Int Journal of Social Sciences Management and Entrepreneurship 9(1): 747-760 2025

ISSN 2411-7323

www.sagepublishers.com

COST MANAGEMENT PRACTICES AND SUCCESSFUL IMPLEMENTATION OF SUBSTATION POWER PROJECTS WITHIN NAIROBI METROPOLITAN IN KENYA

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ABSTRACT

Many projects face challenges of cost management leading to cost overruns and delays in project completion. Approximately 47% project failure rate was reported in Nairobi County which indicates challenges of project management and project performance. The purpose of the study was to examine cost management practices and successful implementation of substation power projects in Kenya. The specific objectives were to establish the effect of planning and budgeting on successful implementation of substation power projects. The theories that guided this study are theory of constraints and theory of budgeting. This study used a descriptive design with questionnaire as the instrument for data collection. Reliability of the study instrument was established using Cronbach Alpha, internal consistency method. Validity of the research instrument was determined using content and construct validity. The target population was 54 substation power projects implemented by Kenya Power, Kenya Electricity Generating Company and Kenya Electricity Transmission Company. The unit of observation was one project manager. The study conducted a census on all projects. Data collected was analyzed using SPSS version 28 to produce frequencies, descriptive and inferential statistics was used to derive conclusions. The study conducted a multiple regression analysis to determine the relationship between cost management and successful implementation of substation power projects. The study presented findings in form of tables and figures. The study concluded that planning has the most positive significant influence on successful implementation of substation power projects within Nairobi Metropolitan in Kenya. In addition, the study concluded that budgeting has a significant influence on successful implementation of substation power projects. Based on the findings, the study recommends that project managers, engineers and contractors involved in implementation of projects should use effective cost planning to enhance cost management and improve implementation. Since cost planning have the most significant effect on implementation, there is a need to implement effective cost planning techniques such as resource planning and cost scheduling to improve project implementation. The study recommends selection of competent project managers to conduct effective cost planning.

Key Words: Cost Management Practices, Planning, Budgeting, Successful Implementation of Substation Power Projects

Background of the Study

This chapter presents the background of the study and the statement of the problem. It outlines theobjectives of the study, the statement of the problem and the scope of the study. This study will examine cost management practices and successful implementation of substation power projects in Kenya. It was guided by four objectives namely planning, control, budgeting and accounting.

The energy sector is marred with a number of challenges hence making it difficult to meet the demand for electric power. Despite widely recognized importance of electric power, electricity is not available everywhere with many people still depending on alternative sources of energy. Power 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, 2021). 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). 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 substation power projects are those delivered to the required quality standards on time within budget and achieving customer needs for reliable power supply (Gitongaet al., 2022). The effective management of costs is a vital element in achieving these objectives. Organizations 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., 2021).

Cost overruns during the execution phase may seriously over-extend the organization financially, to apoint where the project may not be finished to the expected standards or may even have to be abandoned (Cunningham, 2021). 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 implementation. It is a process of continuously monitoring resource utilization, planning and overseeing cost management. Project implementation is determined by the achievement of project goals and objectives within the set scopeand budget. Creedy et al. (2022) asserts that implementation of projects can be derailed by poor planning, poor management and limited resources. According to Asiedu and Adaku (2023), poor planning and lack of effective management, coordination and supervision is a major constraint to project implementation. These studies conclude that that implementation of projects can be enhanced through effective allocation and utilization of resources and effective project management.

Luhan (2022) asserts that implementation of projects is an essentialcomponent of project management. Project implementation indicates the achievement of goals and the expected benefits of such investments. According to Chism (2023), delays in project executions occur due to poor project management, limited financing and cost uncertainties. Such delays affectproject implementation and performance. Boddy (2023) recommends proper planning, management commitment and communication to improve project implementation and performance.

Flyvbjerg et al. (2023) suggests that the high incidence and magnitude of project cost overruns andschedule delays in Sub-Saharan Africa remain unabated and only further complicates the poor infrastructural situation of the region. The African region records high numbers of uncompleted projects associated with poor budgeting and poor planning. The study concluded that cost overruns are a major hindrance to implementation of infrastructural projects in Sub-Saharan Africa. Cost planning is crucial for successful implementation of infrastructural

projects.

In Kenya, the number of power projects is increasing to improve power supply. However, it becomes difficult to complete projects in the allocated cost budget within the power substations. Considering the scarce resources of the country, cost management is one of the major problems in Kenya. There is need for cost control procedures when implementing projects for effective utilization ofavailable resources. (Waithera & Susan, 2021).

Kenya is actively developing its electricity infrastructure, with significant substation projects underway, including the 400/220kV Mariakani Substation, the Suswa Substation, and the Isinya-Konza transmission line, aimed at enhancing power reliability and grid stability. Major substation projects include 400/220kV Mariakani substation connecting Isinya and Rabai, 500kV Ethiopia-Kenya Project and the 400kV Isinya-Suswa transmission line, facilitating power evacuation from Olkaria geothermal complex and other sources. The Isinya-Konza 400 kV double circuit line, with a 400/220 kV substation at Konza Technopolis, is part of the Kenya Power Transmission Expansion Project (KPTEP) and aims to power Kenya's "silicon valley" (KETRACO, 2024). In addition Kimuka substation, part of the Nairobi Ring project, supplies five 66kV feeder lines to various areas in and around Nairobi, contributing to de-loading existing 220kV lines.

In Nairobi Metropolitan area, the Nairobi Ring and Associated Substations project involves the construction of a 103km 400kV double circuit line from Suswa to Isinya, with associated 220kV substations at Suswa and Isinya, and 220/66kV substations at Kimuka, Athi River, and Komarock.

The Nairobi Ring and Associated Substations project, a key initiative by the Kenya Electricity Transmission Company (Ketraco), aims to improve power supply reliability and increase the capacity of the Nairobi metropolitan area's power grid. Kenya Power's Initiative to Construct 36 New Substations aims to expand power distribution lines (KETRACO, 2024). These projects are solutions to the growing demand for electricity in the Nairobi metropolis. It involves the strengthening of Kenyan grid by creating a ring around the Nairobi agglomeration through the reinforcement of the existing grid that bypasses the agglomeration in the east and building a 400 kV line that will bypass it in the west. The Nairobi Metropolitan region has seen significant enhancements in its power infrastructure through the development and modernization of various substations. These initiatives aim to bolster electricity supply reliability, support economic growth, and improve the quality of power distribution.

Statement of the Problem

The energy sector is a key enabler in the development of the society (ERC, 2022). However, demand of power exceeds the supply in the economy. Kenya like other developing countries is not an exception to the energy problem. According to International Energy Agency (IEA) (2020) inadequate electricity generation capacity and an unreliable power supply have been perennial problems for over a decade. In Kenya, power outages affect economic activities and overall productivity in the economy. Kenya’s rural population access to electricity is considerably lower than that of the urban population (more than 80%), with some of rural households not having access to electricity (Rabah, 2020). According to Stephen (2022), the electric power supply in Kenya is significantly insufficient due to inadequate substations. In December 2024, Kenya Power's system losses peaked at 23.65%, up from 23.16% in June. These losses, exceeding the allowable limit of 18.5%, are attributed to factors such as the use of distribution lines for transmission and widespread electricity theft, particularly in informal settlements. Kenya witnessed a significant reduction in electric power supply compared to the demand. Kenya Power and Lighting Company (KPLC) and Kenya Electricity Generating Company PLC (KENGEN) have initiated substation projects to increase power generation and distribution. The energy firms have increased substation power projects to meet demand and

enhance reliable power supply. Despite significant investments in Nairobi's power infrastructure, the implementation of substation power projects has faced notable challenges, leading to delays and inefficiencies. Power customers and businesses continue to experience unreliable powers supply with outages averaging 8.5 hours per month. As of June 2024, Kenya Power reported 2,202 delayed projects valued at approximately Ksh 2.7 billion. Some of these projects had been pending for over 15 years, affecting thousands of customers who had already paid connection fees. According to KETRACO report (2024) some projects have not been commissioned due to lack of funds for project completion. Projects have been affected by budget cuts and financial constraints due to delayed completion time. Many power projects are yet to be commissioned due to delayed completion rates and cost overruns affecting successful implementation. Projects by Kenya Electricity Transmission Company which includes Nairobi 220kv Ring project, Olkaria Lessos project, Power transmission system improvement project are yet to be completed due to failure to meet budget timelines which indicated a gap in implementation of electricity power expansion projects in Kenya (KPLC, 2024).

According to Hassan and Guyo (2021) study, Nairobi County reported a failure rate of 47% in projects due to cost overruns which indicates challenges in project management and performance. Although power projects play a critical role in economic growth and development, they have been facing delays in completion and high cost overruns (Amusan, Dolapo & Joshua, 2021). Cost factors such as planning and budgeting influence performance of projects (Munim, & Schramm, 2022). According to Flyvbjerg, et al. (2023), projects are globally estimated to have 86% probability of experiencing cost escalation.

These studies indicated that effective cost management could lead to improved project implementation. These studies however, present conceptual gaps since they do not consider all the components of cost management in project management. Besides, these studies present contextual gaps since they are not conducted among substation projects. Therefore, this study bridged these gaps by examining cost management practices and successful implementation of substation power projects within Nairobi Metropolitan in Kenya.

Objectives of the study

General Objective

The general objective this study was to establish the relationship between cost management practices and successful implementation of substation power projects within Nairobi Metropolitan in Kenya

Specific Objectives

i. To examine the relationship between planning and successful implementation of substation power projects within Nairobi Metropolitan in Kenya.

ii. To evaluate the relationship between budgeting on and successful implementation of substation power projects within Nairobi Metropolitan in Kenya.

Theoretical Framework

Theory of Constraints

The theory of constraints (TOC) is an overall management philosophy, introduced by Goldratt (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.

Orouji (2016) asserts that a constraint is the most important limiting factor that prevents achievement of goals and objectives. 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. One Key constraint in project management is cost or budget. The theory of constraints therefore explains the importance of planning to improve project implementation. 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.

Theory of Budgeting

It was developed by Hirst in 1987. It emphasizes the need for budges and budget controls to meet the needs of an organization, avert risks, utilize opportunities and facilitate execution of strategies to achieve goals and objectives (Shields & Young, 1993). Budgets are critical in determining future performance. They enable organizations evaluate strategies and prepare monitoring tools during project execution (Silva & Jayamaha, 2012). Budgets enable shareholders have a preview of project costs and possible returns on investment.

Hirst (1987) posit that effective budget controls are critical in helping organizations mitigate risks and capitalize on opportunities. Budgets are effective plans to ensure organizations acquire key resources. According to Young (1993) the theory of budgeting provides a mechanism for detecting variances between set objectives and performance. Budgets are financial plans that control organizational finances and portray organizations financial capabilities.

The theory provides understanding of financial element in project implementation. An effective management control system solves an organization's need to plan and consider how to confront future potential risks and opportunities by establishing an efficient system of control, a detector of variances between organizational objectives and performance (Ingle & Mahesh, 2020). Budgets are considered the core elements of an efficient control process and consequently vital part to the umbrella concept of an effective MCS (Sloan, 2017). The theory of budgeting thus demonstrates the importance of budgeting in project and how this can foster implementation.

Conceptual Framework

Conceptual framework is the graphical representation of variables, which are the dependentvariable 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).

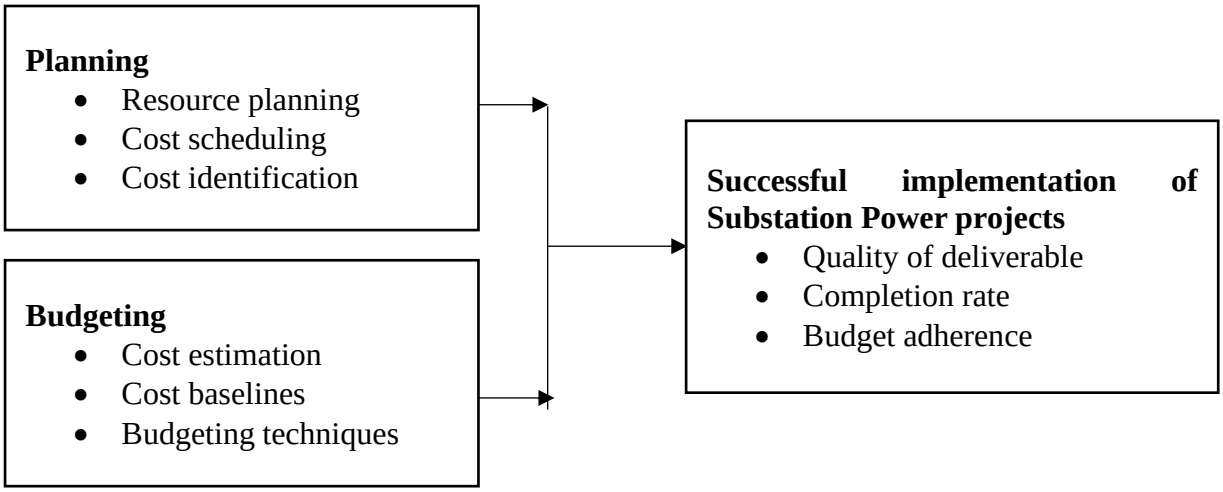

Figure 2.1 Conceptual Framework

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., 2023). In this process, all resources that consume costs are included ina 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 implementation of projects.

According to Mwangi and Yusuf (2022) project managers should conduct effective cost planningby 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.

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 toeliminating constraints that could affect project execution and performance. Besides, cost planningis 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.

Budgeting

Cost budgeting is the process of developing cost estimates for project implementation. It involvesdeveloping work activities for project management to ensure proper funds allocation (Yeri, 2022).The theory of budgeting emphasizes the need for setting a fixed budget and allocating funds to work schedules. Therefore, project managers should have well-developed schedules to ensure accurate cost budgeting. It is a critical process in project management since it ensures project activities are allocated sufficient funds for project implementation success.

According to Andreas and Johanseb (2022) cost budgeting is essential in project management. Thebudget has a significant influence on all decisions made during project planning and project implementation. In addition, the budget affects the goals of the project hence, determines the project scope and timeline. A budget determines whether project objectives are attainable which will determine the performance of construction projects. Therefore, when conducting

cost budgeting, project managers should ensure that the budget is consistent with the project quality and scope.

According to Nor et al. (2022) cost budgeting should consider factors such as the expected projectdeliverables. A budget should be consistent with the expected deliverables to ensure the project does not underperform. Cost budgeting should account for all costs including travel, equipment, fees, and other costs that maybe overlooked during project execution. In addition, the cost of a contingency plan should be including during cost budgeting. A project manager should project alleventualities that could occur during project implementation and include these costs in the projectbudget.

Empirical Review

Planning

Flyvbjerg et al. (2023) 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 (2021) 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.

Mwangi and Yusuf (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 projects.

Ochieng (2020) examined the determinants of successful project implementation in Nairobi County, Kenya. The study found that financial constraint was a major factor affecting completionof 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 analysisfor proper cost planning for successful project implementation.

Budgeting

Nor et al. (2022) conducted a study on cost management and implementation of projects in Malaysia. They found that poor cost management led to project delays and cost overruns. They established that cost budgets were critical in increasing project completion rates and enhancing stakeholder confidence. Successful implementation of projects was constrained by poor cost estimates therefore, recommended accurate cost budgeting to improve project performance.

Solomon and Berhanu, (2021) conducted a study on the impact of project cost management practice on the success of the project management in Netherlands. The study revealed that projectcost management, explained in terms of resource planning, cost estimating, cost budget and cost control has significant association with the overall success of the project management. They recommended proper cost budgeting and cost planning to enhance project performance.

Frimpong and Oluwoye (2022) conducted a project on project management in construction

industry in Ghana. The study found that large infrastructural projects had exceeded the allocated budgets. They established that project management elements which include cost budgeting were critical to project success. The study recommended effective cost budgeting to prevent project delays and cost increments.

Yeri (2022) examined the determinants of infrastructural project success in devolved units in Kenya. The study established that cost budgeting was crucial to successful project implementation.Many projects faced constraints in budget allocations due to underestimations poor project scheduling. The study established that there were increased project delays due to cost overruns andfailure in budget estimates. The study recommended development of accurate cost budgeting processes to improve project completion rates.

RESEARCH METHODOLOGY

Research Design

The study adopted descriptive research survey design. In a descriptive survey method research, participants answer questions administered through interviews or questionnaires. After participants answer the questions, researchers describe the responses given. One reason for the choice of the survey research design is its usefulness in describing the characteristics of a large population (Niyonambaza et al., 2019).

Target Population

The target population was 54 substation power projects within Nairobi Metropolitan implemented by Kenya Power, Kenya Electricity Generating Company PLC and Kenya Electricity Transmission Co. Ltd . According to Ministry of Energy and Petroleum (MoEP) (2024) there are 54 substation power projects within Nairobi Metropolitan. The unit of analysis was 54 substation power projects implemented by Kenya Power, Kenya Electricity Generating Company PLC and Kenya Electricity Transmission Co. Ltd. The unit of observation was project managers from each project who are responsible for overseeing the implementation of the projects.

Sampling Frame, Technique and Sample Size

The sampling frame for this study consists of a list of 54 substation power projects in Nairobi Metropolitan implemented by Kenya Power (KP), Kenya Electricity Generating Company PLC (KENGEN) and Kenya Electricity Transmission Co. Ltd (KETRACO). The study adopted a census of all the substation power projects in Nairobi Metropolitan managed by Kenya Power (KP), Kenya Electricity Generating Company PLC (KENGEN) and Kenya Electricity Transmission Co. Ltd (KETRACO). The study respondents consisted of one project manager from each project. The study used census since the population of 54 is small and the study aims to reach all the substation power projects. Scholars such as Bernard (2011) and Seltman (2014), state that, census approach is effective when the target population is small, that is below 200 respondents.

Data Collection Instruments

The primary data was collected using a questionnaire with both open ended and closed-ended questions. Themain advantage of using questionnaires is that a large number of people can be reached relativelyeasily and economically (Robson, 2011). Secondary data was collected from reports, publications, government census and scholarly journals. Data was recorded in data entry tables.

Pilot Study

A pilot study, or, pilot test, or pre-test is defined as small-scale preliminary research that is

conducted to evaluate time, cost, and feasibility to improve on the design of a particular study before conducting the actual one or full-scale research project (Kultar, 2017). The researcher carried out a pilot study to ensure the data collection tool was reliable and valid. The pilot test helped to correct some of the challenges encountered before undertaking the final study. The pretesting sample was made up of 5 respondents, representing 10% of the sample size. The respondents included project managers who oversee implementation of projects at the facilities. The results from the pilot test will not be used in the main study. In addition, the respondents will be excluded from the final study.

Data Analysis and Presentation

In this study, data was analyzed using both qualitative and quantitative analysis. The qualitative analysis was conducted using thematic analysis. Thematic analysis is a widely-usedqualitative data analysis method. It is one of a cluster of methods that focus on identifying patterned meaning across a dataset. One of the advantages of thematic analysis is its theoretical-flexibility (Zohrabi, 2013). Quantitative data was analyzed using both descriptive and inferential statistics. Data was presented in the form of charts and tables. The relationship between the study variables was tested using multivariate regression model.

$Y = \beta_0 + \beta_1 X_1 + \beta_2 X_2 + \varepsilon$

Whereby;

Y = Successful implementation of substation power projects

β_0 = Constant

$\beta_1, \beta_2,$ = Coefficients of determination

X1 = Planning

X2 = Budgeting

ε = Error term

RESEARCH FINDINGS AND DISCUSSION

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.

Planning

The first objective was to examine the relationship between planning and successful implementation of substation power projects within Nairobi Metropolitan in Kenya. The respondents were asked to indicate the extent to which the agree with the statement on planning based on a Likert scale where Strongly agree -5, Agree -4, Moderate -3, Disagree -2, Strongly disagree -1. The results of the study were as shown in table 4.1.

From the results, the respondents agreed that organization has detailed project plans. This is supported by a mean of 4.13 (std. dv = 0.94). In addition, as shown by a mean of 4.62 (std. dv = 0.79), the respondents strongly agreed that organization has successful substation power projects. Further, the respondents strongly agreed that substation power projects utilize allocated resources. This is shown by a mean of 4.85 (std. dv = 0.36). The respondents were neutral on whether project managers develop cost schedules. This is shown by a mean of 3.28 (std. dv = 1.16). With a mean of 3.11 (std. dv = 1.26), the respondents were neutral on whether all resources that consume costs are included in project cost planning. The respondents strongly agreed that good cost planning improves project implementation. This is supported by a mean

of 4.62 (std. dv = 0.79).

The implication of the results is that majority of the respondents indicated that they agree with the statements on planning as shown by a mean of 4.10. The responses given by the respondents had little variation (standard deviation=0.88). The findings of the study are consistent with the results of a study by Mwangi and Yusuf (2022) which concluded that planning is crucial to eliminating constraints that could affect project execution and performance

Table 4.1 Planning

Statements	Mean	Std Dev
The organization has detailed projectplans	4.13	0.94
The organization has successful substation power projects	4.62	0.79
Substation power projects utilize allocated resources	4.85	0.36
Project managers develop costschedules	3.28	1.16
All resources that consume costs are included in project cost planning	3.11	1.26
Good cost planning improvesproject implementation	4.62	0.79
Average	**4.10**	**0.88**

Budgeting

The second objective was to determine the relationship between budgeting an successful implementation of substation power projects within Nairobi Metropolitan in Kenya. The results of the study were as shown in table 4.2. From the results, the respondents were neutral on whether projects have accurate cost estimates. This is supported by a mean of 3.31 (std. dv = 1.39). In addition, as shown by a mean of 3.43 (std. dv = 1.53), the respondents were neutral on whether projects have clear project schedules. Further, the respondents strongly agreed that project schedules are adhered to during project implementation. This is shown by a mean of 3.98 (std. dv = 0.90). The respondents were neutral on whether projects have strict adherence to set budget. This is shown by a mean of 3.24 (std. dv = 1.41). With a mean of 3.38 (std. dv = 1.17), the respondents were neutral on whether project work activities are outlined with expected costs. The respondents strongly agreed that project managers allocate adequate funds to work activities. This is supported by a mean of 3.88 (std. dv = 0.91). The respondents strongly agreed that adherence to budgets increased project success. This is supported by a mean of 3.84 (std. dv = 0.94).

Majority of the respondents agreed with the statements on budgeting as shown by a mean of 3.58. The responses given by the respondents had little variation (standard deviation=1.18). The findings are of the study are consistent with the results of a study by Nor et al. (2022) which found that cost budgets were critical in increasing project completion rates and enhancing stakeholder confidence.

Table 4.2 Budgeting

Statements	Mean	Std Dev
Projects have accurate cost estimates	3.31	1.39
Projects have clear project schedules	3.43	1.53
Project schedules are adhered to during project implementation	3.98	0.90
Projects have strict adherence to set budget	3.24	1.41
Project work activities are outlined with expected costs	3.38	1.17
Project managers allocate adequate funds to work activities	3.88	0.91
Adherence to budgets increasedproject success	3.84	0.94
Average	**3.58**	**1.18**

Correlation Results

The study carried out correlation tests to determine the relationship between the independent and dependent variables. Pearson correlation, which ranges between -1 and +1 was used because the data was discreet. A positive Pearson correlation value indicates a positive relationship while any negative Pearson correlation value indicates a negative relationship. The association between the variables becomes stronger as the Pearson correlation value approaches either +1 or -1. The results of the correlation analysis are shown in table 4.3.

The results of the correlation showed that planning had a positive and significant relationship with successful implementation of substation power projects (Pearson Moment Correlation = 0.582, Significance = 0.000<0.05). Planning can lead to significant improvement in implementation of substation power projects. These findings are consistent with Gbahabo and Ajuwon (2021) who found that poor cost planning led to insufficient allocation of resources, contractual disputes and project failure.

Further findings revealed that budgeting had a positive and significant relationship with successful implementation of substation power projects (Pearson Moment Correlation = 0.441, Significance = 0.000<0.05). These results shows that budgeting lead to a significant improvement in implementation of substation power projects. The findings of the study are consistent with the findings of a study by Solomon and Berhanu, (2021) who found that resource planning, cost estimating, cost budget and cost control has significant association with the overall success of the project management.

Table 4.3 Correlation Analysis

		Planning	**Budgeting**	**Successful Implementation**
Planning	Pearson Correlation	1		
	Sig. (2-tailed)			
Budgeting	Pearson Correlation	.335**	1	
	Sig. (2-tailed)	0		
Successful Implementation	Pearson Correlation	.582**	.441**	1
	Sig. (2-tailed)	0.000	0.000	
	N	42	42	42

Regression Results

The multiple linear regression analysis was carried out to determine the combined effect of cost management practices on successful implementation of substation power projects. Multiple regression analysis helped to find out the best predictor variable or the strength of relationship of each independent variable (planning and budgeting) 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.

The results showed that cost management practices have a coefficient of determination value of 0.769. This shows that cost management practices accounts for up to 76.9% of the variations in implementation of substation power projects. The implication is that there are other factors that also account for the implementation of substation power projects in the tune of 23.1%. These other factors can be established through other future studies.

Table 4.4 Model Summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.877[a]	.769	.763	.26535

a. Predictors: (Constant), Planning, Budgeting

The results of the study also showed that the overall regression model linking planning and budgeting and successful implementation of substation power projects was significant as indicated by F calculated value of 144.077 at 5% level of significance as shown by a significance level of 0.000, this showed that the overall model was statistically significant at 5% significance level. The results of the study are as shown in table 4.5.

Table 4.5 Analysis of Variance (Model significance)

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	14.983	2	7.492	144.077	.000
	Residual	2.017	39	0.052		
	Total	17.000	41			

a Dependent Variable: Implementation
b Predictors: (Constant), Planning, Budgeting

The results of the study indicated that planning had a positive and significant effect on implementation of substation power projects in Nairobi Metropolitan (β = 0.399, Sig = 0.000). This implies that improving cost planning, which include resource planning, cost scheduling, cost document leads to a significant improvement in implementation of substation power projects in Nairobi Metropolitan. The findings agree with the findings of a study by Ochieng (2020) which showed poor cost planning led to insufficient allocation of resources, contractual disputes and project failure.

In addition, the findings of the study also showed that budgeting had a significant effect on implementation of substation power projects in Nairobi Metropolitan (β = 0.366, Sig = 0.000). This implies that an improvement in cost budgeting leads to a significant improvement in implementation of substation power projects in Nairobi Metropolitan. The findings agree with the findings of a study by Frimpong and Oluwoye (2022) which concluded that cost estimation, cost budget and cost control has significant association with the overall success of the project management.

Table 4.6 Regression coefficients

Model	Variables	B	Std. Error	t	Sig.
1	(Constant)	0.729	0.358	2.037	0.002
	Planning	0.399	0.093	4.290	0.000
	Budgeting	0.366	0.113	3.239	0.000

Dependent Variable: Successful Implementation

$$\mathbf{Y = 0.729 + 0.399X_1 + 0.366\ X_2 + \varepsilon}$$

CONCLUSION AND RECOMMENDATIONS

Conclusion

The study established a positive correlation between planning and successful implementation of substation power projects within Nairobi Metropolitan in Kenya. The study concluded that planning has the most positive significant influence on successful implementation of substation power projects within Nairobi Metropolitan in Kenya. This shows that when projects focus on enhancing planning, for instance through, cost scheduling and resource planning, there will be a significant improvement in implementation.

Further, the study established a positive correlation between budgeting and successful implementation of substation power projects within Nairobi Metropolitan in Kenya and concluded that budgeting has a significant influence on successful implementation of substation power projects. Various budgeting techniques such as cost estimation and cost baselines lead to a significant improvement in the implementation of projects.

Recommendations

The study recommends that project managers, engineers and contractors involved in implementation of projects should use effective cost planning to enhance cost management and improve implementation. Since cost planning have the most significant effect on implementation, there is a need to implement effective cost planning techniques such as resource planning and cost scheduling to improve project implementation. The study recommends selection of competent project managers to conduct effective cost planning.

The study recommends development of accurate cost estimates and establishment of cost baselines during project planning phase. The study established that poor budgeting led to increased cost overruns which led to project delays and abandonment. In order to have an improvement in project implementation, there is a need for projects to have effective cost budgeting since that would significantly improve the project implementation.

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