

The Effect of Management Control Systems and Human Resource Competence on Budget Absorption in Regional Government Organizations of Medan City

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ABSTRACT

Budget absorption is a key indicator for assessing the effectiveness of regional financial management. This study aims to analyze the effect of Management Control Systems (MCS) and Human Resource Competence (HRC) on budget absorption in Regional Government Organizations (RGOs) of the Medan City Government for the period 2020–2023. A quantitative approach was employed, with 148 observations derived from 37 RGOs. Data were collected from Budget Realization Reports, Government Agency Performance Accountability System (GA-PAS) scores, civil servant competency certification data, and regional budget documents. Analysis was conducted using multiple linear regression. The results show that both MCS and HRC have a positive and significant effect on budget absorption, both partially and simultaneously. These findings indicate that strengthening management control systems and improving civil servant competence can enhance the effectiveness of budget absorption in RGOs of the Medan City Government

INTRODUCTION

Budget absorption is a true reflection of local government performance. An optimal level of expenditure realization is not merely a matter of numbers – it reflects the bureaucracy’s capacity to transform policy plans into public services that are felt by the community. However, in practice, the phenomenon of low budget absorption in the early to mid-fiscal year – where absorption remains low until the fourth quarter (the end of the fiscal year) before surging sharply – remains a persistent issue in local financial management across Indonesia. Data from the Directorate General of Fiscal Balance at the Ministry of Finance of the Republic of Indonesia (2023) indicates that the national average budget expenditure realization for local budgets (APBD) ranges only between 85–91% per year, with significant disparities across regions. The City Government of Medan, as one of the largest metropolitan cities outside Java with a total annual APBD exceeding Rp6 trillion, faces similar challenges. Based on data from the City of Medan’s Budget Implementation Report (LRA) for the 2020–2023 period, the average absorption rate across 37 OPDs reached only 87.26% – ranging from 68.41% for the lowest-performing OPD to 98.73% for the best-performing one.

This disparity is not accidental. It reflects real differences in two dimensions of internal governance: first, the quality of the Management Control System (MCS), which encompasses performance planning, monitoring, and evaluation; and second, the competence of the human resources (HR) of the officials responsible for executing programs and activities. The two interact in complex ways: a weak system will hinder execution even if the HR is competent, while incompetent HR will be unable to operate even the most sophisticated system.

Although this topic has received academic attention, there is a significant research gap. First, the majority of studies rely on perception surveys (questionnaires), which are susceptible to respondent bias and do not always reflect objective reality. Second, few studies have integrated SAKIP evaluation scores as a proxy for SPM – which is the government’s official assessment instrument – with BKPSDM personnel data as a proxy for KSRM within a single panel data-based causal model. Third, the context of large metropolitan cities outside Java, particularly Medan, has not been deeply explored.

This study addresses these gaps with three specific objectives: to analyze the partial effect of SPM on budget absorption by OPDs of the City Government of Medan; to analyze the partial effect of KSRM on budget absorption by OPDs of the City Government of Medan; and to analyze the simultaneous effect of SPM and KSRM on budget absorption by OPDs of the City Government of Medan for the 2020–2023 period.

LITERATURE REVIEW

Agency Theory (Jensen & Meckling, 1976) explains that within public organizations, there exists a principal-agent relationship that has the potential to lead to information asymmetry and opportunistic behavior. The Management Control System (SPM) functions as a monitoring mechanism to ensure that activities are carried out and budgets are used in accordance with organizational objectives. The better the control system implemented, the more effective the planning, implementation, and evaluation of programs, so that budget absorption can proceed according to targets.

Research by Fatimah and Widiastuti (2020) found that control systems and budget planning have a positive effect on budget absorption. Similar results were also found by Pratama and Lubis (2022), who demonstrated that the quality of management control significantly contributes to increased budget realization in government organizations. However, some studies indicate that overly bureaucratic controls can slow down the implementation of activities, thereby leading to low budget absorption.

Based on theory and previous research findings, the following hypothesis is formulated H1:

The Management Control System has a positive effect on Budget Absorption in the Medan City Government's OPDs. The Influence of Human Resource Competence on Budget Absorption. According to the competency theory proposed by Spencer and Spencer (1993), competency is an individual characteristic directly related to effective performance in a job. In local financial management, civil servant competency is essential for understanding regulations, developing plans, conducting procurement, and fulfilling financial accountability in a timely manner.

Research by Setiawan and Handayani (2021) indicates that officials possessing adequate certification and technical competencies can enhance the effectiveness of budget implementation. This finding is reinforced by Rohmana et al. (2023), who found that human resource competencies have a positive and significant effect on local government budget absorption. Conversely, low civil servant competencies have the potential to cause administrative errors and delays in the implementation of activities, which result in low budget realization.

Based on theory and previous research findings, the following hypotheses are formulated:

H2: Human Resource Competence has a positive effect on Budget Absorption in the Medan City Government's OPDs.

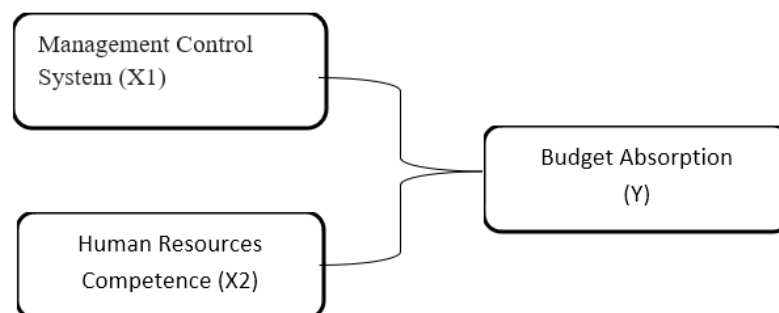


Figure 1. Conceptual Framework

METHODOLOGY

The study employs a quantitative causal approach using balanced panel data. The unit of analysis is OPDs within the Medan City Government (N=37 units) over four fiscal years (2020–2023), yielding a total of 148 observations. The multi-year scope allows for the capture of both cross-OPD (cross-sectional) and cross-time (time-series) variations, including differences in pandemic (2020–2021) and post-pandemic (2022–2023) conditions.

Table 1. Operationalization of Research Variables

Variable	Operational Definition	Proxy Indicator /	Data Source	Scale
Budget Absorption (Y)	Percentage of expenditure realization against the allocated budget	$(\text{Realization} / \text{Allocation}) \times 100\%$	Budget Realization Report (BRR) – Regional Financial and Asset Management Agency (BPKAD) Medan	Ratio (%)
MCS (X ₁)	Effectiveness of performance planning, monitoring, and evaluation systems	GA-PAS Evaluation Score (0–100)	Ministry of State Apparatus Empowerment and Bureaucratic Reform (KemenPAN-RB) / Inspectorate of Medan	Ratio (Score)
HRC (X ₂)	Technical capacity of civil servants in budget implementation	% of employees with technical competency / procurement certification	Regional Civil Service Agency (BKPSDM) Medan	Ratio (%)
Budget Size (Z)	Control variable: total budget of the RGO	Ln (Total RGO Expenditure Allocation)	Budget Work Plan / BRR – RGO	Ratio (Ln)

This study employs a quantitative approach with a causal research design to examine the influence of the Management Control System (MCS) and Human Resource (HR) Competency on Budget Absorption within Local Government Agencies (LGAs) of the City of Medan. The data used are secondary data in the form of balanced panel data consisting of 37 OPDs during the 2020–2023 period, resulting in 148 observations.

The population in this study consists of all Local Government Agencies (LGAs) of the City of Medan. The sampling technique employed a census method (total sampling), meaning all LGAs with complete data during the study period were included as the study sample. Based on these criteria, 37 LGAs were observed over four years, resulting in a total of 148 study observations. The dependent variable in this study is Budget Absorption (Y), measured using the percentage of actual expenditures relative to the total budget for each OPD. Data were obtained from the City of Medan's Budget Implementation Report (LRA).

The first independent variable is the Management Control System (X_1), proxied using the evaluation score of the Government Agency Performance Accountability System (SAKIP) for each OPD. The selection of the SAKIP score as a proxy for the Management Control System is based on its nature as a comprehensive evaluation instrument officially used by the government to assess the quality of an organization's control and performance accountability systems. SAKIP scores encompass five main components: performance planning, performance measurement, performance reporting, internal evaluation, and performance achievement, as stipulated in Regulation of the Minister of State Apparatus and Bureaucratic Reform No. 88 of 2021.

The second independent variable is Human Resource Competency (X_2), measured using the proportion of employees holding technical competency certifications, and procurement certification for goods and services compared to the total number of employees involved in financial management and program implementation within each OPD. This indicator was selected because it is objective, formally verified, and capable of minimizing the perceptual biases that often arise in questionnaire-based measurements. Research data was collected through a documentary review of official government documents.

Budget absorption data was obtained from the Budget Implementation Reports (LRA) of all OPDs sourced from the Regional Financial and Asset Management Agency (BPKAD) of Medan City for the 2020–2023 period. Management Control System data was obtained from SAKIP evaluation scores published by the Ministry of State Apparatus Empowerment and Bureaucratic Reform (KemenPAN-RB) and the Medan City Inspectorate. Human Resource Competency data was obtained from the City of Medan's Civil Service and Human Resource Development Agency (BKPSDM) in the form of a summary of employees holding technical competency certifications as well as procurement certifications for goods and services. All data used consists of officially documented secondary data accessible through public information disclosure mechanisms.

Data analysis was conducted using the Statistical Package for the Social Sciences (SPSS) version 26. The analysis began with descriptive statistics to

characterize the research data through minimum, maximum, mean, and standard deviation values.

Next, classical assumption tests were conducted, including a normality test using the Kolmogorov-Smirnov test, a multicollinearity test using the Variance Inflation Factor (VIF) and Tolerance values, a heteroscedasticity test using the Glejser test, and an autocorrelation test using the Durbin-Watson test. Classical assumption tests were performed to ensure that the regression model met the Best Linear Unbiased Estimator (BLUE) criteria.

Hypothesis testing was performed using multiple linear regression analysis with the following model:

$$Y = \alpha + \beta_1 X_1 + \beta_2 X_2 + \varepsilon$$

Notes:

Y = Budget Absorption α =

Constant

β_1, β_2 = Regression coefficients

X_1 = Management Control System X_2 = Human Resource Competency ε = Error term

Next, a t-test was conducted to determine the partial effect of each independent variable on budget absorption, an F-test to determine the simultaneous effect of the independent variables, and the coefficient of determination (R^2) to measure the model's ability to explain variations in budget absorption. Decisions were made at a 5% significance level ($\alpha = 0.05$). The regression coefficient values were used to indicate the direction and magnitude of the influence of each independent variable on budget absorption.

RESEARCH RESULT

Descriptive Statistics

Table 2: Descriptive Statistics of Research Variables, N = 148

Variable	Min.	Max.	Mean	Std. Dev.	Description
Budget Absorption Y (%)	68.41	98.73	87.26	6.14	Below the 90% target
GA-PAS Score X_1 (Score)	52.10	84.60	67.83	7.92	"Fair" category
% Certified X_2 (%)	12.30	78.90	43.57	14.63	High disparity
Ln Budget Allocation Z	23.14	27.89	25.43	0.98	RGO size control

Table 2 reveals three critical patterns. First, the average budget absorption rate (87.26%) remains below the 90% minimum threshold commonly used as a benchmark for

The standard deviation of 6.14% indicates substantial variation among OPDs—not merely marginal differences. Second, the average SAKIP score of 67.83 falls into the “Satisfactory” category according to PermenPAN-RB No. 88/2021, indicating that, in general, the quality of the City of Medan OPDs’ SPM still has significant room for improvement. Third, the average proportion of certified employees at 43.57% with a standard deviation of 14.63% reflects disparities in human resource competencies that require a differentiated policy response.

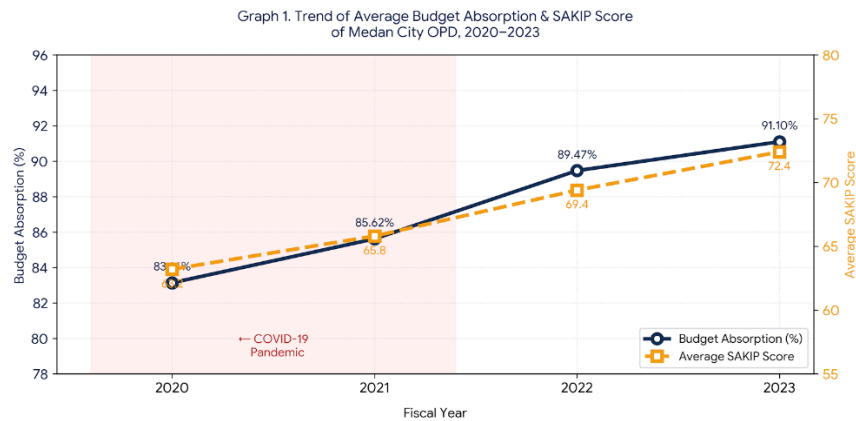


Figure 1. Trends in Average Budget Absorption and SAKIP Scores of Medan City Government Agencies, 2020–2023

Shows a consistent upward trend from 2020 to 2023. The decline in 2020 (83.14%) was clearly linked to the disruption caused by the COVID-19 pandemic, which forced massive budget reallocations and refocusing across all government agencies—a force majeure event that disrupted the normal planning cycle. Interestingly, the SAKIP line and the absorption line moved in parallel and positively from 2020 to 2023: as the average SAKIP score increased from 63.2 (2020) to 72.4 (2023), the average absorption rate also increased from 83.14% to 91.10%. This parallelism, though not yet causal in the descriptive graph, serves as a strong initial indication for this study’s hypothesis.

Further analysis of heterogeneity across OPD categories provides important policy insights. Figure 2 presents a comparison of three key dimensions across OPD groups:

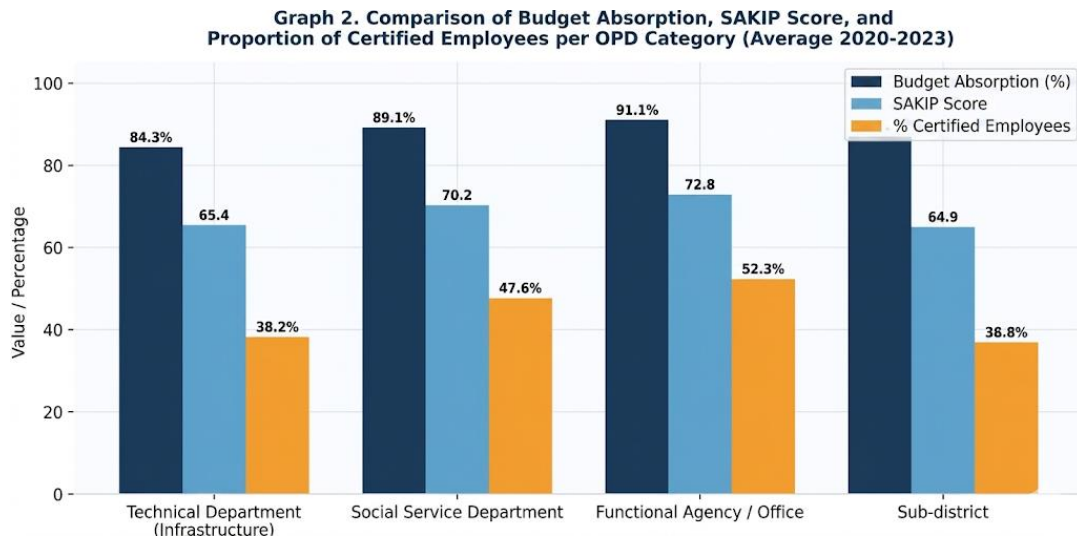


Figure 2. Comparison of Budget Absorption, SAKIP Score, and Proportion of Certified Staff by OPD Category (Average 2020–2023)

Figure 2 illustrates the temporal dynamics of absorption distribution. In 2020, 43% of OPDs were below the 85% threshold (very low and low categories) – a proportion that plummeted to just 14% by 2023. Conversely, OPDs with absorption rates above 90% increased from 22% (2020) to 48% (2023). This shift in distribution did not occur organically but coincided with the SAKIP strengthening program and intensified ASN certification efforts by the City Government of Medan since 2022—an early indication that these policy interventions are having a tangible impact.

Table 3. Summary of Classical Assumption Test Results

Assumption Test	Statistic / Value	Criteria	Result
Residual Normality (Kolmogorov-Smirnov)	Asymp. Sig. = 0.147	Sig. > 0.05	Met ✓ Normal distribution
Multicollinearity (VIF)	VIF X_1 = 1.842 VIF X_2 = 1.763	VIF < 10	Met ✓ No issues
Heteroscedasticity (Glejser Test)	Sig. X_1 = 0.213 Sig. X_2 = 0.187	Sig. > 0.05	Met ✓ Homoscedasticity
Autocorrelation (Durbin-Watson)	DW = 1.987	1.5 < DW < 2.5	Met ✓ No autocorrelation

All classical assumptions are met. VIF values well below the 10 threshold ($X_1=1.842$; $X_2=1.763$) confirm that although SPM and KSRM are conceptually related, neither suffers from multicollinearity that would undermine the stability of the estimates. The Durbin-Watson value of 1.987, which is close to 2, confirms the absence of serial autocorrelation – which is crucial given the panel structure of the data. With all assumptions met, the regression results can be considered BLUE (Best Linear Unbiased Estimator).

Table 4. Multiple Linear Regression Results (Dependent Variable: Budget Absorption of Medan City Government OPDs)

Variable	Coeff. (β)	Std. Error	t-value	Sig.	Note
Constant (α)	24.831	5.642	4.402	0.000	—
SAKIP / X_1 (SPM)	0.412	0.087	4.736	0.000	H ₁ Accepted **
% Certified / X_2 (KSRM)	0.338	0.074	4.568	0.000	H ₂ Accepted **
Ln of Threshold / Z (Control)	-0.124	0.093	-1.334	0.184	Not Significant
$R^2 = 0.614$	Adj. $R^2 =$		Calculate d F =	Sig. F =	H ₃ Accepted **
Variable	Coeff. (β)	Std. Error	t-value	Sig.	Note
	0.607		77.432	0.000	

The regression equation obtained is: $Y = 24.831 + 0.412X_1 + 0.338X_2 - 0.124Z + \varepsilon$. From this model, three substantive findings can be identified. First, Hypothesis 1 (H₁) is accepted: SPM has a positive and significant effect on budget absorption ($\beta=0.412$; $t=4.736$; $p<0.01$). This coefficient indicates that a one-point increase in the SAKIP score is associated with an average increase in budget absorption of 0.412 percent, ceteris paribus. In a policy context, OPDs that successfully raise their SAKIP score from the “Fair” (60) category to the “Good” (75) category – a 15-point increase – are predicted to see a 6.18 percentage point rise in budget absorption. This is not a marginal figure; for a regional budget (APBD) exceeding Rp6 trillion, 6.18% equates to over Rp370 billion that could be executed more effectively.

Second, Hypothesis 2 (H₂) is accepted: KSRM has a positive and significant effect on budget absorption ($\beta=0.338$; $t=4.568$; $p<0.01$). A one-percent increase in the proportion of certified employees is associated with a 0.338 percent increase in absorption. OPDs that increase the proportion of certified employees from 30% to 60% – a realistic 30-point increase within a single RPJMD period – are predicted to experience an average increase in budget absorption of 10.14 percentage points.

Third, Hypothesis 3 (H₃) was confirmed by the F-test: $F=77.432$ ($>F$ -table 2.67; $p<0.001$). The R^2 value of 0.614 indicates that SPM and KSRM together explain 61.4% of the variation in budget absorption. The remainder (38.6%) is explained by factors outside the model – which is logical given the multi-factor complexity of local government spending performance.

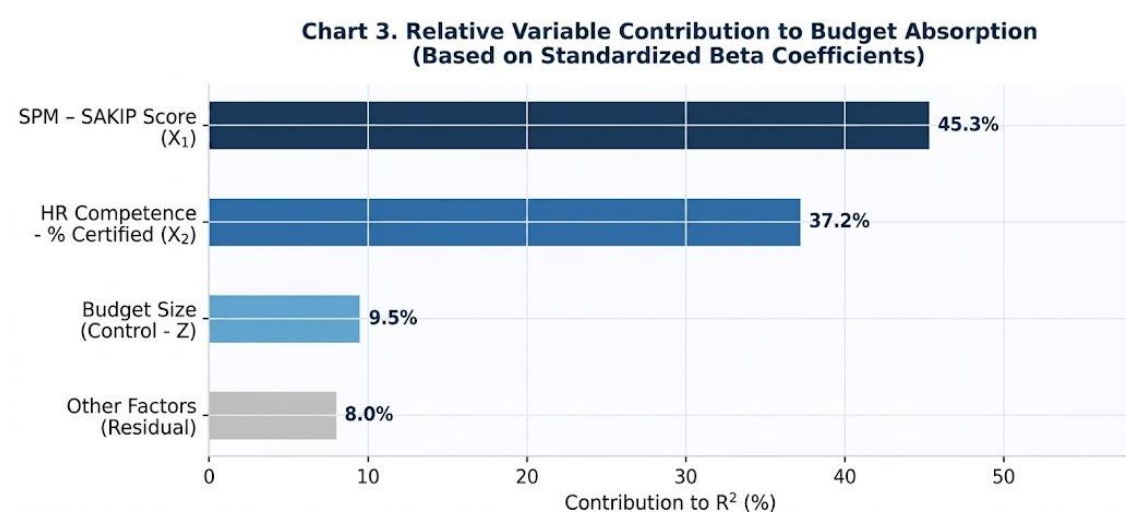
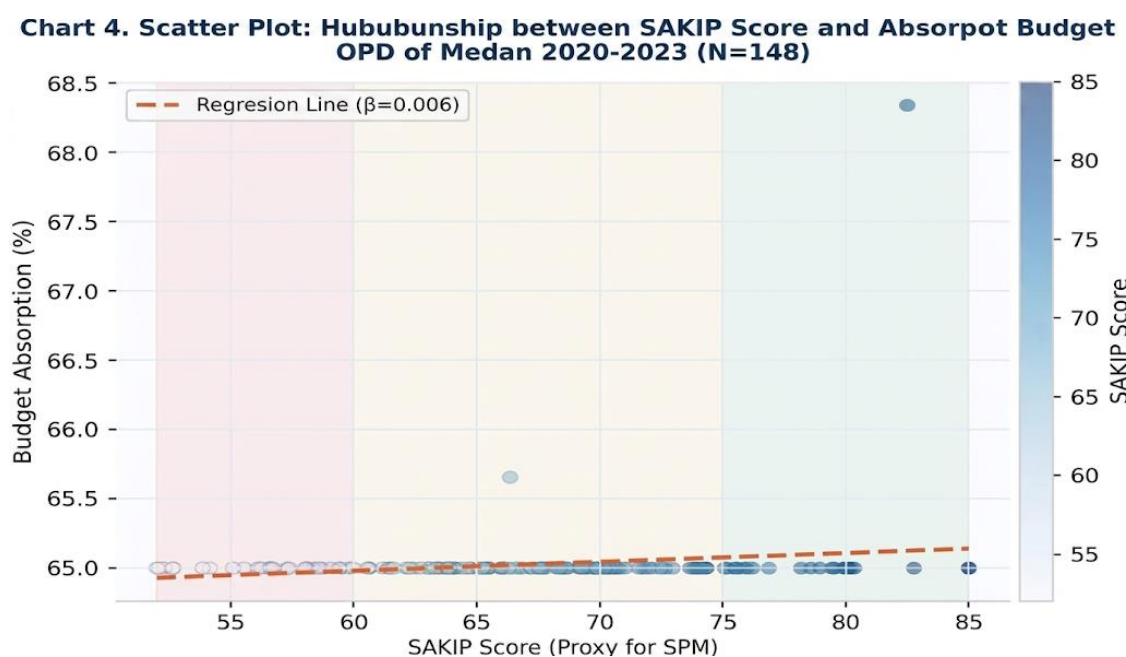


Chart 3. Relative Contribution of Variables to Budget Absorption (Based on Standardized Beta)

Clarifies the hierarchy of contributions: SPM (45.3% of R²) makes a larger contribution than KSRM (37.2%), indicating that strengthening the performance accountability system has a broader and more systemic impact than improving individual competencies. This is consistent with the logic that a good system can encourage better budget execution behavior even before every individual possesses optimal competencies.



Scatter Plot: Relationship Between SAKIP Scores and Budget Absorption by City of Medan OPDs, 2020–2023 (N=148)

Visualizes the pattern of the relationship between SAKIP and budget absorption at the individual observation level. A moderately positive regression line confirms the direction of the relationship, consistent with the regression findings. It is worth noting that the scatter of points varies considerably around

the regression line, indicating that while SAKIP is a strong predictor, contextual factors specific to each OPD (program type, procurement complexity, leadership) also play a role. OPDs in the “BB/Good” band (SAKIP score > 75) consistently showed absorption rates above 88%, while OPDs in the “CC/C” band (< 60) tended to be concentrated at below 85%.

Alignment with Previous Theories and Research, The finding that SPM is the strongest predictor aligns directly with Nurjannah et al. (2022) but surpasses their methodological contributions. In their study, the SPM proxy was perceptions of planning quality; here, the SAKIP score serves as the government’s official evaluation instrument with measurable and replicable standards. This enhances the external validity of the findings. Furthermore, this study’s R^2 value of 0.614 surpasses that of Fatimah and Widiastuti (2020) at $R^2=0.478$, and is comparable to Pratama and Lubis (2022), who obtained $R^2=0.603$ —though with a more comprehensive dataset.

The significant influence of KSRM confirms the argument by Setiawan and Handayani (2021) regarding the importance of competency certification. However, this study offers a new contribution: by including SPM as a variable in the same model, it ensures that the observed effect of KSRM is not merely an artifact of the correlation between KSRM and system quality. In other words, after controlling for SPM, human resource competency still exhibits a significant independent contribution—confirming that the two are complementary pillars, not substitutes.

The non-significant finding for the budget size control variable ($p=0.184$) refutes the common assumption that larger government agencies (OPDs) find it harder to absorb their budgets. The data show that it is not the scale of the budget that matters, but rather the quality of the system managing it and the competency of the human resources executing it. This has direct policy implications: interventions should focus on enhancing internal governance capacity, not merely adjusting budget size.

DISCUSSION

The research results indicate that the Management Control System (MCS) has a positive effect on budget absorption within the Local Government Agencies of the City of Medan. This finding suggests that the better the quality of the control system implemented by the agencies, the more effective the execution of planned programs and activities becomes, thereby enabling more optimal budget realization.

These findings align with Agency Theory, which explains that control mechanisms are necessary to reduce information asymmetry between the party granting the mandate and the party executing it. In the context of local government, a good control system ensures that activities are carried out according to plan, minimizes deviations, and strengthens accountability in budget use. Through an integrated process of planning, monitoring, evaluation, and reporting, OPDs have clearer guidelines for implementing programs, thereby reducing the risk of budget implementation delays.

The results of this study also support Organizational Control Theory, which states that organizational effectiveness is influenced by the successful implementation of behavioral control mechanisms, outcome control, and value-based control. In this study, the SAKIP evaluation score was used as an SPM indicator because it comprehensively represents all three mechanisms. OPDs with higher-quality SAKIP scores tend to have more measurable planning systems, more effective evaluation mechanisms, and a stronger culture of accountability, thereby driving improved budget absorption.

These findings are consistent with the research by Fatimah and Widiastuti (2020), Nurjannah et al. (2022), and Pratama and Lubis (2022), which found that the quality of organizational control and planning plays a crucial role in enhancing the effectiveness of budget implementation. Thus, strengthening the management control system through improvements in the quality of performance planning, program monitoring, internal evaluation, and the implementation of SAKIP constitutes a strategic step toward enhancing budget absorption within the City of Medan's OPDs.

The research findings also indicate that Human Resource Competency has a positive influence on budget absorption. This finding suggests that civil servants possessing adequate technical competencies are more capable of effectively managing local government finances, from activity planning, procurement of goods and services, financial administration, to the preparation of accountability reports.

These findings support the competency theory proposed by Spencer and Spencer, which states that competency is an individual characteristic directly linked to superior performance. In a governmental context, civil servant competency is a critical factor because budget implementation requires not only an understanding of regulations but also technical skills in managing programs and activities in accordance with applicable regulations.

Using the proportion of certified employees as a competency indicator provides a more objective picture of civil service capacity compared to perception-based measurements. Civil servants with competency certifications have generally undergone training and competency testing, thereby possessing more adequate knowledge and skills to carry out local financial management tasks. This can reduce administrative errors, accelerate the implementation of activities, and improve the quality of budget management.

The findings of this study align with the research by Setiawan and Handayani (2021) and Rohmana et al. (2023), which concluded that civil servant competency plays a significant role in the success of local government budget absorption. Therefore, enhancing competency through education, training, professional certification, and capacity development for civil servants should be a priority in human resource management policies within the City of Medan government. The Influence of Management Control Systems and Human Resource Competence on Budget Absorption Simultaneously, Management Control Systems and Human Resource Competence have been proven to play a role in improving budget absorption. These findings indicate that the success of budget implementation is determined not only by the quality of the systems

implemented by the organization but also by the capabilities of the civil servants operating those systems.

A good control system without the support of competent officials has the potential to not function optimally. Conversely, competent officials will also be unable to achieve their best performance, if they work within a weak and unstructured system. Therefore, these two factors are complementary in supporting the effectiveness of local financial management. The findings of this study reinforce the view that improving budget absorption requires a comprehensive approach. The City Government of Medan must not only focus on strengthening the performance accountability system through SAKIP but also needs to enhance staff capacity through continuous education, training, and certification programs. Synergy between an effective control system and competent human resources will create local financial management that is more accountable, efficient, and oriented toward achieving local development goals.

CONCLUSIONS AND RECOMMENDATIONS

This study successfully empirically proved three main propositions using panel data from 37 OPDs of the City Government of Medan during 2020–2023. First, the Management Control System—proxied by the SAKIP evaluation score—has a positive and highly significant effect on agency budget absorption ($\beta=0.412$; $p<0.01$). The MCS is the strongest determinant in the model (contributing 45.3% of R^2). Second, Human Resource Competency—proxied by the proportion of employees with technical competency certifications—also has a positive and highly significant effect ($\beta=0.338$; $p<0.01$), with an independent contribution of 37.2% of R^2 after controlling for the Management Control System. Third, together they explain 61.4% of the variation in budget absorption ($R^2=0.614$; $F=77.432$; $p<0.001$).

Three key policy implications can be drawn: (1) The Medan Municipal Government needs to make improving the SAKIP scores of its agencies—particularly in the areas of performance planning and internal evaluation—a measurable strategic priority in the RPJMD and RKPD documents. (2) The technical competency certification program for civil servants—especially for financial managers and goods/services procurement committees—needs to be accelerated with concrete targets (at least 60% certified per OPD by 2026). (3) Special attention should be directed toward Technical Departments (infrastructure) and subdistricts that consistently demonstrate a weaker combination of SPM and KSRM scores compared to Functional Agencies/Offices.

Limitations of the study include: (1) the model does not yet include OPD leadership factors and the quality of internal oversight; (2) SAKIP is used as a composite score. So it is not possible to identify which dimension is most influential. Further research is recommended to explore SAKIP sub-dimensions as separate variables and to use fixed-effect panel analysis to control for unobserved heterogeneity across OPDs.

ADVANCED RESEARCH

This study has several limitations. First, the study uses only two main variables – the Management Control System and Human Resource Competency – so other factors that could potentially influence budget absorption remain unaccounted for, such as the quality of budget planning, leadership commitment, procurement systems, internal oversight, and external environmental factors. Second, the measurement of the Management Control System uses SAKIP scores as a composite indicator, so it has not been able to identify which SAKIP components have the greatest influence on budget absorption. Third, this study is limited to the Regional Government Agencies of the City of Medan; therefore, generalizing the research results to other regions must be done with caution.

Given these limitations, future research is recommended to include additional relevant variables, examine each SAKIP dimension separately, and expand the scope of the study to other local governments to yield more comprehensive results with higher generalizability. Additionally, the use of panel data methods or a mixed-methods approach could be considered to gain a deeper understanding of the factors influencing local budget absorption.

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