The Effect of Cost Control and Budget Planning on MSME Cost Efficiency: The Mediating Role of Accounting Information Quality and Business Complexity

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Abstract
This study aims to examine the effect of cost control and budget planning on cost efficiency among Micro, Small, and Medium Enterprises (MSMEs), with accounting information quality and business complexity as intervening variables. A quantitative research approach was employed using Structural Equation Modeling (SEM) with Partial Least Squares (PLS). The research population consisted of 488 MSMEs operating in Medan City, and a sample of 220 respondents was determined using the Slovin formula. Data were collected through questionnaires and analyzed using SmartPLS 4.0. The results indicate that both cost control and budget planning have a positive and significant direct effect on cost efficiency. Furthermore, cost control and budget planning significantly influence the quality of accounting information and business complexity. However, accounting information quality was found to have no significant effect on cost efficiency, while business complexity positively and significantly affected cost efficiency. Mediation analysis revealed that business complexity mediates the relationship between cost control and budget planning with cost efficiency. Meanwhile, accounting information quality only mediates the relationship between budget planning and cost efficiency but does not mediate the effect of cost control on cost efficiency. These findings highlight the critical role of budget planning and cost control, integrated with business complexity management, in enhancing cost efficiency for MSMEs. The study provides practical implications for policymakers and practitioners, particularly the need for managerial training and financial mentoring to strengthen budgeting practices, improve accounting systems, and implement effective cost control strategies to ensure business sustainability and competitiveness.
Keywords: *Cost Control, Budget Planning, Cost Efficiency, Accounting Information Quality, Business Complexity*

INTRODUCTION

In the context of business development in Indonesia, Micro, Small, and Medium Enterprises (MSMEs) hold a strategic role in the national economy. The contribution of MSMEs to the Gross Domestic Product (GDP) and their capacity to absorb a significant portion of the workforce has positioned this sector as one of the essential pillars of economic growth. According to data from the Ministry of Cooperatives and SMEs, MSMEs contribute more than 60% of GDP and employ approximately 97% of the Indonesian workforce. Nevertheless, MSMEs continue to face various challenges in sustaining their operations, particularly in terms of operational cost efficiency. The same data indicates that the number of MSMEs has reached 64.2 million units, contributing 61.07% to GDP, or equivalent to IDR 8,573.89 trillion. Cost efficiency is a critical factor for the success of MSMEs in competing within increasingly dynamic markets. (Desembrianita et al., n.d.) Cost efficiency reflects the ability of MSMEs to utilize resources optimally to achieve maximum output at the lowest possible cost. (Mowen et al.,

2018) Cost control and budget planning are two important elements in achieving cost efficiency. Effective cost control enables MSMEs to minimize waste and increase profitability (Anggarwati et al., 2023)This process involves monitoring the use of costs in accordance with the predetermined budget. In addition, good budget planning helps MSMEs in setting financial targets and measuring performance achievements. The combination of cost control and proper budget planning is believed to be able to improve the operational cost efficiency of MSMEs (Manap et al., 2024).

On the other hand, the quality of accounting information plays an important role as an intervening variable in the relationship between cost control, budget planning, and cost efficiency (Wahyudi et al., 2016)(Mahyudin et al., 2025) Good quality accounting information includes the characteristics of relevance, reliability, and ease of decision making. Accurate and timely accounting information will help MSME management identify areas of cost waste and implement more effective cost control strategies (Effendi et al., 2019). In addition to the intervening variable of Information Quality, this study also considers business complexity as an intervening variable. Business complexity describes the level of complexity in business operations that is influenced by factors such as product variety, scale of operations, and business environment dynamics. High business complexity can complicate the cost control and budget planning processes, thereby affecting the level of cost efficiency. In this context, the intervening variable serves to examine the extent to which business complexity mediates the relationship between cost control and budget planning on the cost efficiency of MSMEs. Several previous studies have examined the effect of cost control and budget planning on cost efficiency (Guslan et al., 2020) shows that good cost control contributes positively to improving operational efficiency in the small and medium-sized industrial sector. (Nengsih et al., n.d.) Targeted budget planning can increase cost efficiency through optimal resource allocation. However, these studies are still limited in integrating intervening and moderating variables simultaneously, especially in the context of MSMEs. The challenge for MSMEs in the city of Medan is limited access to business capital, so that many businesses experience difficulties in meeting capital requirements from loans and other sources. Another obstacle faced by MSMEs in the city of Medan is product marketing, which still relies on traditional methods dprdmedan.com. As many as 40% of all SMEs in North Sumatra still experience capital constraints, and 32% of all SMEs in North Sumatra experience difficulties in adjusting human resources in marketing detik.com. Meanwhile, Boby Nasution stated on portal.medan.go.id that what MSMEs in Medan must do is manage their finances and organize their accounting digitally, which can make it easier for MSMEs to manage their businesses so that they can achieve improvement and development (Fadila et al., 2024).

RESEARCH METHODS

This study employs a qualitative research approach with a Structural Equation Modeling (SEM) framework. This approach is particularly effective in testing the most appropriate model for estimating endogenous variables. The population of this research consists of micro, small, and medium enterprises (MSMEs) located in Medan City, under the guidance of the Medan City Office of Cooperatives and MSMEs, with a total of 488 enterprises that have already obtained a Business Identification Number. The sample size was determined using the Slovin formula, with a margin of error of 5% (0.05) and a confidence level of 95% (0.95). The formula used is as follows:

$$n=\frac{N}{1+(N\ x\ e^2)}$$

Where:

n = Sample Size

N= Population
d = margin of error 5%

Based on this formula, the calculation is:

$$n= \frac{488}{1+(488\ X\ 0{,}05^2)}$$

$$n= \frac{488}{2{,}22}$$

n= 219,89 Thus, the sample size is rounded to 220 respondents.

The analytical model employed to test the hypotheses in this study is multiple regression analysis, conducted using SmartPLS software. Multiple regression analysis is a statistical method used to determine the magnitude of the influence of independent variables—namely, cost control and budget planning—on cost efficiency. The regression model is specified as follows:

Y=a + b1X1 + b2X2 + e
Where:
Y= Cost Efficiency
a= Constant
b1-b2= Regression Coefficient
X1= Cost Control
X2= Budget Planning
E= Error Term

Furthermore, the study introduces an intervening variable, which theoretically explains the relationship between independent and dependent variables. In testing moderating effects, there are generally three approaches: (1) interaction test, (2) absolute difference test, and (3) residual test. This research adopts the residual test method for examining the moderating variable. The regression equations for the residual test are as follows:

DF= a + b1X1+ b2X2 + e ……..(1)
IeI= a = b2Y……..(2)

Where:
DF = Fiscal Decentralization (Modetaring Variabel)
a = Constant
b1-b2 = Regression Coefficient
X1 = Cost Control
X2 = Budget Planning
Y = Cost Efficiency.

RESEARCH RESULTS AND DISCUSSION

Discriminant Validity

Data processing to test discriminant validity in this study was conducted using the Fornell-Larcker approach. In this test, the square root of the Average Variance Extracted (AVE) value of each latent variable was compared with the correlation value between that latent variable and other latent variables. The results of the discriminant validity test in this study are as follows:

Table 1. Discriminant Validity Test

	EB (Y)	KU (Z2)	KIA (Z1)	PB (X1)	PA (X2)
Cost Efficiency					
Business Complexity	0,933				
Quality of Accounting Information	0,778	0,834			
Cost Control	0,765	0,795	1,010		
Budget Planning	0,752	0,869	0,903	0,917	

Source: Processed Research Results (2025)

Based on Table 1. the discriminant validity test was conducted by comparing the square root of the Average Variance Extracted (AVE) of each latent variable with the correlations between that latent variable and other latent variables. The results indicate that the square root of the AVE for each latent variable is greater than its correlations with other latent variables. Therefore, it can be concluded that all variables meet the criteria for discriminant validity.

Structural Model Analysis (Inner Model)

The inner model measurement is explained by the results of the path coefficient test, goodness of fit test, and hypothesis test.

R Square

Based on data processing using the Smart PLS 4.0 program, the following R-Square values were obtained:

Table 2. Coefficient of Determination (R-Square)

	R Square	R Square Adjusted
Cost Efficiency	0,830	0,827
Business Complexity	0,702	0,700
Quality of Accounting Information	0,935	0,935

Source: Processed Research Results (2025)

Based on the data presented in the table above, the Adjusted R-Square value for the cost efficiency variable is 0.827 or 82.7%, indicating that this proportion of the variance in cost efficiency can be explained by the independent variables included in the model. The remaining 0.173 or 17.3% is influenced by other variables not covered in this study. Furthermore, the Adjusted R-Square value for business complexity is 0.700 or 70%, meaning that 70% of the variance in business complexity is explained by the variables examined, while the remaining 0.300 or 30% is determined by other factors outside the scope of this research. Lastly, the Adjusted R-Square value for accounting information quality is 0.935 or 93.5%, suggesting that a very large proportion of the variance in accounting information quality is explained by the independent variables in the model. The remaining 0.065 or 6.5% is attributed to other variables not included in this study.

Predictive Relevance (Q2)

The Q^2 value carries the same interpretation as the coefficient of determination (R-Square). A Q^2 value greater than zero ($Q^2 > 0$) indicates that the model possesses predictive relevance, whereas a Q^2 value less than zero ($Q^2 < 0$) suggests that the model lacks predictive relevance. The higher the Q^2 value, the better the model fits the data. The consideration of Q^2 values can be conducted as follows:

$Q_2 = 1 - (1-R_1^2)\ (1-R_2^2)\ \ldots\ (1-R_n^2)$

Q_2 = 1 - (1- 0,827) (1 - 0.700) (1-0.935)
Q_2 = 1 - (0.173) (0.300) (0,065)
Q_2 = 1-0,003
Q_2 = 0.997

Based on these results, the Q2 value is 0.997. Thus, it can be concluded that all variables in the research on cost control, budget planning, accounting information quality, business complexity, and cost efficiency contribute 99.7% to the authenticity of the existing structural model. The remaining 0.3% needs to be developed in addition to the research variables.

Uji t-statistic (Bootstrapping)
Direct Effect

Hypothesis testing in this study was conducted by examining the probability value (p-value) or the significance level of the relationship between variables. A relationship is considered significant when the p-value is less than 0.05, whereas a p-value equal to or greater than 0.05 indicates that the relationship is not significant. At the 5% significance level, hypothesis acceptance can also be determined through the t-statistic value, where the hypothesis is accepted if the t-statistic exceeds the critical value of the t-table (1.969). Accordingly, whether assessed through the p-value approach or by comparing the t-statistic with the t-table, results that meet these criteria demonstrate that the hypothesis is supported by the data. The results of the hypothesis testing are presented in the following table:

Table 3. Direct Effect

	Original Sample (O)	Sample Mean (M)	Standard Deviation (STDEV)	T Statistics (|O/STDEV|)	P Values	Keterangan
Complexity of Operations -> Cost Efficiency	1,153	1,153	0,045	25,676	0,000	significant
Quality of Accounting Information -> Cost Efficiency	0,019	0,026	0,059	0,318	0,751	**insignificant**
Cost Control -> Cost Efficiency	0,125	0,117	0,047	2,656	0,008	significant
Cost Control -> Complexity of Operations	0,291	-0,279	0,099	2,933	0,003	significant
Cost Control -> Quality of Accounting Information	0,311	0,371	0,055	3,220	0,001	significant
Budget Planning -> Cost Efficiency	0,322	-0,328	0,076	4,238	0,000	significant
Budget Planning -> Business Complexity	0,896	0,906	0,063	14,128	0,000	significant
Budget Planning -> Quality of Accounting Information	0,922	0,922	0,040	23,211	0,000	significant

Source: Processed Research Results (2025)

1. The first hypothesis tested in this study examines the relationship between cost control and cost efficiency. Based on the analysis of 220 data samples processed using the SmartPLS application, the findings indicate that cost control exerts a significant direct influence on cost efficiency. This conclusion is supported by a p-value of 0.008, which is lower than the significance threshold of 0.05, and a t-statistic of 2.656, which exceeds the critical value of 1.969. Moreover, the original sample estimate of 0.125 demonstrates a positive relationship between cost control and cost efficiency. Therefore, the first hypothesis is statistically supported and **accepted**.

2. The second hypothesis derived from the data analysis demonstrates a relationship between cost control and the quality of accounting information. Based on the analysis of 220 data samples processed using SmartPLS, the results presented in the table above indicate that cost control has a significant direct effect on the quality of accounting information. This finding is supported by a significance value of 0.001, which is lower than the 0.05 threshold, and a t-statistic value greater than the critical t-value (3.220 > 1.969). Furthermore, the original sample value of 0.311 indicates that the relationship between cost control and the quality of accounting information is positive. Therefore, it can be concluded that the second hypothesis is **accepted**.
3. The third hypothesis of this study, based on the processed research data, demonstrates the relationship between cost control and business complexity. From the analysis of 220 sample data using SmartPLS, the results indicate that cost control has a significant direct effect on business complexity. This finding is supported by the significance value of 0.003, which is lower than the threshold of 0.05, and by the t-statistic value of 2.993, which exceeds the critical t-table value of 1.969. Furthermore, the original sample value of 0.291 indicates that the relationship between cost control and business complexity is positive. Therefore, it can be concluded that the third hypothesis is **accepted**.
4. The fourth hypothesis derived from the data analysis indicates a relationship between budget planning and cost efficiency. Based on the processing of 220 sample data using the SmartPLS application, the results presented in the table above demonstrate that budget planning has a significant direct effect on cost efficiency. This finding is supported by a significance value of 0.000, which is lower than the threshold of 0.05, and a t-statistic value greater than the t-table value (4.238 > 1.969). Furthermore, the original sample value of 0.322 shows that the direction of the relationship between budget planning and cost efficiency is positive. Therefore, it can be concluded that the fourth hypothesis is **accepted**.
5. Hypothesis Five of this study demonstrates the relationship between budget planning and the quality of accounting information. Based on the processing of 220 data samples using the SmartPLS application, the results presented in the table above indicate that budget planning has a significant direct effect on the quality of accounting information. This finding is supported by a significance value of 0.000, which is smaller than the threshold of 0.05, and a t-statistic value greater than the critical t-table value (23.211 > 1.969). Furthermore, the original sample value of 0.922 indicates that the relationship between budget planning and the quality of accounting information is positive. Therefore, it can be concluded that the fifth hypothesis is **accepted**.
6. Hypothesis six from the results of this study demonstrates the relationship between budget planning and business complexity. Based on the processing of 220 data samples using SmartPLS, the findings presented in the table above indicate that budget planning has a significant direct effect on business complexity. This result is evidenced by the significance value of 0.000, which is lower than the 0.05 threshold, and a *t*-statistic value greater than the *t*-table value (14.128 > 1.969). Furthermore, the original sample value of 0.896 shows that the relationship between budget planning and business complexity is positive. Therefore, it can be concluded that the sixth hypothesis is **accepted.**
7. The seventh hypothesis derived from the data analysis examines the relationship between the quality of accounting information and cost efficiency. Based on the analysis of 220 data samples processed using SmartPLS, the results presented in the table above indicate that the direct relationship between accounting information quality and cost efficiency is not statistically significant. This finding is evidenced by the significance value of 0.751, which is greater than the threshold of 0.05, and the calculated t-value of 0.318, which is lower than

the critical t-table value of 1.969. Furthermore, the original sample value of 0.019 suggests that the relationship between accounting information quality and cost efficiency is positive in direction. However, given the lack of statistical significance, it can be concluded that the seventh hypothesis is **rejected***.*

8. The eighth hypothesis of this study, based on the processed research data, examines the relationship between business complexity and cost efficiency. Using 220 sample data points analyzed with SmartPLS software, the results presented in the table above indicate that business complexity has a significant direct effect on cost efficiency. This finding is supported by a significance value of 0.000, which is below the threshold of 0.05, and a t-statistic value greater than the critical t-table value (25.676 > 1.969). Furthermore, the original sample value of 1.153 demonstrates that the relationship between business complexity and cost efficiency is positive. Therefore, it can be concluded that the eighth hypothesis is **accepted***.*

Mediation Effect Testing

Mediation testing is employed to examine whether accounting information quality and business complexity serve as mediating variables in the relationship between cost control and budget planning on cost efficiency. The indirect relationship between the independent variables and the dependent variable through the intervening variables in this study can be observed in the table below.

Table 4. Indirect Influence

Variabel	Original Sample (O)	Sample Mean (M)	Standard Deviation (STDEV)	TStatistics (|O/STDEV|)	P Values	Keterangan
Cost Control -> Complexity of Operations -> Cost Efficiency	0,336	-0,320	0,112	2,995	0,003	significant
Cost Control -> Quality of Accounting Information -> Cost Efficiency	-0,001	-0,002	0,005	0,244	0,808	**insignificant**
Budget Planning -> Business Complexity -> Cost Efficiency	1,033	1,043	0,074	13,891	0,000	significant
Budget Planning -> Quality of Accounting Information -> Cost Efficiency	0,416	0,324	0,126	2,518	0,011	significant

Source: Processed Research Results (2025)

9. The ninth hypothesis from the results of processing the research data shows the relationship between cost control and cost efficiency through the quality of accounting information. It was found from the results of data analysis conducted on 220 data samples processed using the Smart PLS application, where the table above shows that cost control does not have a significant effect on cost efficiency through the quality of accounting information. This result is shown and can be explained by the significant value of 0.808 being greater than 0.05 and the t-count value being smaller than the t-table (0.244>1.969). Furthermore, the original sample value of -0.001 shows that the direction of the relationship between cost control and cost efficiency through accounting information quality is negative, so it can be concluded that the ninth hypothesis is **rejected.**
10. The tenth hypothesis from the results of processing the research data shows the relationship between cost control and cost efficiency through business complexity. It was found from the results of data analysis conducted on 220 data samples processed using the Smart PLS application, where the table above shows that cost control has a significant effect on cost efficiency through business complexity. This result is shown and can be explained by the

significant value of 0.003, which is smaller than 0.05, and the t-count value, which is greater than the t-table (2.995>1.969). Furthermore, the original sample value of 0.336 shows that the direction of the relationship between cost control and cost efficiency through business complexity is positive, so it can be concluded that the tenth hypothesis is **accepted**.

11. The eleventh hypothesis from the results of processing the research data shows the relationship between budget planning and cost efficiency through the quality of accounting information. It was found from the results of data analysis conducted on 220 data samples processed using the Smart PLS application, where the table above shows that budget planning has a significant effect on cost efficiency through the quality of accounting information. This result is shown and can be explained by the significant value of 0.011, which is smaller than 0.05, and the t-count value, which is greater than the t-table (2.518>1.969). Furthermore, the original sample value of 0.416 shows that the direction of the relationship between budget planning and cost efficiency through the quality of accounting information is positive, so it can be concluded that the ninth hypothesis is **accepted.**
12. The twelfth hypothesis from the results of processing the research data shows the relationship between budget planning and cost efficiency through business complexity. It was found from the results of data analysis conducted on 220 data samples processed using the Smart PLS application, where the table above shows that budget planning has a significant effect on cost efficiency through business complexity. This result is shown and can be explained by the significant value of 0.000 being smaller than 0.05 and the t-count value being greater than the t-table (13.891>1.969). Furthermore, the original sample value of 1.033 shows that the direction of the relationship between budget planning and cost efficiency through business complexity is positive, so it can be concluded that the tenth hypothesis is **accepted**.

Discussion

The Effect of Cost Control on Cost Efficiency

The results of the study showing that cost control has a positive and significant effect on cost efficiency ($\beta = 0.125$; $p = 0.008$) indicate two main things: first, the cost control policies and practices implemented by MSMEs are indeed related to their ability to reduce waste and optimize resource use; second, although the coefficient is relatively small in magnitude, its strong statistical significance ($p < 0.01$) indicates the consistency of this effect in the sample and the potential for cumulative impact if applied systematically. Practically speaking, a coefficient of 0.125 can be interpreted to mean that moderate improvements in cost control mechanisms, e.g., increased monitoring frequency, implementation of cost standards, or tightening of expenditure authorization, tend to result in real cost efficiency gains when continued and scaled up (Kipkenei et al., 2022).

Mechanistically, cost control narrows the opportunities for waste across three main dimensions: (1) raw materials, through optimal ordering policies (EOQ), inventory reviews, and appropriate application of safety stock to minimize both storage costs and stock-out risks; (2) labor, by means of effective work-hour planning, overtime control, and efficient task allocation, thereby reducing labor costs per unit; and (3) operational overhead, through real-time monitoring of utility expenses, maintenance, and consumables. These practical interventions not only reduce absolute costs but also improve the cost-to-output ratio, thereby enhancing operational efficiency. Empirical studies on SMEs have identified a similar relationship between control practices (budgetary control, standard costing, and costing systems) and improvements in performance and efficiency (Kausar Alam et al., n.d.).

Modern technology and management strategies reinforce this effect. The adoption of simplified accounting information systems, digital inventory modules, and lean principles (inventory leanness and waste-free processes) enables faster detection of cost deviations, while data-driven decision-making accelerates efficiency improvements. Research on lean strategy and digitalization in SMEs indicates that integrating traditional managerial practices with digital tools enhances the effectiveness of cost control (Liu et al., 2024).

Policy Implications for SMEs**:** prioritize the implementation of periodic budgeting and simple budget monitoring mechanisms, adopt the Economic Order Quantity (EOQ) method or basic inventory control, apply standard costing and variance analysis for major cost components, and utilize lightweight bookkeeping or digitalization tools for real-time reporting. In addition, managerial capacity building in cost management and fostering an internal culture of frugality will enhance the sustainability of outcomes. From a research perspective, further investigation is needed on the moderating roles of firm size, industry type, and level of digitalization, as the effects of cost control may vary across different SME sub-groups (Klychova et al., 2014).

The Effect of Cost Control on Accounting Information Quality

The research findings, with a coefficient of 0.311 and $p = 0.001$, indicate that cost control exerts a positive and significant influence on the quality of accounting information. Practically, the coefficient value of 0.311 suggests a relatively strong effect: each increase in the intensity or effectiveness of cost control mechanisms tends to be associated with substantial improvements in the accuracy, completeness, and timeliness of accounting information. The very small *p*-value (0.001) further reinforces that this result is unlikely to be due to random chance and can therefore be considered reliable for causal inference within the examined sample (Pavlatos & Kostakis, 2022). Mechanistically, effective cost control compels organizations to adopt standardized recording procedures, such as a consistent chart of accounts, systematic cost recording methods (e.g., standard costing or activity-based costing), and routine variance reporting. These procedures reduce data inconsistencies, minimize input errors, and accelerate the reporting cycle, thereby enhancing the relevance and reliability of information for decision-makers. The internal control framework, such as COSO, emphasizes that control components control environment, risk assessment, control activities, information and communication, and monitoring are critical in safeguarding the quality of financial information.

The role of information technology and accounting information systems (AIS) further strengthens this relationship. The integration of cost-recording systems with accounting modules, enterprise resource planning (ERP), or cloud-based platforms enables journal automation, real-time reconciliation, and granular transaction tracking all of which enhance the reliability and timeliness of information. Empirical evidence indicates that the synergy between cost control mechanisms and IT integration produces higher-quality information, thereby supporting both operational and strategic decision-making. Consequently, the modernization of accounting systems is often regarded as an essential complementary step (Maiga et al., 2014). The practical implications of improving the quality of accounting information through cost control include: (1) more accurate managerial decision-making, particularly in pricing and resource allocation; (2) enhanced transparency for external stakeholders, thereby reducing information asymmetry; and (3) improved access to capital as a result of more reliable financial reporting. Specifically for SMEs, the implementation of simple yet consistent cost control mechanisms such as basic budgeting, cost center journals, and monthly variance reports can already enhance reporting quality without requiring substantial implementation costs (Li et al., 2022). Practical Recommendations: Organizations are advised to strengthen control activities

through the automation of record-keeping, task segregation, and reconciliation checklists. In addition, establishing a routine for variance reporting and enhancing the capabilities of accounting staff through continuous training will contribute significantly to effective cost management and information reliability. Implications for Future Research: Subsequent studies may explore the mediating role of Accounting Information Systems (AIS) or organizational culture in the relationship between cost control and information quality. Furthermore, longitudinal research is recommended to assess the long-term effects of control mechanisms on organizational performance. References for Implementation: For practical guidance on the implementation of internal control systems and best practices in cost control, the following references can serve as both practical and theoretical frameworks (Ifc, 2021).

The Effect of Cost Control on Business Complexity

Research results showing the positive and significant effect of cost control on business complexity (coefficient = 0.291; p = 0.003) can be explained through several managerial and strategic mechanisms. First, effective cost control creates financial space and cash flow certainty that allows businesses to expand in scale, for example by increasing production capacity, opening branches, or investing in new equipment. As a business grows in scale, its operational structure naturally becomes more complex: production processes change from simple to layered, marketing channels increase, and the need for inter-functional coordination increases. These findings are consistent with the cost management literature, which emphasizes that cost control strengthens the financial footing for business expansion. Second, good cost control allows businesses to explore product variety without losing control over margins. With controlled unit costs, managers are more willing to add product lines related to a form of operational diversification that often results in economies of scope. However, this diversification adds to managerial complexity because it requires quality control systems, cost accounting per product, and more complex supply chain management. Theoretical studies on diversification and corporate costs/risks support the idea that there needs to be a trade-off between the benefits of diversification and increased coordination costs (Hann et al., n.d.).

Third, the implementation of modern cost control (e.g., activity-based costing systems, flexible budgets, and lightweight ERP for SMEs) is usually accompanied by strengthened procedures, governance, and reporting. These instruments improve the accuracy of accounting information while adding a procedural layer that is measured in the study as "business complexity." In the context of MSMEs, local empirical literature shows that more systematic cost control correlates with increased efficiency as well as the need for more complex task division and supervision (Dang et al., 2017). It is important to note the practical and policy implications: although cost control promotes the ability of businesses to grow and diversify, business owners must balance this with investment in managerial training capacity, simple information systems, and modular process design so that complexity does not become a source of new inefficiencies. Recommendations for further research include testing moderators (e.g., the role of managerial capacity or information technology) that may mitigate the negative effects of increased complexity.

The Effect of Budget Planning on Cost Efficiency

The finding that budget planning has a significant positive effect on cost efficiency (coefficient = 0.322; p = 0.000) confirms the role of the budget as a key managerial tool for directing resources rationally and reducing waste in MSMEs. Theoretically, budgeting forces management to set quantitative targets, detail expenditure items, and compare actual results with plans. It is this mechanism that results in faster and more measurable cost control and

decision making. Cross-country research and the MSME context consistently show that a systematic budgeting process improves financial discipline, improves working capital allocation, and helps reduce unit production costs through variance control (Manyati & Mutsau, 2019). In practical terms, cost efficiency arises through several specific channels. First, priority allocation: budgets encourage spending priorities on value-added activities (production, effective marketing) and delay or eliminate unproductive spending. Second, monitoring and feedback: budgets provide benchmarks so that deviations can be quickly identified and followed up, reducing operational waste. Third, negotiation and planned purchasing: planning enables the purchase of raw materials in optimal volumes or at lower prices, reducing costs per unit. Several field studies on Indonesian MSMEs have also found increased efficiency after the implementation of simple budgeting practices and cost management training (Das et al., 2020).

However, the effectiveness of budget planning depends on the quality of the process. Budgets that are too rigid without a revision mechanism are not responsive to fluctuations in demand or raw material prices, which is particularly relevant for MSMEs facing market uncertainty. Therefore, a flexible or rolling budget approach is often recommended to remain relevant and encourage sustainable efficiency. In addition, managerial capabilities (financial literacy) and access to accurate data determine how optimally the budget is executed (Hilmi et al., 2025). Policy and managerial recommendations for MSMEs: (1) a simple but structured budget format that is easy to fill out; (2) integration with periodic reporting for variance review; (3) financial literacy training for owners/managers; (4) adoption of lightweight digital accounting tools to record and monitor budget realization. Future researchers are advised to test moderation (e.g., financial literacy, digital adoption) in the relationship between budgeting and efficiency to determine when budgeting is most effective.

The Effect of Budget Planning on Accounting Information Quality

Strong budget planning (coefficient 0.922; p = 0.000) shows a very strong causal relationship with accounting information quality. Conceptually, the budget preparation process forces organizations to collect, verify, and synthesize historical data and projections, which directly improves the accuracy, relevance, and reliability of the accounting information that forms the basis of the budget. In other words, a budget is not just a target figure; it becomes a systematic mechanism for interpreting and improving the quality of financial data used by management (Jordan & Messner, 2019). First, this relationship can be explained through the role of Accounting Information Systems (AIS). Well-designed AIS provide standardized data, reduce manual errors, and provide audit evidence that strengthens the reliability of budget figures. Empirical studies show that improvements in AIS quality correlate with improvements in the accuracy of budget planning and control, so that the quality of accounting information improves when organizations invest in adequate technology and reporting procedures (Monteiro et al., 2024). Second, governance mechanisms and budgeting processes (e.g., participatory budgeting, rolling forecasts, and forecast accuracy indicators) strengthen the validity of information. Participatory approaches and the use of accuracy indicators help filter out bias, encourage cross-unit verification, and improve basic budget assumptions. Research on the use of accuracy indicators and rolling forecasts shows improvements in planning quality when organizations implement outcome controls and periodic updates to assumptions (Batt, 2025). Third, organizational contexts such as crisis pressure or business cycle changes indicate that the quality of accounting information moderates the intensity and effectiveness of budget use. Research in the public sector (e.g., hospitals) finds that units with quality cost information are more likely to use budgets intensively for planning and resource allocation during crises. This confirms that the relationship between budget and information quality is dynamic and

influenced by internal accounting capabilities (Almubaideen, n.d.). The practical implications of this high coefficient are clear: organizations that want to improve the quality of accounting information must strengthen their budget planning processes by (1) updating/organizing AIS, (2) implementing adaptive budgeting practices (rolling forecasts, unit participation), and (3) installing accuracy metrics and strict internal controls. These steps not only improve the quality of financial reports but also improve strategic decision-making and operational performance. For further reference, see studies on the role of AIS in budget planning accuracy and empirical research on budgeting and information quality in relevant journals.

The Effect of Budget Planning on Business Complexity

The research results showing a coefficient of 0.896 and p = 0.000 indicate that budget planning is not only correlated with business complexity but is also a strong predictor, meaning that when MSMEs implement sound budget planning, the chances of a more complex business structure emerging increase consistently. Budget planning facilitates planned expansion (e.g., opening new branches or business units), capital allocation for product/service diversification, and the placement of segmented human and technological resources, all of which practically improve the operational and management dimensions of the business(Peel & Bridge, 1998). Theoretically, budgeting acts as a coordination and control mechanism. Detailed budgets force owners/managers to project cash requirements, variable and fixed costs, and the break-even point for each business unit. This process encourages the transformation of businesses from simple structures to layered structures (multi-unit or multi-product) because resource allocation plans become clearer and more administrative. In other words, budgets change from mere numbers to organizational design tools: determining who does what, when investments are made, and how risks are spread across units (Onyeka Anyadufu & Udeachu, 2024).

However, increased complexity is not without consequences. Operational complexity demands higher managerial capabilities (strategic planning, internal control, accounting information systems), as well as stricter control policies to maintain efficiency. If the organization's capacity is not yet ready, e.g., there is no reliable reporting system or trained human resources, budget-based expansion can actually trigger inefficiency and waste. Empirical studies show that effective budgeting practices must be accompanied by regular reporting and review mechanisms in order to optimize benefits(Srbinoska et al., 2023). The practical implications for MSMEs and policymakers are: (1) encourage the adoption of budget planning as part of a growth strategy, (2) supplement the budget with inter-unit performance indicators and a simple reporting system (rolling budget, cash-flow forecast), (3) invest in managerial capacity and supporting AIS, and (4) provide access to phased financing so that expansion does not cause liquidity pressure. Supporting policies such as budgeting training, AIS technical guidance, and structured micro-capital access will make the relationship between budgeting, complexity, and performance more effective.

The Effect of Accounting Information Quality on Cost Efficiency

The test results showing a coefficient of 0.019 (p = 0.751), which indicates an insignificant relationship between accounting information quality and cost efficiency in MSMEs, require further explanation so that readers can understand the theoretical and practical context behind these findings. First, it is necessary to distinguish between the availability of information and the utilization of information. Many studies show that even though accounting records and systems are available in some SMEs, the level of understanding and ability of owners/managers to interpret and apply this information for cost control is still low. This condition results in accounting information functioning more as an administrative archive or formal requirement

rather than an active managerial control tool (Ramli et al., 2017). Second, the difference in the purpose of accounting information is also important: historical financial information (financial accounting) is generally designed for external reporting and compliance, while management accounting or managerial accounting systems that focus on cost control, planning, and operational decision-making are often underdeveloped in the MSME sector. Without integrated accounting management practices, such as cost accounting, budgeting, and variance analysis, the available information is not automatically translated into short-term cost savings (López & Hiebl, 2015). Third, institutional and resource factors limit the effectiveness of information. Centralized business ownership (owner-manager), limited accounting human resources, and a preference for intuition-based decision-making make cost decision-making tend to be reactive and ad-hoc. In addition, the adoption of AIS technology without proper training in its use can result in data that is available but not "actionable," i.e., not used for variance analysis, cost driver calculation, or process optimization. Empirical studies show that system quality needs to be followed by increased user capacity in order to have an impact on operational performance (Kareem et al., 2024). Fourth, non-significant results may reflect the more strategic and long-term role of accounting information: information plays a role in investment planning, access to financing, and component pricing policies that affect total efficiency over a longer time horizon than may be measured in this study. In other words, the direct contribution to short-term cost savings may be small, but the contribution to medium- and long-term efficiency and sustainability remains relevant (Aguirre et al., 2020).

The Effect of Business Complexity on Cost Efficiency

The analysis results showing a coefficient of 1.153 (t = 25.676; p = 0.000) indicate a positive and very strong relationship between business complexity and cost efficiency. Conceptually, this finding makes sense: "complexity" here is not merely uncontrolled chaos, but often reflects higher levels of activity, structure, and organizational capabilities, e.g., more product lines, standardized processes, and integrated functional units that enable the realization of efficiency through several interrelated mechanisms. First, managed complexity often brings economies of scale and spreading of fixed costs, thereby reducing average costs per unit. As businesses grow and add to the variety of activities or production volume, companies can take advantage of greater capacity, centralized purchasing of inputs, and overhead sharing, resulting in lower unit costs. The concepts of minimum efficient scale and economies of scale support this explanation. Second, more complex businesses generally require more sophisticated control and accounting systems, e.g., cost procedures, detailed costing, and periodic management reports, so that managers have better information for cost control decision-making. With more complete disclosure and measurement, information flow becomes the basis for identifying waste, negotiating with suppliers, and allocating resources more efficiently. Studies linking complexity measurement to accounting practices reinforce this mechanism (Hoitash & Hoitash, 2022). Third, complexity drives process innovation and technology adoption (automation, digitization, ERP systems) to handle more complex coordination and integration. Process innovations such as standardization, production layout, or the use of cost analytics tools reduce variability and accelerate production cycles, thereby lowering operational costs. The literature on process innovation models and organizational performance improvement shows similar causal pathways (Yeboah, 2023). However, it is important to note that this relationship is not always a positive linear one without limits: the literature emphasizes ambivalent effects at a certain point, where excessive complexity (product fragmentation, bureaucracy, high coordination costs) can add to cost burdens and reduce performance. Therefore, efficiency benefits emerge when complexity is accompanied by

adequate governance, technology, and managerial capabilities. Your empirical findings (positive and significant coefficients) indicate that the sample context has reached a zone where such complexity is productive rather than a burden (Larsen et al., 2019).

The Effect of Cost Control on Cost Efficiency Through Accounting Information Quality

The findings that the quality of accounting information does not mediate the relationship between cost control and cost efficiency indicate that the existence of "good" accounting information alone is not sufficient to encourage decision-making that leads to efficiency. In practical terms, this means that even though MSMEs successfully produce accurate cost reports or data, the data is not utilized as a managerial tool to identify waste, prioritize process improvements, or restructure variable/fixed costs. A similar phenomenon, namely that information quality is only effective when the information is actually used for decision-making, is reported in studies on the role of AIS as a mediator, which show varying results depending on how effectively the information is used at the management level. Several empirical reasons explain why information quality fails to mediate in the SME context: first, the low accounting/financial literacy of owners makes reports purely administrative (tax records, transaction evidence) rather than an analytical basis for corrective action. Research in the context of Indonesian SMEs shows that existing recording routines are often not translated into systematic cost control practices. This explains the low functional relationship between information and efficiency (Desmaryani, 2016).

Second, limitations in system capabilities (e.g., report formats that do not include cost-per-product indicators, lack of managerial dashboards, or AIS that is complicated/unsuitable for MSME needs) make information difficult to interpret and apply for quick operational decisions. Other studies confirm that system competence and information quality only impact performance if the organization also has the capability to process and apply AIS output into managerial practices. In other words, data quality without utilization capabilities still does not result in cost efficiency (Al-Hattami, 2024). Third, constraints on time, labor, and access to accounting consultants limit the ability of SME owners to analyze cost reports and translate them into action. The literature on SMEs shows that successful interventions generally combine literacy improvement, simplification of report formats, and adoption of user-friendly digital solutions (e.g., cloud-based e-accounting cost templates) so that data is more directly actionable (Zohry & Al-Dhubaibi, 2024). Practical implications for research and policy: (1) If accounting information mediation is tested, additional moderator/mediator variables such as owner literacy, AIS usage capabilities, or access to consultants need to be included because pure mediation of information quality without considering user capacity tends to be zero. (2) Intervention recommendations: applied accounting literacy training programs for owners, preparation of decision-oriented cost reports (simple cost dashboards), and subsidies/ adoption of lightweight accounting applications that automatically present efficiency indicators. (3) For further research: use a qualitative approach (in-depth interviews) to understand how MSME actors interpret cost reports so that strategies to increase information utilization can be designed more precisely.

The Effect of Cost Control on Cost Efficiency Through Business Complexity

The research findings indicating that cost control has a significant effect on cost efficiency through business complexity (coefficient = 0.336; t = 2.995; p = 0.003) emphasize that cost control is not merely a matter of expenditure reduction, but also serves as a catalyst for structural transformation within SMEs. In other words, more rigorous or structured cost control fosters the establishment of procedures, task allocation, and formal reporting systems

conditions that increase operational complexity as firms become more capable of accommodating and managing a greater variety of activities. This phenomenon is consistent with the literature on the application of cost accounting and management control in small enterprises, which demonstrates that the adoption of cost accounting practices enables organizations to better handle pricing decisions, resource allocation, and more sophisticated planning processes. The theoretical mechanism can be explained through two pathways. First, cost control practices (e.g., budgeting, target costing, and standard costing) generate relevant and timely information that enables managers to decompose business processes into measurable and controllable activity modules. This process increases complexity but in a structured form, referred to as *modular complexity*. Second, managed complexity creates opportunities for economies of scale and scope: when SMEs expand their product variety or distribution channels, effective cost control systems facilitate cross-process coordination, thereby allowing resources to be utilized more efficiently (e.g., reducing material waste, optimizing labor, and synchronizing inventory). The literature on management control systems (MCS) emphasizes that "enabling" forms of control not only enhance cost efficiency but also foster creativity and strategic benefits, provided that they are aligned with the organization's capabilities (Ismail & Ummi, 2019).

It is important to note, however, that complexity is inherently ambivalent. Empirical studies indicate that not all forms of complexity generate benefits: complexity arising from cross-line coordination often increases coordination costs and reduces profit margins, whereas complexity stemming from advanced knowledge or services may provide informational advantages and higher margins. Consequently, the positive effect of cost control on efficiency through complexity will only materialize if SMEs are able to effectively manage coordination resources such as processes, information technology, and human capital so that complexity becomes productive rather than burdensome (Cardoni et al., 2020). Empirical evidence within the Indonesian MSME context reinforces these findings. Several case studies and research on MSMEs demonstrate that the implementation of techniques such as target costing and structural cost control practices has successfully reduced production costs (e.g., achieving efficiency gains of 3–8% in various MSME case studies) and improved profit margins following systematic value engineering and cost planning. These results substantiate the interpretation that effective cost control can indeed serve as a bridge toward more productive operational complexity (Nisfiani Sidik et al., 2022).

Practical Implications: (1) SMEs should adopt enabling Management Control Systems (MCS) that combine standardized procedures with sufficient decision-making space for staff; (2) investment in digital record-keeping, cost accounting training, and process modularization can reduce coordination costs, thereby allowing organizational complexity to create value; (3) public policy should facilitate access to training programs and affordable cost-accounting software packages for SMEs, as resource and skill constraints often delay adoption. The literature highlights that barriers to implementing cost accounting systems in SMEs particularly the lack of resources and competencies must be addressed in order for efficiency gains to be fully realized (Roffia et al., 2024)(Fadhila & Mahyudin, 2024).

The Effect of Budget Planning on Cost Efficiency Through Accounting Information Quality

Test results (mediation coefficient = 0.416; p = 0.011) indicate that accounting information quality serves as a crucial mediator between budget planning and cost efficiency. Conceptually, this finding aligns with the literature suggesting that it is not the budget per se that directly reduces costs, but rather the budget followed by the provision of accounting information that is relevant, reliable, timely, and understandable. Such information enables

managers to implement corrective actions, reallocate resources, and exercise variance control effectively. When budget planning is designed with clear targets, assumptions, and baselines, it promotes more systematic recording and reporting mechanisms for instance, the establishment of standardized accounts, strict reporting schedules, and verification procedures which in turn enhance key dimensions of information quality (relevance, reliability, timeliness).

A plausible mediation mechanism that may account for the coefficient of 0.416 can be delineated through the following operational steps: (1) budget planning establishes benchmarks and allocates resources to be achieved; (2) the budget implementation process compels organizations to collect and present cost data in a prescribed format and frequency; (3) the quality of accounting information characterized by relevance, accuracy, and timeliness enables variance analysis, the comparison of actual versus standard costs, and the identification of inefficiencies; (4) management subsequently undertakes corrective actions, such as reducing waste, negotiating with suppliers, and optimizing processes, thereby enhancing cost efficiency. This model is reinforced by empirical evidence suggesting that the quality of accounting information frequently functions as a bridge between the capabilities of budgeting systems and the resulting performance outcomes (Sunarta & Astuti, 2023).

Several supporting studies emphasize the pivotal role of cost/accounting information in reinforcing the budgeting function for both planning and control. For instance, research conducted in public hospitals found that organizations with higher-quality cost information made greater use of budgets for planning, resource allocation, and cost control when facing external pressures. This highlights the contribution of cost information to budgetary effectiveness. Such findings are consistent with the mediating mechanism observed in your study (Pavlatos & Kostakis, 2022b). Cross-contextual studies (covering SMEs, government institutions, and the banking sector) consistently demonstrate a positive relationship between accounting information quality / Accounting Information Systems (AIS) and both decision-making effectiveness and organizational performance. These findings reaffirm that investments in systems and accounting practices that enhance the quality of information significantly contribute to improved organizational outcomes. This evidence strengthens the practical recommendation to reinforce AIS, provide continuous staff training, and ensure better integration of budgeting and reporting processes (Huy & Phuc, 2025).

The Effect of Budget Planning on Cost Efficiency Through Business Complexity

The finding that budget planning has a significant effect on cost efficiency through business complexity (coefficient = 1.033; p = 0.000) indicates a strong causal relationship rather than a mere correlation between well-structured planning processes and an enterprise's ability to reduce costs. Effective budget planning positions income and expenditure projections within a defined timeframe, compelling management to prioritize spending, evaluate investment options, and establish clear operational targets. In the context of SMEs, such planning practices have been shown to enhance financial performance by improving resource allocation and minimizing waste. Mechanistically, budget planning operates through three primary channels: (1) Forecasting and budget allocation compel realistic estimations of demand and costs, ensuring that expenditures are properly aligned; (2) Control and monitoring of actual versus budgeted performance enable the identification of deviations and potential inefficiencies; (3) Strategic budget planning integrated with overall strategy provides entrepreneurs with a solid financial basis for expansion or diversification initiatives. Contemporary financial management literature underscores the strategic role of budgeting (e.g., rolling budgets, evaluative feedback) in enhancing organizational responsiveness to environmental changes and sharpening investment decisions. In other words, a budget should

not be perceived as a static set of figures but rather as a managerial instrument that drives purposeful action (Godoy-Bejarano et al., 2020). However, budget planning that drives expansion and diversification also increases organizational complexity: the addition of product lines, processes, suppliers, and distribution channels creates further dimensions of coordination and control. The literature on organizational complexity highlights its ambivalent effects. Certain forms of complexity when measured, modular, and supported by managerial capabilities can enhance efficiency through specialization, economies of scale, and process optimization. In contrast, uncontrolled complexity that exceeds managerial cognitive capacity generates coordination costs, functional duplication, and inefficiencies. Therefore, the finding of a high coefficient (1.033) is reasonable when the type of complexity observed is designed rather than emergent, thereby channeling structure and procedures that ultimately support efficiency (Doko, 2024).

Practical Implications for SMEs: In order for the complexity of budget planning to translate into cost efficiency, it must be accompanied by strengthened managerial capabilities particularly in budgeting and monitoring skills the implementation of simple budget controls (e.g., periodic variance analysis), and the adoption of lightweight financial information systems that enhance cost visibility. Research on budgeting processes in SMEs recommends a gradual approach, beginning with basic cash and operational budgets, and progressively advancing toward performance evaluation based on key performance indicators (KPIs). In this way, the resulting complexity can be leveraged as a source of efficiency rather than becoming an organizational burden.

CONCLUSION

This research directly found that the variables of budget planning cost control and business complexity affect cost efficiency in micro, small, and medium enterprises in the city of Medan. This study finds that cost control and budget planning variables directly affect the quality of accounting information in micro, small, and medium enterprises in Medan. This study finds that cost control and budget planning variables directly affect business complexity in micro, small, and medium enterprises in Medan. This study finds that accounting information quality variables do not directly affect cost efficiency in micro, small, and medium enterprises in Medan. Indirectly, this study finds that the cost control variable does not affect cost efficiency in micro, small, and medium enterprises in Medan through accounting information quality. Indirectly, this study finds that the cost control and budget planning variables affect cost efficiency in micro, small, and medium enterprises in Medan through business complexity. Indirectly, this study found that the budget planning variable affects cost efficiency in micro, small, and medium enterprises in Medan through accounting information quality.

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