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PROJECT COST MANAGEMENT PRACTICES AND PERFORMANCE OF SEWERAGE MANAGEMENT PROJECTS IN NAIROBI CITY COUNTY, KENYA

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Abstract

The performance of sewerage management projects funded by the National Government in Kenya has been a major concern, especially because of the huge benefits to be accrued by the beneficiaries and as well because of the huge investments made on these projects. The purpose of this study is to examine the influence of project cost management practices on performance of sewerage management projects in Nairobi city county, Kenya. Specifically, the study sought to assess the influence of cost budgeting and cost control on performance of sewerage management projects in Nairobi city county, Kenya. This study was guided by Theory of Constraints and The Control Theory. This study adopted a descriptive research design. There are a total of 167 employees involved in the projects 64 government representatives and 39 local authorities as at October 2021 (Ministry of Water and Sanitation, 2021). The unit of observation comprised these 270 respondents from the 18 sewerage management projects in Nairobi city county, Kenya. The study adopted census approach since the population under study is small and use questionnaires for data collection. The sample for piloting was 10% of the sample hence 27 respondents. This study used both construct validity and content validity. The Cronbach Alpha coefficient was used to measure the consistency of variables. Primary data was analyzed using both descriptive statistics (frequency, percentage, mean) inferential statistics that included Pearson correlation and regression. The study concludes that that cost budgeting has a significant effect on performance of sewerage management projects in Nairobi city county, Kenya. The study also concludes that cost control has a significant effect on performance of sewerage management projects in Nairobi city county, Kenya. This study recommends that project managers should conduct a thorough and accurate assessment of project requirements, considering all aspects such as materials, labor, equipment, and potential risks.

Key words: Cost control, Cost budgeting, Project cost management practices, Project performance

Background of the Study

Sanitary sewerage systems, as a part of built infrastructure, are unquestionably of high significance for modern societies. The role of sewer networks is to collect and transfer wastewater from buildings (residential, commercial, or industrial) and all kinds of public and private establishments to a point of treatment and disposal. These systems are the results of construction projects aiming to either build new or renovate existing sewerages. Most of such projects one may even dare to say that the overwhelming majority are financed from public funds. According to Javier and Alonso (2017), more than 884 million people worldwide lack access to safe drinking water and an estimated 2.5 billion lack access to basic sanitation services. They further state that the World Health Organization estimates that 6.3% of all deaths worldwide are caused by limited access to safe drinking water and limited access to improved sanitation facilities and hygiene practices. Therefore, achieving universal access to the two still remains a crucial goal of the global development agenda. Hutton et al. (2017) states that water and sanitation interventions have demonstrated economic benefits ranging from $5 to $46 per $1 invested.

When considering sewerage construction projects, management problems become subjects of research and study, similar to other types of construction projects. Some noteworthy examples of general problems presented in the literature include the following: an optimization model for sewage rehabilitation aiming to achieve maximum effectiveness at the lowest cost, utilizing genetic algorithms ; a methodology for selecting and prioritizing sewerage projects within available funds and system capacity, based on dynamic programming principles ; a study on the risk of cost overruns in water and sewerage system construction projects ; the development of a new method to enhance the accuracy of Monte Carlo simulations and its validation in predicting the success likelihood of sewerage build–operate–transfer projects, based on eight case studies ; research on culturally appropriate organization of projects implemented through public–private partnerships; theoretical and empirical analysis of issues arising in public–private partnership projects within the sewerage sector ; and an investigation into delay factors in sewerage projects using simulations and a dynamic systems approach (Juszczyk, *et al*, 2023).

Project cost management practices refer to the set of processes, methodologies, and strategies implemented by organizations to plan, estimate, budget, monitor, and control costs throughout the lifecycle of a project. Effective project cost management is crucial for ensuring that a project is completed within the allocated budget while delivering the desired outcomes (Kipngetich, Odhiambo, & Nyaberi, 2023). Project cost management practices encompass several integral components, each playing a vital role in ensuring the efficient utilization of financial resources and the successful completion of projects within budget constraints. The first crucial component is cost estimation, where methodologies such as bottom-up estimation, analogous estimation, and parametric estimation are employed. These approaches break down the project into smaller tasks, utilize historical data, and leverage statistical relationships to estimate costs at different levels of granularity (Anya, Umoh, & Worlu, 2017).

Cost budgeting involves the allocation of the overall project budget to specific tasks or work packages based on the earlier cost estimates. Additionally, a cost baseline is established, providing a reference point against which actual costs can be compared throughout the project's progression (Muute, & James, 2019). Cost control involves continuous monitoring and reporting of project expenditures. Variance analysis is employed to scrutinize differences between planned and actual costs, facilitating timely corrective actions. Change control mechanisms manage alterations to project scope, schedule, or resources, assessing their impact on the project's financial parameters (Andinda, & Dushimimana, 2023). This study therefore sought to examine the influence of project cost management practices on performance of sewerage management projects in Nairobi city county, Kenya

Canadian government records attainment of project sustainability due to implementation of monitoring practices that makes it possible to monitor and track project progress towards goals.

In the USA, implementation guidelines for infrastructural development projects underscore tracking and appraisal activities that allow for successful correction of project details and promote consistency in project progress assessment. The United States of America became particularly engaged in results-based analysis and assessment of project success management of policy and implementation programmes (Suskie, 2018).

According to United Nations (2018), 42% of people lack a basic water supply in Sub-Saharan Africa, and 72% lack basic sanitation. In addition, Africa is urbanizing rapidly and its urban population is expected to increase from 345 million in 2017 to 1.3 billion people by 2050. Urbanization in Africa is not accompanied by a sufficient rate of economic growth and therefore there is a large and growing infrastructure and financing gap. "Investments will have to be increased by a multiple of existing amounts to meet the Sustainable Development Goals for poverty reduction and water and sanitation in SubSaharan Africa" (OECD, 2018). According to Minyiri and Muchelule (2018), the amount of money dedicated to international development and aid is growing each year but it is unclear how much of a lasting positive impact it has on developing economies and societies. According to the UNDP, official development assistance spending is not enough to address the existing water and sanitation needs or to meet the Millennium Development Goals (Ruwa, & Chinyavu, 2016).

According to the Kenya National Water Services Strategy (2018 - 2022), sustainable water access levels in Kenya were estimated to be at 60%, while sanitation was estimated at 68%. According to Minyiri and Muchelule (2018), a closer look at Kenya‟s water projects leaves no doubt that performance is a challenge. This is evident in most of the water projects that have been undertaken over time with little impact despite the resources used. People lack proper services because systems fail, often because not enough resources are invested to appropriately build and maintain them, and also because of the stress that the fast growing population places on the existing infrastructure.

The Nairobi City Water and Sewerage Company (NCWSC) was incorporated in December 2003 under the companies Act, Cap 486. It is a wholly owned subsidiary of the City Council of Nairobi (CCN). The Company‘s formation arose from the enactment of the new Water Act 2002, which created new institutions to manage water resources and services in Kenya. Water service provision in Kenya is governed by the Water Act 2002 which brought about reforms in the water sector aimed at facilitating access to clean water and sanitation services to all Kenyans (Water, 2015).

The reforms saw the creation of 8 regional Water Service Boards (WSBs) under the Ministry of Environment, Water and Natural Resources (MEWNR). WSBs are responsible for overseeing the operations of water and sewerage/sanitation utilities in their respective areas of jurisdiction. The Athi Water Works Development Agency (AWWDA) oversees NCWSC and 11 other water service providers (Water, 2015).

The Water Service Boards are in turn regulated by the Water Services Regulatory Board (WASREB). This is a non-commercial State Corporation established in March 2003. The mandate of the institution is to oversee the implementation of policies and strategies relating to provision of water and sewerage services. WASREB sets rules and enforces standards to ensure that consumers are protected and have access to efficient, affordable and sustainable services. Its powers are set in the Water Act, 2002 (Water, 2015).

The Act separates policy formulation, regulation and services provision. In the Constitution of Kenya, decreed in 2010, the Ministry of Water and Environment delegated authority to the devolved units of the County Governments. NCWSC, as a service provider, signs a five year Service Provision Agreement with AWSB and an annual performance contract with the Nairobi City County (NCC). NCC has developed an integrated development plan which is anchored in national policies and plans such as Vision 2030 and its second Medium Term Plan 2013-2017(Water, 2015).

Statement of the Problem

The performance of sewerage management projects funded by the National Government in Kenya has been a major concern, especially because of the huge benefits to be accrued by the beneficiaries and as well because of the huge investments made on these projects. Project managers always target project success. This involves finishing the project on time, within budget, meeting end product specifications, meeting customer needs and meeting management objectives (Minyiri, & Muchelule, 2018). According to the Kenya National Water Services Strategy (2018 - 2022), sustainable water access levels in Kenya were estimated to be at 60%, while sanitation was estimated at 68%. However, many water and sanitation projects in Kenya experience project time overrun, budget overrun and as well do not meet product specifications, customer needs and management objectives (Ndegwa, 2019).

When projects are unsuccessful or delayed, this implies that targeted project benefits are only realized in part or never at all (Mutoro *et.al*. 2017). Delayed project completion has both high costs to society and incapacitating effects on the contracting parties (Ondari & Gekara, 2016). In particular, delayed completion of water and sanitation projects makes it difficult to achieve the required access to affordable, safe and adequate water supply services. Investments in water and sanitation projects in Kenya are colossal. For instance, the total development expenditure on water supplies (includes sewerage and waste management) and related services increased from KShs 20.5 billion in 2012/13 to KShs 65.2 billion in 2020/21 financial year (KNBS, 2022). Research has shown that project cost management practices influence project performance.

Various studies have been conducted on project cost management practices and project performance. For instance; Okereke, Zakariyau and Eze (2022) conducted a study on the role of construction cost management practices on construction organizations' strategic performance. Ngwai, Simba and Oyoo (2019) investigated the influence of project management practices on construction cost control of projects in Mombasa County. Chigara, Moyo and Mudzengerere (2018) conducted a study on an analysis of cost management strategies employed by building contractors on projects in Zimbabwe. Nevertheless, none of these studies focused on performance of sewerage management projects in Nairobi city county, Kenya. To fill the highlighted gaps, the current study sought to examine the influence of project cost management practices on performance of sewerage management projects in Nairobi city county, Kenya.

General Objective

The purpose of this study is to examine the influence of project cost management practices on performance of sewerage management projects in Nairobi city county, Kenya.

Specific Objectives

This study was guided by the following specific objectives:

i. To examine the influence of cost budgeting on performance of sewerage management projects in Nairobi city county, Kenya.
ii. To determine the influence of cost control on performance of sewerage management projects in Nairobi city county, Kenya.

Theoretical Review

Theory of Constraints

The theory of constraints (TOC) is a management philosophy and approach to continuous improvement that was developed by Eliyahu Goldratt in 1984. It is based on the idea that organizations have inherent constraints that limit their ability to achieve their goals, and that by identifying and addressing these constraints, organizations can improve their performance (Uwiragiye & Mulyungi, 2019). The theory of constraints (TOC) has had an ample implication

in supply chain and the whole aura of logistics. Anchored on a maxim that "a chain is no stronger than its weakest link", TOC has been considered as a management philosophy, which seeks to ignite and consequently implement novel innovations over a constraint that prevents a system from achieving superior levels of performance (Murei, Kidombo & Gakuu, 2017).

TOC suggests subordinating non-constraints or less critical activities to the constraints. In cost budgeting, this involves aligning budget allocations with the priorities of critical project activities, ensuring that resources are directed toward tasks that have the most significant impact on project success. TOC advocates for actions to elevate or eliminate constraints to improve system performance. In cost budgeting, this could involve seeking additional funding, negotiating for increased budgets, or implementing measures to overcome financial limitations that may hinder project progress (Mutya, 2018). This study will use theory of constraints to assess the influence of cost budgeting on performance of sewerage management projects in Nairobi city county, Kenya

The Control Theory

Travis Hirschi came up with the control theory at the end of the 1960s. The Theory, particularly as applied to management and systems, provides a relevant framework supporting the practice of cost control in project management. Control theory, in a general sense, is concerned with mechanisms for regulating and influencing the behavior of systems. In the context of cost control, this theory offers principles and strategies for managing and steering project costs effectively (Zhao, Mbachu & Domingo, 2017).

Control theory acknowledges that systems are dynamic, evolving entities. In cost control, recognizing the dynamic nature of projects allows for adaptability in strategies, ensuring that cost control measures remain effective in the face of changing project conditions. Closed-loop control systems continuously compare actual performance with the desired setpoint and adjust accordingly. In cost control, this involves a continuous loop of monitoring, comparing, and adjusting project costs to ensure they align with the approved budget (Igwe, Mohammed, Azwrie & Ugulu, 2022). The Control Theory will be used to assess the influence of cost control and performance of sewerage management projects in Nairobi city county, Kenya.

Conceptual Framework

A conceptual framework is a diagrammatic representation of the research variables. The relationship of the study variables visualized to show their interconnectedness (Oso & Onen, 2009). This conceptual framework comprises the independent variables (cost budgeting and cost control) and the dependent variable (performance of sewerage management projects in Nairobi city county, Kenya). The conceptual framework of this study is presented in Figure 1 below.

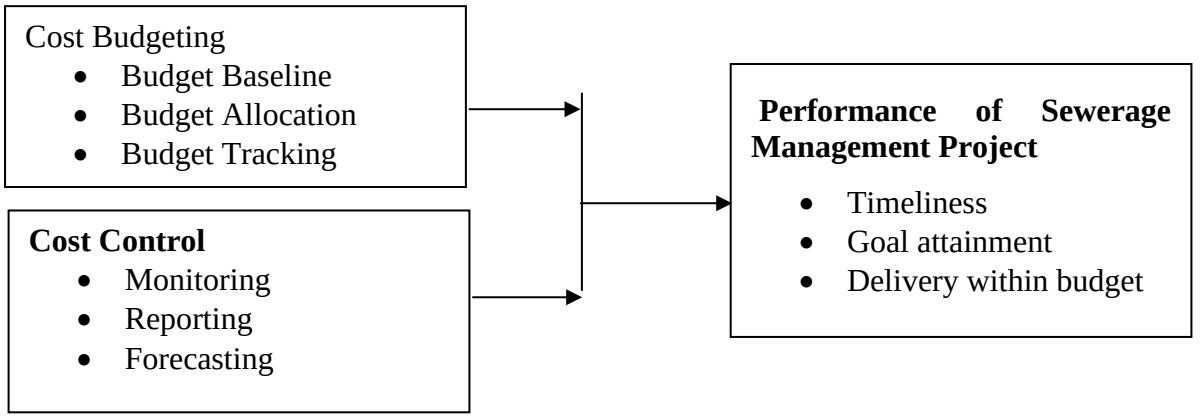

Figure 1: Conceptual Framework

Cost budgeting is a pivotal aspect of project management, focusing on the allocation and distribution of financial resources to various activities and tasks within a project. It involves the process of estimating, planning, and controlling costs to ensure that a project is completed within the approved budgetary constraints (Nsengiyumva & Njenga, 2021). Cost budgeting provides project managers and stakeholders with a structured framework for managing expenses and monitoring financial performance throughout the project lifecycle.

Cost control is a fundamental aspect of financial management within organizations, particularly in the context of project management and operational efficiency. It encompasses the processes and techniques used to monitor, manage, and minimize expenses associated with various activities, projects, or business operations (Igwe, Mohammed, Aazwarie & Ugulu, 2020). The primary objective of cost control is to ensure that expenditures remain within predefined budgets while maximizing the value derived from available resources (Gitonga, Muchelule & Nyang'au (2022).

Research Methodology

This study adopted a descriptive research design. This is a scientific method of investigation in which data is collected, processed, analyzed and presented in order to describe the current conditions, terms or relationships concerning a certain field (Mugenda, 2018). A scientific method involves observation and description of behavior of subject without influencing it in any way. The choice of this research design was influenced by the fact that it caters for qualitative and quantitative data (Cooper & Schindler, 2019).

There are a total of 167 employees involved in the projects 64 government representatives and 39 local authorities as at October 2023 (Ministry of Water and Sanitation, 2021). The unit of observation comprised of these 270 respondents from the 18 sewerage management projects in Nairobi city county, Kenya

The study adopted census technique since all the 18 sewerage management projects in Nairobi City County, Kenya were considered. The respondents of the study were 270 respondents comprising of 167 employees involved in the projects 64 government representatives and 39 local authorities

This research used a questionnaire to collect primary data. Structured questions were used to collect primary data from the field. Questionnaires were preferred because they are effective data collection instruments that allow respondents to give much of their opinions pertaining to the research problem (Dempsey, 2017).

An introductory letter from the university, introducing the researcher to relevant authorities for field data collection was first obtained. This letter was used to obtain the research permit from the National Commission for Science, Technology, and Innovation (NACOSTI). In addition, the researcher sought permission from firms in order to be allowed to collect data. They used the drop and pick later technique where respondents were allowed two weeks to fill in the questionnaires.

A pilot test was conducted to assess the questionnaire's validity and reliability of the data that was collected. The subjects participating in the pilot study were not included in the final study to avoid survey fatigue. Twenty-seven questionnaires were piloted that represented 10% of the target population. For the purpose of this study the researcher sought opinions of experts in the field of study especially the supervisors and project management lecturers to establish the validity of the research instrument. This facilitated necessary revision and modification of the research instrument thereby enhancing validity. The study applied the reliability analysis to assess internal consistency of the study variables. Cronbach's Alpha coefficient were computed on all components of questionnaire and their assessment given (Malhotra, 2017). Alpha of 0.7 and above was used as a threshold in this study (Cooper & Schindler, 2006; Hair *et al.*, 2010).

Descriptive statistics, such as mean and frequencies, were used for data analysis in this study. Mean scores were utilized to rank factors in terms of their importance. Questionnaire data underwent analysis through procedures such as editing, handling blank responses, coding, categorizing, and inputting into the Statistical Package for the Social Sciences (SPSS) software for analysis. Microsoft Excel 2018 was utilized to generate charts based on the data analyzed by SPSS (Version 25). SPSS produced frequencies, descriptive statistics (including frequencies, mean scores, and standard deviation), and inferential statistics, facilitating conclusions and generalizations about the population. Specifically, inferential statistics such as regression and correlation analysis were employed (Levesque, 2017).

Data Analysis and Findings

The sample size of the study was 270 respondents comprising of 167 employees involved in the projects 64 government representatives and 39 local authorities. The questionnaires were dropped off and picked up later after they were filled by the respondents. Out of 270 questionnaires which were distributed, 255 were duly filled and returned. The drop-off and pick-up-later method yielded the high response rate of 94.4%. According to Babbie (2017), a response rate of 75 per cent is adequate for analysis as well as making conclusions and inferences about a population. This implies that the response rate of 94.4% was adequate for analysis, drawing conclusions and reporting.

Pilot Study Results

The study conducted pilot test to test for validity and reliability of the data collection tool. In this study, reliability of the questionnaires was assessed by use of Cronbach‘s Alpha. The data collected from the pilot study was not used in the final analysis.

As shown in Table 1, cost budgeting had an average Cronbach’s reliability alpha of 0.789, cost control had a Cronbach’s reliability alpha of 0.832 and performance of sewerage management projects had an average Cronbach’s reliability alpha of 0.845. This shows that the study questionnaire met the reliability criteria (α>0.7).

Table 1: Reliability Test Results

Variable	Cronbach's Alpha	Interpretation
cost budgeting	0.789	Reliable
cost control	0.832	Reliable
performance of sewerage management projects	0.845	Reliable

Descriptive statistics

Performance of Sewerage Management Projects

The respondents were requested to indicate their level of agreement on various statements relating to performance of sewerage management projects in Nairobi city county, Kenya. A 5 point Likert scale was used where 1 symbolized strongly disagree, 2 symbolized disagree, 3 symbolized neutral, 4 symbolized agree and 5 symbolized strongly agree. The results were as presented in Table 2.

From the results, the respondents agreed that the sewerage management projects are initiated and implemented in accordance with the approved plan and specifications. This is supported by a mean of 3.968 (std. dv = 0.905). In addition, as shown by a mean of 3.859 (std. dv = 0.885), the respondents agreed that the project team demonstrate effective coordination and collaboration during the implementation phase. Further, the respondents agreed that construction activities are executed efficiently, minimizing disruptions to the community. This is shown by a mean of 3.800 (std. dv = 0.605).

As shown by a mean of 3.785 (std. dv = 0.981), the respondents agreed that the projects adhere to environmental regulations and standards throughout its implementation. In addition, the

respondents agreed that quality control measures are consistently applied to ensure the durability and effectiveness of sewerage infrastructure. This is shown by a mean of 3.777 (std. dv = 0.878). The respondents also agreed that they are satisfied with the overall performance of sewerage management projects. This is shown by a mean of 3.678 (std. dv = 0.897).

Table 2: Performance of Sewerage Management Projects

	Mean	Std. Deviation
The sewerage management projects are initiated and implemented in accordance with the approved plan and specifications.	3.968	0.905
The project team demonstrate effective coordination and collaboration during the implementation phase.	3.859	0.885
Construction activities are executed efficiently, minimizing disruptions to the community.	3.800	0.605
The projects adhere to environmental regulations and standards throughout its implementation.	3.785	0.981
Quality control measures are consistently applied to ensure the durability and effectiveness of sewerage infrastructure.	3.777	0.878
Am satisfied with the overall performance of sewerage management projects	3.678	0.897
Aggregate	**3.798**	**0.821**

Cost Budgeting and Performance of Sewerage Management Projects

The first objective of the study was to assess the influence of cost budgeting on performance of sewerage management projects in Nairobi city county, Kenya. The respondents were requested to indicate their level of agreement on various statements relating to cost budgeting and performance of sewerage management projects in Nairobi city county, Kenya. A 5 point Likert scale was used where 1 symbolized strongly disagree, 2 symbolized disagree, 3 symbolized neutral, 4 symbolized agree and 5 symbolized strongly agree. The results were as presented in Table 3.

From the results, the respondents agreed that the initial cost budget was realistic and aligned with the financial requirements of the project. This is supported by a mean of 3.943 (std. dv = 0.986). In addition, as shown by a mean of 3.926 (std. dv = 0.840), the respondents agreed that the cost budgeting process is well-documented and follows established financial practices. Further, the respondents agreed that actual project expenditures consistently align with the allocated budget for each phase or task. This is shown by a mean of 3.846 (std. dv = 0.879). The respondents also agreed that the cost budget includes sufficient provisions for unexpected expenses or changes in scope. This is shown by a mean of 3.831 (std. dv = 0.904).

As shown by a mean of 3.816 (std. dv = 0.789), the respondents agreed that team members are knowledgeable about the cost budget and understand their role in managing expenses. Further, the respondents agreed that changes in project scope or requirements are evaluated for their impact on the overall budget. This is shown by a mean of 3.796 (std. dv = 0.937). The respondents also agreed that contingency plans and funds are effectively utilized to address unforeseen cost overruns. This is shown by a mean of 3.689 (std. dv = 0.876).

Table 3: Cost Budgeting and Performance of Sewerage Management Projects

	Mean	Std. Deviation
The initial cost budget was realistic and aligned with the financial requirements of the project.	3.943	0.986
The cost budgeting process is well-documented and follows established financial practices.	3.926	0.840
Actual project expenditures consistently align with the allocated budget for each phase or task.	3.846	0.879
The cost budget includes sufficient provisions for unexpected expenses or changes in scope.	3.831	0.904
Team members are knowledgeable about the cost budget and understand their role in managing expenses.	3.816	0.789
Changes in project scope or requirements are evaluated for their impact on the overall budget.	3.796	0.937
Contingency plans and funds are effectively utilized to address unforeseen cost overruns.	3.689	0.876
Aggregate	**3.788**	**0.897**

Cost Control and Performance of Sewerage Management Projects

The second specific objective of the study was to determine the influence of cost control on performance of sewerage management projects in Nairobi city county, Kenya. The respondents were requested to indicate their level of agreement on various statements relating to cost control and performance of sewerage management projects in Nairobi city county, Kenya. A 5 point Likert scale was used where 1 symbolized strongly disagree, 2 symbolized disagree, 3 symbolized neutral, 4 symbolized agree and 5 symbolized strongly agree. The results were as presented in Table 4.

From the results, the respondents agreed that the project has established robust mechanisms for monitoring and controlling costs throughout its lifecycle. This is supported by a mean of 3.891 (std. dv = 0.865). In addition, as shown by a mean of 3.818 (std. dv = 0.945), the respondents agreed that regular reviews of project expenses are conducted to ensure adherence to the budget. Further, the respondents agreed that variances between actual and planned costs are promptly identified and addressed. This is shown by a mean of 3.808 (std. dv = 0.611). The respondents also agreed that the cost control measures in place effectively prevent unauthorized expenditures. This is shown by a mean of 3.721 (std. dv = 0.908).

As shown by a mean of 3.661 (std. dv = 0.776), the respondents agreed that there is a clear process for approving and managing changes that may impact project costs. From the results, the respondents agreed that the project team actively seeks and implements cost-saving opportunities without compromising quality. This is supported by a mean of 3.654 (std. dv = 0.967). In addition, as shown by a mean of 3.621 (std. dv = 0.786), the respondents agreed that budget revisions, if necessary, are communicated and approved in a timely manner.

Table 4: Cost Control and Performance of Sewerage Management Projects

	Mean	Std. Deviation
The project has established robust mechanisms for monitoring and controlling costs throughout its lifecycle.	3.891	0.865
Regular reviews of project expenses are conducted to ensure adherence to the budget.	3.818	0.945
Variances between actual and planned costs are promptly identified and addressed.	3.808	0.611
The cost control measures in place effectively prevent unauthorized expenditures.	3.721	0.908
There is a clear process for approving and managing changes that may impact project costs.	3.661	0.776
The project team actively seeks and implements cost-saving opportunities without compromising quality.	3.654	0.967
Budget revisions, if necessary, are communicated and approved in a timely manner.	3.621	0.786
Aggregate	**3.765**	**0.758**

Correlation Analysis

The present study used Pearson correlation analysis to determine the strength of association between independent variables (cost budgeting and cost control) and the dependent variable (performance of sewerage management projects in Nairobi city county, Kenya). Pearson correlation coefficient range between zero and one, where by the strength of association increase with increase in the value of the correlation coefficients.

Table 5: Correlation Coefficients

		Project Performance	Cost Budgeting	Cost Control
Project Performance	Pearson Correlation	1		
	Sig. (2-tailed)			
	N	255		
Cost Budgeting	Pearson Correlation	.826**	1	
	Sig. (2-tailed)	.002		
	N	255	255	
Cost Control	Pearson Correlation	.871**	.278	1
	Sig. (2-tailed)	.000	.076	
	N	255	255	255

The results revealed that there is a very strong relationship between cost budgeting and performance of sewerage management projects in Nairobi city county, Kenya (r = 0.826, p value =0.002). The relationship was significant since the p value 0.002 was less than 0.05 (significant level). The findings are in line with the findings of Wenbo and Qin (2020) that there is a very strong relationship between cost budgeting and project performance.

The results also revealed that there was a very strong relationship between cost control and performance of sewerage management projects in Nairobi city county, Kenya (r = 0.871, p value =0.000). The relationship was significant since the p value 0.000 was less than 0.05 (significant level). The findings are in line with the results of Otim (2017) who revealed that there is a very strong relationship between cost control and project performance.

Regression Analysis

Multivariate regression analysis was used to assess the relationship between independent variables (cost budgeting and cost control) and the dependent variable (performance of sewerage management projects in Nairobi city county, Kenya)

Table 6: Model Summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.931	.857	.858	.10428

a. Predictors: (Constant), cost budgeting and cost control

The model summary was used to explain the variation in the dependent variable that could be explained by the independent variables. The r-squared for the relationship between the independent variables and the dependent variable was 0.857. This implied that 85.7% of the variation in the dependent variable (performance of sewerage management projects in Nairobi city county, Kenya) could be explained by independent variables (cost budgeting and cost control).

Table 7: Analysis of Variance

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	141.081	2	35.270	1216.2	.000[b]
	Residual	7.254	252	.0290		
	Total	148.335	254			

a. Dependent Variable: Performance of sewerage management projects
b. Predictors: (Constant), cost budgeting and cost control

The ANOVA was used to determine whether the model was a good fit for the data. F calculated was 1216.2 while the F critical was 2.408. The p value was 0.000. Since the F-calculated was greater than the F-critical and the p value 0.000 was less than 0.05, the model was considered as a good fit for the data. Therefore, the model can be used to predict the influence of resource planning, cost estimation, cost budgeting and cost control on performance of sewerage management projects in Nairobi city county, Kenya.

Table 8: Regression Coefficients

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	0.239	0.061		3.918	0.000
	cost budgeting	0.357	0.098	0.356	3.643	0.002
	cost control	0.375	0.099	0.376	3.788	0.001

a Dependent Variable: Performance of sewerage management projects

The regression model was as follows:

$Y = 0.239 + 0.\ 0.357X_1 + 0.375X_2 + \varepsilon$

The results revealed that cost budgeting has significant effect on performance of sewerage management projects in Nairobi city county, Kenya, $\beta 1=0.357$, p value= 0.002). The relationship was considered significant since the p value 0.002 was less than the significant level of 0.05. The findings are in line with the findings of Wenbo and Qin (2020) that there is a very strong relationship between cost budgeting and project performance.

In addition, the results revealed that cost control has significant effect on performance of sewerage management projects in Nairobi city county, Kenya, $\beta 1=0.375$, p value= 0.001). The relationship was considered significant since the p value 0.001 was less than the significant

level of 0.05. The findings are in line with the results of Otim (2017) who revealed that there is a very strong relationship between cost control and project performance.

Conclusions

The study concludes that cost budgeting has a significant effect on performance of sewerage management projects in Nairobi city county, Kenya. The study findings revealed that budget Baseline, resource Allocation and budget Tracking influences performance of sewerage management projects in Nairobi city county, Kenya.

The study also concludes that cost control has a significant effect on performance of sewerage management projects in Nairobi city county, Kenya. The study findings revealed that monitoring and Reporting, variance Analysis and forecasting influences performance of sewerage management projects in Nairobi city county, Kenya.

Recommendations

This study recommends Further, the management should implement a system for regular updates and reviews of cost estimates throughout the project lifecycle. This ensures that estimates are adjusted to reflect any changes in project scope, market conditions, or unforeseen challenges, leading to more accurate and reliable projections.

The study also recommends that the management should establish a robust system for real-time monitoring of project costs. Utilize technology and project management tools to track expenses, identify cost variations, and generate timely reports. This allows project managers to stay informed about the financial status of the project and take immediate corrective actions when necessary.

This study was limited to performance of sewerage management projects in Nairobi city county, Kenya, hence the study findings cannot generalized to performance of projects in the private sector in Kenya. The study therefore suggests further studies on influence of project cost management practices on project performance in the private sector in Kenya.

Further, the study found that the independent variables (resource planning, cost estimation, cost budgeting and cost control) could only explain 85.7% of performance of sewerage management projects in Nairobi city county, Kenya. This study therefore suggests further research on other factors affecting performance of sewerage management projects in Nairobi city county, Kenya.

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