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Effect of Monitoring and Evaluation Tools on the Performance of Housing Projects in Kenya

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Abstract

The performance of housing projects in Kenya continues to attract scrutiny due to recurring challenges such as cost overruns, project delays, and quality shortfalls that hinder the achievement of affordable housing goals. This study examined the influence of Monitoring and Evaluation (M&E) tools on the performance of housing projects, focusing on the Two Rivers Development Project by Centum Real Estate as a case study. The objectives of the study were to: (1) establish the effect of quantitative M&E tools on housing project performance, (2) determine the effect of qualitative M&E tools on performance, (3) assess the effect of planning and analysis tools on performance, (4) evaluate the effect of technological tools on performance, and (5) examine the moderating role of organizational capacity in the relationship between M&E tools and project performance. The study adopted a descriptive research design grounded in Results-Based Management (RBM) and Systems Theory, emphasizing accountability, feedback, and outcome-based decision-making. The target population comprised 163 project staff involved in planning, implementation, and supervision at the Two Rivers Project. A census approach was used, and data were collected using a structured questionnaire. A pilot test was conducted on 10% of respondents to assess reliability, yielding a Cronbach's alpha of 0.812, confirming internal consistency. Data were analyzed using SPSS version 28, employing descriptive statistics, correlation, and multiple regression analyses. Diagnostic tests for normality, multicollinearity, and homoscedasticity confirmed model validity. Results showed a strong positive correlation between the application of M&E tools and housing project performance ($r = 0.734$, $p < 0.05$). Regression analysis revealed that quantitative tools ($\beta = 0.286$, $p < 0.05$), qualitative tools ($\beta = 0.249$, $p < 0.05$), planning and analysis tools ($\beta = 0.213$, $p < 0.05$), and technological tools ($\beta = 0.198$, $p < 0.05$) significantly influenced project performance. Moreover, organizational capacity exhibited a significant moderating effect ($\beta = 0.154$, $p < 0.05$) on the relationship between M&E tools and performance, suggesting that strong institutional structures amplify the positive impact of M&E systems. The study concludes that integrating diverse M&E tools enhances cost efficiency, timeliness, quality, and stakeholder satisfaction in large-scale housing projects. It recommends that Centum Real Estate and similar developers institutionalize comprehensive digital M&E frameworks, strengthen staff capacity-building programs, and adopt participatory monitoring systems to ensure accountability and sustainability. The study contributes to empirical and theoretical discourse on project management by demonstrating that structured and technology-enabled M&E systems are critical drivers of performance within Kenya's private housing sector.

Keywords: Quantitative Tools, Qualitative Tools, Planning and Analysis Tools, Technological Tools, Organizational Capacity, Performance

1. Introduction

Monitoring and Evaluation (M&E) has become an essential pillar of modern project management, driving accountability, evidence-based decision-making, and performance optimization across public and private sectors. In the context of Kenya's housing sector—where affordability, sustainability, and timeliness are critical—M&E tools provide mechanisms for tracking progress, identifying inefficiencies, and ensuring that project outputs align with intended objectives (Mutisya & Ochieng, 2023). Globally, M&E frameworks are recognized as the backbone of effective project implementation, enabling organizations to translate resources into measurable results (Kerzner, 2022).

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Large-scale housing projects are particularly susceptible to cost escalations, schedule delays, and quality deficiencies, making the adoption of structured M&E tools indispensable (Ndirangu & Kiraka, 2023). Through tools such as logical frameworks, key performance indicators, and digital monitoring platforms, project managers can track milestones, ensure compliance with quality standards, and strengthen accountability (Wambugu, 2022).

This study focuses on the Two Rivers Development Project by Centum Real Estate, a flagship private-sector housing initiative in Nairobi County. The project, part of Kenya's broader urban transformation agenda, provides a relevant context for examining how M&E tools influence project performance within the private real estate sector. As the government pushes forward the Affordable Housing Programme under Vision 2030 and the Big Four Agenda, understanding how private developers integrate M&E into their housing projects is crucial to achieving national development goals (Republic of Kenya, 2023).

Beyond mere tracking of activities, modern M&E systems have evolved into strategic management tools that enable organizations to make informed and adaptive decisions. They provide early warning signs of implementation bottlenecks, enhance communication among stakeholders, and contribute to institutional learning and innovation (World Bank, 2023). In project-based organizations such as Centum Real Estate, M&E acts not only as a compliance instrument but also as a value-creation mechanism, ensuring that resources are utilized efficiently and outcomes are aligned with strategic goals. The presence of well-integrated M&E systems allows management to identify risks in real time, take corrective actions, and ensure that performance indicators remain within acceptable thresholds (Otieno & Mutua, 2024).

Moreover, M&E tools serve as key enablers of transparency and stakeholder engagement, which are fundamental to the sustainability of large-scale housing projects. Effective M&E frameworks encourage participatory approaches that include contractors, financiers, local authorities, and end-users in decision-making and performance assessment (Kamau & Gichure, 2023). Such inclusion fosters accountability, improves stakeholder satisfaction, and enhances trust between project implementers and the community. In a dynamic housing market like Kenya's, where public–private partnerships are increasingly common, M&E systems bridge the gap between development objectives and investor expectations.

In the specific case of the Two Rivers Development Project, M&E has taken on greater significance given the project's scale, financial scope, and multidimensional objectives. The integration of housing, retail, and leisure components within one development demands rigorous monitoring of timelines, cost flows, and deliverables. The project's complexity necessitates the use of sophisticated M&E tools, including digital dashboards, performance matrices, and management information systems, to maintain coordination and ensure alignment with both organizational strategy and customer expectations. Consequently, the success of Two Rivers as a flagship project not only reflects Centum's operational capacity but also symbolizes Kenya's ability to implement large-scale housing initiatives in line with international best practices.

1.2 Background to the research Problem

Globally, the construction and housing sector is one of the most resource-intensive industries, often characterized by complexity, multi-stakeholder engagement, and susceptibility to inefficiencies. According to the World Bank (2023), nearly 35% of global construction projects experience cost overruns, while over 45% exceed their timelines, mainly due to weak M&E systems and fragmented reporting frameworks. Developed nations such as Singapore, Germany, and the United States have demonstrated how structured M&E systems—including digital dashboards, Building Information Modeling (BIM), and results-based frameworks—significantly reduce inefficiencies and improve accountability (Tan & Goh, 2023; Bamberger et al., 2024).

In Asia, China has institutionalized M&E within its housing development agenda through smart monitoring systems, leveraging digital innov\ations like real-time data analytics and Geographic Information Systems (GIS) to enhance project tracking and risk management (Li et al., 2023). These systems not only ensure compliance with project timelines but also promote environmental sustainability and cost optimization. Similarly, in Europe, Results-Based Management (RBM) and Logical Framework Approaches (LFA) have been integrated into public housing programs to enhance transparency and evidence-based decision-making (UNDP, 2022).

Across Africa, the implementation of M&E frameworks remains inconsistent, leading to persistent challenges in housing delivery. Studies in Ghana and Nigeria reveal that poor monitoring, inadequate stakeholder engagement, and weak data systems contribute to project failures, cost overruns, and reduced community satisfaction (Osei-Kwame & Mensah, 2023; Johnson & Patel, 2023). However, where participatory and digital M&E systems are effectively institutionalized, housing projects show higher rates of completion, improved quality, and enhanced stakeholder confidence (Odhiambo & Nyangena, 2023).

Kenya's housing sector mirrors these continental patterns, exhibiting both innovation and persistent structural gaps. The Kenya National Bureau of Statistics (2023) estimates a national housing deficit exceeding two million units, which continues to expand by roughly 200,000 units per year. The Affordable Housing Programme—launched under the government's Big Four Agenda—aims to alleviate this shortage, yet many projects still experience implementation bottlenecks. Challenges such as resource misallocation, inadequate data tracking, and limited coordination among implementing partners have been identified as critical barriers to performance (Republic of Kenya, 2023). Strengthened M&E mechanisms could therefore provide the basis for evidence-driven planning, efficiency, and cost accountability across both public and private projects.

The private sector, represented by developers such as Centum Real Estate, plays a crucial role in bridging Kenya's housing deficit. The Two Rivers Development Project epitomizes the evolving landscape of private urban housing by integrating residential, commercial, and infrastructural components. However, managing such a large and multifaceted development

poses immense monitoring challenges—ranging from procurement tracking and schedule adherence to quality control and stakeholder communication. Evidence from project management literature indicates that private-sector entities often lack the institutionalized M&E structures characteristic of donor-funded or government projects (Muli & Kirui, 2023). This gap underlines the need for systematic analysis of how M&E tools function within commercially driven real estate contexts.

Furthermore, Kenya's shift toward digital transformation and sustainable urbanization has amplified the importance of data-driven M&E practices. Developers are increasingly adopting technologies such as mobile-based reporting, satellite imaging, and real-time dashboards to improve decision-making accuracy and responsiveness (Njoroge & Wekesa, 2024). However, empirical data on how these innovations translate into measurable performance outcomes—such as project cost, quality, or time efficiency—remains limited. By focusing on the Two Rivers Development Project, this study responds to the need for context-specific evidence on the role of M&E tools in enhancing project success within Kenya's high-value private housing sector

1.3 Purpose of Study

The purpose of this study was to examine the influence of monitoring and evaluation tools on the performance of Housing projects in Kenya focusing on the Two Rivers Development Project by Centum Real Estate.

1.4 Research Objectives

The objectives of the study were to:

i. Establish the effect of quantitative and qualitative tools on the performance of housing projects in Centum limited, Kenya.
ii. Determine the effect of planning and analysis tools on the performance of housing projects in Centum Limited.
iii. Determine the effect of technological tools on the performance of housing projects in Centum Limited.
iv. Examine the moderating effect of organizational capacity on the relationship between monitoring and evaluation tools and the performance of Housing projects in Kenya: A case of Centum Limited.

2. Review of Literature

2.1 Theoretical Review

Results-Based Management (RBM) Theory

This research is grounded on the Results-Based Management (RBM) Theory, which focuses on the strategic application of monitoring and evaluation to realize accountability, learning, and better performance. According to RBM, the success of a project can be predetermined by the possibility to set clear goals, to identify measurable indicators, and to analyze the progress constantly to guarantee the achieved outcomes match the desired results (UNDP, 2022). As applied in the housing projects, RBM offers a framework of planning and performance measurement by connecting the project inputs, activities, outputs and outcomes with the key performance indicators like the cost efficiency, timeliness, quality and stakeholder satisfaction. It is this that makes it an appropriate anchor theory to consider the effect of Monitoring and Evaluation (M&E) instrument on project performance.

The RBM approach is supported by the Systems Theory that perceives projects as systems that are interrelated and the performance of a project is affected by the successful interaction of various elements of the project, including resources, processes, and stakeholders (Bertalanffy, 1968; project studies update by Chen, 2023). In housing projects, M&E tools work as the binding factor that connects these parts with each other because of creating feedback and identifying the deviations and providing adaptive management. Systems Theory thus supports the fact that in the absence of a good M&E system, the housing projects will be exposed to inefficiencies, cost overruns, and delays, which will eventually affect performance.

Also, the paper relies on the Agency Theory that describes the interaction between the project owners (principals) and the project managers (agents). Housing projects usually have various stakeholders who have different interests and unless they are effectively monitored, the managers may engage in various activities that are not in line with the organization or beneficiary interests. M&E tools serve as accountability instruments that lead to a reduction in the information asymmetry, lessen the agency problem, and also make sure that the activities of managers can generate the desired performance outcomes (Jensen and Meckling, 1976; contemporary perspectives on their use in project governance by Adegbite, 2022). The study uses RBM, Systems Theory, and Agency Theory allowing the researchers to develop a robust theoretical framework to examine the effects of M&E tools on the performance of housing projects.

2.2 Conceptual Framework

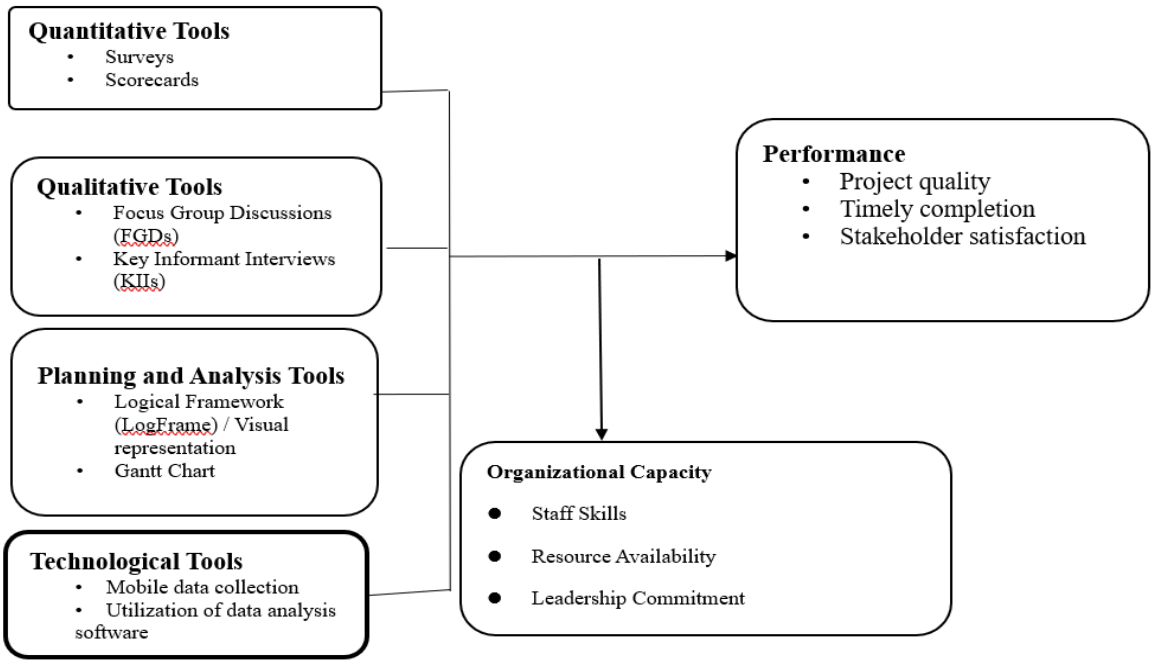

Figure 1: Conceptual Review

3. Methodology

3.1 Research Design

The study was grounded on the positivist research philosophy, which assumes that reality can be objectively measured and explained through empirical evidence. Positivism is appropriate for studies involving quantifiable data, hypothesis testing, and statistical inference (Saunders et al., 2023). This study used a descriptive research design. Siedlecki (2020) defines descriptive research design is a methodological approach used in social sciences and other fields to systematically observe, record, and analyse phenomena as they naturally occur, without manipulating variables or attempting to establish causality. This study, the population comprised of 163 employees of Centum Limited. The target population included all the 163 staff employees working under the Two Rivers Development Project by Centum Real Estate. A sample is a subset of the entire population chosen to represent the broader group in a research study. It allows the researcher to draw conclusions without studying every individual. However, this study adopted a census approach by including all 163 staff employees working under the Two Rivers Development Project by Centum Real Estate. This ensured comprehensive data collection from the entire target population for greater accuracy and representation. For this study, the researcher used both open ended and closed ended questionnaire.

4 Data Analysis, Presentation and Discussion of Findings

The study applied two inferential statistics. The two inferential statistics were Pearson's correlation analysis and multiple regression analysis.

4.1 Correlation Analysis

The study also sought to determine the relationship between the various project management tools and project performance using the Pearson Product Moment Correlation.

Table 1: Correlation Analysis for the study variables

Variables	Quantitative Tools	Qualitative Tools	Planning & Analysis Tools	Technological Tools	Project Performance
Quantitative Tools	1				
Qualitative Tools	0.4523	1			
	0.0031				
Planning & Analysis Tools	0.6012	0.5032	1		
	0.0008	0.0007			
Technological Tools	0.5514	0.4041	0.7032	1	
	0.0041	0.0006	0.0001		
Project Performance	0.7015	0.651	0.8001	0.7508	1
	0.0001	0.0005	0.0000	0.0000	

Source: Field Data (2025)

The Pearson correlation analysis established the level of significance and type of relationship between the variables at the level of significance at alpha =0.05. Pearson R correlation was used to determine the nature and strength of the relationship between the independent variables and the dependent variable. The Pearson R correlation coefficient ranged between zero and one meaning that the higher the coefficient correlation values, the stronger was the association.

The results have identified a positive correlation (r=0.7015, p=0.0001) to exist between quantitative tools and project performance. This implied that the use of quantitative tools had a good and desirable relationship with the overall performance of the project. There was therefore a tendency with the increasing use of quantitative tools with organizations in that the performance of the project also increased. The relationship was statistically significant at 0.05 level, which suggests that the observed correlation could not have taken place due to chance.

In addition, the findings revealed that the correlation between qualitative tools and project performance was moderate and positive (r=0.651, p=0.0005). This proved that there was a positive relationship between qualitative tools and project performance. It also meant that the better organizations incorporate the qualitative tools in the project management processes, the higher chances of them enhancing project performance and vice versa. The observed statistical significance of such relationship proves the reliability of such a relationship and implies that the qualitative tools contribute to the improvement of the project outcomes.

The research also established that the planning and analysis tools positively correlated with project performance with the value of r= 0.8001 and p=0.0000. This indicated that the capacity of an organization to use the tools of planning and analysis effectively will enhance the performance of a project. The p-value of this case is so low that it gives the impression that it is the most important and statistically significant relationship of all the variables analyzed, which shows that planning and analysis tools are extremely significant in the realization of successful project results.

Also, technological tools were found to be positively and significantly correlated with the project performance (r=0.7508, p=0.0000). This showed that the use and successful application of technological tools in project management had a significant and positive effect on the project performance. The p-value is of great importance and supports the idea that technological tools are the key elements of the contemporary project management practices that play a significant role in the project success.

4.2 Regression Analysis

The regression analysis was performed in order to investigate the prediction relationship between the project management tools (quantitative tools, qualitative tools, planning and analysis tools and technological tools) and project performance. The analysis was to identify whether these tools are related to project performance as well as the strength and direction of their impacts with the other variables held constant in the model.

Table 2: Regression Analysis

Variable	Unstandardized Coefficient	Standard Error	Standardized Coefficient	p-value
Constant	2.5000	0.3063		
Quantitative Tools	0.3513	0.0815	0.3356	0.002
Qualitative Tools	0.2675	0.0728	0.1827	0.045
Planning & Analysis Tools	0.5853	0.1001	0.4583	0.001
Technological Tools	0.4737	0.0906	0.3557	0.003

Source: Field Data (2025)

The findings showed that quantitative tools influenced the performance of the project significantly in a positive way. The performance of the project was predicted to go up by one unit (other factors remaining constant) with one-unit increment in the application of the quantitative tools. The coefficient of 0.3356 was standardized, meaning that the coefficient of change of one standard deviation in the use of the quantitative tools corresponded to an increase of the standard deviation of the project performance by 0.3356. The significance of this effect was proven by the p-value of 0.002 which was convincing evidence to convey that the use of quantitative tools has a strong positive influence on the project performance. This observation was in line with the previous correlation analysis that revealed a close positive correlation (r=0.7015, p=0.0001) between quantitative tools and project performance.

On the same note, qualitative tools revealed that there is a big positive relationship with performance of the project. The one-unit movement in the usage of qualitative tools contributed to the increase in the project performance by about 0.2675 units, holding other factors constant. The standardized coefficient of 0.1827 had a smaller relative impact than that of quantitative tools, indicating that the quantitative tools have a positive impact on the performance of a project, but the magnitude of this impact is lower. The p-value of 0.045 showed that such effect was statistically significant but not as strongly as quantitative tools. Although this relationship is important, it implied that qualitative tools are supplementary yet play an important part in improving the outcomes of the project.

The analysis also indicated that the strongest effect of the predictors on the project performance was the planning and analysis tools among the predictors that were analyzed. Planning and analysis tools increased project performance by 0.5853 units which is significant as it was a one-unit increase. This predictor made the biggest relative contribution to

project performance with its largest standardized coefficient of 0.4583. A p-value of 0.001 indicated that such an effect was of high statistical significance showing the paramount level of criticality of planning and analysis tools in ensuring successful project results. The result was in line with the correlation analysis that revealed planning and analysis tools to be the most associated with project performance (r=0.8001, p=0.0000).

Moreover, technological tools demonstrated a strong positive impact on the project performance. One unit of technological tools increment resulted in a 0.4737-unit increase in project performance. The standardized coefficient of 0.3557 was moderate-strong effect compared to other predictors. The p-value of 0.003 has proved that this effect is statistically significant and, therefore, the adoption and the effective use of technological tools play an important role in project success. This finding supported the findings of the correlation, which revealed a strong positive relationship (r=0.7508, p=0.0000) between technological tools and the project performance.

Combined Effect of M&E Tools on Project Performance

Table 3: Model Summary on Combined Effect of M&E Tools on Project Performance

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	0.832	0.692	0.681	0.359

Source: Field Data (2025)

In the case where the four M&E tools were used in a combined form, the model demonstrated a very high correlation with Project Performance (R = 0.832). The R2 of 0.692 shows that 69.2 percent of the variability in the performance of the project is explained by the combination of the four tools.

Table 4: ANOVA Table on Combined Effect of M&E Tools on Project Performance

Model	Sum of Squares	df	Mean Square	F	Sig.
Regression	27.340	4	6.835	53.105	0.000
Residual	12.170	118	0.134		
Total	39.510	122			

Source: Field Data (2025)

The model was highly significant ($F = 53.105$, $p < 0.001$), confirming that the combined use of M&E tools significantly predicts project performance.

Table 5: Coefficients Table on Combined Effect of M&E Tools on Project Performance

Predictor	Unstandardized Coefficients (B)	Std. Error	Standardized Coefficients (Beta)	t	Sig.
(Constant)	0.742	0.176	—	4.22	0.000
Quantitative Tools	0.241	0.082	0.236	2.93	0.004
Qualitative Tools	0.183	0.075	0.179	2.44	0.016
Planning & Analysis Tools	0.308	0.078	0.317	3.95	0.000
Technological Tools	0.227	0.069	0.228	3.29	0.001

Source: Field Data (2025)

Regression Equation:

Project Performance = 0.742+0.241(QuantitativeTools)+0.183(QualitativeTools)+0.308(Planning&An"alysis Tools) +0.227(Technological Tools)"

These results indicate that Planning and Analysis Tools ($\beta = 0.317$) had the greatest contribution to project success, followed by Quantitative, Technological, and Qualitative Tools respectively.

4.3 Moderating Effect of Organizational Capacity Model Summary on Moderating Effect of Organizational Capacity

Table 6: Moderating Effect of Organizational Capacity Model Summary on Moderating Effect of Organizational Capacity

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	0.832	0.692	0.681	0.359
2 (with interaction)	0.865	0.748	0.732	0.328

Source: Field Data (2025)

When Organizational Capacity was introduced as a moderating variable, the model fit improved from $R^2 = 0.692$ to $R^2 = 0.748$. This 5.6% increase shows that Organizational Capacity enhances the relationship between M&E tools and Project

Performance.

Table 7: ANOVA Table on Moderating Effect of Organizational Capacity

Model	Sum of Squares	df	Mean Square	F	Sig.
Regression	29.540	9	3.282	30.506	0.000
Residual	9.970	113	0.116		
Total	39.510	122			

Source: Field Data (2025)

The model remained statistically significant ($F = 30.506$, $p < 0.001$), indicating that the inclusion of the moderator significantly improves model predictability.

Table 7: Coefficients on Moderating Effect of Organizational Capacity

Predictor	Unstandardized Coefficients (B)	Std. Error	Standardized Coefficients (Beta)	t	Sig.
(Constant)	0.521	0.174	—	2.99	0.004
Quantitative Tools (QT)	0.198	0.078	0.187	2.54	0.013
Qualitative Tools (QLT)	0.143	0.070	0.140	2.04	0.045
Planning & Analysis Tools (PAT)	0.246	0.074	0.253	3.32	0.001
Technological Tools (TT)	0.191	0.067	0.192	2.85	0.006
Organizational Capacity (OC)	0.264	0.061	0.255	4.33	0.000
QT×OC	0.071	0.030	0.089	2.37	0.020
QLT×OC	0.054	0.028	0.072	1.94	0.056
PAT×OC	0.083	0.031	0.098	2.68	0.009
TT×OC	0.067	0.029	0.085	2.31	0.023

Source: Field Data (2025)

Organizational Capacity had a direct positive effect on project performance ($\beta = 0.255$, $p < 0.001$).
Additionally, most interaction terms were significant, especially:
Planning & Analysis Tools × Organizational Capacity ($\beta = 0.098$, $p = 0.009$)
Quantitative Tools × Organizational Capacity ($\beta = 0.089$, $p = 0.020$)
These findings imply that organizations with strong capacity—adequate resources, skilled staff, and effective systems—are more capable of leveraging M&E tools to achieve superior project performance.

5 Conclusion and Recommendations

The study concluded that Monitoring and Evaluation tools significantly and positively influence housing project performance, with organizational capacity enhancing this effect. The study concludes that integrating diverse M&E tools enhances cost efficiency, timeliness, quality, and stakeholder satisfaction in large-scale housing projects. It recommends that Centum Real Estate and similar developers institutionalize comprehensive digital M&E frameworks, strengthen staff capacity-building programs, and adopt participatory monitoring systems to ensure accountability and sustainability. The study contributes to empirical and theoretical discourse on project management by demonstrating that structured and technology-enabled M&E systems are critical drivers of performance within Kenya's private housing sector.

Declaration of Competing Interests

The authors declare that they have no conflicting interests.

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Data Availability statement

The data used to support the findings of this study are available upon request, from the corresponding author.

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