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COST MANAGEMENT AND PERFORMANCE OF CONSTRUCTION PROJECTS IN PUBLIC HOSPITALS IN NAIROBI CITY COUNTY, KENYA

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ABSTRACT

This study sought to evaluate the effect of cost management on performance of construction projects in public hospitals in NCC, Kenya. The specific objectives were to establish the effect of cost planning, cost monitoring and control on performance of construction projects. Performance of construction projects was measured using metrics of adherence to budget, quality and completion time. This study used a descriptive research design with a questionnaire as the instrument for data collection. The study targeted 200 technical personnel involved in Engineering Procurement and Construction (EPC) Projects in 57 healthcare facilities managed by NCCG. The unit of analysis was public healthcare projects managed by the NCCG. The unit of observation was project team members i.e. project managers, Contractors, Architects, Engineers, Quantity Surveyors, implementing infrastructural projects in the public hospitals. The study conducted a census survey on all construction projects in public hospitals in NCC. A pilot study was conducted to check the validity and reliability of the research instruments. A pretesting sample of 10% of the target population was studied. It involved projects in public hospitals within Nairobi County but managed by the National Government and from the private sector. Reliability was tested using the internal consistency method. A threshold value of 0.7 as suggested by the Cronbach Alpha coefficient was adopted for the study. Also, the pilot study tested the validity of the research instruments. Aspects of content and face validity where the tools were checked by industry experts and the supervisors was used. Additionally, using the confirmatory test analysis, construct validity was used to test suitability of variables. A factor loading of at least 0.4 was set as the benchmark for this study. Data collected was analyzed using Statistical Package for Social Science (SPSS) version 25 to produce frequencies, descriptive and inferential statistics were used to derive conclusions. Quantitative data was analyzed through the use of descriptive statistics e.g. standard deviation, mean scores, significance, etc. The study conducted a multiple regression analysis, Pearson correlation, t-test and ANOVA to determine the relationship between cost management and performance of construction projects. The study presented findings in form of tables and figures. Correlation results revealed that cost planning influences performance of construction projects positively. The results also indicated that there was a positive and significant relationship between cost control and performance of construction projects.

Key Words: Cost management, Cost planning, Cost monitoring and control, Performance, Construction projects

Background of the Study

The construction projects play a significant role in societies in terms of meeting the development needs of the economy and more so in transforming the quality of life of citizens (Gitonga & Keiyoro, 2017). Projects are themselves complicated undertakings, spanning a development timeof years or decades, with unique requirements, bringing together multiple stakeholders and a disparate workforce that spans the entire supply chain (Belay & Torp, 2021). The lack of completion of the infrastructure projects is a problem of public health concern since it limits healthcare delivery to the people (Mobegi et al., 2019). Cost overruns are problems in developed and developing countries, and the trend is more severe in developing countries.

Cost management is one of the important factors determining project completion successfully within limited time with reasonable profit. Successful infrastructural projects are those delivered safe and sound to the required quality standards on time within budget and desired budget (Gitongaet al., 2022). The effective management of costs is a vital element in achieving these objectives. Clients rightly expect that the final cost of their projects should not exceed the approved budget, and indeed for some, cost control and certainty is their main priority (Hinz et al., 2017).

Cost overruns during the construction phase may seriously over-extend the client financially, to apoint where the project may not be finished to the expected standards or may even have to be abandoned (Cunningham, 2017). There are many challenges especially in the delivery criteria of scope, cost, time, quality and customer satisfaction thus, cost management critical in ensuring project success. Hence studying cost management is essential in unlocking project success.

According to Herrera et al. (2020), many factors influence project performance. It is a process of continuously monitoring resource utilization, planning and overseeing cost management. Project performance is determined by the achievement of project goals and objectives within the set scopeand budget. Creedy et al. (2018) asserts that performance of construction projects can be derailedby poor planning, poor management and limited resources. According to Asiedu and Adaku (2019), poor planning and lack of effective management, coordination and supervision is a majorconstraint to project performance. These studies conclude that that performance of construction projects can be enhanced through effective allocation and utilization of resources and effective project management.

Statement of the Problem

Healthcare plays a very important role in an economy (Ghebreyesus, 2018). In Kenya, the Government has put in place various interventions to improve healthcare services. For instance, the Government spent Kshs. 32.4 billion equivalents to 13.4% of its GDP on healthcare in the financial year 2008-2009 (Chavangi et al., 2021). Through the constitution of Kenya, 2010, the health sector was devolved to the counties to allow them design and implement innovative ways that are tailored to solve unique healthcare needs, (Kimathi, 2017). Through the vision 2030 plan, the government increased the healthcare budget by up to 12 billion and increased healthcare facilities by 18% in the counties (Government of Kenya, 2020). In spite of all these efforts, there are many challenges facing the devolved healthcare units such as poor healthcare delivery, lack of resources and infrastructure and failed projects. In Nairobi City County, despite the commissioning of many healthcare projects and refurbishing of public facilities, the project failure rates have increased affecting healthcare delivery. According to Hassan and Guyo (2017) study, Nairobi County reported a failure rate of 47% in projects which indicates challenges in project management and performance. In 2013, a construction project was commissioned at Mama Lucy hospital with an estimated budget of 1.1 billion. However, it stalled in 2016 due to under-funding. By 2019, the project was 86% complete and facing financing challenges (Ministry of Health, 2019).

As a result, the government is not able to provide the much needed services through construction of these facilities. Also, the government is losing on providing employment opportunities, revenues and general economic growth and development in an industry contributes up to a tune of 5.6% of Kenya's GDP according to the Kenya Association of Manufacturers (2019). The most impacted population is the common citizens who depend on public healthcare system.

Several studies have been done on the factors that influence the implementation of projects. Toyya (2020) determined that adequate funding was the greatest determinant of the implementation of healthcare projects. Musau and Kirui (2018) found that bureaucratic policies, demotivated staff and inadequate funding affected implementation of public healthcare projects in Nyeri County. Yeri (2018) concluded that many healthcare projects were commissioned without proper planning and budgeting, which has led to stalling in project execution and service delivery. Other studies on construction projects in general revealed that, many projects failed due to various factors of project management such as lack of finances, poor planning, lack of infrastructure and poor management, (Gifting, Muchelule and Nyang'au, 2022). Mutiso and Nyang'au (2021) established that cost control, cost estimation, cost contingencies, influenced implementation of water projects in Machakos County. According to Flyvbjerg, et al. (2019), construction projects are globally estimated to have 86% probability of experiencing cost escalation.

Generally, from the foregoing, these studies indicated that effective cost management could lead to improved project performance. However, none of the studies has addressed specific relationship between cost management practices on performance of construction projects in Kenyan healthcare perspective. This presents contextual gaps since they are not conducted among hospitals. These studies also present conceptual gaps since they do not consider all the components of cost management in project management. This clearly presents a need to bridge this knowledge and practices gap in cost management practices in the Kenya's healthcare context. Therefore, this study tried to bridge these gaps by examining the effects of cost management onperformance of construction projects in public hospitals in Nairobi City County. It tried to answer questions on how cost planning, cost control influence performance of construction projects.

Objectives of the study

The general objective this study is to establish the influence of Cost Management on Performanceof Construction Projects in Public Hospitals Nairobi City County, Kenya.

This research reviewed the following objectives,

i. To examine the influence of cost planning on performance of construction projects in public hospitals in Nairobi City County, Kenya.
ii. To examine the influence of cost monitoring and control on performance of construction projects in public hospitals in Nairobi City County, Kenya.

LITERATURE REVIEW

Theoretical Framework

Theory of Constraints

The theory of constraints (TOC) is an overall management philosophy, introduced by Goldratt in 1984. Goldratt adapted the concept to project management with his book Critical Chain,published in 1997. TOC is a management paradigm that views any manageable system as being limited in achieving more of its goals by a very small number of constraints. There is always at least one constraint, and TOC uses a focusing process to identify the constraint and restructure therest of the

organization around it.

The theory of constraints focuses on optimizing resources and assets throughout processes to enhance productivity and profitability. According to Mabin et al. (2018) constraints limit the output of processes and systems therefore, should be identified and managed to improve profitability and output. The theory posits that when constraints run out of control, they affect delivery schedules and cause delays in processes. According to Melendez et al. (2018) all processes have constraints, hence, it is crucial to concentrate on improving the constraint to achieve profitability.

The theory is based on the triple constraints theory which postulates that each one of the three limiting factors i.e. cost or budget, scope, and time have a great impact on implementation of projects. Orouji (2016) asserts that a constraint is the most important limiting factor that prevents achievement of goals and objectives. One key constraint in Project management is cost planning. Hence, each process such as project management process should focus on improving the constraint until it is no longer a limiting factor to achieving project goals. The theory of constraints therefore was considered suitable for this study because it highlights the importance of cost planning to improve project performance.

Planning for costs as per this theory allow the project team to establish a baseline to which they can compare their spending throughout the course of the project and monitor project performance (Muchelule, 2018). The theory is suitable for this study as it guides on project teams to identify costs and plan them accordingly so as to improve projects performance of infrastructure construction projects (Mathenge, 2020)

Public Value Theory

Public Value Theory was formulated by Moore in 1995. The theory was aimed at providing managers from the public sector with an improved understanding of the opportunities and constraints within which they function with the aim of producing valuable outcomes, which satisfy public interests. According to this theory, a manager should not only aim at policy implementationbut also adhere to institutional norms. The ultimate goal should be improving the lives of citizens.

Unlike private entities, which are accountable to their owners and shareholders, public organizations are accountable to members of the public and their democratically elected representatives (Smith, 2021).

According to Strathoff (2016), the public represent the government customers hence should be considered in establishing performance indicators for key processes and projects. Moore (2011) posits that the public should act as the mediator and stakeholders in creating public value by ensuring efficiency of service delivery and value of goods offered. According to Turkel and Turkel (2016), creating public value involves managing resources through cost controls and communicating with citizens and public managers ensure project values are met resourcefully through effective cost controls and budgets.

This theory is relevant to this study because it stipulates that goods and services offered to citizens should meet their needs and offer them value as communities and individuals. Moore argued that, public managers are responsible for creating public value. The theory posits that managerial work such as project management in the public sector should aim at creating public value. This theory provides a basis for understanding the importance of effective cost control to generate value to the public. In this study, the theory explains the importance of cost forecasting to prevent cost overruns to provide maximum benefits of project implementation to the public and availability of project cost reports to provide oversight documents for measuring project value. This theory supports cost control variable under study. In this study, the theory explains

the importance of cost control to foster performance of infrastructural projects in terms of being accountable to Citizens

Conceptual Framework

Conceptual framework is the graphical representation of variables, which are the dependent variable and the independent variables. The framework shows the dependent and independent variables utilized in a study. Hrebiniak (2016), defines it as a group of concepts, which are organized in a systematic manner to provide a tool for integrating and interpreting information. The conceptual framework provides a foundation for development of the variables under study (Kothari, 2014). The independent variables entail, cost reporting,, cost control, and cost planning and performance of construction projects as the dependent variable.

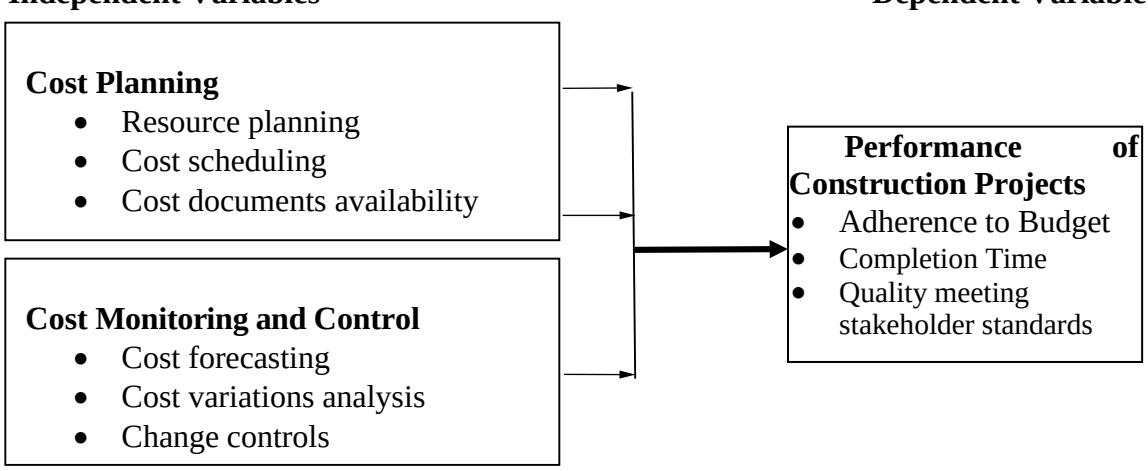

Fig 2.1: Conceptual Framework

Empirical Review

Cost Planning

Cost planning involves assessing the resource requirements that involve costs hence manage demand for resources. Project managers develop plans indicating where costs fall in the project schedule (Flyvbjerg et al., 2019). In this process, all resources that consume costs are included in a plan to facilitate project scheduling and budgeting. Cost planning is crucial in project management as it encompass all resource demands for effective budgeting to enhance performance of construction projects.

Mwangi and Muchelule (2022) assessed project management and infrastructural health projects in Nairobi County, Kenya. The study showed that scope planning in terms of cost and schedules hada significant effect on health project implementation. Cost planning had a positive and significanteffect on project performance hence, the study recommended effective cost planning to enhance successful implementation of health projects. They retaliated that project managers should conduct effective cost planning by ensuring they have sufficient knowledge on the project scope, the risks and tools required to complete a project. Projects that are implemented without conducting detailed cost planning fail to identify potential risks and resource requirement which leads to cost overruns and project delays.

Flyvbjerg et al. (2019) examined the high rate of cost overruns on projects in the Sub-Saharan Africa. The study found that the high incidence of project cost overruns led increased project delays and derailed infrastructural development in the region. The findings indicted that poor

cost planning resulted to schedule delays and increased number of uncompleted projects. Consequently, the study recommended effective planning to ensure successful project completion.

Gbahabo and Ajuwon (2017) conducted a study on the impact of schedule delays on project performance in Sub-Saharan Africa. The findings showed that poor cost planning led to insufficient allocation of resources, contractual disputes and project failure. In addition, lack of concrete work structures and resource requirements resulted to depletion of finances during project implementation leading to incomplete projects and high number of project failures. The study recommended undertaking cost planning to forecast cost inputs.

Ochieng (2016) examined the determinants of successful health project implementation in Nairobi County, Kenya. The study found that financial constraint was a major factor affecting completion of projects in the County. The sources and availability of finances to meet project obligations were not clearly outlined in project management. The study recommended conducting financial analysis for proper cost planning for successful project implementation.

These observations are consistent with assertions of the theory of constraints which states that constraints can prevent achievement of goals and objectives. Therefore, cost planning is crucial to eliminating constraints that could affect project execution and performance. Besides, cost planning is critical in enhancing accurate cost estimations by assessing project material and resource requirement. Therefore, project managers should engage in cost planning to eliminate challenges of cost management during project implementation phases.

Cost Control

Cost control involves overseeing expenses associated with project implementation. It includes assessing and preparing for financial risks that could rise during later stages of planning and implementation (Kim et al., 2018). Project managers oversee project budgets and prepare for potential financial risks that could affect project completion or derail implementation. Project managers manage project expenses to ensure such risks are mitigated since they could lead to setbacks in performance of construction projects.

According to Wauters and Vanhoucke (2018), cost control element in project management enables communication with stakeholders and track a project's performance based on the allocated budget. Cost control ensures the project is executed within the allocated time by eliminating challenges ofcost overruns and project delays. In addition, cost control provides a clear picture of the project progress, which enhances decision making on budget adjustments. It also enables project managersto forecast any cost overruns, which could affect project execution.

Moreover, cost control measures provide project managers with monitoring tools to identify any variations from the budget and costs arising from changes in project scope. Tracking costs is crucial to enhancing project performance and creating value for stakeholders as stipulated in the public value theory. Project managers should ensure there is accountability in resource use throughcontrol measures to enhance project performance. It ensures all changes are monitored and submitted. Project managers can monitor the changes that affect the costs of project implementation (Waithera & Susan, 2017).

Wauters and Vanhoucke (2016) conducted a study on project management in Malaysia. The findings indicated that infrastructural projects faced challenges of cost overruns. These overruns resulted from addition of scope during project implementation and underestimation of project costs. The study recommended conducting cost forecasts to determine changes that would occur in later stages of project implementation.

Kim et al. (2018) conducted a study on cost overruns among hospital projects in Vietnam. The study found that the major causes of cost overruns were scope change, delays in work project performance and increased material cost. Many projects experienced deviations in work schedule and resource utilization. The study recommended use of cost controls to ensure adherence to budget and project schedules.

Waithera and Susan (2017) conducted a study on implementation of infrastructural projects in Kenya. They established that the number of incomplete and delayed projects was increasing. Manyprojects could not be completed with the allocated budget hence, many stalled leading to high number of unsuccessful infrastructural developments. The study revealed that poor cost management was a key factor in incomplete projects. It recommended establishment of cost control procedures to ensure projects are successfully implemented within the allocated budgets.

Performance of Construction Projects

Performance is the level of productivity of any undertaking, which enables achievement of goals and objectives. Performance of construction projects is the ability to adhere to a set budget, meet stakeholder needs, lead to stakeholder satisfaction and generate profits in a sustainable way after implementation (Onyango, 2021). Performance is measured through profitability, return on assets,and return on investment among other financial and non-financial metrics. Performance indicates the output of implementation of various strategies and policies that guide the functioning of institutions. Performance of infrastructural projects can be indicated through project completion rates, adherence to the budget and stakeholder satisfaction.

Kwon and Kang (2018) assessed cost management and performance of projects in Korea. The study found that project success was determined by factors such as budgets and cost control. Costcontrol was found to be an important element in forecasting risks and ensuring timely cost adjustments, which affected project execution. The study recommended using accurate cost estimates and cost control measures to enhance project performance. They recommended that project managers must develop effective cost management measures achieve better project performance. In addition, cost management enhances efficient utilization of resources to ensure they fit into the project budget. Infrastructural projects require high capital and resource input hence, effective cost management is crucial.

Anicic (2019) conducted a study on cost management and project performance in Serbia. The study found that performance of construction projects is constrained by factors such as poor planning, lack of cost control measures and poor management. The findings indicated that cost management had significant influence on performance of projects. Project budgets were crucial in ensuring sufficient allocation of funds and avoiding delays in project execution. Project planning is critical to establish all material inputs that would be necessary for project implementation. As such, it is crucial to ensure costs of project requirements are ascertained before project budgeting. This process ensures development of accurate budget estimates and acts as a guide in cost monitoring to improve project performance. Therefore, project performance is a sum of all cost managementfactors, which can lead to project delays and failure. Other factors affecting project performance include management. Good management is critical to project success since it determines team effort and commitment and creates momentum for project execution. The study recommended developing accurate costs estimates and good management to ensure projects are completed successfully.

Amusan, Dolapo and Joshua (2017) conducted a study on cost management and performance of projects in Nigeria. The study established that cost overruns, change requests were factors affectingproject completion. Project variations arising from cost overruns and changes resulted to project delays. Further, the study showed that poor planning caused cost and timeline

variations. The study recommended adequate planning and cost control to improve project performance.

Gitonga, Muchelule and Nyang'au (2022) examined cost management and performance of road projects in Kenya. The study found that cost management had significant effect on project performance. Poor cost management resulted to low project completion rates and increased cost overruns. The study recommended development of effective cost management measures such as accurate cost estimations, budgeting and cost control to improve project performance.

RESEARCH METHODOLOGY

The study adopted a descriptive research design to conduct a thorough analysis that led to the understanding of the relationship between cost management and performance of construction projects. The goal of descriptive studies is to comprehend what is in a particular situation with a known population (Niyonambaza et al., 2019). The study targeted 200 technical personnel involved in Engineering Procurement and Construction (EPC) Projects in public healthcare facilities managed by NCCG. According to the Kenya Gazette Vol. CXXII- No. 24 (2020) there are 57 public hospitals in Nairobi City managed by the County Government. The unit of analysis was public healthcare projects managed by the NCCG. The unit of observation was project team members i.e. project managers, Contractors, Architects, Structural, Civil and MEP Engineers, Quantity Surveyors, implementing infrastructural projects in the public hospitals. The study conducted a census survey on 41 construction projects in public hospitals in NCC. The projects were multi-staged. i.e. ongoing, completed and stalled projects. The research also included upgrading and equipping existing facilities projects.

The primary data was collected using a questionnaire with both open ended and closed-ended questions. Questionnaires were used for both project managers and project team members. The main advantage of using questionnaires is that a large number of people can be reached relatively easily and economically (Robson, 2011). The data was analyzed using both qualitative and quantitative analysis. The qualitative analysis was conducted using thematic analysis. The data was analyzed using both descriptive and inferential statistics. Descriptive statics such as frequency, means and percentages had summarized the data and made initial inferences while inferential statistic such as correlation and regression analysis establish relationships between variables.

RESEARCH FINDINGS AND DISCUSSION

The study sought to determine the response rate of the study. The total number of questionnaires that were administered was 200. Most of the public healthcare projects are designed and supervised by the Ministry of Public Works. A total of 124 questionnaires were filled and returned. This represented an overall successful response rate of 62% as shown in Figure 4.1. According to Render et al (2012), a response rate of 50% or more is adequate for a descriptive study. Therefore, a response rate of 62% was good for the study.

Descriptive Findings and Analysis

This part provides the results of the descriptive analysis carried out by the study consisting percentages, mean and standard deviation. The findings were presented as per each objective.

Cost Planning

The study sought to determine the effect of cost planning on performance of construction projects in public hospitals in Nairobi County. The respondents were asked to indicate the extent to which the agree with the statement on cost planning based on a Likert scale where strongly agree -5,

Agree -4, Neutral -3, Disagree -2, Strongly disagree -1. The results of the study were as shown in table 1.

Table 1: Cost Planning

Statements	Strongly Disagree	Disagree	Neutral	Agree	Strongly Agree	Mean n	Standard Deviation (Std Dev)
The hospital has detailed project plans	0.0%	6.7%	18.3%	30.8%	44.2%	4.13	0.94
The hospital has successfully completed its construction project	0.0%	0.0%	19.2%	0.0%	80.8%	4.62	0.79
Construction project utilize allocated resources	0.0%	0.0%	5.0%	45.0%	50.0%	4.85	0.36
Project managers develop cost schedules	0.0%	0.0%	5.0%	10.0%	85%	3.28	1.16
All resources that consume costs are included in project cost planning	0.0%	0.0%	10.0%	20.0%	70.0%	3.11	1.26
Good cost planning improves project performance	0.0%	0.0%	5.0%	10.0%	85.0%	3.28	1.16
Average						**3.9**	**0.95**

The findings revealed that 44.2% of the respondents strongly agreed that the hospitals have detailed project plans, 30.8% agreed, 18.3% were neutral while 6.7% disagreed. The study findings also showed that 80.8% of the respondents strongly agreed that the hospitals have successful construction projects while 85% strongly agreed that project managers develop cost schedules. Moreover, 50% of the respondents strongly agreed that the construction projects utilize allocated resources while 45% agreed. Further, the results of the study revealed that 70% of the respondents strongly agreed that all the resources that consume costs are included in project cost planning while 20% agreed.

The implication of the results is that majority of the respondents indicated that they agree with the statements on cost planning as shown by a mean of 3.90. The responses given by the respondents had little variation (standard deviation=0.95). The findings of the study are consistent with the results of a study by Mwangi and Yusuf (2022) which concluded that cost planning is crucial to eliminating constraints that could affect project execution and performance.

Cost Control

The study sought to determine the effect of cost control on performance of construction projects in public hospitals in Nairobi County. The respondents were asked to indicate the extent to which the agree with the statement on cost control based on a Likert scale where strongly agree -5, Agree -4, Neutral -3, Disagree -2, Strongly disagree -1. The results of the study were as shown in table 2.

Table 2: Cost Control

Statements	Strongly Disagree	Disagree	Neutral	Agree	Strongly Agree	Mean n	Std Dev
Project managers conduct costforecasts	12.5%	22.5%	11.7%	28.3%	25.0%	3.31	1.39
Cost variations are factored in project plans	0.0%	11.7%	19.2%	45.0%	24.1%	3.43	1.53
Project managers oversee project Expenses	8.3%	13.3%	8.3%	57.5%	12.5%	3.98	1.40
Project managers prepare potentialfinancial risks	10.0%	13.3%	27.5%	28.3%	20.8%	3.24	1.41
Project managers control project budgets during implementation	13.3%	3.3%	29.2%	40.8%	13.3%	3.38	1.17
There are many changes requests during project implementation	28.8%	31.8%	14.0%	13.2%	12.2%	3.22	1.40
Cost control enhances timely completion	5.3%	10.3%	8.3%	60.5%	15.5%	3.91	1.33
Average						**3.50**	**1.38**

The findings revealed that 25% of the respondents strongly agreed that project managers conduct cost forecasts, 28.3% agreed, 11.7% were neutral while 22.5% disagreed. The study findings also showed that 24.1% of the respondents strongly agreed that cost variations are factored in project plans, 45% agreed, while 19.2% were neutral. Moreover, 12.5% strongly agreed that Project managers oversee project expenses while 57.5% agreed. Besides, 20.8% of the respondents strongly agreed that the project managers prepare potential financial risks while 28.3% agreed. The results also revealed that 13.3% of the respondents strongly agreed that project managers control project budgets during implementation while 40.8% agreed. The results also revealed that 28.8% of the respondents strongly disagreed that there are many changes requests during project implementation while 31.8% disagreed. Moreover, 60.5% of the respondents agreed that cost control increases project completion rates.

The implication of the results is that majority of the respondents indicated that they agree with the statements on cost control as shown by a mean of 3.50. The responses given by the respondents had little variation (standard deviation=1.38). The findings are of the study are consistent with the results of a study by Waithera and Susan (2017) which concluded that there was a relationship between cost control and performance of construction projects.

Performance of Construction Projects

The study established the percentage number of completed, stalled, and abandoned projects in the hospitals in the last 5 years from year 2018 to the year 2022. The findings in figure 4.5 reveal a high percentage of stalled construction projects in public hospitals in Nairobi County to a tune of 51.35%. The findings established the percentage of completed projects was 35.14% while abandoned projects were 13.51%. Completed construction projects included 13 NMS hospitals by 2022 among 24 hospitals commissioned in 2020. The completed projects include 5 hospitals in Mukuru Kwa Rueben, Tassia Kwa Ndege, and Our Lady of Nazareth in Mukuru Kwa Njenga. The findings established that about 19 construction projects had stalled due to underfunding, lack of land for construction, pending bills and lack of supplies. Findings revealed that poor planning and poor budgeting were significant factors that contributed to stalled projects. In addition, findings

revealed that 13.51% of the projects had been abandoned due to lack of finances, lack of infrastructure and political interference. Findings established that factors such as effective project management, planning and financing contributed to the successful implementation of completed projects.

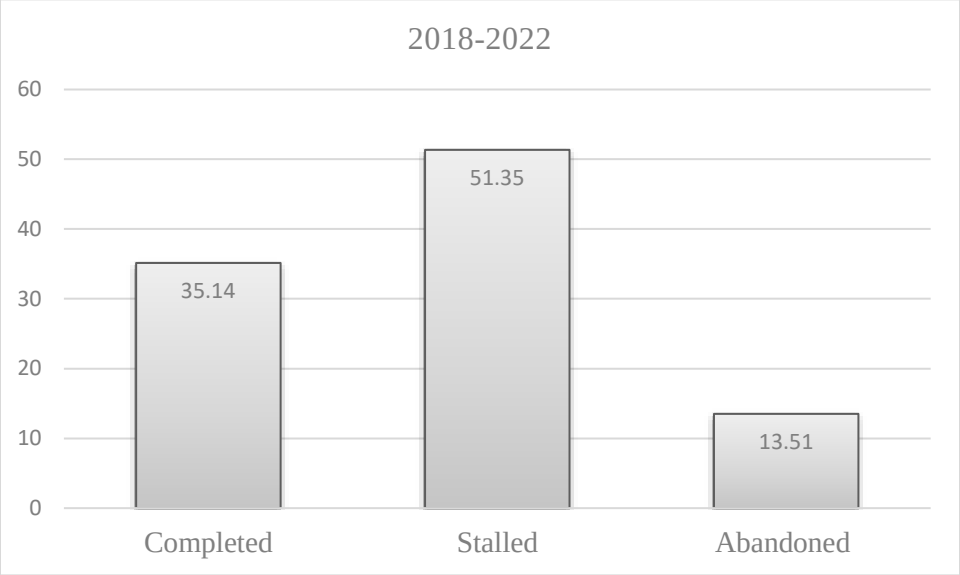

Figure 1 Percentage of Completed, Stalled, Abandoned Projects

To assess performance, the respondents were asked two sets of questions. One was as to whether, they believe the various aspects of measuring performance were met in the projects they were involved.

Further, the respondents were asked to indicate the extent to which they thought cost planning, cost control affected performance of construction projects in public hospitals in Nairobi County. The results showed that 70% of the respondents agreed to a very great extent that cost planning affected performance of construction projects while 25% agreed to a great extent. The results also revealed that 65% of the respondents agreed to a very great extent that cost control affected performance of construction projects while 25% agreed to a great extent. The results imply that many project managers, contractors and project engineers involved in implementation of construction projects in public hospitals believed that cost management influence performance of construction projects. The results are shown in figure 2. The results agree with findings by Anicic (2019) study, which found that cost management had significant influence on performance of projects.

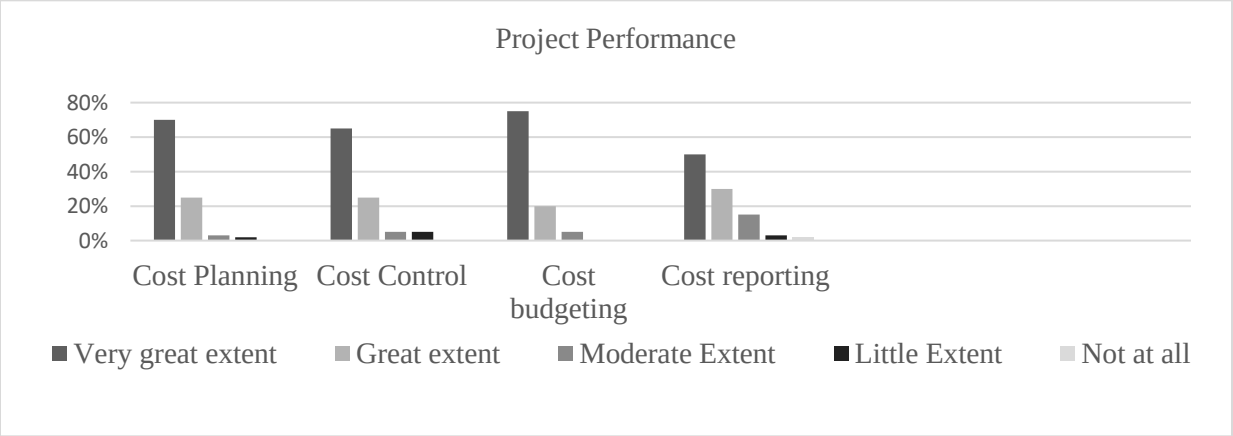

Figure 2 **Project Performance based on the independent variables**

Inferential Analysis Results

Correlation Analysis

The results of the correlation showed that cost planning had a positive and significant influence on performance of construction projects in public hospitals in Nairobi County (Pearson Moment Correlation = 0.582, Significance = 0.000). These findings imply that using cost planning such as resource planning, cost scheduling and developing cost documents will lead to a significant improvement in performance of construction projects. These findings are consistent with Flyvbjerg et al. (2019) who examined cost planning and project performance and concluded that poor cost planning resulted to schedule delays and increased number of uncompleted projects.

The results of the correlation showed that cost control had a positive and significant influence on performance of construction projects in public hospitals in Nairobi County (Pearson Moment Correlation = 0.515, Significance = 0.000). The findings reveal that implementation of cost control measures such as cost forecasting, cost variations and change controls leads to a significant improvement in performance of construction projects. The findings of the study are consistent with the findings of a study by Kim et al. (2018) who studied cost control and project performance and concluded that use of cost controls ensure adherence to budget and project schedules.

Table 4: Correlation Analysis Results

		Cost Planning	Cost Control	Performance
Cost Planning	Pearson Correlation	1		
	Sig. (2-tailed)			
	N	124		
Cost Control	Pearson Correlation	0.515**	1	
	Sig. (2-tailed)	0.000		
	N	124	124	
Performance	Pearson Correlation	0.582	0.515	1
	Sig. (2-tailed)	0.001	0.001	
	N	124	124	124

Regression Analysis

The multiple linear regression analysis was carried out to determine the combined effect of cost management variables on performance of construction projects in public hospitals in Nairobi County. Multiple regression analysis helped to find out the best predictor variable or the strength of relationship of each independent variable (cost planning, cost control) on the dependent variable thus resulting into an optimal model. The results from the regression model were used to establish the coefficient of determination analysis, model fitness analysis and model coefficients.

Table 5: Model Summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	0.756	0.572	0.558	0.2739

a Predictors: (Constant), Cost Planning, Cost Control

The findings in Table 5 showed that cost management which comprises cost planning, cost control, (the independent variables) has a high positive correlation with performance of construction projects (dependent variable) in public hospitals in Nairobi County.

The results show that the independent variables were found to be satisfactory and had a strong relationship with performance of construction projects in public hospitals in Nairobi City County as represented by R value of 0.756.

On the other hand, the results showed that cost management has a Coefficient of Determination value of R^2 of 0.572. This R^2 shows that cost management accounts for up to 57.2% of the variations in performance of construction projects in public hospitals in Nairobi County. The implication is that there are other factors not considered in this research that also account for the performance of construction projects in public hospitals in Nairobi County in the tune of 42.8%. These other factors can be established through other future studies.

The significance of the p-value shows the degree of the connection between the independent and dependent variables. If the significance level, also called the p-value, is lower than the critical value of 0.05, it can be concluded that the model effectively explains the relationship. However, if the p-value is higher than 0.05, the model is considered to have no significant impact on explaining the relationship.

The p-value was 0.00<0.05 an indication that at least one independent variable significantly influenced the and performance of infrastructure construction projects in public hospitals in Nairobi County. The results of the study are as shown in table 4.14.

Table 6: Analysis of Variance (Model significance)

Model		**Sum of Squares**	**Df**	**Mean Square**	**F**	**Sig.**
1	Regression	11.836	4	2.959	39.453	.0001
	Residual	8.867	119	0.075		
	Total	**20.703**	**123**			

a Dependent Variable: Performance of Construction Projects
b Predictors: (Constant), Cost Planning, Cost Control

The Analysis of Variance was used to examine if the model was a good fit for the collected data. The research conducted an F-test at α=0.05 for the overall significance of the relationship model. The null hypothesis for the test was that the regression coefficients of the four independent variables are all zero. That is, there is no significant relationship between any of the independent variables and the dependent variable. H_0: $\beta_{1=}\beta_2=\beta_3=\beta_4=0$

The alternative hypothesis is that at least one of the coefficients is not zero. i.e. At least one of the independent variables is linearly related to the dependent variable.
H_1: At least one $\beta_I \neq 0$
The test statistic is that; the $F_{Calculated}$ was obtained as 39.453 and the $Fc_{critical}$ obtained from the F-Table with numerical degrees of freedom, $Fc_{critical}$ (4, 119) at α=0.05 was 2.448. Therefore, the research rejected the null hypothesis since $F_{Calculated} > Fc_{critical}$. Similarly, the calculated p-value is less than 0.05 and therefore we reject the null hypothesis. The research therefore concludes that the overall model is valid and statistically significant at 5% significance level. The model a good fit and was suitable in explaining the relationship between the independent variables and dependent variable. The results in Table 7, showed that the overall regression model linking cost planning, cost control and performance of construction projects in public hospitals in Nairobi County was statistically significant. The summary of the findings regression analysis coefficients is as shown in table 7.

Table 7: Regression Coefficients

Model		Unstandardized Coefficients		t	Sig.
		B	Std. Error		
1	(Constant)	0.729	0.318	2.292	0.042
	Cost Planning	0.423	0.053	7.981	0.001
	Cost Control	0.230	0.032	7.188	0.001

Dependent Variable: Performance of construction projects

Therefore, the Optimal Regression Model was found to be;

$$Y = 0.729 + 0.423X_1 + 0.230X_2$$

Whereby; X1 = Cost Planning; X2 = Cost Control

The results of the study indicated that cost planning had a positive and the most significant effect on performance of construction projects in public hospitals in Nairobi County (β = 0.423, Sig = 0.001). This implies that a unit change in cost planning, which include resource planning, cost scheduling, cost document leads to a change in performance of construction projects by a factor of 0.423. The findings agree with the findings of a study by Gbahabo and Ajuwon (2017) which showed poor cost planning led to insufficient allocation of resources, contractual disputes and project failure.

Moreover, the findings of the study also indicate that cost control had a positive and second most significant effect on performance of construction projects in public hospitals in Nairobi County (β = 0.230, Sig = 0.001). This implies that a unit change in cost control measures such as cost forecasting, cost variations and change controls leads to an improvement in performance of construction projects by a factor of 0.230. The findings agree Kim et al. (2018) study, which found that cost controls to ensure adherence to budget and project schedules.

Conclusion

The study established a positive correlation between cost planning and performance of infrastructure construction projects in Nairobi City County. The study concluded that cost planning has the most positive significant influence on performance of infrastructure construction projects in Nairobi City County. The study concluded that when construction projects focus on enhancing cost planning through cost scheduling, resource planning and cost document availability, there is significant improvement in performance of infrastructure construction projects in Nairobi City County.

The study also established a positive correlation between cost control and performance of construction projects in Nairobi City County. Therefore, it concluded that cost control enhanced performance of construction projects in a significant manner. The study concluded that improvements in factors such as cost forecasting, cost variations analysis and change controls leads to a significant improvement in performance.

Recommendations

The study recommends that project managers, engineers and contractors involved in implementation of construction projects in public hospitals should use effective cost planning to enhance cost management and improve performance. Since cost planning have the most significant effect on performance, the study recommends implementation of effective cost planning techniques such as resource planning, cost scheduling and cost document availability which lead to positive and the most significant influence on performance of infrastructure construction projects.

The study recommends that the project team involved in implementation of construction projects in public hospitals have effective cost control measures since they play a significant role improving the performance of construction projects. The study recommends use of cost forecasting tools, scope change controls and cost variation analysis to manage project costs since they lead to positive and significant influence on performance of infrastructural construction projects.

Areas for Further Research

The knowledge gaps upon which the current study was built on came from the critique of literature indicating a necessity to carry out this study. The study filled this gap but even though it did, it was established that cost management could only explain up to 57.2% of the variations in performance of construction projects in public hospitals in Nairobi County. The implication is that there are other factors that also account for the performance of construction projects in public hospitals in Nairobi County in the tune of 42.8%, which are captured by the regression model as the error term. These other factors can be established through other further studies. Other studies can also be conducted to focus on other sectors other than the health sector. There is a need to fill the contextual research gaps of this study. Furthermore, a similar study can be conducted using a different method of analysis.

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