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ACTIVITY-BASED COSTING CAPABILITY AS A DETERMINANT OF OPERATIONAL EFFICIENCY AND COMPETITIVENESS OF FOOD MSMES: EMPIRICAL EVIDENCE FROM WEST JAVA

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Abstract

Micro, Small, and Medium Enterprises (MSMEs) in the food and beverage processing industry sector in West Java face increasingly complex cost management challenges amid post-pandemic market dynamics, raw material inflationary pressures, and intensification of digital competition that requires a much more systematic and data-based cost management approach. This study aims to analyze the influence of Activity-Based Costing (ABC)-based cost management capabilities on the operational efficiency and competitiveness of MSMEs in the food and beverage processing industry sector in West Java for the 2021–2024 period. A quantitative approach with a descriptive-associative design was used through the collection of primary data from 287 respondents of MSME owners or managers who were analyzed using Structural Equation Modeling based on Partial Least Squares (SEM-PLS) with SmartPLS 4 software. The results of the study confirm that ABC-based cost management capabilities have a significant positive effect on operational efficiency (beta = 0.423; p < 0.001) and MSME competitiveness (beta = 0.387; p < 0.001), with operational efficiency partially mediating the relationship between ABC capability and competitiveness (indirect effect = 0.164; p < 0.001). The research model explains 68.7 percent variation in the competitiveness of MSMEs. This study provides evidence-based empirical guidance for MSME actors and policymakers in strengthening cost management systems as the foundation of sustainable competitiveness.

Keywords: Activity-Based Costing; MSMEs; Operational Efficiency; Competitiveness.

INTRODUCTION

The transformation of the global economy accelerated by digitalization, supply chain disruptions post-COVID-19 pandemic, and intensification of cross-border competition have placed systematic cost management as one of the most critical determinants that distinguish businesses that are able to survive and thrive from those that are unable to survive in an increasingly unpredictable business environment. The World Bank (2023) reports that MSMEs account for an average of 40 percent of Gross Domestic Product in developing countries and employ more than 70 percent of the global workforce, but paradoxically more than 60 percent of MSMEs in developing countries still face serious challenges in cost management systems that fundamentally affect the sustainability of their businesses. The Organisation for Economic Co-operation and Development (OECD, 2023) in its SME Outlook report asserts that the inability to efficiently manage costs is one of the main causes of MSME failure in the first five years of operation, with an estimated failure rate of 50 to 60 percent in various developing countries including Indonesia. Kaplan and Anderson (2007) in the seminal development of Activity-Based Costing affirm that an accurate and activity-based costing system is the foundation of superior managerial decision-making, a proposition that is increasingly relevant in the context of modern MSMEs operating in an increasingly complex and multidimensional cost environment due to the fragmentation of digital value chains.

In Indonesia, MSMEs have an undeniable strategic role in the national economic structure but at the same time face the challenge of increasingly complex and multidimensional cost management. The Ministry of Cooperatives and SMEs (2023) reported that MSMEs account for 61.07 percent of Indonesia's Gross Domestic Product worth IDR 9,580 trillion and absorb 97 percent of the total national labor force of 117 million people, making MSMEs the most vital and strategic backbone of the economy. However, a survey by the Central Statistics Agency (2023) revealed that only 18.4 percent of Indonesian MSMEs implement a structured and consistent cost

recording and recording system, while 81.6 percent still rely on informal recording or even do no recording at all, which directly impacts the inability to accurately identify cost inefficiencies. Bank Indonesia (2024) added that the problem of financial management and unstructured costs is the second biggest obstacle after access to capital that prevents Indonesian MSMEs from transforming from micro scale to larger and sustainable scale in an increasingly competitive and digitalized economic ecosystem. This condition creates a very strong urgency to examine empirically how a more systematic cost management capability based on Activity-Based Costing can be an effective intervention in improving the operational efficiency and competitiveness of Indonesian MSMEs, which so far urgently need a strong empirical foundation.

West Java Province is one of the largest and most strategic MSME centers in Indonesia which at the same time faces the most intense competitiveness challenges in the context of increasingly inevitable regional and global competition. The West Java Provincial Cooperatives and MSMEs Office (2023) noted that there are more than 4.2 million MSME units operating in West Java with a contribution to the province's GDP of 58.3 percent and labor absorption of 89.7 percent of the total regional workforce, making West Java the most economically significant MSME ecosystem in Indonesia. Specifically for the food and beverage processing industry subsector, BPS West Java (2023) recorded its contribution to the GDP of the processing industry sector reaching 32.7 percent with a total of 847,312 business units spread across all districts and cities. However, a survey by the West Java Department of Industry and Trade (2023) found that 73.8 percent of food and beverage processing MSMEs in West Java experienced significant profit margin pressure due to an average increase in raw material prices of 23.4 percent in the 2021-2023 period which was not offset by an increase in adequate cost management capabilities. This phenomenon directly indicates the urgent need to adopt an Activity-Based Costing approach that is better able to identify and allocate costs based on real activities that occur in the food and beverage production process.

Activity-Based Costing (ABC) is a cost management methodology that allocates overhead costs based on actual activities that consume resources, fundamentally different from traditional cost systems that allocate overhead costs based on production volumes, which often result in product cost distortions that mislead managerial decisions. Drury (2018) explained that ABC allows for much more accurate cost identification because it traces costs through cost drivers that reflect the actual resource consumption by each product or service, resulting in more relevant cost information for strategic decision-making about pricing, product mix, and elimination of non-value-added activities. Krishnan (2022) in his comparative study found that companies that adopted ABC consistently were able to identify cost inefficiencies on average 28.3 percent more accurately than companies that still use traditional cost systems, resulting in cost-saving decisions that are much more targeted and have a real impact. The Resource-Based View developed by Barney (1991) asserts that unique and hard-to-replicate organizational capabilities — including ABC-based cost management capabilities — are the most sustainable source of competitive advantage, a proposition that is particularly relevant for MSMEs that compete with limited resources.

Recent literature review reveals that research on the implementation of ABC in MSMEs in Indonesia, particularly in the sub-sector of the food and beverage processing industry in West Java, is still very limited and leaves significant empirical gaps that need to be filled with more representative data and more sophisticated methods. Most research on ABC in Indonesia has focused on large and medium-sized enterprises and formal manufacturing companies, while its application to informal and semi-formal MSMEs that dominate the structure of Indonesia's food and beverage processing industry has still received a disproportionate empirical attention from the academic community. Prasetya et al. (2023) identified that most Indonesian MSME efficiency research still uses a qualitative approach with a very small sample that limits the generalization of findings, while Kurniawan et al. (2024) added that a model that integrates ABC as a mediator between cost management capabilities and MSME competitiveness has never been empirically developed in Indonesia with adequate primary data. The gap in this study is

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the main and most fundamental justification why this research needs to be conducted with a stricter quantitative method using SEM-PLS on a more representative sample.

Recent issues that are developing in the global MSME ecosystem and Indonesia further strengthen the urgency of research that examines cost management capabilities as a determinant of competitiveness. Global inflationary pressures triggered by post-pandemic supply chain disruptions have driven the price of raw materials for food and beverage production to rise significantly — the Food and Agriculture Organization (FAO, 2023) reported that the Global Food Price Index increased by an average of 18.7 percent in the 2021–2023 period, which directly squeezed the profit margins of MSMEs that do not have adequate cost management capabilities to absorb these pressures efficiently. In addition, accelerated digital transformation through e-commerce platforms and marketplaces has dramatically increased price transparency and competition intensity, forcing food and beverage MSMEs to maintain competitive prices while maintaining profitability which means that only MSMEs with the most efficient cost management are able to survive and develop sustainably. UNESCO (2022) in its Global Education Monitoring report reports that financial literacy and low cost management among MSME actors in developing countries are the biggest structural obstacles to sustainable inclusive economic transformation.

Based on all contexts, quantitative data, and research gaps that have been presented in depth, this study establishes three main objectives that are interrelated and strengthen each other in an integrated analysis framework. First, analyze and quantify the influence of Activity-Based Costing cost management capabilities on the operational efficiency of MSMEs in the food and beverage processing industry sector in West Java for the 2021–2024 period. Second, test the influence of ABC-based cost management capabilities on the competitiveness of MSMEs directly or indirectly through operational efficiency mediation in one comprehensive structural model. Third, provide empirical evidence-based recommendations to MSME actors, industry associations, and policymakers in designing the most effective cost management capability strengthening programs. Three main hypotheses are proposed: (H1) ABC-based cost management capabilities have a significant positive effect on the operational efficiency of MSMEs; (H2) ABC-based cost management capabilities have a significant positive effect on the competitiveness of MSMEs; and (H3) operational efficiency mediates significantly the relationship between ABC capabilities and the competitiveness of food and beverage MSMEs in West Java.

METHODS

This study uses a quantitative approach with a descriptive-associative-mediated research design that allows testing the direct and indirect influences between research variables simultaneously in one integrated and comprehensive structural model. The quantitative approach was chosen because it is in line with the research objectives that aim to quantify the magnitude of the influence of Activity-Based Costing-based cost management capabilities on operational efficiency and competitiveness, test the significance of the relationship between variables, and produce findings that can be generalized to the food and beverage MSME population in West Java more broadly as recommended by Sugiyono (2022) for research aimed at testing causal hypotheses. The data collection instrument uses a structured questionnaire based on a Likert scale of 1-5 developed through a review of the latest literature and validated in content by five experts in management accounting, MSME entrepreneurship, and industrial economics who have research and consulting experience in Indonesian food and beverage MSMEs for at least eight years.

The research population is all owners or managers of MSMEs in the food and beverage processing industry sector that are officially registered with the Regency/City Industry and Trade Office in West Java and have been operating for at least two years in the 2021–2024 period. Based on data from the West Java Provincial Cooperatives and MSMEs Office (2023), the total registered population of food and beverage processing MSMEs is 847,312 units spread across 27 districts and cities. The sampling technique uses purposive sampling combined with stratified random sampling based on business scale (micro, small, medium) and operating area (Greater Bandung, Bogor, Bekasi, Cirebon, and other regions). The inclusion

criteria that are strictly applied include: (1) formally registered food and beverage processing MSMEs; (2) have operated for at least two consecutive years in the 2021–2024 period; (3) the owner or manager is willing and able to respond to the research questionnaire independently; and (4) has at least one person responsible for the financial recording of the business. A total of 287 respondents met all the inclusion criteria from the 340 questionnaires distributed, resulting in a response rate of 84.4 percent which is excellent.

The research variables were operationalized in detail based on the latest literature review tailored to the context of MSMEs in the Indonesian food and beverage industry. The independent variables of ABC-based Cost Management Capability (KAB) were measured through four main dimensions: accurate identification of cost drivers (6 indicators), mapping of activities and cost pools (5 indicators), activity-based cost allocation (6 indicators), and use of ABC information in managerial decisions (5 indicators). The mediator variables of Operational Efficiency (EO) were measured through three dimensions: efficiency of raw material use (5 indicators), labor efficiency (5 indicators), and efficiency of production overhead costs (4 indicators). The dependent variables of MSME Competitiveness (DS) were measured through four dimensions: competitive price advantage (5 indicators), relative product quality (5 indicators), product innovation ability (4 indicators), and customer loyalty (4 indicators). A total of 59 indicators were spread across the three main variables of the research that ensured comprehensive and multidimensional measurement.

The data analysis technique used Structural Equation Modeling based on Partial Least Squares (SEM-PLS) with SmartPLS 4 software which was chosen because of its ability to estimate complex models with mediating variables simultaneously and its suitability for medium-sized samples with distributions that do not have to be normal in a multivariate manner. Testing of the mediating effect of operational efficiency was carried out using a bootstrapping procedure of 10,000 iterations with a bias-corrected confidence interval as recommended by Hair et al. (2021) for more accurate mediation testing. The analysis was carried out in two stages: the first stage was a measurement model assessment which tested the validity and reliability of the construct through confirmatory factor analysis with factor loading criteria above 0.70, Composite Reliability (CR) above 0.80, Average Variance Extracted (AVE) above 0.50, and HTMT ratio below 0.85 for discriminant validity; The second stage is a structural model assessment that tests the path coefficient, R-squared, Q-squared, and mediation effects. All tests were conducted at a confidence level of 95 percent with alpha 0.05 as the significance limit applied consistently.

RESEARCH RESULTS

Respondent Profiles and Descriptive Statistics

Of the 287 respondents who were successfully collected and met all inclusion criteria, the demographic profile showed a fairly representative distribution of the MSME ecosystem in food and beverage processing in West Java. Based on the business scale, micro (62.4%), small (29.6%), and medium (8.0%). Based on the length of business, 2–5 years (38.3%), 5–10 years (42.2%), and over 10 years (19.5%). Based on region, Greater Bandung (35.2%), Bogor (21.6%), Bekasi (18.8%), Cirebon (14.3%), and other regions (10.1%). The average annual turnover of respondents was IDR 847 million with a range of IDR 120 million to IDR 4.8 billion. Table 1 presents descriptive statistics of all variables.

Table 1. Descriptive Statistics of Research Variables (N = 287)

Variable / Dimension	Red	Std. Dev.	Min.	Max.
ABC Capabilities (KAB)	3,74	0,62	1,60	5,00
Identify Cost Drivers	3,81	0,68	1,00	5,00
Activity Mapping	3,76	0,71	1,00	5,00
Activity-Based Cost Allocation	3,69	0,74	1,00	5,00
Use of ABC Information	3,71	0,70	1,00	5,00
Operational Efficiency (EO)	3,68	0,64	1,40	5,00

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Variable / Dimension	Red	Std. Dev.	Min.	Max.
Raw Material Efficiency	3,74	0,72	1,00	5,00
Labor Efficiency	3,66	0,69	1,00	5,00
Production Overhead Efficiency	3,63	0,73	1,00	5,00
MSME Competitiveness (DS)	3,61	0,67	1,20	5,00
Competitive Price Advantage	3,67	0,74	1,00	5,00
Relative Product Quality	3,72	0,71	1,00	5,00
Product Innovation Capability	3,58	0,76	1,00	5,00
Customer Loyalty	3,47	0,78	1,00	5,00

Source: Primary data processed by researchers (2025). Likert scale 1-5.

Test Results of Measurement Model

Testing of the measurement model using SmartPLS 4 showed that all indicators and constructs of the study met the required criteria of validity and reliability comprehensively. All factor loading values were above 0.70 with a range of 0.712 to 0.894, confirming the significant contribution of each indicator to its latent construct. The Composite Reliability (CR) values of the entire construct exceeded the minimum limit of 0.80: KAB of 0.917, EO of 0.908, and DS of 0.921. The Average Variance Extracted (AVE) of the entire construct above 0.50 confirmed the validity of the convergence. The HTMT ratio of all construct pairs below 0.85 confirmed the adequate discriminant validity.

Table 2. Test Results of Measurement Model

Construct	Loading Factor (Range)	CR	AVE	Cronbach Alpha
pabilities (KAB)	0,718 – 0,894	0,917	0,647	0,896
nal Efficiency	0,712 – 0,881	0,908	0,631	0,882
Competitiveness	0,724 – 0,887	0,921	0,658	0,903

Source: SmartPLS 4 (2025) data processing results.

Structural Model Test Results and Hypothesis Testing

The results of the structural model estimation using bootstrapping of 10,000 iterations are presented in Table 3. The model yields an R-squared of 0.687 for the DS variable, explaining 68.7 percent variation in the competitiveness of West Java food and beverage MSMEs — a very substantial predictive power for MSME managerial behavior research. Q-squared of 0.521 confirms the excellent predictive relevance of the model. H1 confirmed: KAB had a significant positive effect on EO (beta = 0.423; t = 7.841; p < 0.001). H2 confirmed: KAB had a significant positive effect on DS (beta = 0.387; t = 6.234; p < 0.001). H3 confirmed: EO partially mediated the relationship of KAB to DS (indirect effect = 0.164; CI: 0.112-0.218; p < 0.001).

Table 3. Structural Model Hypothesis Testing Results (Bootstrapping N = 10,000)

Hypothesis	Pathway	Beta	t-stat	p-value	Verdict
H1	E.g → .	0,423	7,841	0,000	ACCEPTED
H2	KAB → DS (direct)	0,387	6,234	0,000	ACCEPTED
H3a	EO → DS	0,388	6,127	0,000	Significant
H3b	KAB → DS via EO (not directly)	0,164	5,312	0,000	ACCEPTED
--	Total effect of KAB → DS	0,551	8,743	0,000	Significant

Source: SmartPLS 4 (2025) data processing results. R-squared DS = 0.687; Q-squared = 0.521.

ABC Capability Dimension Analysis

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A more in-depth analysis of the contribution of each dimension of KAB reveals a very informative hierarchy. The activity-based cost allocation dimension had the greatest influence (beta = 0.334; p < 0.001), followed by the identification of cost drivers (beta = 0.298; p < 0.001), the use of ABC information (beta = 0.267; p < 0.001), and activity mapping (beta = 0.241; p = 0.002). These findings indicate that MSMEs that are able to accurately allocate overhead costs based on the actual activities that occur in the production process have the most significant impact on operational efficiency and competitiveness compared to other ABC dimensions that are more methodological prerequisites.

Table 4. The Contribution of the KAB Dimension to Operational Efficiency and Competitiveness of MSMEs

Ratings	KAB Dimensions	Beta	f-squared	Interpretation
1	Activity-Based Cost Allocation	0,334	0,224	Large (approximate)
2	Identify Cost Drivers	0,298	0,187	Mid-Large
3	Use of ABC Information	0,267	0,159	Intermediate
4	Activity Mapping	0,241	0,134	Small-Medium

Source: SmartPLS 4 (2025) data processing results.

DISCUSSION

ABC Capability as a Driver of MSME Operational Efficiency

Empirical confirmation that ABC-based cost management capabilities have a significant positive effect on the operational efficiency of MSMEs (H1 accepted; beta = 0.423; p < 0.001) provides strong and contextual empirical evidence in support of Drury's (2018) theoretical proposition that the ABC system implemented consistently is able to identify and eliminate non-value-added activities in the production process much more accurately than traditional cost systems that use a volume allocation basis. The relatively substantial magnitude of the influence (beta = 0.423) confirms that the improvement of one standard unit in ABC's capabilities on average increases operational efficiency by 0.423 standard units, a very meaningful impact for MSMEs operating with very thin profit margins amid the pressure of raw material inflation. Krishnan (2022) supports these findings with evidence that MSMEs that consistently adopt ABC are able to reduce waste in the production process by an average of 18–27 percent in the first 12 months of implementation, especially in the dimension of identification and elimination of non-value-added activities that have the most impact on the overall production overhead cost structure.

The Direct Influence of ABC Capabilities on the Competitiveness of MSMEs

The finding that ABC capabilities have a significant positive effect directly on the competitiveness of MSMEs (H2 accepted; beta = 0.387; p < 0.001) empirically confirm that the benefits of ABC are not limited to improving internal efficiency but also directly strengthening the competitive position of MSMEs in the market through more accurate pricing capabilities, more optimal product mix selection based on clearly identified profitability profiles per product, and the ability to provide more competitive price quotes without sacrificing profitability. Resource-Based View Barney (1991) which affirms organizational capability as a source of sustainable competitive advantage is empirically confirmed in the context of food and beverage MSMEs in West Java, where ABC capabilities that are idiosyncratic and difficult to imitate by competitors who do not have an equivalent cost management system result in measurable and sustainable competitive advantage. Prasetya et al. (2023) supported these findings by finding that Indonesian MSMEs that implement a structured cost management system have a 2.4 times greater probability of maintaining market share during periods of significant raw material cost pressures.

The Role of Operational Efficiency Mediation: ABCs as a Competitive Advantage

Confirmation of the significant partial mediating effect of operational efficiency in

linking ABC capabilities to the competitiveness of MSMEs (H3 accepted; indirect effect = 0.164; p < 0.001) provides very important theoretical implications about the causal mechanisms that explain how ABC creates competitiveness systematically ABC not only directly increases competitiveness through more accurate cost information, but also works indirectly through improved operational efficiency which then reduces production costs per unit and widens the space for competitive pricing maneuvers. The findings of partial mediation (not full mediation) indicate that part of ABC's influence on competitiveness takes place through a direct path that is not mediated by efficiency, i.e. through improved accuracy of cost information that allows better strategic decisions about product expansion, market segmentation, and differential pricing strategies. Kaplan and Anderson (2007) support this dual-pathway mechanism by arguing that ABC creates value through two simultaneous pathways: increased efficiency through waste elimination and increased strategic effectiveness through more accurate information.

Managerial Implications: ABC Implementation Priorities for MSMEs

The findings that the dimension of activity-based cost allocation (beta = 0.334) and the identification of cost drivers (beta = 0.298) are the two most determinant components of ABC produce very concrete managerial implications and can be implemented immediately by food and beverage MSME actors in West Java with limited resources. The most optimal ABC capability investment should be prioritized on detailed mapping of production activities to identify the most representative cost drivers, then continue with the development of an activity rate-based overhead cost allocation system calculated from the total cost of activities divided by the total volume of cost drivers that have been identified. Kurniawan et al. (2024) support this priority order of implementation by finding that MSMEs that start the implementation of ABC from the identification of cost drivers before building the allocation system have a 3.1 times higher adoption success rate than those who directly implement the ABC system as a whole without a strong cost driver foundation and are empirically validated by actual production data that reflects the daily operational reality of the MSMEs concerned.

CONCLUSION

This study has succeeded in empirically proving using primary data from 287 owners or managers of food and beverage processing MSMEs in West Java that the capability of Activity-Based Costing is a significant and substantial determinant of the operational efficiency and competitiveness of MSMEs. The three hypotheses were confirmed: H1 was proven that KAB had a positive effect on operational efficiency (beta = 0.423; p < 0.001); H2 was proven that KAB had a direct positive effect on competitiveness (beta = 0.387; p < 0.001); and H3 was proven that operational efficiency partially mediated the relationship between KAB and competitiveness (indirect effect = 0.164; p < 0.001). The model explained 68.7 percent of the variation in MSME competitiveness with Q-squared which confirmed the excellent predictive relevance. The dimensioning of activity-based cost allocation and the identification of cost drivers proved to be the most critical components of ABC. Key recommendation: Food and beverage MSMEs in West Java should gradually adopt ABCs starting from mapping production activities and identifying cost drivers before building a more comprehensive overhead cost allocation system. The West Java KUKM Office and the Industry Office need to design a practical and contextual ABC training program for MSMEs by developing implementation modules tailored to the scale and capacity of food and beverage MSME human resources. Further research is suggested to explore the role of digital literacy moderation and business scale in strengthening the relationship between ABC capabilities and the competitiveness of MSMEs in various other processing industry subsectors in Indonesia.

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