Project Cost Management And Successful Implementation Of Machakos County Government Funded Water Projects, Kenya

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ABSTRACT

The aim of the study was to establish the effect of project cost management on implementation of county government funded water projects in Machakos County, Kenya. The specific objectives of the study were; To evaluate the effect of methods of cost estimation on implementation of county government funded water projects in Machakos County, Kenya; To establish the effect of cost control on implementation of county government funded water projects in Machakos County, Kenya; To determine the effect of cost contingencies on implementation of county government funded water projects in Machakos County, Kenya; To examine the effect of cost reporting on implementation of county government funded water projects in Machakos County, Kenya. . The study was based on the program theory, Theory of Constraints, ABJ Stick cost theory of management and Public Value Theory. This study used a descriptive research design. The target population of the study was 51 county government funded water projects in Machakos County. The study used a census and semi structured questionnaires were used to collect data primary data from the targeted respondents. Qualitative data was coded thematically and then analyzed by use of thematic content analysis. The results were then presented in form of a prose. Quantitative data was analyzed by use of both inferential and descriptive statistics with the help of statistical software known as Statistical Package for Social Sciences (SPSS version 22). Descriptive statistics included percentages, frequencies, mean, and standard deviation. The results were presented using tables and figures which included bar charts and pie charts. Inferential statistics such as correlation analysis and regression analysis were used to establish the relationship between the independent and the dependent variable. Results revealed that all the project cost management dimensions had a positive and significant relationship with implementation of county government funded water projects in Machakos County, Kenya. However, the magnitude of the influence was different for the specific project cost management dimensions. The project cost control had the largest effect followed by project cost reporting then project cost contingencies and finally the project methods of cost estimation. Consequently, this study provides project managers involved in the implementation of county government funded water projects with insights of how to improve implementation of projects through project cost management. The key recommendations are that implementation of county government funded water projects should embrace project cost management practices such as improved methods of cost estimation, cost control, cost contingencies and cost reporting in order to realize project implementation success.

Keywords: Project cost management, government, water project, implementation

INTRODUCTION

Globally, access to clean water for drinking and other domestic purposes remains an insurmountable challenge for 783 million people especially the rural populace mainly due to the unsustainable management of natural water resources and poor public service delivery strategies by governments (Achieno & Mwangangi, 2018). Embedded in the belief of improving this situation through efficient service delivery and implementation of water projects, governments adopted devolution of the water function (Ngwai, Simba & Oyoo, 2019).

To achieve this, investment in water and sanitation projects especially in the developing countries needs to be enhanced. In addition, such projects must be environmentally, economically and socially sustainable in order to benefit the target population. According to Korir (2017), the process of project implementation involves the successful development and introduction of projects in the organization, thus presents an ongoing challenge for managers. The project implementation process is complex, usually requiring simultaneous attention to a wide variety of human, budgetary and technical variables. As a result, the organizational project manager is faced with a difficult job characterized by role overload, frenetic activity, fragmentation and superficiality. Implementation of water and sanitation projects largely depends on the implementation of the specific projects which could be affected by such variables as technical capacity, community participation, funding, and government support.

Despite many years of development efforts, access to safe water supplies and sanitation services (WSS) in the world continues to be extremely marginal. Over 1.2 billion people worldwide; the majorities living in developing nations, particularly in sub-Saharan Africa, 300 million of which 80% live in rural areas still do not have access to clean water facilities (Prokopy, 2015). In Africa, the number of people in rural areas without an improved water supply is six times higher than in urban populations (Baur&Woodhouse,2019). This has led to tehe establishment of devolved units to enhance water projects in many developing countries (Oino, 2019).

Global Perspective on Implementation of Government Funded Water Projects

It has been the earnest governments' desire to improve access to safe drinking water in several European countries including; Azerbaijan, Czech Republic, Denmark, Finland, Georgia, Greece, Italy, Moldova, Netherlands, Spain, Portugal, Poland and United Kingdom have been reported to have informed decision to devolve this public service provision function (Cheema, 2017). The immediate need to achieve better public service delivery and in particular access to water did inform devolved governance of this function in Papua New Guinea (May, 2006). In Africa, the continued need for better public service delivery including access to clean water did inform the devolution of water administration by the governments of: South Africa, Uganda and Rwanda (Kauzya, 2017.

In Europe, devolution has had a mixture of results in terms of implementation of water projects. Devolved water governance has Calamai (2019) been faced with a myriad of financial resources challenges with disparities in financial disbursements for water projects under devolution to enhance access in the different regional governments of Italy resulting to 15% of regions facing water challenges while others enjoying sufficient supply. However, devolution of water management to improve access was successful with 95% of Autonomous Communities (A.C) in Spain having implemented water projects (Solé-Ollé and Alejandro, 2005).Access to clean water improved with 75% in the Czech Republic under devolution, this resulting from the implementation of better fiscal decentralization structures leading to timely funding of water projects by municipalities (Hemmings, 2016). Strong fiscal decentralization structures Barankay and Ben (2016) to different Cantons did enhance access to clean water emanating also from the successful implementation of water projects in Switzerland.

In Cambodia, failure to effectively involve communities and delayed financial disbursements derailed the implementation of water projects by Commune Councils adversely influencing access to water meant for irrigation and domestic use in the country (Chea, 2020 ; Pak, 2017). Budgetary reforms undertaken by the 20 provincial governments operating under devolution positively influenced the implementation of water projects consequently improving access to clean drinking water in Papua New Guinea (Kua, 2016). In South America, different scholars have different views on the role of devolved units in the provision (Ahmad, 2017) of water through the implementation of water projects. For instance in Mexico, poor water systems according to González-Rivas (2017) emanating from poor funding of most local governments by the national government and the failure to embrace community participation in some areas had derailed implementation of water projects due to resistance by the community adversely influencing clean water access. However, poor fiscal management according to Ahmad and Mercedes (2017) under devolution did adversely influence the implementation of water projects in Peru. In Nicaragua, community involvement by 9 out of the 15 departmental governments was an important factor in the implementation of water projects consequently improving access (Bay, 2017). Further, in Bolivia poor access to water according to Inchauste (2018) emanated from high debts incurred by the 9 departmental governments which had negatively influenced availability of financial resources adversely influencing the implementation of water projects in the country.

Regional Perspective on Implementation of Government Funded Water Projects

In Africa, Forje (2016) did contend that devolution promises better delivery of public services to citizens in the continent, key among these being access to clean water. However, in Nigeria poor access to clean water Nkwocha (2018) notes was as a result of poor funding of water projects, which had adversely influenced their implementation process in the Niger delta region. In South Africa, also poor access to clean water according to Matta and Ashkenas

(2013) emanated from a poor rate of flow of project's financial resources that adversely influenced the implementation of community water projects under provincial governments. Local government's failure to involve local communities did influence access to local labour adversely influencing the implementation of water projects and access to clean water (Thwala, 2017). In Namibia, community participation according to Nekwaya (2017) did expedite the implementation of water supply projects at the Omusati Regional Council consequently improving water access. In Tanzania, access to clean water according to Liviga (2018) had gradually improved under devolution this emanating from the successful implementation of water projects in rural areas attributed to: embracing of community participation, timely transfer of projects" funds from the central government and cordial intergovernmental relations. In Kenya, it is the aspiration of the citizenry access to water would improve under the devolved system of governance (Burugu, 2018).

According to ADF report (2015), about 33% of water supply projects in Ethiopia are Non-functional due to lack of funds for operation and maintenance, inadequate community mobilization and commitment, less community participation in decision making as well as lack of spare parts. As Harvey and Reed (2013) report showed that community issues like perceived lackof education on water supply and sanitation, poor management system and limited demand are related to low sustainability rates of water supply systems (Harvey &Reed, 2013). According to Paulinus and Iyenemi (2014), poor implementation waterof projects in Nigeria and Ghana depended on the poor project cost management including budgeting. Sustaining a functional rural water supply infrastructure has been a challenge in Sub-Saharan Africa. In Tanzania, nearly half of rural water points are not functional and about 20% of newly constructed water points become non-functional within one year due to lack of cost management practices. Rural citizens soon return to traditional, unimproved water sources and endanger their health and well-being (Gine & Perez-Foguet, 2018).

Local Perspective on Implementation of Government Funded Water Projects

Kenya's Vision 2030 has an ambitious target of ensuring universal access to water and improved sanitation services by 2030. This aspiration is also reflected in the Kenya Environmental Sanitation and Hygiene Policy (KESHP) 2016–2030 that aims to ensure 100% access to improved sanitation services by 2030. Kenya's renewable water resource per capita is projected to fall below the absolute water scarcity level of 500m3 per year by 2030 due to population growth with poor sanitation estimated to cost Kenya's economy Ksh. 27 billion annually. The implementation and sustainability of water supply projects has been prophesied as a promising direction for a variety of communities in Kenya (Dube, 2012). Formal project cost management systems as practiced in Kenya have not fully been incorporated in the government projects cost control systems thus affecting implementation of government funded (Abdulkadir, 2014).

Further, a closer look at Kenya's water projects leaves no doubt that implementation 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. For example, Thematic Group (2015) finds out that, among 24 million rural dwellers in Kenya about 10 million have access to an improved water supply. The study further reveals that most of them are inactive yet the county governments have continued to establish numerous new water projects, while giving little regard to project cost management. From the study by Thematic Group (2015), it is true to drive that most of the project implementers does not adhrere to the principle of project cost management where the citizens would mention the need of reviving already existing but inactive implemented water projects. Despite the knowledge in project cost management as necessary for an improvement in the attainment of results and implementation of government funded projects, several organizations, governments departments and institutions are yet to get a strong backing on the need to invest in project cost management practices (Ondieki, 2019). It is against this background the current study seeks to establish the relationship between project cost management and implementation of county government funded water projects in Machakos County, Kenya.

Statement of the Problem

The importance of water projects sustainability is further emphasized in the global Sustainable Development Goals (SDGs) number 6 aimed to ensure availability and sustainable management of water and sanitation for all. Bridging the gap in access to improved water and sanitation is a core concern of the 2030 Agenda for Sustainable Development Goals. The SDGs, as part of the 2030 Agenda for sustainable development, target 6.1calls for universal and equitable access to safe and affordable drinking-water and Target 6.4 substantially increase water use efficiency across all sectors and ensure sustainable withdrawals and supply of fresh water to address water scarcity and substantially reduce the number of people suffering from water scarcity (WHO Report, 2019). Notwithstanding, the implementation of water projects in the many counties is influenced by a multiplicity of factors, most of the water projects have stalled (Auditor General Report, 2019).The Machakos County Government allocated Ksh.430

million in the financial year 2018/2019 for the implementation of water projects, but only 10% of people in Machakos County have access to clean and safe drinking (KNBS, 2018). Further, the findings showed that out of 120 community water projects implemented, only 40% were functional while 60% had failed shortly2 years after hand over to community. The report further indicated that majority of the parts, where these projects were constructed, are still faced with shortage of water and poor sanitation. The question now remains; is project cost management the actual missing factor especially for implementation of county funded water projects? If it has been effected, how has it contributed to improvement on implementation of county funded water projects in Machakos County?

Locally, a number of studies have been done to access and bring out the situation of the implementation of various water projects in different counties in the country. Achieno, and Mwangangi (2018) study focused on the determinants of sustainability of rural community based Water Projects in Narok County, Kenya. Njuguna (2014) did a study on factors influencing sustainability of donor funded projects: the case of water and sanitation projects in Laikipia East district, Laikipia County, Kenya. From these studies and many more not mentioned, it is evident that implementation of water projects in Kenya have a number of factors influencing their success. Also, it is evident that such a study has not been done in Machakos county funded water projects; where this study will focus on. It is on this premise the study sought to establish the relationship between project cost management and implementation of county funded water projects in Machakos County, Kenya.

Objective

The general objective of the study is to establish the effect of project cost management on successful implementation of county government funded water projects in Machakos County, Kenya.

In order to fulfill the purpose of the study, the specific objective of the study were;
1. To determine the effect of methods of cost estimation on successful implementation of county government funded water projects in Machakos County, Kenya.
2. To establish the effect of cost control on successful implementation of county government funded water projects in Machakos County, Kenya
3. To determine the effect of cost contingencies on successful implementation of county government funded water projects in Machakos County, Kenya
4. To examine the effect of cost reporting on successful implementation of county government funded water projects in Machakos County, Kenya

Research Questions

The study was guided by the following research questions: -
1. To what extent do methods of cost estimation affect successful implementation of county government funded water projects in Machakos County, Kenya?
2. Does cost control affect successful implementation of county government funded water projects in Machakos County, Kenya?
3. How do cost contingencies affect successful implementation of county government funded water projects in Machakos County, Kenya?
4. In what ways does cost reporting affect successful implementation of county government funded water projects in Machakos County, Kenya?

LITERATURE REVIEW
2.1   Introduction
The study seeks to examine the effects of project cost management on implementation of government funded water projects. The chapter examines and review past but current literatures that provide relevant theoretical structure on the specific objectives. The chapter will examine the gathered literature critically in order to support or refute the arguments and findings in such literatures. Lastly, it will identify the research gaps that the study wished to bridge or close

2.2   Theoretical Review
Theory is a systematically organized knowledge applicable in a relatively wide variety of circumstances, especially a system of assumptions, accepted principles and rules of procedure devised to analyze, predict, or otherwise explain the nature or behavior of a specified set of phenomena (Epstein & Zin, 2013).Theories are analytical tools for understanding, explaining, and making predictions about a given subject matter (Crowley, 2013). This section discusses the theoretical framework for this study various theories will be discussed that underpin the research objectives.

2.2.1   Program Theory

The proponents of the theory Lipsey (1990) argued that it contributes to evaluation practice through the identification of key program elements as well as providing information on how these elements relate to each other. Data collection plans are then involved in the framework to ensure information to measure the extent and nature of each aspects and their occurrence. Once the data on the elements is collected, it is analyzed within the framework. Program theory is a plausible and sensible model on how a program is supposed to work (Chen 2014). Haji, Morin and Parker (2013) stated that it is a proposition with regard to the transformation on input into output and how to transform a bad situation into a better one through inputs. It is also illustrated as the process through which program components are presumed to affect outcomes. Chen (2014) argued that a program theory consists of an organizational plan on how to deploy resources and organize the activities of the program activities to ensure that the intended service system is developed and maintained. The theory further deals with the service utilization's plan which analyses how the intended target population receives the intended amount of intervention. This is through the interaction of the service delivery systems. Finally, program theory looks at how the intended intervention of cost management for the specified projects can be implemented to achieve the desired social benefits. Rogers as cited by Chen (2014) illustrates the advantages of using a theory-based framework in cost estimation. It includes the ability of the project manager to estimate the cost to attribute project outcomes of specific projects or activities as well as identification of anticipated and undesired program consequences.

Theory based evaluations as such enables the evaluator to understand why and how the program is working (Haji, Morin & Parker, 2013). Construction projects are encountered with serious risks in the completion of the project. One of these risks is the inaccuracy of cost estimate; the project is carried out under conditions of uncertainty, it is whether the over or underestimate of construction works. Cost estimation and budgeting are essential tools for planning in the construction industry and play a central role in both preconstruction and construction phases of a project. Best practices dictate a total project budget should be developed as early as possible in a project. Hence, it arises the need to set out a cost estimating model in line with major studies made locally and internationally in terms of estimating methods and a common relationships between various expenses so that the cost estimate would be more realistic. It on this basis the current study seeks adopted program theory to establish the influence of cost estimation and implementation of county government funded water projects in Machakos County, Kenya.

2.2.2   Theory of Constraints

The theory of constraints (TOC) can be used to demonstrate how managers can effectively manage organizations based on the assumption of system thinking and constraint management (Kohli& Gupta, 2010). TOC-based management philosophy focuses on change at three levels; mind-set of the organization, measures that drive the organization, and methods employed within the organization (Gupta & Boyd, 2008). Needs and constraints in a multi-party working situation which is necessary for construction projects bring complications in project management (Lau & Kong, 2006) and therefore for effective project management, constraints have to be managed.During the execution of a project, procedures for project control and record keeping become indispensable tools to managers and other participants in the construction process. According to Dharwadker (2015), cost control can be achieved by selecting the right man for the right job, the right equipment and tools for the right work and the right quality of materials, in the right quantity, from the right source, at the right price and delivered at the right time. Managers are expected to be well equipped to execute the project, with due consideration to the quality of work, yet within the estimated cost and limits

This study is based on the triple constraint theory where most of adopted cost control from organizational perspectives may work well or fail hence leading to delays if this theory is not well embraced. Delays in project completion are a common problem in the construction industry not only with an immeasurable cost to society but also with debilitating effects on the contracting parties (Ondari & Gekara, 2013). Other factors which measure project performance include cost and quality requirements (Nwachukwu & Emoh, 2011). Cost controlling and monitoring of projects occurs when you establish ways to track the course of all activities and events in the project. The current study seeks to establish the relationship between cost control and implementation of county government funded water projects in Machakos County, Kenya.

2.2.3   ABJ Sticky Cost Theory in Project Management

Traditional models of cost behavior usually posit a linear relation between activities and costs where in the short run, total costs equal fixed costs plus unit variable costs × activity volume. This model implies a mechanical relation between changes in costs and contemporaneous changes in sale activity. According to Müller and Jugdev (2012) resent research has begun to focus on how managerial incentives affect the tradeoff between fixed and variable costs. The starting point of the sticky costs theory is that many (but, not necessarily, all) costs arise as a result of

deliberate resource commitment decisions made by managers (Shahu, Pundir and Ganapathy, 2012). Sudhakar (2012) opined that the concept of cost stickiness is consistent with the thought that costs arise as a result of deliberate resource commitment decisions made by managers. This means that the absolute change in selling, general, and administrative cost associated with decreased sales activity is systematically less than those associated with increased sales activity and they interpret this as evidence of overt cost management (Tabish and Jha, 2012).

Verschuren et al. (2010) argue that when sales decrease, managers choose to retain slack resources to avoid resource adjustment costs such as severance payments to dismissed workers or disposal losses on equipment. When demand increases beyond available resource capacity, managers can meet the demand only if they add the required resources. The main obligations of a project team towards a client are usually reduced to concerns around functional requirements, specific quality, and delivery within acceptable budget and time-frame. Usually for most clients, the cost aspects seem to rank highest (Ward and Daniel, 2013). A project manager needs to have a clear understanding of cost behavior since this form the basis for many decisions such as budgeting, controlling, and compensation.

The above theory relates to influence of project cost contingencies on implementation of county government funded water projects. The use of project cost contingency in construction projects gives a clear and vivid acknowledgement of impending perennial problems of cost overruns in the delivery of construction projects. The incidence of cost overrun in construction projects and in the construction industry is a common phenomenon the world over.The design contingency is usually up to 10% of the overall construction cost. Whilst calculated and identified separately, the contingency amount should be an additional sum held by the owner in the project budget. The owner holds the budget and retains it for use by the architect and designers to ensure that all desired scope is covered. As the project evolves, the contingency is drawn upon by the owner and transferred to the project. This should be based on checks and balances where owner, architect and cost consultant work together to decide when to use the contingency. Therefore, the current study adopted ABJ Sticky Cost Theory in Project Management to establish the relationship between cost contingencies and implementation of county government water funded projects in Machakos County, Kenya.

2.2.4 Public Value Theory

Public Value Theory was formulated by Moore (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 implementation but 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 (Awino & Marendi-getuno, 2014).
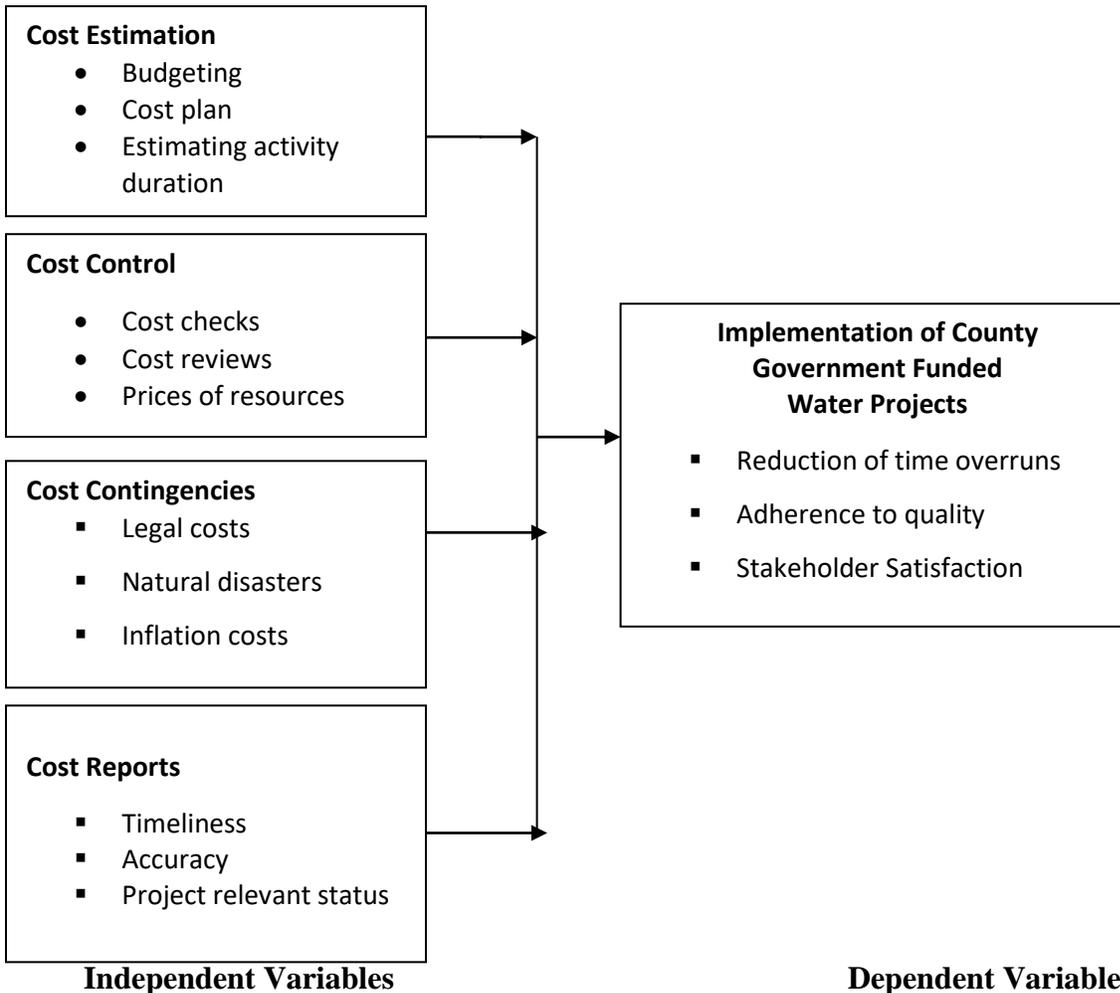
Public value theory (PVT) reformulates core aspects of traditional public management (TPM) and new public management (NPM), two sharply divergent approaches within public administration scholarship. The study will apply the Public Value Theory to gauge the accountability of public institutions set up to act on behalf of the public. County government committees are constituted to decide which projects will be undertaken using public funds while also monitoring and overseeing the progress of such projects. These committees should act in the best interest of the citizens.

The public value theory emphasizes the need for the public to be informed of the government projects is implementing to benefit the public. A cost report will generally include all the costs incurred by the date of the report, where they are known, a forecast of the costs likely to be incurred during the rest of the project, in so far as these can be foreseen and estimated, and risk allowances for the possibility of unforeseeable costs.. For example, the client may have costs that, whilst they are directly related to the project, they would prefer to account for them themselves. In the absence of a single, standard type of cost report format, or specific formatting requirements by the client, most cost consultants will develop their own format for cost reports. It is on the premise the current study adopts public value theory to examine the relationship between project cost reporting and implementation of county government funded water projects in Machakos County, Kenya.

2.3. Conceptual Framework

According to Chepkwei (2019) when conducting a study, a conceptual framework should be developed to show the relationship between the independent variables (cost estimation, cost control, cost contingencies and cost reports) and dependent variable (implementation of County Funded Water Projects). Out of the literature reviewed various variable are suggested, but in this study the variables are Cost Estimation (budgeting, cost plan & activity duration estimation), Cost Control (cost checks, cost reviews & prices of project resources), Cost Contingencies (legal costs,

natural disasters & inflation costs), Cost reports (timeliness, reliability and relevance). This is illustrated in Figure 2.1.

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┌─────────────────────────────┐
│ Cost Estimation             │
│   •  Budgeting              │
│   •  Cost plan              │
│   •  Estimating activity    │
│      duration               │
└─────────────────────────────┘

┌─────────────────────────────┐          ┌─────────────────────────────────┐
│ Cost Control                │          │ Implementation of County        │
│                             │          │ Government Funded               │
│   •  Cost checks            │          │ Water Projects                  │
│   •  Cost reviews           │─────────▶│                                 │
│   •  Prices of resources    │          │  ▪  Reduction of time overruns  │
└─────────────────────────────┘          │                                 │
                                         │  ▪  Adherence to quality        │
┌─────────────────────────────┐          │                                 │
│ Cost Contingencies          │          │  ▪  Stakeholder Satisfaction    │
│   ▪  Legal costs            │          └─────────────────────────────────┘
│                             │
│   ▪  Natural disasters      │
│                             │
│   ▪  Inflation costs        │
└─────────────────────────────┘

┌─────────────────────────────┐
│ Cost Reports                │
│                             │
│   ▪  Timeliness             │
│   ▪  Accuracy               │
│   ▪  Project relevant status│
└─────────────────────────────┘
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      Independent Variables   **Dependent Variable**

Figure 2.1: Conceptual Framework

RESEARCH METHODOLOGY
Research Design
The study adopted a descriptive survey design. To achieve the study purpose, the researcher adopted a descriptive survey to make assertions on how methods of cost estimation, cost control, cost contingencies and cost reporting affect implementation of county government funded water projects in Machakos County, Kenya.
3.3   Target Population
The target population for the study was 51 county funded water projects in Machakos county, based in the different sub-counties within Machakos county undertaken from the year 2013 to 2020. The unit of analysis was the county government funded water project. The study unit of observation was the project managers, contractor, supervisors and engineers of the water funded construction projects. They were chosen for the study as they run day to day project activities and are in a better position to provide comprehensive and credible information about the project constraints and project implementation in terms of the water construction projects, they are involved to provide the services in the county. This is as illustrated in Table 3.1:

Table 3.1: Target Population

Category	Population
Contractors	13
Supervisors	67
Engineers	18
Project managers	55
Total	**153**

Source: Auditors' General Report (2020)

3.4   Sample Size and Sampling Technique

The study was a census study since it focuses on all the projects. This therefore ruled out application of any sampling technique. A census describes a population that is subject to the variations of chance. A population approach uses census data to infer to a greater population that is less than 200 objects that hypothetically could exist, may have existed, or may exist in the future (Benjamin, Kevin, &Mikaela, 2015). For scientific generalizations, the findings of this study from the census data are therefore applicable to all county government funded water projects within Machakos County.

3.5   Data Collection Instruments

Data was collected using semi-structured questionnaire. The instrument was developed to contain the items that are aligned towards the achievement of the objectives of the study. The questionnaire items had both closed and some open-ended questions. Closed questions consisted of standardized questions which were presented to the respondents with no variation and have a specified sequence and statements describing beliefs about the attitude being measured. The respondent indicated the extent to which they agreed or disagreed with each statement. Open-ended questions are not restrictive to the respondents. The questionnaire was divided into three sections. Section one had background information about the respondents and Machakos county government, whereas sections two consisted question on the dependent variables and section three had questions about independent variables which the researcher intended to study.

Data Collection Procedure

The primary data collection process started by acquiring a letter from the university to the county government and a research permit from the National Council for Science and Technology (NACOSTI).Secondary data was obtained from up to date information from journals, research project reports, newspapers, publications, conference papers, and presentations as well as updated information from relevant websites from projects reports and project files that are available at respective county government offices. Primary data was collected from the respondents who are involved in each of the identified projects. Data collection instruments were administered through a drop and pick later approach. The study dispatched a total of 153 questionnaires to the respondents. Out of the 153 questionnaires, 127 were returned.

Pilot Test

The research instrument was piloted to 15 respondents and the findings were not included in the actual study.

Validity of the Instrument

Validity was achieved through expert judgments of the research supervisors. This facilitated the necessary revision and modification of the research instrument thereby enhancing validity.

Reliability of the Instrument

Cronbach Alpha co-efficients obtained for the different variables are Methods of Cost Estimation (.879),Cost Control (.890), Cost Contingencies (.902), Cost Reporting (.954) and Project Implementation (.896). Since all the values are of 0.7 and above, it indicates a good reliability.

3.8.   Data Processing and Analysis

The primary data collections were sorted for ease of manipulation and analysis. The data was then be edited, coded and classified with the aid of the Statistical Package for the Social Sciences (SPSS). Descriptive statistics were applied to describe or summarize the data collected to enable a researcher to come up with a meaning fully distribution of measurements and values from the samples selected using mean indices and standard deviation statistics..

From the above statistics, frequency distributions and percentages tables were generated showing the distribution of scores in a sample for a specific variable. The analysis gives a record of the number of times a score or a response occurs (Mugenda & Mugenda, 2012). For each variable, the researchers tabulated the findings and calculated the frequencies and percentages then make interpretations from the research findings.

A regression model was used to test the effect of project cost management on implementation of county government funded water project at Machakos County Government. This helped researcher evaluated and explored the strength of relationships between the dependent and the four independent variables of the study. Multiple linear regressions were employed to predict the outcome.. The multiple regression model was given by the equation below;

$$PCI = \beta_0 + \beta_1 X_1 + \beta_2 X_2 + \beta_3 X_3 + \beta_4 X_4 + \varepsilon \ldots\ldots\ldots\ldots1.6$$

Where: $\beta_1, \beta_2, \beta_3$ and β_4 are the regression coefficients of the predictors in the model

Y – Project Implementation

β_0 – The intercept of the equation (Constant term)

X_1 – Methods of cost estimation

X_2 – Cost control

X_3 – Cost contingencies

X_4 – Cost Reporting

ε – The Error term

The study fitted the various OLS models and test for significance at 0.05 level of significance. On correlation analyses, the correlation coefficients estimated was tested and concluded to be significant if the p-values were less than 0.05. Regression models were tested for goodness of fit by computing the R-square statistics that shows the explanatory power of the models. A large R-square was associated with high explanatory power implying good fitness. Every regression model fitted was tested for general significance by carrying out ANOVA and calculating the F-statistic, the regression models with p-values of less than 0.05 will be considered significant. The relationship among the variables was tested from the student's t-test of the multiple regression coefficients of the variables. Variables with p-values of less than 0.05 of the t-statistics were concluded to have significant role on implementation of county government funded water projects in Machakos County, Kenya.

Data will be presented in various forms. A frequency distribution table was used to summarize categorical or numerical data. According to Orodho (2009) a frequency table is a table showing how often each value of the variable occurs in a data set. Frequencies and percentages will also be used to present the data. Frequency distribution tables are the devices that are used to present the data in a simple form. The tables were numbered and a title given to every table.

FINDINGS AND DISCUSSION
Descriptive Statistics for the Construct Methods of Cost Estimation
The first study objective was to establish whether methods of cost estimation influence implementation of county government funded water projects in Machakos County, Kenya. Table 4.6 presented the percentages, means and standard deviation statistics relating to the information measuring the respondents' level of agreement as to how the given indicators of methods of cost estimation influenced implementation of county government funded water projects in Machakos County, Kenya. The value that had the highest frequency scores among the respondents was the occurrence, agree (value of 4.00 on the monadic scale), as all the indicators for methods of cost estimation under this column had high numbers of respondents. This implied that most respondents were in agreement that the indicators listed for methods of cost estimation influenced implementation of county government funded water projects in Machakos County, Kenya.

From the findings in Table 4.6, majority of the respondents agreed that the project cost budgeting was based on experience of pricing construction projects (M=3.987, SD=0.876); The cost plan was clear and detailed on drawing of specifications (M=3.897, SD=0.987), Project budgeting was based on the availability of database of bids on similar projects (historical data) (M=3.888, SD=0.543), Estimating activity duration depended on the time allowed for preparing cost estimates (M=3.654, SD=0.432), The project cost plan factor in the site constraints (access, storage and services) (M=4.321, SD=0.654); Estimating activity duration depended on the material availability and financial capabilities of the contractor (M=4.112, SD=0.759), This implies that methods of cost estimation influence implementation of county government funded water projects in Machakos County, Kenya.

The study findings are in agreement with literature review by Hatamleh, *et al*., (2018) that cost estimation is considered to be one of the most significant processes in project cost management. It is the initial stage of the project cost at various project development stages. As utilized in the development process of the project, project cost estimate consists of all capital expenditures, including constructing and landscaping but does not usually consists of capital support expenditures. Cost estimating is employed as one of the fundamental tools in order for the management to be successful. It is significant to analyze the cost assumptions in estimating through using a series of

expertise of gaining precise cost estimating that corresponds with the construction and design details once a base line budget is established. Therefore, the cost estimation improves implementation of projects

Table 4.6: Descriptive Statistics for the Methods of Cost Estimation

Description	Mean	Std.
The project cost budgeting is based on experience of pricing construction projects	3.987	.876
The cost plan is clear and detailed on drawing of specifications	3.897	..987
Project budgeting is based on the availability of database of bids on similar projects (historical data)	3.888	.543
Estimating activity duration depends on the time allowed for preparing cost estimates	3.654	.432
The project cost plan factor in the site constraints (access, storage and services)	4.321	.654
Estimating activity duration depends on the material availability and financial capabilities of the contractor	4.112	.759

4.7.2 Descriptive Statistics for the Construct Cost Control

The second study objective was to establish whether methods of cost estimation influence implementation of county government funded water projects in Machakos County, Kenya. Table 4.7 presented the percentages, means and standard deviation statistics relating to the information measuring the respondents' level of agreement as to how the given indicators of cost control influenced implementation of county government funded water projects in Machakos County, Kenya. The value that had the highest frequency scores among the respondents was the occurrence, agree (value of 4.00 on the monadic scale), as all the indicators for cost control under this column had high numbers of respondents. This implied that most respondents were in agreement that the indicators listed for cost control influenced implementation of county government funded water projects in Machakos County, Kenya.

From the findings in Table 4.7, majority of the respondents agreed that project cost reviews were conducted regularly (M=4.212, SD=0.876); The cost checks were used to revise the project budgets (M=4.218, SD=0.098), Activity duration was based on the prices of the project resources (M=4.213, SD=0.876), Activity resources estimation was based on the cost checks and reviews (M=3.987, SD=0.009), Cost checks determined the project budgeting (M=4.218, SD=0.870); The financial capabilities of the contractor was based on the project cost checks and reviews (M=3.989, SD=0.017), This implies that methods of cost control influence implementation of county government funded water projects in Machakos County, Kenya. The study results are in agreement with the findings by Ayodele and Alabi (2014) describe cost control as a method of controlling the cost of building within a determined value during the design stage. This involves the preparation of an approximate estimate to which the project is committed, and the refining of the cost as the design detail developers. Chigara, Moyo and Mudzengerere (2018) describes cost control as a systematic application of cost control criteria to the design process so as to maintain in the first place a sensible and economic relation between cost, quality, utility and appearance and in the second place, such overall control of proposed expenditure as circumstances might dictate. He stressed further that cost control does not merely estimate the tender sum but probe deeper into the cost implication of each building element whereby each design decision maintain a sensible relationship through the design and construction stages.

Table 4.7: Descriptive Statistics for the Cost Control

Description	Mean	Std.
The project cost reviews are conducted regularly	4.212	.876
The cost checks are used to revise the project budgets	4.218	.098
Activity duration is based on the prices of the project resources	4.213	.876
Activity resources estimation is based on the cost checks and reviews	3.987	.009
Cost checks determines the project budgeting	4.218	.870
The financial capabilities of the contractor is based on the project cost checks and reviews	3.989	.017

4.7.3 Descriptive Statistics for the Construct Cost Contingencies

The third study objective was to establish whether cost contingencies influence implementation of county government funded water projects in Machakos County, Kenya. Table 4.8 presented the percentages, means and standard deviation statistics relating to the information measuring the respondents' level of agreement as to how the given indicators of cost contingencies influenced implementation of county government funded water projects in Machakos County, Kenya. The value that had the highest frequency scores among the respondents was the

occurrence, agree (value of 4.00 on the monadic scale), as all the indicators for cost control under this column had high numbers of respondents. This implied that most respondents were in agreement that the indicators listed for cost contingencies influenced implementation of county government funded water projects in Machakos County, Kenya.

From the findings in Table 4.8, majority of the respondents agreed that the legal costs were used to acquire the project estimate and schedule (M=4.091, SD=0.917); Legal costs determined the trade-off discussion and transparency of the project (M=4.321, SD=0.917), Natural disasters such as weather, floods, earthquakes determined the cost contingency reserve (M=3.987, SD=0.008), Inflation cost of project material was normally secured before the beginning of the project (M=3.888, SD=0.117), Inflation costs determine the technical and technological complexities of the project (M=4.117, SD=0.021); This implies that cost contingencies influence implementation of county government funded water projects in Machakos County, Kenya.

The study findings are in agreement with the findings by Enshassi & Ayyash (2014) the use of cost contingency in construction projects provides a lucid and lively recognition of upcoming/impending challenges of cost overrun in delivering the construction project thereby giving room for project delivery to cost. In a construction project, cost contingency planning begins with the size of the project before looking at other factors. This helps the project to be able to establish a baseline for uncertainties within the project. It also helps in defining both external and internal risks and putting appropriate measures in place (Teye & Adjei, 2013). Enshassi and Ayyash (2014) added that cost contingency planning provides good structure to identify, quantify and put risks first thereby setting the programme for the project and allocating resources. A poor cost contingency allowance can result in cost overrun on a project as well as time overrun. However, a good cost contingency plan can be tailored based on the previous similar projects while taking into consideration the individuality of that particular project (Akinradewo *et al*., 2019).

Table 4.8: Descriptive Statistics for the Cost Contingencies

Description	Mean	Std.
The legal costs are used to acquire the project estimate and schedule	4.091	.009
Legal costs determine the trade-off discussion and transparency of the project	4.321	.917
Natural disasters such as weather, floods, earthquakes determine the cost contingency reserve	3.987	.008
Inflation cost of project material is normally secured before the beginning of the project	3.888	.117
Inflation costs determine the technical and technological complexities of the project	4.117	.021

4.7.4   Descriptive Statistics for the Construct Cost Reporting

The fourth study objective was to establish whether cost reporting influence implementation of county government funded water projects in Machakos County, Kenya. Table 4.9 presented the percentages, means and standard deviation statistics relating to the information measuring the respondents' level of agreement as to how the given indicators of cost reporting influenced implementation of county government funded water projects in Machakos County, Kenya. The value that had the highest frequency scores among the respondents was the occurrence, agree (value of 4.00 on the monadic scale), as all the indicators for cost control under this column had high numbers of respondents. This implied that most respondents were in agreement that the indicators listed for cost reporting influenced implementation of county government funded water projects in Machakos County, Kenya.

From the findings in Table 4.9, majority of the respondents agreed that the cost reporting tools adopted ensure timely delivery of project reports (M=3.998, SD=0.112); Timeliness of the project cost reports were carried out periodically (M=3.876, SD=0.001), The cost reports were reliable to make informed decisions in regard to project implementation (M=4.213, SD=0.918), True status of a project was not misrepresented, intentionally or unintentionally (M=3.654, SD=0.109), The accuracy of the project cost reports determined project resourcing (M=3.987, SD=0.018).This implies that cost reporting influence implementation of county government funded water projects in Machakos County, Kenya.

The study results are in tandem with the findings by Lhee (2014) that project cost totals may be known at some higher level of management, many individual project managers we have consulted with are not provided with their individual project cost information. It is interesting to note that organizations accumulate project cost totals, which in turn are reported in the annual financial disclosures, yet in many organizations detailed individual project cost information is not provided to the project managers If the organization has this information available then serious questions should be raised as to why this important cost information detail is not shared with the individual project managers. One of the principal elements regarding the proper use of a cost report on any project, is the timeliness of

its use. The most important concept of cost reporting, is to allow the field management team to predict cost issues on individual line items or work activities.

Table 4.9: Descriptive Statistics for the Cost Reporting

Description	Mean	Std.
The cost reporting tools adopted ensure timely delivery of project reports	3.998	.112
Timeliness of the project cost reports is carried out periodically	3.876	.001
The cost reports are reliable to make informed decisions in regard to project implementation	4.213	.918
True status of a project is not misrepresented, intentionally or unintentionally.	3.654	.109
The accuracy of the project cost reports determines project resourcing	3.987	.018

4.7.5 Descriptive Statistics for the Implementation of Projects

The study sought to examine the status of implementation of county government funded water projects in Machakos County, Kenya. Table 4.10 presented the percentages, means and standard deviation statistics relating to the information measuring the respondents' level of agreement as to how the given indicators of implementation of county government funded water projects in Machakos County, Kenya. The value that had the highest frequency scores among the respondents was the occurrence, agree (value of 4.00 on the monadic scale), as all the indicators for project implementation under this column had high numbers of respondents.

From the findings in Table 4.10, majority of the respondents agreed that the accuracy of the project cost reports determined project resourcing (M=4.111, SD=0.243) (M=3.998, SD=0.919); The projects were implemented according to the set timelines (M=3.789, SD=0.513), The projects were implemented in line with the budget provisions (M=4.213, SD=0.918), The projects were implemented in line with the set standards (technical requirements) (M=3.918, SD=0.713), The projects implemented met the set and desired quality standards (M=4.001, SD=0.812). The users (citizens) were satisfied with the projects implemented (M=3.978, SD=0.118).

Table 4.10: Descriptive Statistics for the Project Implementation

Description	Mean	Std.
The projects start and end within the planned period	4.111	.243
The projects are implemented according to the set timelines	3.998	.919
The projects are implemented in line with the budget provisions	3.789	.513
The projects are implemented in line with the set standards (technical requirements)	3.918	.713
The projects implemented meet the set and desired quality standards	4.001	.812
The users (citizens) are satisfied with the projects implemented	3.978	.118

4.8 Inferential Analysis

4.8.1 Correlation Analysis

Gogtay and Thatte (2017), states that (*r*) that is Pearson correlation is widely the correlation statistic adopted to measure the extent (degree) of the association between the linearly related variables. Normally, (*r*) is between positive one (+1) and negative one (-1). As the (*r*) value goes towards 0, the relationship between the two variables will be weaker. Pearson correlation (*r*) was used to show the relationship between project planning and projects implementation. The study results are illustrated in Table 4.11:

 The study sought to establish the relationship between methods of cost estimation and implementation of county government funded water projects in Machakos County, Kenya. A Pearson Correlation was performed and the result of the Pearson correlation test as presented in Table 4.11 show a correlation (r 127) = 0.562; p<0.05) between methods of cost estimation and implementation of county government funded water projects in Machakos County, Kenya. This implies that the methods of cost estimation is positively correlated to the implementation of county government funded water projects in Machakos County, Kenya. In addition, the correlation between these two variables was significant, that is p<0.5 implying a linear relationship between methods of cost estimation and implementation of county government funded water projects in Machakos County, Kenya. This shows that methods of cost estimation significantly influenced implementation of county government funded water projects in Machakos County, Kenya. The study findings are in agreement with findings by Simanjutak (2018) study sought to analyze effect of project cost management on cost overrun in construction projects. The study identified that the increasing project cost estimation is expected to reduce the potential cost overrun. Hatamleh *et al*., (2018) study identified the critical factors that affect accuracy of cost estimation and evaluate the degree to which these factors are important from contractors 'and consultants 'view points.

In addition, the study sought to determine the relationship between cost control and implementation of county government funded water projects in Machakos County, Kenya. A Pearson Correlation was performed and the result

of the Pearson correlation test as presented in Table 4.11 show a correlation (r=127) = 0.872; p<0.05) between cost control and implementation of county government funded water projects in Machakos County, Kenya. This implies that the cost control is positively correlated to the implementation of county government funded water projects in Machakos County, Kenya. The correlation between these two variables was significant, that is p<0.5 implying a linear relationship between cost control and implementation of county government funded water projects in Machakos County, Kenya. This shows that cost control significantly influenced implementation of county government funded water projects in Machakos County, Kenya. The study results are in agreement with the findings by Chigara, Moyo, & Mudzengerere (2013) study explored cost management strategies employed by contractors on building projects and also investigated the challenges that contractors encounter in managing project cost in Zimbambwe. Contrary to having cost management systems in place, contractors admit experiencing cost overruns on their projects. These cost overruns are attributable to organizational related challenges such as deficiency in cost control systems.

Further, the study sought to examine the relationship between cost contingencies and implementation of county government funded water projects in Machakos County, Kenya. A Pearson Correlation was performed and the result of the Pearson correlation test as presented in Table 4.11 show a correlation (r=127) = 0.576; p<0.05) between cost contingencies and implementation of county government funded water projects in Machakos County, Kenya. This implies that the cost contingencies is positively correlated to the implementation of county government funded water projects in Machakos County, Kenya. The correlation between these two variables was significant, that is p<0.5 implying a linear relationship between cost contingencies and implementation of county government funded water projects in Machakos County, Kenya. This shows that cost contingencies significantly influenced implementation of county government funded water projects in Machakos County, Kenya.

Lastly, the study sought to examine the relationship between cost reporting and implementation of county government funded water projects in Machakos County, Kenya. A Pearson Correlation was performed and the result of the Pearson correlation test as presented in Table 4.11 show a correlation (r=127) = 0.673; p<0.05) between cost reporting and implementation of county government funded water projects in Machakos County, Kenya. This implies that the cost reporting is positively correlated to the implementation of county government funded water projects in Machakos County, Kenya. The correlation between these two variables was significant, that is p<0.5 implying a linear relationship between cost reporting and implementation of county government funded water projects in Machakos County, Kenya. This shows that cost reporting significantly influenced implementation of county government funded water projects in Machakos County, Kenya. According to Adler and Smith (2009) while a project's scope and schedule expectations have their own set of standards and principles, project cost reporting seems to be an underdeveloped discipline today. They also discussed the issues of project cost reporting and the implications of how organizations affect the appropriate costing of projects when managerial accounting processes are available to facilitate project costing.

Table 4.11: Correlation Matrix for Independent and Dependent Variables

		CE	CControl	C.Conti.	C. Report.	PI
Cost Estimation	Pearson Correlation	1				
	Sig.(2-tailed)					
	N	127				
Cost Control	Pearson Correlation	.235**	1			
	Sig.(2-tailed)	.000				
	N	127	127			
Cost Contingencies	Pearson Correlation	.623**	.316**	1		
	Sig.(2-	.000	.007			
	N	127	127	127		
Cost Reporting	Pearson Correlation	.3278**	.498**	.236**	1	
	Sig.(2-	.009	.017	.145		
	N	127	127	127	127	
Project Implementation	Pearson Correlation	.562**	.872**	.576**	.673**	1
	Sig.(2-	.000	.000	.000	.000	
	N	127	127	127	127	127

* Correlation is significant at the 0.05 level (2-tailed).

PI = Project Implementation; CE= Cost Estimation; C.Control= Cost Control; C.Report. = Cost Reporting;

4.8.2   Multiple Regression Analysis

A multiple regression analysis was conducted to investigate the joint causal relationship between the independent (project cost management) and dependent variable (implementation of county government funded water projects). In Table 4.12, the correlation coefficient (R) of 0.868 shows that there is a strong positive joint correlation between project cost management (methods of cost estimation, cost control, cost contingencies and cost reporting) with implementation of government funded water projects in Machakos County, Kenya. From the study findings, it is notable is notable that correlation determination of by R^2 value (0.753).This indicates that independent variables jointly accounted for 75.30% of the implementation of county government funded water projects in Machakos County, Kenya as represented by the R^2. This therefore means that other factors not studied in this research contribute 24.70% to the implementation of county government funded water projects in Machakos County, Kenya. This implies that these project cost management variables are very significant and need to be factored to improve implementation of county government funded water projects in Machakos County, Kenya.

Further, the analysis of variance was used to examine whether the regression model was a good fit for the data. The F-critical (4, 122) was 1.543 while the F-calculated was 92.985 as shown in Table 4.12. This shows that F-calculated was greater than the F-critical and hence linear relationship between the project cost management and implementation of county government funded water projects in Machakos County, Kenya. In addition, the p-value was 0.000, which was less than the significance level (0.05). Therefore, the model can be considered to be a good fit for the data and hence it is appropriate in predicting the influence of the four independent variables (project cost management) on the dependent variable (implementation of county government funded water projects in Machakos County, Kenya).

Further, the study ran the procedure of obtaining the regression coefficients, and the results were as shown on the Table 4.12. The coefficients or beta weights for each variable allows the researcher to relative importance comparatively of the independent variables. In this study the unstandardized coefficients and standardized coefficients are given for the multiple regression equations. However, discussions are based on the unstandardized

coefficients.

Findings in Table 4.12 showed that methods of cost estimation had coefficients of estimate which was significant basing on $\beta_1 = 0.569$ (p-value = 0.003 which is less than $\alpha = 0.05$). Also, the influence of methods of cost estimation is more than the influence attributed to the error and supported by the t values whereby $t_{cal=2.697}$ > t critical =1.96 at a 5 percent level of significance, thus we conclude that methods of cost estimation significantly influence implementation of county government funded water projects in Machakos County, Kenya. The study results are in tandem by Simanjutak (2018) study sought to analyze effect of project cost management on cost overrun in construction projects. The study identified that there are 55 variables that are classified into 4 main factors in project cost estimation such as cost management plan, estimate cost, determine budget and control cost. And for the third problem has been identified that the increasing project cost estimation is expected to reduce the potential cost overrun. Enshassi, Mohamed and Madi (2015) study focused on the factors affecting accuracy of cost estimation of building contracts in the Gaza Strip. Estimating is a fundamental part of the construction industry. The success or failure of a project is dependent on the accuracy of several estimates through-out the course of the project. Overestimated or underestimated cost has the potential to cause loss to local contracting companies. The objective of this paper is to identify the essential factors and their relative importance that affect accuracy of cost estimation of building contracts in the Gaza strip. The results of analyzing fifty one factors considered in a questionnaire survey concluded that the main factors are: location of the project, segmentation of the Gaza strip and limitation of movements between areas, political situation, and financial status of the owner.

In addition, the study results in Table 4.12 showed that cost control had coefficients of estimate which was significant basing on $\beta_2 = 0.766$ (p-value = 0.003 which is less than $\alpha = 0.05$). Also, the influence of cost control is more than the influence attributed to the error and supported by the t values whereby $t_{cal=5.803}$ > t critical =1.96 at a 5 percent level of significance, thus we conclude that cost control significantly influence implementation of county government funded water projects in Machakos County, Kenya. The study results are in line with the findings by Chigara, Moyo, & Mudzengerere (2013) study explored cost management strategies employed by contractors on building projects and also investigated the challenges that contractors encounter in managing project cost in Zimbambwe. The study observed that in the majority of cases, contractors' efforts to manage projects costs are centred on management of project resources. Contrary to having cost management systems in place, contractors admit experiencing cost overruns on their projects.Ayodele and Alabi (2014) sought to determine the effects of Cost Control Techniques on building projects delivery for both government and private developers based on quality, time and cost. Interviews were conducted for selected Quantity Surveyors, Architects, Civil Engineers, Builders, and Contractors.. Results from interview and observation showed that, Bill of Quantities and other cost control techniques was utilised on government building contracts while none of the cost control techniques was utilised by private developers. Malkanthi, Premala and Mudalige (2017) study focused on the impact of cost control techniques on cost overruns in construction projects It was established that it is important to identify cost controlling techniques and their impact on cost overruns.

Further, the study findings in Table 4.12 showed that cost contingencies had coefficients of estimate which was significant basing on $\beta_3 = 0.632$ (p-value = 0.003 which is less than $\alpha = 0.05$). Also, the influence of methods of cost estimation is more than the influence attributed to the error and supported by the t values whereby $t_{cal=3.176}$ > t critical =1.96 at a 5 percent level of significance, thus we conclude that cost contingencies significantly influence implementation of county government funded water projects in Machakos County, Kenya. The study results are in line with the findings by Kujala, Brady and Putila (2014) built on existing research on complex products and systems (CoPS) to address the challenges of managing costs in projects of varying complexity. Based on a qualitative case study, we identify several challenges in performing various cost management functions related to cost estimation, cost control and monitoring, revenue recognition, profitability analysis and margin calculation. The cost contingencies functions are impacted by the large size, complexity, uncertainty and uniqueness of those project.

Lastly, the study findings in Table 4.12 showed that cost reporting had coefficients of estimate which was significant basing on $\beta_4 = 0.654$ (p-value = 0.003 which is less than $\alpha = 0.05$). Also, the influence of cost reporting is more than the influence attributed to the error and supported by the t values whereby $t_{cal=3.497}$ > t critical =1.96 at a 5 percent level of significance, thus we conclude that cost reporting significantly influence implementation of county government funded water projects in Machakos County, Kenya. The study results are in tandem with literature review by According to Adler and Smith (2009) while a project's scope and schedule expectations have their own set of standards and principles, project cost reporting seems to be an underdeveloped discipline today. The study established that cost reporting influence successful implementation of construction projects.

Table 4.12: Regression Analysis
Model Summary (Combined Effect)

R	R-Square	Adjusted R Square	Std. Error Estimate
.868	.753	.741	.33218

a.   Predictors: (Constant), Methods of Cost Estimation, Cost Control, Cost Contingencies and Cost Reporting

ANOVA

Model		Sum of Squares	d.f	Mean Square	F	Sig.
1	Regression	961.465	4	240.366	92.985	.000[b]
	Residual	315.411	122	2.585		
	Total	1276.876	126			

a.   Dependent Variable: Y
b. Predictors: (Constant), X_1,X_2,X_3,X_4

Regression Coefficents

Model		Unstandardized Coefficients		Standardized Coefficients	T	P-value.
		B	Std. Error	B		
1	(Constant)	4.986	1.007		4.951	.000
	Methods of Cost Estimation	.569	.211	.511	2.697	.005
	Cost Control	.766	.132	.743	5.803	.000
	Cost Contingencies	.632	.199	.609	3.176	.003
	Cost Reporting	.654	.187	.611	3.497	.002

The optimal model equation would be ($Y = \beta_0 + \beta_1X_1 + \beta_2X_2 + \beta_3X_3 + \beta_4X_4 + \varepsilon$) becomes: Y= 4.986+ 0.569X_1+ 0.766X_2 + 0.632X_3 + 0.654X_4. This indicates that implementation of county government funded water projects in Machakos County, Kenya = 4.986 + 0.569 (Methods of cost estimation) + 0.766(Cost control) + 0.632(Cost contingencies) + 0.654(Cost reporting). According to the regression equation established, taking all factors into account methods of cost estimation, cost control, cost contingencies and cost reporting constant at zero, implementation of county government funded water projects in Machakos County, Kenya was 10.987.

CONCLUSION
The first objective of the study was to establish the relationship between methods of cost estimation and implementation of county government water projects in Machakos County, Kenya. The results showed that methods of cost estimation have a positive and statistically significant influence on implementation of county government water projects in Machakos County, Kenya. The study concluded that the improvement in methods of cost estimation leads to improvement on implementation of county government water projects in Machakos County, Kenya. Providing accurate and detailed construction cost estimates early in the planning and design process allows creating a roadmap for a successful project. The study findings conclude that methods of cost estimation improve plans, saves money, allow to make better bid estimation.
The second objective of the study was to establish the relationship between cost control and implementation of county government water projects in Machakos County, Kenya. The results showed that cost control has a positive and statistically significant influence on implementation of county government water projects in Machakos County, Kenya. The study concluded that the improvement in cost control leads to improvement on implementation of county government water projects in Machakos County, Kenya. The objective of cost control in the county government projects is to manage the delivery of the project within the approved budget. Regular cost reporting is used to facilitate, at all times, the best possible estimate of and establish Established project cost to date.; and anticipated final cost of the project and future cash flow.
The third objective of the study was to establish the relationship between cost contingencies and implementation of county government water projects in Machakos County, Kenya. The results showed that cost contingencies have a

positive and statistically significant influence on implementation of county government water projects in Machakos County, Kenya. The study concluded that the improvement in cost contingencies lead to improvement on implementation of county government water projects in Machakos County, Kenya. The study results indicated that typically, lack of a contingency plan, which is a plan that can be enacted to mitigate project risks, were missing in the projects.. While it is advisable for projects to hold a contingency, they might not wish to share this information with the rest of the project team, who may see a contingency as a license to exceed the budget in the knowledge that the client has a reserve that can be spent.

The fourth objective of the study was to establish the relationship between cost reporting and implementation of county government water projects in Machakos County, Kenya. The results showed that cost reporting has a positive and statistically significant influence on implementation of county government water projects in Machakos County, Kenya. The study concluded that the improvement in cost reporting leads to improvement on implementation of county government funded water projects in Machakos County, Kenya

RECOMMENDATIONS

The study recommends that there is need to enhance methods of cost estimation to improve implementation of county government funded water projects in Machakos County, Kenya. The methods of estimation plays an important role in water construction projects. The budgeting, cost plans and estimation of activity duration are a key for successful implementation of the projects.

The study established that cost control influence implementation county government funded water projects in Machakos County, Kenya. There is need to enhance cost control as a method of controlling the cost of building within a determined value during the design stage. This involves the preparation of an approximate estimate to which the project is committed, and the refining of the cost as the design detail developers. This may require cost checks, reviews and prices of resources for the successful implementation of the projects.

The study established that cost contingencies influence of implementation of county government funded water projects in Machakos County, Kenya. The study finding added that cost contingency planning provides good structure to identify, quantify and put risks first thereby setting the programme for the project and allocating resources. A good cost contingency allowance cannot result in cost overrun on a project as well as time overrun. However, a good cost contingency plan can be tailored based on the previous similar projects while taking into consideration the individuality of that particular project. The project managers need to ensure that legal costs, natural disasters and inflation costs are well catered for the successful implementation of the projects.

The study established that cost reporting influence implementation of county government funded water projects in Machakos County, Kenya. The cost reporting may to allow the field management team to predict cost issues on individual line items or work activities. This prediction is initially used for identifying any cost issues that are occurring on the project in time to minimize any negative cost conditions. The study recommends that there is need to improve timelines, accuracy and project relevant status for successful implementation of the projects.

REFERENCES

Achieno, G. O., & Mwangangi, P. (2018). Determinants of Sustainability of Rural Community Based Water Projects in Narok County, Kenya. *International Journal of Entrepreneurship and Project Management*, *3*(1), 41-57.

Akinradewo, O., Ngwenya, L., Aigbavboa, C., Thwala, W., & Mphela, L. (2019, November). Improving the efficacy of cost contingency plans for construction projects in South Africa. In *IOP Conference Series: Materials Science and Engineering* (Vol. 640, No. 1, p. 012030). IOP Publishing.

Amuma, F. A. (2020). *Influence of Implementation of Community Water Projects on Social Development in Kenya: a Case of Todonyang, Turkana County, Kenya* (Doctoral dissertation, University of Nairobi).

Auditor General's Report (2020), Nairobi Kenya

Ayodele, E. O., & Alabi, M. O. (2014). Effect of cost control on Building Projects Delivery in Nigeria. *Civil and Environmental Research*, *6*(2), 76-79.

Chigara, B., Moyo, T., & Mudzengerere, F. H. (2013). An analysis of cost management strategies employed by building contractors on projects in Zimbabwe. *International Journal of Sustainable Construction Engineering and Technology*, *4*(2), 1-13.

Enshassi, A., & Ayyash, A. (2014). Factors affecting cost contingency in the construction industry–Contractors' perspective. *International Journal of Construction Management*, *14*(3), 191-208.

Enshassi, A., Mohamed, S., & Madi, I. (2005). Factors affecting accuracy of cost estimation of building contracts in the Gaza Strip. *Journal of Financial Management of Property and Construction*.

Gurcanli, G. E., Bilir, S., & Sevim, M. (2015). Activity based risk assessment and safety cost estimation for residential building construction projects. *Safety Science*, *80*, 1-12.

Hatamleh, M. T., Hiyassat, M., Sweis, G. J., & Sweis, R. J. (2018). Factors affecting the accuracy of cost estimate: case of Jordan. *Engineering, Construction and Architectural Management*.

Kikuvi, K. M. (2016). *Determinants Of Successful Implementation Of Water And Sanitation Projects In Kenya: A Case Of Informal Settlement In Kenya Mombasa County, Kenya* (Doctoral dissertation, University Of Nairobi).

Kujala, J., Brady, T., & Putila, J. (2014). Challenges of cost management in complex projects. *International Journal of Business and Management*, *9*(11), 48.

Langat, P. K., Kumar, L., & Koech, R. (2019). Understanding water and land use within tana and athi river basins in Kenya: Opportunities for improvement. *Sustainable Water Resources Management*, *5*(3), 977-987.

Lhee, S. C. (2014). Finding Significant Factors to Affect Cost Contingency on Construction Projects Using ANOVA Statistical Method: Focused on Transportation Construction Projects in the US. *Architectural research*, *16*(2), 75-80.

Macharia, E. W., Mbassana, M., & Oduor, J. (2015). Assessing sustainability of rural water projects in naivasha, Kenya, case study: Maraigushu water project. *European Journal of Business and Social Sciences*, *4*(7), 52-83.

Malkanthi, S. N., Premalal, A. G. D., & Mudalige, R. K. P. C. B. (2017). Impact of cost control techniques on cost overruns in construction projects. *The Institution of Engineers, Sri Lanka, 50(4),* 53-60

Mohamud, G. I., & Nyang'au P.S (2020). Effect Of Project Management Constraints On Implementation Of Public Housing Projects In Isiolo County, Kenya. *International Journal of Social Sciences Management and Entrepreneurship (IJSSME)*, *4*(1), 1-9

Ngwai, F. M., Simba, F., & Oyoo, J. J. (2019). Influence of project management practices on construction cost control of projects in Mombasa County. *The Strategic Journal of Business & Change Management*, *6*(3), 314-330.

Obare, J. O., Kyalo, D. N., Mulwa, S. A., & Mbugua, J. (2016). Implementation Process of Project Control Systems, Project Team Training Diversity and Performance of Rural Roads Construction Projects in Kenya. *International Journal of Innovative Research & Development*, *5*(12), 12-22.

Peleskei, C. A., Dorca, V., Munteanu, R. A., & Munteanu, R. (2015). Risk Consideration and Cost Estimation in Construction Projects Using Monte Carlo Simulation. *Management (18544223)*, *10*(2).

Simanjuntak, M. R. A. (2018). Analysis of Project Cost Management and The Effect On Cost Overrun In Construction Projects. *International Journal of Innovative Research in Science, Engineering and Technology*, *7*(7), 8049-8054.

Teye Buertey, J. I., Abeere-Inga, E., & Adjei Kumi, T. (2013). The financial impact of risk factors affecting project cost contingency: evidential reasoning method.

Zakayo, M. M. (2017). *Factors influencing the implementation of water projects under the devolved system of governance in Kenya: A case of Meru County Government* (Doctoral dissertation, Doctoral dissertation, University of Nairobi).