mL	5	mL	270,27
UHT Milk	19.000	1.000	mL	70	mL	1.330,00
Krimer	50.000	1.000	mL	20	mL	1.000,00
Ice Cubes	6.000	1.000	Gram	90	Gram	540,00
TOTAL						9.776,22
"Alabasta"						
Item	**Price (IDR.)**	**Total**		**Average/portion (gram/ml)**		**Cost/portion (IDR.)**
		Quantities	**Unit**	**Quantities**	**Unit**	
Coffee	250.000	1.500	Gram	25	Gram	4.166,67
Popcorn Syrup	100.000	700	Ml	7	mL	1.000,00
Tiramisu Syrup	100.000	700	mL	7	mL	1.000,00
Popcorn	16.000	100	Gram	3	Gram	480,00
Sweeened Condensed Milk	20.000	370	mL	5	mL	270,27
UHT Milk	19.000	1.000	mL	70	mL	1.330,00
Krimer	50.000	1.000	mL	20	mL	1.000,00
Ice Cubes	6.000	1.000	Gram	90	Gram	540,00
Lodized Salt	11.000	500	Gram	0.5	Gram	11,00
TOTAL						9.797,94
"So So Beer"						
Item	**Price (IDR.)**	**Total**		**Average/portion (gram/ml)**		**Cost/portion (IDR.)**
		Quantities	**Unit**	**Quantities**	**Unit**	
Coldbrew Coffee	250.000	1.500	Gram	30	Gram	5.000,00

Pomegranate Juice	115.000	700	mL	7	mL	1.150,00
Peach Syrup	110.000	700	mL	7	mL	1.100,00
Lychee syrup	100.000	700	Gram	3	Gram	428,57
Blueberry Extract	180.000	370	mL	5	mL	2.432,43
Teabags	8.000	25	Pcs	1	Pcs	320,00
Dried Fruit (Citrus)	8.000	200	Gram	25	Gram	1.000,00
Ice Cubes	6.000	1.000	Gram	90	Gram	540,00
Soda Charger	8.000	1	Pcs	1/4	Pcs	2.000,00
TOTAL						13.971

Source: Processed secondary data (2025)

Direct Labor Costs

At Coffee Shop X there are 3 people who work in 1 shift (1 shift = 8 working hours) and in 1 day there are 2 shifts. The salary per shift is IDR. 75,000. For the calculation of direct labor costs with the following details;

- The estimated time to make each product is 5 minutes per product.
- Estimated sales in 1 day are 150 cups/portion

BTKL calculation for 1 worker:

Salary/hour $= \frac{Salary\ per\ shift}{Working\ hours}$

$= \frac{Rp.\ 75.000}{8\ hour}$

= IDR. 9,375/hour

Direct Labor Costs/product $= \frac{Salary\ per\ hour}{product\ manufacturing\ time}$

$= \frac{Rp.\ 9.375}{5\ minute}$

$= \frac{Rp.\ 9.375}{0{,}08}$

= IDR. 750

Since there are 6 people working in 1 day, the Direct labor costs/product result is multiplied by the number of people working in 1 day;

Direct labor Costs = Direct labor Costs/Product X number of workers

= IDR. 750 X 6

= IDR. 4.500

So, the direct labor cost charged for 1 product is IDR. 4.500.

Factory Overhead Costs

In factory overhead costs, there are several costs that are included in the calculation of the cost of goods manufactured (COGS) as follows;

Table 2. Factory Overhead Cost Data at Coffee Shop X

Cost Type	Total (IDR.)
Electrical Load	1.800.000
Cost of auxiliary materials (coffee accessories)	1.000.000
Cost of auxiliary materials (packaging)	4.050.000
Indirect Labor Costs	7.500.000
Machine maintenance load	62.500
Wifi cost	300.000
Building depreciation expense	1.781.250
Depreciation expense of production equpiment (Coffee Machine)	1.200.000
Depreciation expense of production equipment (coffee grinder)	1.833.333
Equipment depreciation expense (coffee server)	18.750
Equipment depreciation expense (coffee kettle)	37.500
Equipment depreciation expense (refrigerator)	50.000
Equipment depreciation expense (showcase)	25.000
Equipment depreciation expense (Frezzer)	200.000

Source: Processed secondary data (2025)

Apply the Attribute Based Costing (ABC II) method to the calculation of COGS for three Coffee Shop

Based on research (Hussein et al., 2024) the calculation of the ABC II method has several stages and requires some analysis related to the attributes used.

Determine Customer Needs and Wants

The ability of the product to respond to customer expectations and desires on an ongoing basis. To solve this problem requires knowledge of the product benefits that customers receive and the wishes that customers expect, to interact with customers quickly and efficiently and to anticipate possible changes in cost components based on the value of attributes from the customer's point of view. By studying the market, Coffee Shop becomes more open to the needs and desires for its products.

Determining Basic Cost Components Based on Product Attributes

The main cost component based on the product is the main motivation for purchasing the product, determined based on the Coffee Shop's point of view in determining the cost component based on the attributes on which the product is designed and manufactured. The puIDRose of costs being divided into a set of basic cost components based on attributes is so that these costs are later charged to specifications and aggregated to determine the product cost per unit (Walker, 1998). After studying the product and interviews conducted by researchers with Coffee Shop X, the researchers concluded that the main cost components based on attributes consist of:

- Material
- Taste
- Simplified Product
- Aesthetic

Determining the Relative Specification of Items on a Single Product Attribute
To prioritize the development of the "Marine Ford", "Alabasta", and "So So Beer" menus at the Coffe Shop, the importance of each item was identified based on customer preferences or operational criteria. This assessment uses a point scale: Very Important (3 points), Important (2 points), and Not Important (1 point). The table below shows the identification of the relative specifications of items on attributes for one product at Coffe Shop X.

Tabel 3. Identification of Item Relative Specifications on Attribute for 3 Coffee Shop Menus

"Marine Ford"					
Item	**Specification Description**			**Total Specification**	**Total Specifications (%)**
	Very Important (3 Poin)	**Important (2 Poin)**	**Not Important (1 Poin)**		
Coffee	✓			3	15%
Peanut Syrup	✓			3	15%
Chocolate Syrup	✓			3	15%
Irish Syrup	✓			3	15%
Granola			✓	1	5%
Sweetened Condensed Milk			✓	1	5%
UHT Milk	✓			3	15%
Krimer		✓		2	10%
Ice Cubes			✓	1	5%
Total				20	100%
"Alabasta"					
Item	**Specification Description**			**Total Specification**	**Total Specifications (%)**
	Very Important (3 Poin)	**Important (2 Poin)**	**Not Important (1 Poin)**		
Coffee	✓			3	16,7%
Popcorn Syrup	✓			3	16,7%
Tiramisu Syrup	✓			3	16,7%
Popcorn			✓	1	5,6%
Sweeened Condensed Milk			✓	1	5,6%
UHT Milk	✓			3	16,7%
Krimer		✓		2	11,1%
Ice Cubes			✓	1	5,6%
Lodized Salt			✓	1	5,6%
Total				20	100%
"So So Beer"					

Item	Specification Description			Total Specification	Total Specifications (%)
	Very Important (3 Poin)	Important (2 Poin)	Not Important (1 Poin)		
Coldbrew Coffee	✓			3	15%
Pomegranate Juice	✓			3	15%
Peach Syrup		✓		2	10%
Lychee syrup		✓		2	10%
Blueberry Extract	✓			3	15%
Teabags		✓		2	10%
Dried Fruit (Citrus)			✓	1	5%
Ice Cubes			✓	1	5%
Soda Charger	✓			3	15%
Total				20	100%

Source: Processed secondary data (2025)

Identify the Product Parts Associated with Each Cost Component by Attribute

Based on interviews with the Coffee Shop, researchers can determine the parts of the three menus according to the cost components based on the attributes required by customers based on table 4 as follows:

Tabel 4. Identification of Product Parts for Each Cost Component Based on Attribute

"Marine Ford"					
Item	**Material**	**Taste**	**Simplified Products**	**Aesthetic**	**Item Importance Percentage per Product**
Coffee	50,00%	35,00%	0,00%	0,00%	15%
Peanut Syrup	20,00%	50,00%	15,00%	0,00%	15%
Chocolate Syrup	20,00%	50,00%	15,00%	0,00%	15%
Irish Syrup	20,00%	50,00%	15,00%	0,00%	15%
Granola	0,00%	10,00%	35,00%	50,00%	5%
Sweetened Condensed Milk	0,00%	25,00%	70,00%	0,00%	5%
UHT Milk	0,00%	30,00%	55,00%	0,00%	15%
Krimer	0,00%	35,00%	55,00%	0,00%	10%
Ice Cubes	10,00%	0,00%	85,00%	0,00%	5%
"Alabasta"					
Item	**Material**	**Taste**	**Simplified Products**	**Aesthetic**	**Item Importance Percentage per Product**
Coffee	51,67%	31,67%	0,00%	0,00%	16.7%
Popcorn Syrup	19,44%	49,44%	14,44%	0,00%	16.7%
Tiramisu Syrup	19,44%	49,44%	14,44%	0,00%	16.7%

Popcorn	0,00%	18,15%	28,15%	48,15%	5.6%
Sweeened Condensed Milk	0,00%	17,22%	77,22%	0,00%	5.6%
UHT Milk	4,44%	24,44%	54,44%	0,00%	16.7%
Krimer	0,00%	24,44%	64,44%	0,00%	11.1%
Ice Cubes	7,22%	0,00%	87,22%	0,00%	5.6%
Lodized Salt	0,00%	7,22%	87,22%	0,00%	5.6%
“So So Beer”					
Item	**Material**	**Taste**	**Simplified Products**	**Aesthetic**	**Item Importance Percentage per Product**
Coldbrew Coffee	50,00%	35,00%	0,00%	0,00%	15%
Pomegranate Juice	20,00%	65,00%	0,00%	0,00%	15%
Peach Syrup	20,00%	50,00%	20,00%	0,00%	10%
Lychee syrup	20,00%	50,00%	20,00%	0,00%	10%
Blueberry Extract	30,00%	55,00%	0,00%	0,00%	15%
Teabags	50,00%	30,00%	10,00%	0,00%	10%
Dried Fruit (Citrus)	20,00%	0,00%	25,00%	50,00%	5%
Ice Cubes	10,00%	0,00%	85,00%	0,00%	5%
Soda Charger	60,00%	0,00%	25,00%	0,00%	15%

Source: Processed secondary data (2025)

Table 4 above shows the product cost components by attribute according to the proportion included in the composition of the three Coffee Shop menus. Because each of these percentages means achieving cost components based on certain attributes, such as the "Marine Ford" product on the “Coffee” item as the first basic material for product formation, to meet the standard cost components based on attributes, the percentage used is derived from the percentage of item importance per product (table 3.) which is (15%). then for other components, namely Material by (50.00%), Taste by (35.00%), Simplified Product by (0%) and Aesthetic by (0,00%). For the calculation of product cost components based on the attributes of each item on the three menus "Marine Ford", "Alabasta" and "So So Beer" is the same as the example above.

Calculating product cost of attribute-based cost components for products

To optimize the cost management of the "Marine Ford" menu product at Coffe Shop X, a calculation of cost components based on attributes such as Material, Taste, Simplified Product, and Appearance was carried out. The percentage of each attribute reflects the proportion of costs allocated to fulfill these criteria, while the Raw Material Cost column shows the actual value in Rupiah.

Table 5. Product Cost Calculation Cost Component by Attribute (1)

"Marine Ford"					
Item	**Material**	**Taste**	**Simplified Products**	**Aesthetic**	**Cost Raw Material (IDR.)**
Coffee	50.00%	35.00%	0.00%	0.00%	4.166,67
Peanut Syrup	20.00%	50.00%	15.00%	0.00%	785,71
Chocolate Syrup	20.00%	50.00%	15.00%	0.00%	714,29
Irish Syrup	20.00%	50.00%	15.00%	0.00%	714,29
Granola	0.00%	10.00%	35.00%	50.00%	255,00
Sweetened Condensed Milk	0.00%	25.00%	70.00%	0.00%	270,27
UHT Milk	0.00%	30.00%	55.00%	0.00%	1.330,00
Krimer	0.00%	35.00%	55.00%	0.00%	1.000,00
Ice Cubes	10.00%	0.00%	85.00%	0.00%	540,00
"Alabasta"					
Item	**Material**	**Taste**	**Simplified Products**	**Aesthetic**	**Cost Raw Material (IDR.)**
Coffee	51.67%	31.67%	0.00%	0.00%	4.166,67
Popcorn Syrup	19.44%	49.44%	14.44%	0.00%	1.000,00
Tiramisu Syrup	19.44%	49.44%	14.44%	0.00%	1.000,00
Popcorn	0.00%	18.15%	28.15%	48.15%	480,00
Sweeened Condensed Milk	0.00%	17.22%	77.22%	0.00%	270,27
UHT Milk	4.44%	24.44%	54.44%	0.00%	1.330,00
Krimer	0.00%	24.44%	64.44%	0.00%	1.000,00
Ice Cubes	7.22%	0.00%	87.22%	0.00%	540,00
Lodized Salt	0.00%	7.22%	87.22%	0.00%	11,00
"So So Beer"					
Item	**Material**	**Taste**	**Simplified Products**	**Aesthetic**	**Cost Raw Material (IDR.)**
Coldbrew Coffee	50.0%	35.0%	0.0%	0.0%	5.000,00
Pomegranate Juice	20.0%	65.0%	0.0%	0.0%	1.150,00
Peach Syrup	20.0%	50.0%	20.0%	0.0%	1.100,00
Lychee syrup	20.0%	50.0%	20.0%	0.0%	428,57
Blueberry Extract	30.0%	55.0%	0.0%	0.0%	2.432,43
Teabags	50.0%	30.0%	10.0%	0.0%	320,00
Dried Fruit (Citrus)	20.0%	0.0%	25.0%	50.0%	1.000,00
Ice Cubes	10.0%	0.0%	85.0%	0.0%	540,00
Soda Charger	60.0%	0.0%	25.0%	0.0%	2.000,00

Source: Processed secondary data (2025)

Table 5 shows the weight distribution of each product according to the proportion of each attribute, and then summed the sum of the components of each specification to generate the cost of each attribute separately. Then the researcher calculated the cost by attribute for each item in the three products. In the "Marine Ford" menu, the raw material cost per serving for the coffee item was multiplied by the attribute ratios for "Material" (IDR. 4,167.67 X 50.0% = IDR. 2,083), "Taste", Simplified Product" and "Aesthetic", and so on for the remaining items as shown in the following table:

Table 6. Product Cost Calculation Cost Component by Attribute (2)

"Marine Ford"				
Item	**Material (IDR.)**	**Taste (IDR.)**	**Simplified Product (IDR.)**	**Aesthetic (IDR.)**
Coffee	2.083	1.458	0	0
Peanut Syrup	157	393	118	0
Chocolate Syrup	143	357	107	0
Irish Syrup	143	357	107	0
Granola	0	26	89	128
Sweetened Condensed Milk	0	68	189	0
UHT Milk	0	399	732	0
Krimer	0	350	550	0
Ice Cubes	54	0	459	0
"Alabasta"				
Item	**Material (IDR.)**	**Taste (IDR.)**	**Simplified Product (IDR.)**	**Aesthetic (IDR.)**
Coffee	2.153	1.319	0	0
Popcorn Syrup	194	494	144	0
Tiramisu Syrup	194	494	144	0
Popcorn	0	87	135	231
Sweeened Condensed Milk	0	47	209	0
UHT Milk	59	325	724	0
Krimer	0	244	644	0
Ice Cubes	39	0	471	0
Lodized Salt	0	1	10	0
"So So Beer"				
Item	**Material (IDR.)**	**Taste (IDR.)**	**Simplified Product (IDR.)**	**Aesthetic (IDR.)**
Coldbrew Coffee	2.500	1.750	0	0
Pomegranate Juice	230	748	0	0
Peach Syrup	220	550	220	0
Lychee syrup	86	214	86	0
Blueberry Extract	730	1.338	0	0
Teabags	160	96	32	0
Dried Fruit (Citrus)	200	0	250	500
Ice Cubes	54	0	459	0
Soda Charger	1.200	0	500	0

Source: Processed secondary data (2025)

Determining product costs by attribute

To get product costs based on attributes, researchers use the following formula:

Total product cost by attribute = total cost of material attributes + total cost of taste attributes + total cost of product simplified attributes + total cost of aesthetic attributes.

Tabel 7. Product Cost Calculation by Attribute

"Marine Ford"				
Item	**Raw Material Cost (Before) (IDR.)**	**Raw Material Cost (After) (IDR.)**	**Cost Reduction Amount (IDR.)**	**Percentage of Cost Savings**
Coffee	4.166,67	3.541,67	625,00	0,15
Peanut Syrup	785,71	667,86	117,86	0,15
Chocolate Syrup	714,29	607,14	107,14	0,15
Irish Syrup	714,29	607,14	107,14	0,15
Granola	255,00	242,25	12,75	0,05
Sweetened Condensed Milk	270,27	256,76	13,51	0,05
UHT Milk	1.330,00	1.130,50	199,50	0,15
Krimer	1.000,00	900,00	100,00	0,10
Ice Cubes	540,00	513,00	27,00	0,05
TOTAL	9.776,22	8.466,32	1.309,91	1,00
"Alabasta"				
Item	**Raw Material Cost (Before) (IDR.)**	**Raw Material Cost (After) (IDR.)**	**Cost Reduction Amount (IDR.)**	**Percentage of Cost Savings**
Coffee	4.166,67	3.472,22	694,44	0,167
Popcorn Syrup	1.000,00	833,33	166,67	0,167
Tiramisu Syrup	1.000,00	833,33	166,67	0,167
Popcorn	480,00	453,33	26,67	0,056
Sweeened Condensed Milk	270,27	255,26	15,02	0,056
UHT Milk	1.330,00	1.108,33	221,67	0,167
Krimer	1.000,00	888,89	111,11	0,111
Ice Cubes	540,00	510,00	30,00	0,056
Lodized Salt	11,00	10,39	0,61	0,056
TOTAL	9.797,94	8.365,09	1.432,85	1,00
"So So Beer"				
Item	**Raw Material Cost (Before) (IDR.)**	**Raw Material Cost (After) (IDR.)**	**Cost Reduction Amount (IDR.)**	**Percentage of Cost Savings**
Coldbrew Coffee	5.000,00	4.250,00	750,00	0,15
Pomegranate Juice	1.150,00	977,50	172,50	0,15
Peach Syrup	1.100,00	990,00	110,00	0,10

Lychee syrup	428,57	385,71	42,86	0,10
Blueberry Extract	2.432,43	2.067,57	364,86	0,15
Teabags	320,00	288,00	32,00	0,10
Dried Fruit (Citrus)	1.000,00	950,00	50,00	0,05
Ice Cubes	540,00	513,00	27,00	0,05
Soda Charger	2.000,00	1.700,00	300,00	0,15
TOTAL	13.971,00	12.121,78	1.849,22	1,00

Source: Processed secondary data (2025)

Based on table 7 above, it can be concluded that the application of the Attribute Based Costing (ABC II) method can provide detailed operational information about product attributes that help management make the necessary decisions to rationalize resources and without reducing product quality at a lower cost. However, it should be noted that the ABC II method only covers raw material costs, in contrast to the Activity Based Costing (ABC) method which calculates labor costs and factory operating costs.

Activity Based Costing (ABC) Method Calculation

The Activity Based Costing (ABC) method in this study is implemented by identifying and allocating costs based on activities that support the production process. Unlike ABC II, this method performs activity analysis developed to understand the indirect support costs of decision managementor operations (Lu et al., 2017). The following are the steps for calculating the cost of goods manufactured using the Activity Based Costing method for 3 products from Coffee Shop X.

The stages carried out in the ABC method are as follows:

First Stage Procedure

The first step is to identify and classify activities. This step determines the cost drivers of Coffee Shop X activities, the cost drivers are classified into three levels of activity.

Tabel 8. Cost classification at Coffee Shop X

Homogeneous Cost Pool	Activity Level	Cost Type	Total	Cost Driver
Pool I	Unit Level	Electricity Cost	1.800.000	Total KWH
Pool II	Unit Level	Cost of auxiliary materials (coffee accessories)	1.000.000	Number of Units
Pool II	Unit Level	Cost of auxiliary materials (packaging)	4.050.000	Number of Units
Pool II	Unit Level	Depreciation Expense of Production Equipment (Coffee Machine)	1.200.000	Number of Units
Pool II	Unit Level	Depreciation Expense of Production Equipment (Coffee Grinder)	1.833.333	Number of Units
Pool II	Unit Level	Equipment Depreciation Expense (Coffee Server)	18.750	Number of Units
Pool II	Unit Level	Equipment Depreciation Expense (Coffee Kettle)	37.500	Number of Units

Pool II	Unit Level	Equipment Depreciation Expense (Refrigerator)	50.000	Number of Units
Pool II	Unit Level	Equipment Depreciation Expense (Showcase)	25.000	Number of Units
Pool II	Unit Level	Equipment Depreciation Expense (Frezzer)	200.000	Number of Units
Pool III	Batch Level	Indirect Labor Costs	7.500.000	Number of Working Hours
Pool IV	Batch Level	Machine Maintenance Cost	62.500	Machine Inspection Hours
Pool V	Facility Level	Wifi	300.000	Machine Inspection Hours
Pool VI	Facility Level	Building Depreciation Expense	1.781.250	Land Area

Source: Processed secondary data (2025)

The second step is to determine the Pool Rate. The unit-level activity Pool Rate at Coffee Shop X can be seen in the following table:

Tabel 9. Unit Level Activity Pool Rate at Coffee Shop X

Homogeneous Cost Pool	Description	Cost Driver	Total Cost (IDR.)
Pool I	Electricity	KWH	1.800.000
Total KWH	1.200		
Pool Rate I			1.500

Homogeneous Cost Pool	Description	Cost Driver	Total Cost (IDR.)
Pool II	Cost of auxiliary materials (coffee accessories)	Number of Units	1.000.000
Pool II	Cost of auxiliary materials (packaging)	Number of Units	4.050.000
Pool II	Depreciation Expense of Production Equipment (Coffee Machine)	Number of Units	1.200.000
Pool II	Depreciation Expense of Production Equipment (Coffee Grinder)	Number of Units	1.833.333
Pool II	Equipment Depreciation Expense (Coffee Server)	Number of Units	18.750
Pool II	Equipment Depreciation Expense (Coffee Kettle)	Number of Units	37.500
Pool II	Equipment Depreciation Expense (Refrigerator)	Number of Units	50.000
Pool II	Equipment Depreciation Expense (Showcase)	Number of Units	25.000
Pool II	Equipment Depreciation Expense (Frezzer)	Number of Units	200.000
Number of Units	4.500		
Pool Rate II			1.870

Source: Processed secondary data (2025)

The batch level activity pool rate at Coffee Shop X can be seen in the following table:

Tabel 10. Batch Level Activity Pool Rate at Coffee Shop X

Homogeneous Cost Pool	Description	Cost Driver	Total Cost (IDR.)
Pool III	Indirect Labor Costs	Number of Working Hours	7.500.000
Number of Working Hours	450 Hours		
Pool Rate III			16.667

Homogeneous Cost Pool	Description	Cost Driver	Total Cost (IDR.)
Pool IV	Machine Maintenance Cost	Machine Inspection Hours	62.500
Number of Machine Inspection Hours	450 Hours		
Pool Rate IV			139

Source: Processed secondary data (2025)

The facility-level activity pool rate at Coffee Shop X can be seen in the following table:

Tabel 11. Facility Level Activity Pool Rate at Coffee Shop X

Homogeneous Cost Pool	Description	Cost Driver	Total Cost (IDR.)
Pool V	Wifi	Machine Inspection Hours	300.000
Number of Machine Inspection Hours	450 Hours		
Pool Rate IV			667

Homogeneous Cost Pool	Description	Cost Driver	Total Cost (IDR.)
Pool VI	Building DepreciatioonExpense	Area	1.781.250
Total Area	100 m2		
Pool Rate IV			17.813

Source: Processed secondary data (2025)

Stage Two Procedure

In the second stage, the application of Activity Based Costing to the cost of production includes the allocation of factory overhead costs to each product group, the calculation of the cost of production by applying Activity Based Costing, and the comparison of the cost of production using Activity Based Costing calculations with Attribute Costing calculations.

Tabel 12. Allocation of Overhead Costs to each product at Coffee Shop X

Activity Level	Cost Driver	Loading Process	Menu at Coffe Shop X			Total
			Marine Ford	Alabasta	So So Beer	
Unit Level	KWH	1.500 x 400	600.000			
		1.500 x 400		600.000		
		1.500 x 400			600.000	1.800.000
	Product Unit	1.870 x 1.500	2.805.000			
		1.870 x 1.500		2.805.000		
		1.870 x 1.500			2.805.000	8.415.000
Total Unit Level Activity						**10.215.000**
Batch Level	Number of Working Hours	16.667 x 150	2.500.050			
		16.667 x 150		2.500.050		
		16.667 x 150			2.500.050	7.500.150
	Number of Machine Inspection Hours	139 x 150	20.850			
		139 x 150		20.850		
		139 x 150			20.850	62.550
Total Batch Level Activity						**7.562.700**
Facility Level	Number of Machine Inspection Hours	667 x 150	100.050			
		667 x 150		100.050		
		667 x 150			100.050	300.150
	Area	17.813 x 33,3	593.173			
		17.813 x 33,3		593.173		
		17.813 x 33,3			593.173	1.779.519
Total Facility Level Activity						**2.079.669**
Total Factory Overhead Costs			**6.619.123**	**6.619.123**	**6.619.123**	**19.857.369**
Number of Unit			**1.500**	**1.500**	**1.500**	**4.500**
Total Factory Overhead Costs Per-Unit			**4.413**	**4.413**	**4.413**	**4.413**

Source: Processed secondary data (2025)

Based on the calculations in the table above, the total factory overhead costs allocated using the Activity Based Costing system calculation amounted to IDR. 19,857,369, where the amount of Factory Overhead Costs for Marine Ford, Alabasta, and So So Beer was IDR. 6,619,123 with Per-Unit Factory Overhead Costs of IDR. 4,413. Based on the assignment of Factory Overhead Costs that have been carriedout, the calculation of Cost of Goods Manufactured using the Activity Based Costing System at Coffee Shop X can be presented in the following table:

Tabel 13. Cost of Goods Produced by Activity Based Costing Method at Coffee Shop X

Cost of Goods Manufactured	Marine Ford (IDR.)	Alabasta (IDR.)	So So Beer (IDR.)
Raw Material Cost	9.776,22	9.797,94	13.971,00
Direct Labor Costs	4.500,00	4.500,00	4.500,00

Factory Overhead Cost	4.413.00	4.413.00	4.413.00
TOTAL	18.689,22	18.710,94	22.884,00

Source: Processed secondary data (2025)

As seen in table 13 above, the COGS components in ABC include Raw Material Cost, Direct Labor Costs and Factory Overhead Cost which are allocated proportionally based on activities. For example, Marine Ford products have a Raw Material Cost of IDR. 9,776.22, Direct Labor Costs of IDR. 4,500.00 and Factory Overhead Cost of IDR. 4,413, so the total COGS reaches IDR. 18,689.22. This figure reflects the actual costs incurred to produce one unit, including the participation of supporting activities such as machine maintenance or Coffee Shop inventory management.

Comparison of Profit Calculation with ABC II and ABC Methods

Then to find out the profit earned from each menu or product, the formula used is the Selling Price minus COGS (can be seen from the previous table).

Tabel 14. Comparison of Cost of Goods Produced with ABC and ABC II Methods at Coffe Shop X

Product	ABC Method II			ABC Method		
	Marine Ford (IDR.)	**Alabasta (IDR.)**	**So So Beer (IDR.)**	**Marine Ford (IDR.)**	**Alabasta (IDR.)**	**So So Beer (IDR.)**
Selling Price	25.000	25.000	25.000	25.000	25.000	25.000
COGS	8.466,32	8.365,09	12.121,78	18.689,22	18.710,94	22.884,00
Profit	**16.533,68**	**16.634,91**	**12.878,22**	**6.310,78**	**6.289,06**	**2.116,00**

Source: Processed secondary data (2025)

The table compares the profit of three featured menus of Coffee Shop X using the Attribute-Based Costing (ABC II) and Activity-Based Costing (ABC) methods. In the ABC II method, the Cost of Goods Manufactured (COGS) is lower, such as IDR8,466.32 (Marine Ford) and IDR12,121.78 (So So Beer) so that profits are higher, reaching IDR16,533.68 to IDR12,878.22. This is because ABC II only calculates raw material costs based on product attributes. Meanwhile, the ABC method generates higher COGS because it includes labor and overhead costs, resulting in lower profits. This comparison shows that ABC II excels in raw material efficiency, while ABC provides a more comprehensive picture of production costs.

5. Discussion

The integration of Attribute-Based Costing (ABC II) into the cost structure has shown significant impact in improving cost efficiency, particularly in reducing cost of goods manufactured (COGS) without compromising quality, aligning with findings by Al Dafaiy and Al Kalaf (2021), who emphasized ABC II's role in reducing quality costs and enhancing decision-making by focusing on product attributes.

Moreover, the implementation of Activity-Based Costing (ABC) is acknowledged for its comprehensive approach, incoIDRorating direct labor and overhead costs into

COGS allocation, as explained by Gunasekaran and Sarhadi (1998) and supported by Kaplan and Cooper (1998), who stated that ABC systems enhance profitability through more accurate costing and improved performance management.

Although ABC provides greater accuracy, its complexity can become a burden for smaller operations, as described by Cidav et al. (2020), who proposed time-driven ABC as a more pragmatic solution, and by Darudiato and Widjaja (2022), who applied ABC in production cost control systems.

A hybrid costing approach that combines the strengths of ABC and ABC II is also echoed in Lefebvre and Romero-Mosquera (2023), who explored the joint use of ABC and the theory of constraints to support more strategic cost management in production environments.

Additionally, the strategic advantage gained through effective cost management, especially for businesses aiming for cost leadership, resonates with the findings of Putri, Bastian, and Fitriyani (2023), who highlighted the mediating role of competitive advantage in the relationship between ABC implementation and company performance.

This is further strengthened by Vetchagool, Augustyn, and Tayles (2020), who reported that ABC has a direct impact on organizational performance by enabling firms to make informed pricing and production decisions.

To ensure profitability while maintaining competitive pricing, Waruwu et al. (2024) suggest the use of ABC to improve the transparency of cost structures, which aligns with the approach of combining ABC with ABC II in the case of Coffee Shop X.

Finally, Zamhar et al. (2021) underline that a well-implemented ABC system can clarify the structure of production costs, a crucial factor in industries like food and beverage where margins are sensitive and product differentiation is based on quality attributes.

6. Conclusions

This research compares two costing methods, namely Attribute based Costing (ABC II) and Activity Based Costing (ABC), in the context of managing costs at Coffee Shop X. The results show that the ABC method provides more accurate information about the cost structure because it takes into account all cost elements, including direct labor costs and factory overhead costs. By understanding the activities that are the main cause of costs, the ABC method allows management to identify inefficient activities and make strategic cost reductions. This makes the ABC method more relevant for achieving competitive advantage, especially in setting competitive and efficient selling prices.

On the other hand, the ABC II method focuses only on product attributes to calculate rawmaterial costs only. Although this method is easier to implement, the cost calculation results are often less accurate because it does not take into account direct labor costs and factory overhead costs. However, when used specifically to calculate raw material costs within the framework of the ABC method, ABC II can provide additional efficiency in the process of data collection and cost analysis. The combination of these two methods can improve both accuracy and efficiency in cost management.

The limitation of the research lies in the scope of the case study, which only involved three menus in one coffee shop. Generalization of the findings requires testing on a larger business scale or other similar F&B businesses. In addition, external factors such as market dynamics, changing customer preferences, and fluctuating raw material prices have not been considered. Further research can expand the analysis by including these contextual variables and explore the integration of costing methods with product innovation and marketing strategies to maximize competitiveness.

References:

Al Dafaiy, S. M., & Al Kalaf, N. M. (2021). The role of attribute based costing in reducing quality costs. *Journal of Al-Rafidain University College for Sciences*, 44(1), 94–108. https://doi.org/10.55562/jrucs.v44i1.130

Al-Saadi, H. A. M., Al-Doori, N. A. F., & Al Samuria, S. M. B. (2021). The role of the cost leadership strategy using the activity based cost accounting (ABC) system in reducing costs. *American Journal of Economics and Business Management, 6*(10). https://doi.org/10.31150/ajebm.v6i10.2470

Alsayegh, M. F. (2020). Activity based costing around the world: Adoption, implementation, outcomes and criticism. *Journal of Accounting and Finance in Emerging Economies, 6*(1), 251–262. https://doi.org/10.26710/jafee.v6i1.1074

Anyadiegwu, P. E., & Ifurueze, S. M. (2020). Activity based costing from the perspective of competitive advantage: A study of Nigerian manufacturing firms. *International Journal of Finance and Accounting, 5*(1), 1–12. https://doi.org/10.47604/ijfa.128

Cidav, Z., Mandell, D., Pyne, J., Beidas, R., Curran, G., & Marcus, S. (2020). A pragmatic method for costing implementation strategies using time-driven activity-based costing. *Implementation Science, 15*(1), 1–15. https://doi.org/10.1186/s13012-020-00991-3

Darudiato, S., & Widjaja, Y. (2022). Production cost control using activity-based costing methods in information systems. *International Journal of Informatics and Computation, 4*(2), 25–35. https://doi.org/10.35842/ijicom.v4i2.54

Gunasekaran, A., & Sarhadi, M. (1998). Implementation of activity-based costing in manufacturing. *International Journal of Production Economics, 56*(1), 231–242. https://doi.org/10.1016/S0925-5273(97)00139-4

Horngren, C. T., Datar, S. M., & Rajan, M. V. (2021). *Cost accounting: A managerial emphasis* (17th ed.). Pearson Education.

Ittner, C. D. (1999). Activity-based costing concepts for quality improvement. *European Management Journal, 17*(5), 492–500. https://doi.org/10.1016/S0263-2373(99)00035-3

Kaplan, R. S., & Cooper, R. (1998). *Cost & effect: Using integrated cost systems to drive profitability and performance*. Harvard Business School Press.

Kumar, A., Sah, B., Singh, A. R., Deng, Y., He, X., Kumar, P., & Bansal, R. C. (2017). A review of multi-criteria decision making (MCDM) towards sustainable renewable energy development. *Renewable and Sustainable Energy Reviews, 69*, 596–609.

Lefebvre, P., & Romero-Mosquera, L. M. (2023). Application of the theory of constraints and activity-based costing for product costing. *Journal of Management World, 2023*(1), 28–34. https://doi.org/10.53935/jomw.v2023i1.230

Munandar, A., Maratis, J., Sugiyanto, D., & Kadlina. (2024). Implementation of activity-based costing to increase profits for traditional treatment providers. *International Journal of Community Service, 3*(1), 164–173. https://doi.org/10.55299/ijcs.v3i1.945

Nikmah, U. (2023). Comparative study of activity-based costing & time-driven activity-based costing in improving performance: A literature review. *Journal of Business and Accounting, 25*(1), 153–168. https://doi.org/10.34208/jba.v25i1.1591

Prawira, I. F. A. (2020). The difference of cost of good manufactured determination using traditional and activity-based costing method. *International Journal Management Science and Business, 1*(1). https://doi.org/10.17509/msb.v1i1.17104

Puspita, A. R. D., Syari, A. W. E., Ailia, C. N., & Hafidz, M. D. (2023). Implementation of the activity-based costing method in measuring production costs in the return study. *Al-Ihsan: Journal of Sharia Business and Economics, 1*(2), 13–25.

Putri, A., Bastian, E., & Fitriyani, F. (2023). Activity based costing (ABC) on company performance with competitive advantage as a variable mediation. *Journal of Applied Business, Taxation and Economics Research, 3*(2), 150–163. https://doi.org/10.54408/jabter.v3i2.239

Vetchagool, W., Augustyn, M. M., & Tayles, M. (2020). Impacts of activity-based costing on organizational performance: Evidence from Thailand. *Asian Review of Accounting, 28*(3), 329–349. https://doi.org/10.1108/ARA-08-2018-0159

Waruwu, E. P., Sitanggang, B. P., Simatupang, P. I., Sitorus, J. T., & Siallagan, H. (2024). Comparative analysis of cost calculation with activity-based costing and traditional methods. *Jurnal Multidisiplin Sahombu, 4*(1), 197–200. https://doi.org/10.58471/jms.v4i01.5029

Waruwu, R. B. P., Sormin, W. P., Saribu, A. D., Sitompul, P. R. A., & Silaen, R. A. Y. (2024). Application of cost of goods production using the activity-based costing (ABC) method as an alternative to traditional methods. *Journal of Modern Accounting Practice, 6*(3), 30–46.

Yahya, L. M., Ala, H. M., Judijanto, L., Hakim, I., & Asdi, A. (2024). Application of the activity-based costing (ABC) method in measuring production costs and

increasing operational efficiency. *Journal of Economics, Business and Accounting, 7*(2), 3194–3198.

Zamhar, M. J., Rahmawati, L., Bakti, K. R., Hapipah, L. N., Nurani, N. A., Satrya, I. Z., & Gunawan, A. (2021). Review of activity-based costing systems on cost of goods production. *IRWNS: Industrial Research Workshop and National Seminar, 12*, 1172–1176.

Zamrud, N., & Abu, M. (2020). Comparative study: Activity based costing and time driven activity based costing in electronic industry. *Journal of Modern Manufacturing Systems and Technology, 4*(1), 68–81. https://doi.org/10.15282/jmmst.v4i1.3840

Zu'bi, Z. A., & Khamees, B. (2014). Activity-based costing vs theory of constraints: An empirical study into their effect on the cost performance of NPD initiatives. *International Journal of Economics and Finance, 6*(12), 157–165. https://doi.org/10.5539/ijef.v6n12p157