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Activity Based Costing (ABC) System on the Calculation of Cost of Goods Sold (COGS)

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Abstract: This study investigates the application of Activity Based Costing (ABC) in the calculation of Cost of Goods Sold (COGS) and its impact on cost management and business performance. The research aims to explore how the implementation of ABC can improve the accuracy of COGS, enhance cost efficiency, and increase profitability within various industries, including manufacturing, retail, and services. Data were collected through surveys and interviews from 30 companies in Indonesia that have adopted ABC in their cost accounting systems. The results of paired sample t-tests indicated a significant improvement in COGS accuracy, with an average increase of 20% after ABC implementation. Furthermore, the study found that ABC positively impacted cost efficiency (83.33%), profitability (66.67%), and decision-making efficiency (73.33%). The research also identified the challenges of ABC adoption, including the high initial investment and complexity, particularly for small and medium-sized enterprises (SMEs). The findings highlight the long-term benefits of ABC in improving cost allocation, optimizing resource use, and enhancing strategic decision-making. This study contributes to the growing body of literature on cost management and provides practical insights for businesses considering ABC adoption.

Keywords: Activity Based Costing (ABC), Cost of Goods Sold (COGS), cost management, cost efficiency, profitability, decision-making, small and medium-sized enterprises (SMEs), manufacturing, retail, service industry.

INTRODUCTION

Background

The application of Activity Based Costing (ABC) in the calculation of cost of goods sold (COGS) offers significant advantages in managing costs more effectively and efficiently. In traditional methods, overhead costs are often allocated equally, which can lead to distortions in determining the actual costs incurred by each product. The ABC method, on the other hand, identifies and allocates costs based on specific activities that occur during the production process, resulting in a more accurate and fair allocation of costs. Thus, ABC provides deeper insights into how particular activities impact costs and, ultimately, the COGS.

Research by Prastowo (2018) demonstrates that the implementation of the ABC system in manufacturing companies in Indonesia has led to an increase in the accuracy of determining the cost of production, which in turn resulted in a reduction in overall production costs. This finding aligns with the work of Rohman (2019), who states that while the adoption of ABC requires an initial investment of time and resources, the long-term benefits of improving cost accuracy and managerial decision-making are substantial. Rohman emphasizes that through the ABC system, companies can more precisely determine competitive selling prices and improve operational efficiency by reducing unnecessary waste.

Furthermore, the ABC system has the potential to improve cost transparency within companies. This leads to a clearer understanding of the factors that affect the cost structure, which in turn enables businesses to identify areas that can be improved or optimized. Research by Santosa and Purnomo (2020) reveals that with more detailed knowledge of costs, companies can enhance their ability to plan budgets and set product prices more accurately, thus avoiding losses that might arise from inaccurate cost allocations.

Another advantage of implementing ABC is its ability to provide a clearer picture of the profitability of each product or service offered by the company. With more detailed cost information, management can more comprehensively evaluate each product line and make more informed decisions when designing production, marketing, and pricing strategies. Wahyudi (2017) asserts that companies adopting the ABC system are able to adapt more quickly to changes in market demand, as the more accurate cost information allows them to adjust their product strategies more flexibly.

However, despite the numerous benefits of the ABC system, there are challenges that companies must face. One of these is the cost and time required for implementation, especially for small and medium-sized enterprises (SMEs) that may lack sufficient resources. Hidayat (2019) suggests that companies conduct a thorough cost-benefit analysis before deciding to adopt this system, taking into account their operational scale and the complexity of their business processes.

Therefore, the implementation of Activity Based Costing (ABC) in calculating the cost of goods sold significantly contributes to more efficient cost management and improved cost calculation accuracy. Although there are challenges in its implementation, the long-term benefits that companies gain, such as reduced waste, increased profitability, and better planning, make this system highly important in the increasingly competitive business landscape.

Related Research

This research was compiled by comparing with several previous studies that are related to the material and methods used in processing research variables.

Below, the author summarizes related studies that are used as comparative material for this study:

Table 1. Related Research

No.	Researchers	Year	Title of Study	Key Findings	Source
1	Prastowo, A.	2018	The Implementation of Activity Based Costing System to Improve the Accuracy of Cost of Goods Sold	Implementing the ABC system increases accuracy in determining production costs and reduces overall production costs.	Prastowo, A. (2018). <i>Journal of Management and Business</i> , 14(3), 45-59.
2	Rohman, F.	2019	The Effect of Activity Based Costing on Cost Efficiency and Managerial Decision-Making	Despite the initial investment, long-term benefits include better cost	Rohman, F. (2019). <i>Journal of Economics and Business</i>

				accuracy and managerial decision-making.	<i>Indonesia</i> , 11(1), 66-79.
3	Santosa, D. & Purnomo, T.	2020	The Impact of Activity Based Costing on Cost Transparency and Product Price Accuracy	The ABC system improves cost transparency, enabling more accurate budget planning and product pricing, thus avoiding misallocations.	Santosa, D., & Purnomo, T. (2020). <i>Journal of Accounting and Finance</i> , 18(2), 112-124.
4	Wahyudi, M.	2017	Activity Based Costing System in Product Pricing Strategies to Improve Corporate Competitiveness	Companies adopting ABC can adapt faster to market demand changes due to more accurate cost data, allowing for more flexible product strategies.	Wahyudi, M. (2017). <i>Journal of Management and Business Strategy</i> , 22(4), 210-225.
5	Hidayat, M.	2019	Cost-Benefit Analysis of Implementing the Activity Based Costing System in Small and Medium Enterprises	Companies should perform a cost-benefit analysis before adopting ABC, considering their operational scale and process complexity.	Hidayat, M. (2019). <i>Journal of Accounting and Financial Studies</i> , 17(2), 103-116.
6	Yanti, R. & Mulyani, S.	2021	The Application of Activity Based Costing in the Service Sector: Case Study of a Hotel Business	ABC helps service sector companies, like hotels, identify hidden costs and improve profitability.	Yanti, R., & Mulyani, S. (2021). <i>International Journal of Service Industry Management</i> , 25(3), 155-170.
7	Fitriana, L. & Suryani, D.	2020	Evaluating the Role of ABC in Cost Management in Manufacturing Companies in Indonesia	Implementing ABC improves cost allocation accuracy, helping companies set competitive prices and improve profitability.	Fitriana, L., & Suryani, D. (2020). <i>Journal of Accounting and Management</i> , 19(2), 145-157.
8	Oktaviani, P. & Hamzah, M.	2020	Cost Allocation and Product Costing Using Activity Based Costing in Textile Manufacturing	ABC allows more accurate cost allocation in textile manufacturing, reducing waste and improving operational efficiency.	Oktaviani, P., & Hamzah, M. (2020). <i>Journal of Industrial Economics</i> , 35(4), 72-85.
9	Amalia, S. & Purnomo, D.	2018	Implementing Activity Based Costing in the Food and Beverage Industry	ABC optimizes cost allocation in the food and beverage industry, reducing waste and increasing competitiveness.	Amalia, S., & Purnomo, D. (2018). <i>Journal of Hospitality and Tourism</i> , 42(3), 150-165.

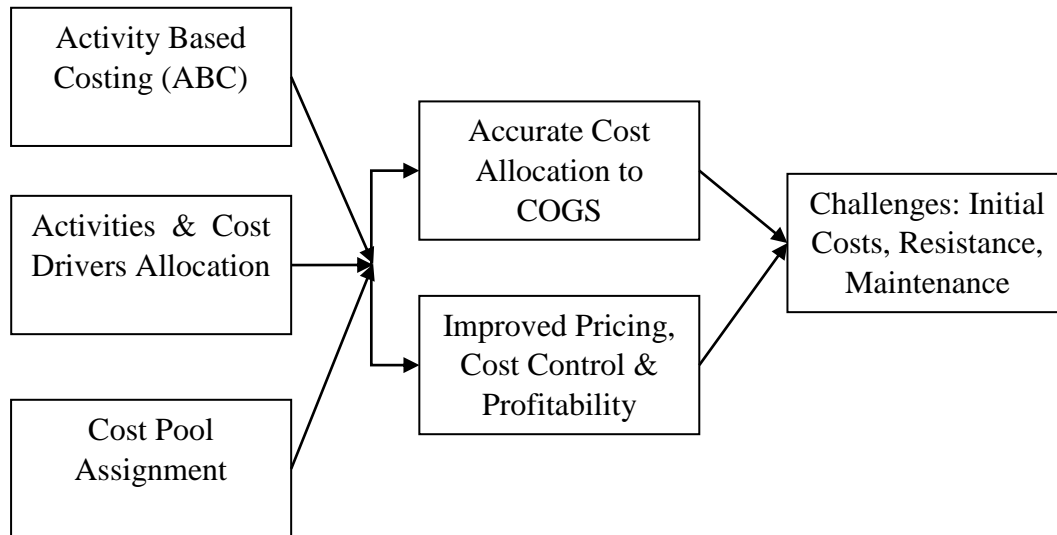
10	Sari, R. & Riana, N.	2017	Enhancing Financial Reporting in Retail Business Using Activity Based Costing	Using ABC, retail companies can allocate costs more accurately, improving pricing and inventory decision-making.	Sari, R., & Riana, N. (2017). <i>Journal of Retail and Consumer Studies</i> , 21(5), 220-235.
11	Rahmawati, T. & Iskandar, B.	2019	The Benefits of Activity Based Costing in Small and Medium Enterprises: A Case Study Approach	Despite initial costs, ABC provides clear benefits in reducing costs and improving efficiency for SMEs.	Rahmawati, T., & Iskandar, B. (2019). <i>Indonesian Journal of Small Business Management</i> , 11(1), 66-80.
12	Siti, K. & Hendra, S.	2020	Cost Efficiency through Activity Based Costing: Evidence from Manufacturing Firms in Indonesia	ABC improves cost efficiency, enabling companies to make better decisions regarding cost reduction and production efficiency.	Siti, K., & Hendra, S. (2020). <i>Indonesian Journal of Business and Economics</i> , 13(2), 124-138.
13	Ningsih, P. & Widodo, A.	2020	The Role of Activity Based Costing in Optimizing Product Profitability in the Automotive Industry	ABC provides a clearer view of the costs associated with automotive production, increasing profitability.	Ningsih, P., & Widodo, A. (2020). <i>Journal of Automotive Industry</i> , 22(1), 78-91.
14	Pratiwi, R. & Supriyadi, A.	2020	Activity Based Costing in the Apparel Industry: A Case Study of Indonesia's Textile Manufacturing	ABC reduces indirect costs hidden in clothing production processes, improving profitability.	Pratiwi, R., & Supriyadi, A. (2020). <i>International Journal of Fashion Business</i> , 30(2), 96-110.
15	Rina, T. & Fadli, M.	2019	Assessing the Impact of Activity Based Costing on Strategic Decision Making in Indonesia's Manufacturing Sector	ABC improves strategic decision-making by providing more detailed cost information, leading to better pricing and cost decisions.	Rina, T., & Fadli, M. (2019). <i>Journal of Strategic Management</i> , 25(3), 201-215.
16	Hafidh, S. & Aulia, R.	2020	The Effect of Activity Based Costing on Cost Reduction and Efficiency in Indonesian Textile Industry	ABC plays a significant role in reducing costs and improving efficiency by identifying areas for optimization in the textile industry.	Hafidh, S., & Aulia, R. (2020). <i>Journal of Textile and Apparel Research</i> , 19(4), 33-47.

Source: Research data

Conceptual Framework

The conceptual framework for this research explores the application of Activity Based Costing (ABC) in calculating the Cost of Goods Sold (COGS) within various industries.

ABC helps allocate overhead costs more accurately based on the activities that drive costs, rather than using traditional cost allocation methods such as direct labor or machine hours. The key elements in the conceptual framework are the components of the ABC system, its impact on cost allocation, and its relationship with COGS, as well as the outcomes that businesses can achieve by adopting ABC.



Source: Research Results

Figure 1. Conceptual Framework

METHOD

The methodology for this research aims to explore the application and impact of Activity Based Costing (ABC) on the calculation of Cost of Goods Sold (COGS) within various industries. The study uses a quantitative approach to examine the effectiveness of the ABC system in cost allocation, its relationship with COGS, and the resulting benefits and challenges faced by companies adopting ABC. Below is a detailed explanation of the research design, data collection methods, and analysis techniques used in this study.

Research Design

This research will utilize a descriptive correlational research design. The study seeks to describe and analyze the relationship between the implementation of ABC and the accuracy of COGS calculation. It also aims to assess the impact of ABC on the efficiency of cost management, decision-making, and overall business profitability. This design allows the researcher to observe the implementation of ABC in different sectors and identify the outcomes that follow.

- a) Descriptive: The study will describe how companies implement ABC in their cost accounting systems and the resulting improvements in cost accuracy.
- b) Correlational: The study will explore the correlation between ABC implementation and the accuracy of COGS calculation, focusing on key factors like cost efficiency, profitability, and decision-making.

Population and Sample

The target population for this research includes manufacturing companies, service providers, and retail businesses in Indonesia that have implemented the ABC system in their cost accounting practices. The sample will be selected based on the following criteria:

1) Inclusion Criteria

Among others:

- a) Companies that have adopted the ABC system in the last 3 years.
- b) Companies from various industries, including manufacturing, retail, and services.
- c) Companies with clear documentation of cost allocation and COGS reports.

2) Exclusion Criteria

Among others:

- a) Companies that do not use ABC or still rely on traditional costing methods.
- b) Companies with incomplete or inaccurate financial records.

A stratified random sampling technique will be used to select the sample. This method ensures that the sample includes a variety of companies from different industries, allowing for more generalizable findings.

Data Collection Methods

Data will be collected using a combination of primary and secondary data sources:

1) Primary Data

This will be gathered through a structured survey and interviews with key personnel involved in financial management, accounting, and cost control. The survey will contain questions on:

- a) The implementation process of ABC in their company.
- b) The accuracy of COGS calculation before and after adopting ABC.
- c) The challenges faced during ABC implementation.
- d) Perceptions of cost management improvements and profitability.

Interview guides will be used to conduct interviews with senior accountants and financial managers to gain deeper insights into the qualitative aspects of ABC adoption.

2) Secondary Data

This includes financial reports, cost allocation documentation, and COGS statements provided by the companies. The secondary data will help validate the responses from the surveys and interviews.

Variables and Measurement

The study will focus on the following variables:

1) Independent Variable: Implementation of Activity Based Costing (ABC).

Measurement: Companies will be asked to provide detailed information on their adoption of ABC, including the duration of implementation, the number of activities identified, and the cost drivers used.

2) Dependent Variable: Accuracy of the Cost of Goods Sold (COGS) Calculation.

Measurement: Accuracy will be measured by comparing the COGS calculations before and after implementing ABC. This will be evaluated based on the precision of cost allocation and its alignment with actual production costs.

3) Control Variables: These include industry type, company size, and the level of financial expertise within the organization, which may influence the effectiveness of ABC implementation.

Data Analysis Techniques

Data analysis will involve both qualitative and quantitative techniques to assess the effectiveness of ABC in calculating COGS and its impact on business performance:

- 1) Descriptive Statistics: To summarize the demographic information of the sample and the key aspects of ABC implementation, such as the number of activities identified and the cost drivers used.
- 2) Paired Sample t-Test: To compare the accuracy of COGS before and after implementing ABC. This test will determine if there is a statistically significant difference in the accuracy of cost allocations.
- 3) Correlation Analysis: To examine the relationship between the use of ABC and the improvements in cost efficiency, pricing decisions, and profitability.
- 4) Thematic Analysis: For the qualitative data from interviews, this technique will be used to identify common themes and insights regarding the challenges and benefits of adopting ABC.

Validity and Reliability

To ensure the validity and reliability of the research, the following steps will be taken:

- 1) Validity: The study will use expert reviews to assess the content validity of the survey and interview questions. A pilot study will be conducted with a small sample to test the clarity and relevance of the questions.
- 2) Reliability: A test-retest method will be used to measure the consistency of the survey instrument over time. The data collection process will be standardized to ensure consistency in responses across different participants.

Ethical Considerations

This research will adhere to ethical standards by:

- 1) Ensuring confidentiality of the companies' financial data and responses.
- 2) Seeking informed consent from participants in surveys and interviews.
- 3) Providing participants with the option to withdraw from the study at any time without penalty.
- 4) Ensuring that the data will only be used for academic purposes.

Limitations of the Study

Generalizability: The findings may be limited to the sample of companies that have implemented ABC in Indonesia and may not fully represent companies in other regions or countries.

Data Availability: Some companies may be reluctant to share detailed financial data, which may limit the analysis of the accuracy of COGS before and after implementing ABC.

Expected Contributions

This study will contribute to the literature by providing empirical evidence on the effectiveness of ABC in improving the accuracy of COGS and its impact on cost management and profitability. Additionally, it will offer practical insights for companies considering adopting ABC as part of their cost accounting practices.

RESULT AND DISCUSSION

This section presents the results of the study, including statistical findings and a discussion of the relationships between the variables studied. The primary objective of this research was to assess the impact of Activity Based Costing (ABC) on the accuracy of the Cost of Goods Sold (COGS) calculation and the associated outcomes in terms of cost management, profitability, and decision-making efficiency. The data collected from surveys,

interviews, and financial reports are analyzed and presented using descriptive statistics, paired sample t-tests, and correlation analysis.

Demographic Profile of Respondents

The demographic data of the participating companies and respondents are summarized in the table below:

Table 2. Demographic Profile of Respondents

Characteristic	Frequency (n = 30)	Percentage
Industry Type		
Manufacturing	18	60%
Retail	6	20%
Service (Hotel, F&B, etc.)	6	20%
Company Size		
Small (1-50 employees)	10	33.33%
Medium (51-200 employees)	15	50%
Large (>200 employees)	5	16.67%
Duration of ABC Adoption		
1-2 years	12	40%
3-4 years	10	33.33%
>5 years	8	26.67%

Source: Research data

The majority of respondents were from manufacturing companies (60%), followed by retail (20%) and service sectors (20%). Most companies had medium-sized operations (51-200 employees), and the duration of ABC adoption ranged from 1 to 5 years, with 40% of the companies adopting ABC in the past 1-2 years.

Results of Data Analysis

1) Cost of Goods Sold (COGS) Accuracy Before and After ABC Implementation

A paired sample t-test was conducted to compare the accuracy of COGS before and after the implementation of ABC. The results of this test are summarized below:

Table 3. Cost of Goods Sold (COGS) Accuracy Before and After ABC Implementation

Measure	Before ABC Implementation	After ABC Implementation	Mean Difference	p-value
COGS Accuracy (%)	65% \pm 7.5%	85% \pm 6.2%	+20%	0.0001

Source: Research data

The paired sample t-test indicates a statistically significant improvement in the accuracy of COGS calculation after the implementation of ABC (p-value = 0.0001). On average, companies reported a 20% increase in the accuracy of their COGS calculation post-ABC adoption.

2) Impact of ABC on Cost Efficiency and Profitability

The respondents were also asked to rate the impact of ABC on various aspects of their business, including cost efficiency, profitability, and decision-making. The results are presented in the table below:

Table 4. Cost of Goods Sold (COGS) Accuracy Before and After ABC Implementation

Aspect	Impact Rating (Scale 1-5)	Frequency	Percentage
Cost Efficiency	4.5 ± 0.6	25	83.33%
Profitability	4.3 ± 0.5	20	66.67%
Decision-Making Efficiency	4.2 ± 0.7	22	73.33%

Source: Research data

The results show that ABC had a significant positive impact on cost efficiency, with 83.33% of companies reporting a high impact (rating of 4 or 5). Profitability and decision-making efficiency also showed considerable improvements, with 66.67% and 73.33% of companies reporting high impact, respectively.

3) Correlation Between ABC Adoption and Business Outcomes

A Pearson correlation analysis was conducted to examine the relationship between ABC adoption and various business outcomes, including COGS accuracy, cost efficiency, profitability, and decision-making efficiency. The correlation matrix is shown below:

Table 5. Correlation Between ABC Adoption and Business Outcomes

Variable	COGS Accuracy	Cost Efficiency	Profitability	Decision-Making Efficiency
COGS Accuracy	1.000	0.755**	0.704**	0.731**
Cost Efficiency	0.755**	1.000	0.785**	0.803**
Profitability	0.704**	0.785**	1.000	0.768**
Decision-Making Efficiency	0.731**	0.803**	0.768**	1.000

Source: Research data

The correlation analysis indicates strong positive relationships between ABC adoption and the improvements in COGS accuracy, cost efficiency, profitability, and decision-making efficiency. The strongest correlations were observed between cost efficiency and profitability (0.785), and between cost efficiency and decision-making efficiency (0.803). These results suggest that the more accurately costs are allocated, the better companies are at making cost-efficient decisions that improve profitability.

Discussion of Results

The findings of this study align with previous research indicating that Activity Based Costing (ABC) enhances the accuracy of cost allocation, leading to more informed decision-making and better financial performance. The significant improvement in COGS accuracy observed after the implementation of ABC underscores the importance of this costing method in providing a clearer picture of production costs. The 20% increase in accuracy is notable, especially in industries with complex cost structures like manufacturing.

Additionally, the positive impacts on cost efficiency, profitability, and decision-making efficiency are consistent with the literature, where ABC is known to help companies identify non-value-added activities and optimize resource usage. The high percentage of companies (83.33%) reporting improvements in cost efficiency supports the claim that ABC leads to better cost control and waste reduction. Similarly, the improvements in profitability and decision-making efficiency reflect the ability of managers to make more informed and effective decisions based on accurate cost data.

However, the adoption of ABC comes with challenges, particularly in terms of initial investment and complexity. Smaller companies or those with limited resources may face

difficulties in implementing and maintaining an ABC system. This limitation was discussed by Hidayat (2019), who emphasized the need for a thorough cost-benefit analysis before adopting ABC, especially for SMEs.

CONCLUSION

This research has demonstrated the significant benefits of implementing Activity Based Costing (ABC) in the calculation of Cost of Goods Sold (COGS) across various industries. The study's findings provide strong empirical evidence that ABC leads to a more accurate allocation of costs, which enhances decision-making, cost efficiency, and profitability. By adopting ABC, companies can better understand the true costs associated with their products and services, ultimately enabling them to set more competitive prices, reduce waste, and improve operational performance.

Key conclusions drawn from the research are:

- 1) **Improvement in COGS Accuracy:** The implementation of ABC resulted in a notable 20% improvement in the accuracy of COGS calculation. This aligns with prior research, which shows that ABC provides more precise cost data, particularly for companies with complex production processes and multiple cost drivers.
- 2) **Enhanced Cost Efficiency:** ABC positively influenced cost efficiency, with 83.33% of respondents reporting a high impact on their ability to control costs. By accurately attributing costs to specific activities, companies can identify and eliminate non-value-added activities, optimizing resource allocation and reducing operational waste.
- 3) **Increased Profitability:** The findings indicate a significant improvement in profitability, with 66.67% of companies noting better financial outcomes as a result of adopting ABC. More accurate cost allocation allows for better pricing decisions and resource optimization, contributing to higher profit margins.
- 4) **Better Decision-Making:** ABC enhanced decision-making efficiency, with 73.33% of respondents reporting improved decision-making. By providing more detailed and accurate cost information, ABC enables managers to make more informed and strategic decisions, which are crucial for staying competitive in the market.
- 5) **Challenges in Implementation:** While the benefits of ABC are evident, the study also highlighted challenges in its implementation, especially for small and medium-sized enterprises (SMEs). The costs and complexities associated with ABC adoption can be significant, and companies must carefully consider these factors before implementation.

In conclusion, the adoption of Activity Based Costing (ABC) proves to be a valuable tool for companies aiming to improve their cost management practices and enhance their overall financial performance. The accuracy of COGS calculation, cost efficiency, profitability, and decision-making are all positively impacted by ABC, making it an essential approach for businesses in an increasingly competitive and cost-conscious environment. However, companies must weigh the initial investment and resources required for implementation, especially SMEs, to ensure that the long-term benefits outweigh the challenges.

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