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Effect of Sustainable Procurement Practices on Performance of Construction Projects in Homa Bay County, Kenya

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Abstract

The construction sector plays a central role in national development through infrastructure delivery and job creation, yet it is persistently challenged by cost overruns and procurement inefficiencies. This study investigates the effect of sustainable procurement practices, specifically cost management on the performance of public construction projects in Homa Bay County, Kenya. Guided by the Dynamic Capability Theory, the study conceptualizes cost management as a strategic procurement function involving cost-saving strategies, resource utilization, life cycle cost analysis, and value engineering. A descriptive survey design was adopted, targeting 189 participants. Data were collected using structured questionnaires and analyzed through descriptive statistics and multiple linear regression using SPSS. Results revealed that all four cost management practices had a significant and positive influence on project performance indicators such as budget compliance, timely delivery, quality, and stakeholder satisfaction. Cost-saving strategies had the greatest influence ($\beta = 0.184$, $p < 0.001$), followed by life cycle cost analysis ($\beta = 0.174$), value engineering ($\beta = 0.151$), and resource utilization ($\beta = 0.144$). The regression model accounted for 53.3% of the variance in project performance. These findings affirm that sustainable procurement, through effective cost management, enhances the efficiency and accountability of publicly funded construction projects. The study concludes that integrating cost management into procurement functions fosters adaptive institutional capabilities, supporting the realization of sustainable infrastructure outcomes. It recommends capacity building for procurement officers and institutional reforms that embed strategic cost tools in construction management. The findings contribute to procurement policy and project governance under Kenya's devolved system.

Keywords

Cost Management, Lifecycle Costs, Sustainability, Construction Projects

1. Introduction

The construction industry is one of the key sectors of economic development both nationally and globally, and moreover, the global construction industry plays the key role in terms of contribution to the countries in terms of infrastructure growth, as well as job creation, and delivery of better services to the population. But it is also plagued by recurrent inefficiencies, more so, in cost management and in purchasing. Montasser, Laila, and Fatema (2024a) point out that more than 40 percent of construction projects around the world have been characterized by cost over-runs and failure to meet the budget owing to poor cost controls and lack of formal management principals. These inefficiencies highlight the importance of efficient and long-term value in the procurement practices that must be sustainable and cannot be concentrated on the short-term minimization of costs but need to emphasize the accountability and effective use of resources.

Sustainable procurement entails the incorporation of the environmental, social and economic issues into the procurement decision to foster value-for-money and sustainability. In this context, the cost management is one of the fundamental pillars of the economy, as it is a factor that assures that projects are completed within their budget; in addition to financial and material resources utilized throughout the life cycle of the project. Value engineering, life cycle cost analysis and cost-saving measures are deemed as critical disciplines in sustainable procurement, especially with regard to the public sector which is held to accountability and efficiency in respect to resources at its disposal.

Sustainable procurement has been weak in having good practice in Sub-Saharan Africa. The findings are consistent with the observations made by Ogungbe (2021a), who made it possible to say that outdated cost practices in the construction of various projects funded by the state of Nigeria resulted in cost overruns in more than 60 percent of all cases. According to the study by Nyayo and Achuora (2020), the project sustainability was undermined in Kenya due to poor cost planning, non-use of life cycle analysis, and deficient budgeting models in the informal settlements. Onyango (2021), similarly, underscored the significance of the cost management systems towards improving the performance of the given project in Elgeyo Marakwet County.

In Homa Bay County, the emergence of problems in procurement appears in construction projects and projects that are stalled or abandoned by the government. The Auditor General (2022) in his Report has found that more than KES 294 million that was supposed to go towards the construction could not be accounted for. Moreover, the County Oversight Report (2024) also reported poor procurement planning as well as the inability to control costs, which were among

the major contributors to underperformance in more than 24 road and building projects.

This study determines the impact of the cost management practices being used as part of the sustainable procurement to construction projects in Homa Bay County. It also focuses on the impact that cost control mechanisms, resources, life stage cost analysis and value engineering ability have in maintaining a budget, meeting schedules, provision of quality services and customer happiness. Within the context of the Dynamic Capability Theory developed by Teece et al. (1990), the study interprets the concept of cost management as a strategic procurement ability that allows construction institutions to perform adjustment and optimization in the achievement (long-lasting effects within the changing contexts).

2. Literature review

2.1. Theoretical Framework

Dynamic Capability Theory

The research will be grounded in the Dynamic Capability Theory that was developed by Teece et al. (1990) and which is based on the idea that an organization can deal effectively with the highly dynamic environment by adapting, integrating and re-arranging both internal and external competencies. Cost management as a dynamic procurement capability: In the case of the public sector construction, with cost limit, politicization and unreliable cycles of funding, these factors can pose a challenge in the process of project building. Cost management has the ability to facilitate flexible planning, financial control and provision of strategic resources which guarantees that any public construction project can have its performance goals in the short and long term.

Dynamic capabilities in procurement systems are displayed by institutional mechanisms that improve agility which includes life cycle costing, real-time monitoring and value engineering. Not only do these tools make construction costs more efficient but they also instill sustainability into the outcomes of construction. Cost management, as will be conceptualized in the study however, is not only an exercise in budgeting, but the ability of a strategic procurement role in providing a sustainable performance of a project.

2.2. Cost Management within Sustainable Procurement

Procurement is a multidimensional activity that has been gaining recognition because of its focus on cost factors, quality, environmental implications, and its long-term value in the acquisition decisions. In this context, one of the key practices is the cost control that guarantees that costly financial and material resources will be utilized reasonably, and, at the same time, transparency and accountability will be achieved in the field of state governance.

Unit cost analysis, expenditure forecasting, and milestone budgeting tools can improve the viability of the projects and help reduce wastage and ensure better predictability in the financial performance of the project (Nyayo & Achuora,

2020). These tools, when integrated into the procurement systems, become the vehicles of sustainability, where cost overruns are minimized, fair business dealings with the suppliers are achieved, and life cycle value is promoted.

Likewise, a research study on the Nigerian construction projects undertaken by a governmental agency reported that the low cost performance indicated by cost overruns to the extent of 61.84 percent was mostly in isolation to the outdated cost management techniques and the disengagement of the same in the governmental procurement of the construction projects (Ogungbe, 2021b). The research indicated that it is imperative to modernize procurement with dynamic and responsive cost control models that perceive risk and control complexity.

2.3. Empirical Perspectives on Cost Management and Project Performance

There is empirical confirmation of the association of cost management and project performance throughout the globe. Montasser, Laila, and Fatema (2024b) noted that close to 40 percent of investment-based projects fail to meet the budgetary expectations as a result of disjunctions in cost control mechanisms. Such failures are common in projects undertaken in the public sector where procedures are fixed and there is less technical competence hence fail in effectiveness of procurement.

In Kenya, Onyango (2021) indicated that low cost planning and non-provision of performance monitoring resulted in frequent delays and variations of the budgets in Elgeyo Marakwet County. In order to enhance delivery schedules and stakeholder satisfaction he suggested integration of procurement and cost management systems. Nyayo and Achuora (2020) stated that proper unit cost analysis and lifecycle-based planning had made a big difference in the performance of the contractors and efficiency of material use in informal settlements in Nairobi.

The conclusion of all these studies points out the realization that project performance cannot be entirely viewed as a factor of the design or the capacities of the contractor but is rather a matter that is highly driven by the way the costs are procured. Better management of costs promotes fiscal compliance, minimizes delays and guarantees that investments of the people produce actual infrastructure results.

2.4. Gaps in the Literature

Even though there is growing interest in the topic of sustainable procurement, the review of the available literature shows that the empirical confirmation of the cost control as one of the strategic procurement tools in the area of public construction remains arguably lacking. The majority of the research, including those done by Montasser et al. (2024b) or Ogungbe (2021a), utilize secondary information or literature reviews, and thus lack generalizability. Nyayo and Achuora (2020) as well as others reflect on the small-scale projects in informal settlements and thus are not structured or county-level government projects.

Additionally, very little research that focuses on the impact of the cost management on performance under devolved governance units in Kenya is affected by interventions in acquisition patterns which are politically tuned, and limited capacity. Critical to note, there is also no integration of the dynamic capability theory and procurement practice thus resulting in a conceptual gap in how internal cost systems can be used to drive performance under complex institutional arrangements.

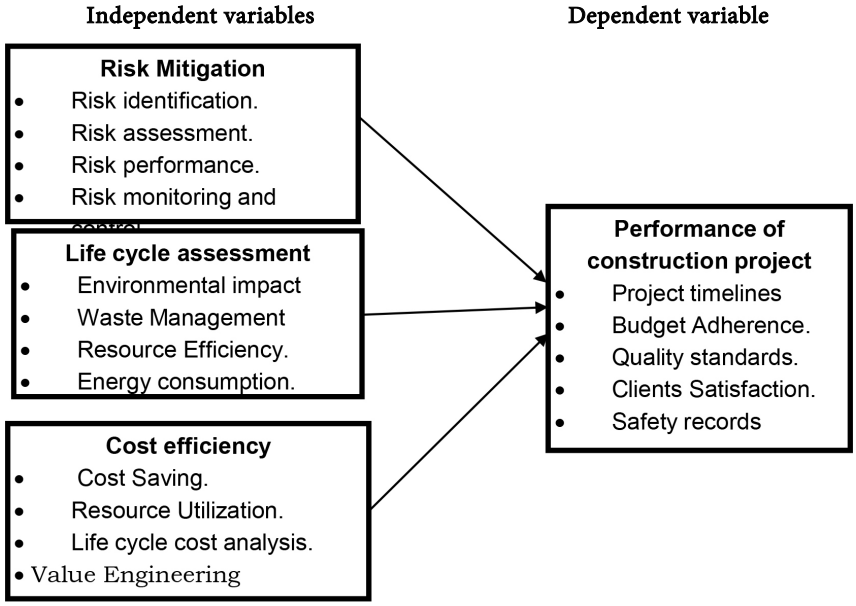
2.5. Justification for the Study

The identified gaps in the study are filled by conducting an empirical analysis of how cost management practices as sustainable procurement mechanisms influence the performance of the construction projects in the Homa Bay country. It adds to the literature by providing the foundations of the cost management based on dynamic capability theory, original data of a county-based context of the public sector, and the evaluation of the practices related to the costs including the utilization of the resources, value engineering, and life cycle costing.

Through this, the research is able to complement the current theoretical knowledge in addition to providing a practical work of policy makers, procurement officers and contractors interested in institutionalizing sustainable procurement practices as Kenya gears to adopt the devolved government system.

2.6. Conceptual framework of the study

According to Mugenda & Mugenda, a conceptual framework helps the researcher to quickly see the proposed relationships between variables in the study.



Source: (Adapted from Teece et al., 1990).

Figure 1. Conceptual framework on effect of sustainable procurement practices and performance.

The conceptual model above (see Figure 1) establishes the envisaged relationships among variables. The study was informed by the independent variables (risk mitigation, Life cycle assessment and cost management) and the dependent variable (performance of construction projects).

3. Methodology

3.1. Research Design

The research study conducted a descriptive survey research design, which was adequate to look into the prevailing practices of cost management and how these practices affect performance of construction projects in the natural public-sector environment. The design made it possible to have measures that could be quantified in a selected population and allowed it to apply inferential statistics in determining relationships between variables. It was also selected because it is used to analyze in a structured fashion the impact of cost saving strategies, resource utilization, life cycle cost analysis and value engineering conceptualized as elements of sustainable procurement on project outcome like budget compliance, time and quality delivery.

3.2. Study Area and Context

The research work was done in Homa Bay County in Kenya which is one of the devolved units of administration that carries out many construction projects that are publicly funded. Even with policy changes, the county has been ranked as being in-stages of projects, cost overrun, and irregular spending. According to the Auditor General (2022) Report, 294 million has gone unaccounted in terms of construction and it is an indicator of serious weakness in procurement and costs management. This situation offered an appropriate background to study the impact of sustainability in the cost control activities on the project performance.

3.3. Target Population and Sampling

The target population was 630 participants (150 procurement officers, 180 engineers, 120 project contractors, and 180 community representatives) in the direct implementation of 42 public construction projects seen to have been confirmed by different departments in Homa Bay County. A 15-member committee of procurement officers, engineers, contractors and community members was established to oversee each project.

The stratified random sampling method was executed to have a proportional representation concerning all the departments dealing with the projects. It was calculated that the representative sample of 189 individuals was selected based on the Krejcie and Morgan sampling formula of 1970. The stratification was such that the opinions of technical as well as administrative members were observed in all the working construction units.

3.4. Data Collection Instrument

The primary data were obtained with the help of a structured questionnaire that was designed in two major parts describing the demographics of the respondent and the constructs of cost management. The independent variable cost management practices were operationalized as four constructs as cost-saving strategies, resource utilization, life cycle cost analysis, and value engineering. The selection of these four constructs—cost-saving strategies, resource utilization, life cycle cost analysis, and value engineering—was based on their recurring prominence in literature as core cost management tools (Montasser et al., 2024a; Ogungbe, 2021b; Nyayo & Achuora, 2020). These constructs collectively capture both strategic and operational aspects of sustainable procurement in public projects.

Project performance was determined as a dependent variable with four most significant measures which included budget conformance, promptness, quality of work and client satisfaction.

The five-point Likert scale was used to measure all constructs, where the low end was strongly disagreements, whereas strongly agreements were a high-point stance. This form was chosen as it is rather simple and scaleable, it measures attitudes and perceptions successfully.

3.5. Validity and Reliability

In order to guarantee content validity, the questionnaire went through the review of the academic relevant persons working in the field of procurement, project management and research methodology. Some of the adjustments were done to ensure that every item is related to the study objectives, especially the third objective, which revolves around cost management. In order to pilot test the clarity and instrument structure, the pilot study was done among 10% of the sample size (n = 18) in the adjacent county of Migori.

Internal consistency of the instrument was determined with the aid of Cronbach's alpha that gave a coefficient of 0.972. This means that it is highly reliable and exceeds the required standard of reliability which is 0.70 as suggested by Mugenda and Mugenda and it was established that the instrument would be capable of reliably measuring the constructs used.

3.6. Data Analysis

Quantitative data were carried out through descriptive and inferential statistics. The respondent characteristics and perceptions trends on cost management practices were summarised using descriptive measures means, frequencies and standard deviations. In order to verify how cost management practices influences project performance, multiple linear regression analysis was performed. This has enabled the check of individual predictive power as well as combined power of four constructs of cost management on indicators of performance. This study also employed the SPSS in carrying out the analysis and the outcome was interpreted at a confidence level of 95 percent.

4. Results and Findings

4.1. Overview

In the present section, the output of the data processing based on which the impact of cost management practices as the elements of sustainable procurement-on the performance of the construction projects in Homa Bay County is assessed-has been introduced. There will be descriptive statistics and inferential results of a multiple linear regression model included in the analysis. Four constructs of cost management were examined, and these are cost-saving strategies, resource utilization, life cycle cost analysis and value engineering. The dependent variable was performance of the construction projects based on budget performance, timely project execution, quality results and stakeholder satisfaction.

4.2. Descriptive Statistics of Cost Management Practices

Table 1 contains the mean scores and standards deviations of four cost management practices studied in the research. The results show that most of the practices received a moderate high rating among the respondents, which implies that it was utilized generally among the construction projects within the county.

Table 1. Descriptive statistics for cost management practices (n = 189).

Cost Management Practice	Mean	Standard Deviation
Cost-Saving Strategies	4.19	0.498
Resource Utilization	4.02	0.462
Life Cycle Cost Analysis	4.16	0.526
Value Engineering	3.95	0.481

Source: Authors Computation 2024.

Respondents strongly agreed that cost-saving mechanisms (M = 4.19, SD = 0.498) and life cycle cost analysis (M = 4.16, SD = 0.526) were key cost management practices. Value engineering scored slightly lower (M = 3.95), though still indicating favorable perceptions. This suggests that while all practices are in use, there is room for improving technical adoption of more advanced tools such as value engineering.

4.3. Regression Analysis

To assess the combined and individual effect of cost management practices on construction project performance, a multiple linear regression analysis was conducted. The model included cost-saving strategies, resource utilization, life cycle cost analysis, and value engineering as predictors.

The regression analysis was significant ($F = 53.383$, $p < 0.001$), which signifies that the cost management practices collectively accounted for 53.3 percent of variance in construction project performance. Each of the four predictor variables turned out significant ($p < 0.05$) and confirmed the individual contribution of each of them to the performance outcomes (see Table 2).

Table 2. Regression coefficients and model summary.

Predictor Variable	Unstandardized Coefficient (β)	Standard Error	t-value	p-value
Constant	0.583	0.167	3.497	0.001
Cost-Saving Strategies	0.184	0.049	3.745	0.000
Resource Utilization	0.144	0.067	2.133	0.034
Life Cycle Cost Analysis	0.174	0.064	2.708	0.007
Value Engineering	0.151	0.060	2.520	0.013

Source: Authors Computation 2024.

4.4. Summary of Findings

The findings prove: Cost saving strategies positively affected performance most meaningfully (specifically Costa-saving strategy with 0.184 strength and $p = 0.001$). Life cycle cost analysis and value engineering were significant positively too (at $p = 0.007$ and 0.013 respectively). The statistically significant predictor, although slightly, was resource utilization ($p = 0.034$).

These results imply that integrated cost management, which is one of the approaches of sustainable procurement, is crucial to developing the performance of the public construction project. Some of the practices that motivate timely, cost-effective, and quality deliveries of projects include proactive budgeting, maximization of resources that go into projects, and consideration of long-term cost implications.

5. Discussion

5.1. Discussion of Findings

The objective of this study was to examine the effect of cost management practices positioned within the framework of sustainable procurement on the performance of public construction projects in Homa Bay County. The findings revealed that all four cost management components investigated cost-saving strategies, resource utilization, life cycle cost analysis, and value engineering significantly influenced project performance.

The positive and statistically significant effect of cost-saving strategies ($\beta = 0.184$, $p < 0.001$) affirms that proactive financial planning, budget forecasting, and efficient supplier negotiations are essential in reducing project costs and enhancing financial accountability. These findings are in line with Nyayo and Achuora (2020), who established that unit cost differentiation and strategic budgeting enhanced construction efficiency and cost predictability in Nairobi's informal settlements.

Life cycle cost analysis ($\beta = 0.174$, $p = 0.007$) also emerged as a significant predictor, confirming that long-term cost consideration beyond immediate procure-

ment prices enhances value-for-money outcomes. This aligns with the view of Montasser et al. (2024b), who argue that poor performance in public projects often stems from short-term cost focus rather than holistic life cycle costing. The adoption of life cycle analysis as a procurement practice thus supports both fiscal discipline and long-term asset sustainability.

Value engineering ($\beta = 0.151$, $p = 0.013$), though the lowest among the predictors, had a statistically significant effect, reinforcing the argument that performance improvements are achievable when project teams evaluate alternative materials, designs, or processes to achieve the same functionality at a lower cost. This is consistent with Ogungbe (2021a), who emphasized the need for engineering-led procurement reforms in Nigerian public infrastructure projects to counter chronic budget overruns.

Lastly, resource utilization ($\beta = 0.144$, $p = 0.034$) had a positive impact on performance, indicating that efficient allocation and monitoring of human, financial, and material inputs contribute to timely and quality project delivery. This supports Onyango's (2021) findings in Elgeyo Marakwet County, which showed that projects with optimized resource flows experienced fewer delays and better stakeholder satisfaction.

Together, these findings substantiate the view that cost management, when implemented as a sustainable procurement function, is critical to improving project outcomes in public construction. This reinforces the application of Dynamic Capability Theory (Teece et al., 1990), which posits that organizations can enhance performance through the adaptive reconfiguration of internal processes. By embedding cost management within procurement systems, project implementers build institutional resilience, reduce inefficiencies, and strengthen long-term performance.

These findings validate Dynamic Capability Theory by demonstrating how construction agencies in resource-constrained settings use specific cost tools (e.g., value engineering, lifecycle analysis) to reconfigure internal processes and adapt to shifting project demands, consistent with Teece's et al. (1990) proposition of dynamic organizational renewal.

5.2. Limitations of the Study

This study is limited by its reliance on self-reported survey data, which may introduce response biases. Additionally, it focuses on a single county (Homa Bay), which limits generalizability to other counties or national contexts. Future research should consider mixed-method approaches including interviews and focus groups to enrich and triangulate findings.

6. Conclusion

The study concludes that cost management practices integrated as part of sustainable procurement have a significant and positive effect on the performance of construction projects in Homa Bay County. Specifically, cost-saving strategies, life

cycle cost analysis, resource utilization, and value engineering are not merely budgeting tools but strategic procurement mechanisms that enhance project efficiency, accountability, and delivery success.

These results affirm the theoretical proposition of the Dynamic Capability Theory, demonstrating that counties and project agencies can achieve better outcomes by continuously adapting their cost systems to meet contextual demands. In an environment characterized by limited resources and public scrutiny, cost management becomes a cornerstone of sustainable infrastructure development.

7. Future Work

Future studies should also expand the geographical scope beyond Homa Bay County. Conducting similar investigations in other counties or regions—especially those with varying levels of infrastructure development—would offer comparative insights and enhance the generalizability of results. Cross-county or national-level studies could help uncover structural patterns in procurement performance, particularly under Kenya's devolved governance system, and guide harmonized policy responses.

There is a need to explore the longitudinal impact of cost management practices on project sustainability and maintenance outcomes. Most public construction projects face performance issues not only during implementation but also in the post-completion phase. Tracking performance indicators such as maintenance efficiency, operational costs, and stakeholder satisfaction over time would help assess the true value of sustainable procurement strategies like life cycle costing and value engineering in the long term.

Lastly, further investigation is needed into the institutional and political dynamics that either facilitate or hinder the integration of cost management tools in public procurement. Understanding how organizational culture, leadership commitment, procurement regulation, and political interference influence cost practices could provide a more holistic view of the enablers and barriers to sustainability in public project delivery. Such work could inform targeted capacity-building and reform strategies to institutionalize sustainable procurement at scale.

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Heartfelt appreciation goes to the respondents and stakeholders in Homa Bay County who willingly shared their time, experiences, and insights, making this research possible.

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Conflicts of Interest

The authors declare no conflicts of interest regarding the publication of this paper.

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Appendix Questionnaire

Section A: Demographic Characteristics of Respondents

1. Give your age in years.
    a). 20 and below
    b). 21 - 30
    c). 31 - 40
    d). 41 - 50
    e). 51 and above
2. State your gender orientation.
    a). Male
    b). Female
3. State your marital status.
    a). Single
    b). Married
    c). Divorced
    d). Separated
    e). Other (specify)...
4. What is your highest level of education?
    a). Primary
    b). Secondary
    c). Tertiary
    d). University
    e). Other (specify)
5. For how long have you been participating in the implementation of construction projects in the public sector in Homa Bay County?
    a). 5 and below
    b). 5 - 10
    c). 10 - 15
    d). 15 - 20
    e). 20 and above
6. Which stakeholder group do you represent in the project management committee?
    a). County staff
    b). Faith based
    c). Civil society
    d). Community
    e). Other (specify)

Section B: Study Variables

7. Risk mitigation

In a scale of 1 - 5, how do the following variables influence performance of construction projects in Homa Bay County?

		1	2	3	4	5
A	We embrace early warming signs effectively					
B	Key performance indicators are tracked regularly					
C	Risk assessment tools are made available					
D	Incident reports are thoroughly evaluated and acted upon					

8. In your own opinion, explain the influence of risk mitigation on performance of construction projects in Homa Bay County

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9. Supplier performance

		1	2	3	4	5
A	On time delivery is often realized					
B	Only high quality products are supplied					
C	All supplies meet cost competitiveness					
D	Our suppliers are always responsive to our requirements					

10. In your own opinion, explain how supplier performance influences performance of construction projects in Homa Bay County

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11. Life cycle assessment

		1	2	3	4	5
A	Our supplies are free from global warming potentials					
B	Our resource footprints are devoid of environmental hazards					
C	Energy use is effectively embraced in our project					
D	Resource depletion is always addressed					

12. In your own opinion, explain how life cycle assessment influences performance of construction projects in the public sector in Homa Bay County

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13. Cost efficiency

		1	2	3	4	5
A	Cost per unit on supplies is always low					
B	We always obtain superior return on investments					
C	Cost variance is always marginal on our suppliers					
D	Resource optimization is always assured in our project					

14. In your own opinion, explain the influence of cost efficiency on performance of construction projects in the public sector in Homa Bay County

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