EFFECT OF PROJECT MANAGEMENT CONSTRAINTS ON IMPLEMENTATION OF PUBLIC HOUSING PROJECTS IN ISIOLO COUNTY, KENYA

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Abstract

The purpose of this study was to examine the influence of project constraints on implementation of public housing construction projects in Isiolo County, Kenya. The specific objectives of the study included: To examine the influence of project scope management on implementation of public housing construction projects in Isiolo County, Kenya; To establish the influence of project time management on implementation of public housing construction projects in Isiolo County, Kenya; To determine the influence of project cost management on implementation of public housing construction projects in Isiolo County, Kenya; To assess the influence of project quality management on implementation of public housing construction projects in Isiolo County, Kenya. The study was anchored to the theory of project management, theory of triple constraints and complexity theory. The study adopted a descriptive research design. The target population for the study was 140 county governments' funded housing construction projects in Isiolo County, Kenya. The study conducted census and a pilot study was undertaken to check the validity and reliability of the data collection instrument. A questionnaire was used to collect primary data and consisted of both structured and open-ended questions to give qualitative and quantitative data. Data was analyzed using descriptive and inferential statistics in which frequencies and percentages were used. SPSS was used to analyze the data and to determine whether the independent variables are related to the dependent variable. Data was presented in tables, pie charts and graphs. Qualitative data was coded, and themes related to research questions in the study identified. Qualitative data was interpreted by attaching significance to themes and patterns observed by the use of content analysis. The study results imply that project management constraints jointly influenced positively and significantly implementation of county funded public housing construction projects. This implies that these variables are very significant and need to be factored to improve implementation of county funded public housing construction projects. However, the magnitude of the influence was different for the specific project management constraints. Time management had the largest effect followed by cost management then scope management and finally the quality management. The study recommended county government need to manage constraints in the projects. This could go a long way in ensuring there is improved implementation of county funded construction housing projects in Isiolo County, Kenya.

Keyword: Project Management, Project Manager, Project Cost Management, Project Quality Management, Project Scope, Project Scope Management, Project Time Management and Project Triple Constraints.

Introduction

The project performance is based on a set-criteria anchored on the standards or principles from which stakeholders are able to judge the project success (Nibiyza, 2015; Rugenyi & Bwisa, 2016). These are the key predictors which are very crucial for every successful project in terms of achievement of the goals and objectives. Many authors though have argued that performance of a project is more or less based on the client's satisfaction as prerequisite; a project success is controlled by time, cost and scope, commonly referred to as Project Triple Constraint (Baymount, 2015; Akinyde, 2014; Wanjau, 2015). For every successful project, considerations are based on the triple constraint before, during and after project implementation. The project constraints sometimes referred as the iron triangle are common in the construction projects (Catanio, Armstrong & Tucker, 2015; Nasir, Nawi & Radzuan, 2016). The failure to understand and interpret iron triangle appropriately may affect a construction project though project activities are carried out effectively (Omondi, 2017; Chin & Hamadi, 2015; Kiarie & Wanyoike, 2016; Kariungi, 2014; Leong et al. 2014).

In order to understand County Government funded construction projects performance in Kenya, this study is grounded on the triple constraint theory trying to explain the influence of time, cost and scope which bounds the universe of every performing project (Osedo, 2015; Hassan & Adeleke, 2019; Banda & Pretorius, 2016; Nibyza, 2015). The key standards and principles which must be accomplished in every project as stated by (Van Wayngaad, Pretorius, & Pretorius, 2012) are the definitely the project triple constraint in a construction project which must be balanced appropriately (Catanio, Armstrong & Tucker, 2015; Nasir, Nawi &Radzuan, 2016). The cause and effect of new or changing triple constraint requirements are constantly negotiated during all phases of a project (Lukale, 2018; Rugenyi & Bwisa, 2016; Omondi, 2017). The three key triple constraint relationships signify that at least one of the triple constraint variables must be constrained (otherwise there is no baseline for planning), and at least one of the variables must have capacity for exploitation (otherwise quality may be affected) (Abulkhaim & Adeleke, 2019; Beleu, Crisan & Nistor, 2015; Omondi, 2017; Rugenyi, 2017).

Based on this argument, according to Osedo (2015) stated the county government funded projects in Kenya have indicated puzzling statistics which have shown underperforming statistics whereby the existing records have reported that between 60% to 82% of projects have failed. These projects are struggling in terms of being accomplished within the budget, time without compromising quality (Omondi, 2017). Similarly, Omolo (2016) found out that county governments funded construction projects have issues in regard to project scope management. This means that they rarely follow the necessary processes for the implementation of the projects, activities and tasks associated and for the successful finalization of the project (Sikudi & Otieno, 2017; Mwangi, 2018).

The housing market in Kenya has evolved considerably since independence in 1963. The 1968/76 National Housing Policy promoted a strong role for the government in providing affordable housing for the citizens of the country through its parastatal or quasi-government institution, the National Housing Corporation (NHC), through municipal councils, and through civil service housing. For more than two decades, the NHC was the market leader in the housing industry, responsible for the development of government run and managed public housing. The Nairobi City Council and local authorities throughout the country augmented the public housing of NHC by developing and managing a considerable stock of housing units, largely in urban centers.

Concurrently, the government provided housing to civil servants working at national, provincial, parastatal and municipal levels of administration at a time when one in two wage earners were public sector employees (Shitote et al,2010). In the late 1970s and onwards, however, the urban housing situation in the country deteriorated. Demand for housing radically outstripped supply as people migrated to cities, the national economy –itself suffering from poor performance could no longer finance public housing, and poor governance led to the near collapse of parastatal institutions, including NHC. The advent of structural adjustment policies in the 1980s and 1990s compounded the problem as government downsized the civil service and the housing benefits associated with it (Wafula, 2015).

The county government of Isiolo has established various projects to enhance development in the county. These are projects with high impact in terms of increasing county competitiveness, generation of revenue, creation of employment among others. The construction projects are anchored on the County Transformative Agenda and Kenya Vision 2030 agenda. These construction projects are funded as per CADP sectors anchored on the MTEF Sectors which include the Infrastructure and ICT, Culture and Recreation, Social Protection, Health; Education; General Economic, and Commercial Affairs Agriculture, Environmental protection, Water and Natural Resources; Public Administration & International (or inter-government) Relations Rural and Urban Development (ARUD) and Energy.

Statement of the Problem

Public housing construction implementation criteria are anchored on the set of standards or principles on which a performing project can be judged (Nibiyza, 2015; Rugenyi & Bwisa, 2016). However, most of the public housing construction projects in the country have failed since they have shown to have time and cost overruns over 50% (Baymount, 2015; Akinyde, 2014; Wanjau, 2015). Despite the guidelines set out by county governments of Kenya on the implementation of various projects, the housing construction projects is wanting (Osedo, 2015; Sikudi& Otieno, 2017; Mwangi, 2018). According to Osedo (2015) the county hosing governments funded projects have shown puzzling statistics which presently indicates that underperforming as between 60 and 82 percent of projects have failed or completely abandoned by the county governments. The Auditor General report (2017) indicated that 75% of the county funded housing construction

projects had cost and time overruns or abandoned in Isiolo County. The question now remains; is project triple constraints management the actual missing factor for implementation of housing construction projects in Kenya? If it has been implemented, how has it enhanced or improved implementation of housing construction projects in Kenya?

The local studies related to project management constraints and performance of projects have been carried out in different sectors. For instance, Omondi (2017) study focused on the triple constraint management and WASH projects completion in Nakuru County, Kenya. Rugenyi and Bwisa (2016) study was on project triple constraint and project manager's perspective on management of projects in Nairobi. Further, Kiarie and Wanyoike (2016) study focused on the government funded projects and specifically integrated financial management information system (IFMIS) project was used as a case study. From the aforementioned studies no study has focused on the relationship between project triple constraints management and county funded housing construction projects performance in Isiolo County, Kenya. A gap this study seeks to fill. It is on this premise the study, therefore, investigated the effect of project management constraints (cost, time, quality and scope) on implementation of housing construction projects in Isiolo County, Kenya.

Objectives of the Study

The purpose of the study was to examine the effect of project management constraints on implementation of public housing construction projects in Isiolo County, Kenya. The study was guided by the following specific objectives;

   i.   To examine the effect of project scope management on implementation of public housing construction projects in Isiolo County, Kenya.
  ii.   To establish the effect of project time management on implementation of public housing construction projects in Isiolo County, Kenya.
 iii.   To determine the effect of project cost management on implementation of public housing construction projects in Isiolo County, Kenya.
  iv.   To assess the effect of project quality management on implementation of public housing construction projects in Isiolo County, Kenya.

Theoretical Review

The theoretical framework is a structure which supports and holds a research study; it introduces and describes the theory or theories that explain why the research problem under study exists. This study sought to be guided by the following theories namely; Theory of Triple Constraints, Complexity Theory and Goal Setting Theory

Theory of Project Triple Constraints

The theory of triple constraints is derived from the very definition of a project which states that a project is a temporary group activity which is designed to produce a desired result or service or a unique product (PMI, 2015).The theory of the triple constraint depicts that the project triple constraint management is an iron triangle of cost, scope, quality and time which bounds the project universe which must be achieved (Dobson, 2004). Construction projects brings complications in project management, needs and constraints and therefore for effective project management, constraints have to be managed. Projects take place inside organizations where, there is a finite amount of resources with which to accomplish infinite tasks. This results in scarcity and the triple constraints; a deadline, a budget, and a minimum acceptable level of performance (Dobson, 2004).

The theory of the triple constraints is anchored on the project management with an understanding that a project should be a balance of the three interdependent project constraints (time, scope and cost) to achieve the desirable results. The cause and effect of new or changing triple constraint requirements are constantly negotiated during all project processes, and the three key triple constraint relationships signify that at least one of the triple constraint variables must be constrained (Wayngaad, Pretorius & Pretorius, 2012).This theory will guide the study to establish the relationship between project management constraints and implementation of public housing construction projects in Kenya.

Goal Setting Theory

Goal-setting theory was developed by Latham and Locke (1994) which states that project team is able to deliver the project deliverables within scope, time, cost and quality when the project team feel motivated. The goals are achievable when the project team is given the appropriate support to enhance performance (Armstrong, 2005). Goal setting is understood to mean the identification process in the stages of performance to achieve the desirable outcomes. The basic principle of goal setting theory in projects is to look for means to achieve the project constraints (time, scope and cost) without compromising quality (PSU WC, 2015). It is understood that if the project team find that the project performance is not achievable to the desired goals, they will find new strategy not compromise the project constraints (goals) (Locke & Latham, 2006).

Saleemi (2006) states that the goal setting theory aims at ensuring the project team to set the achievable targets to accomplish them with their project managers within the project scope. The county government construction projects require scope management in goal setting as means of achieving the desired goals (Armstrong, 2005). This theory is applicable in the county government funded housing construction projects as the stakeholders expect the project scope being well managed to meet or achieve project cost constraints to deliver projects as expected. This is expected as the county provides the construction contractors to meet the set goals in order to be

paid in time. This theory will guide the study to establish the relationship between project scope management and implementation of public housing construction projects in Kenya.

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). Lugusa and Moronge (2016) 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. 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 timeframe. Usually for most clients, the cost aspects seem to rank highest (Lugusa & Moronge, 2016). The concept of cost stickiness is thus important in this study as it portrays a clear connection on how managerial incentives affect the tradeoff between fixed and variable costs. This theory will guide the study to establish the relationship between project cost management and implementation of public housing construction projects in Kenya.

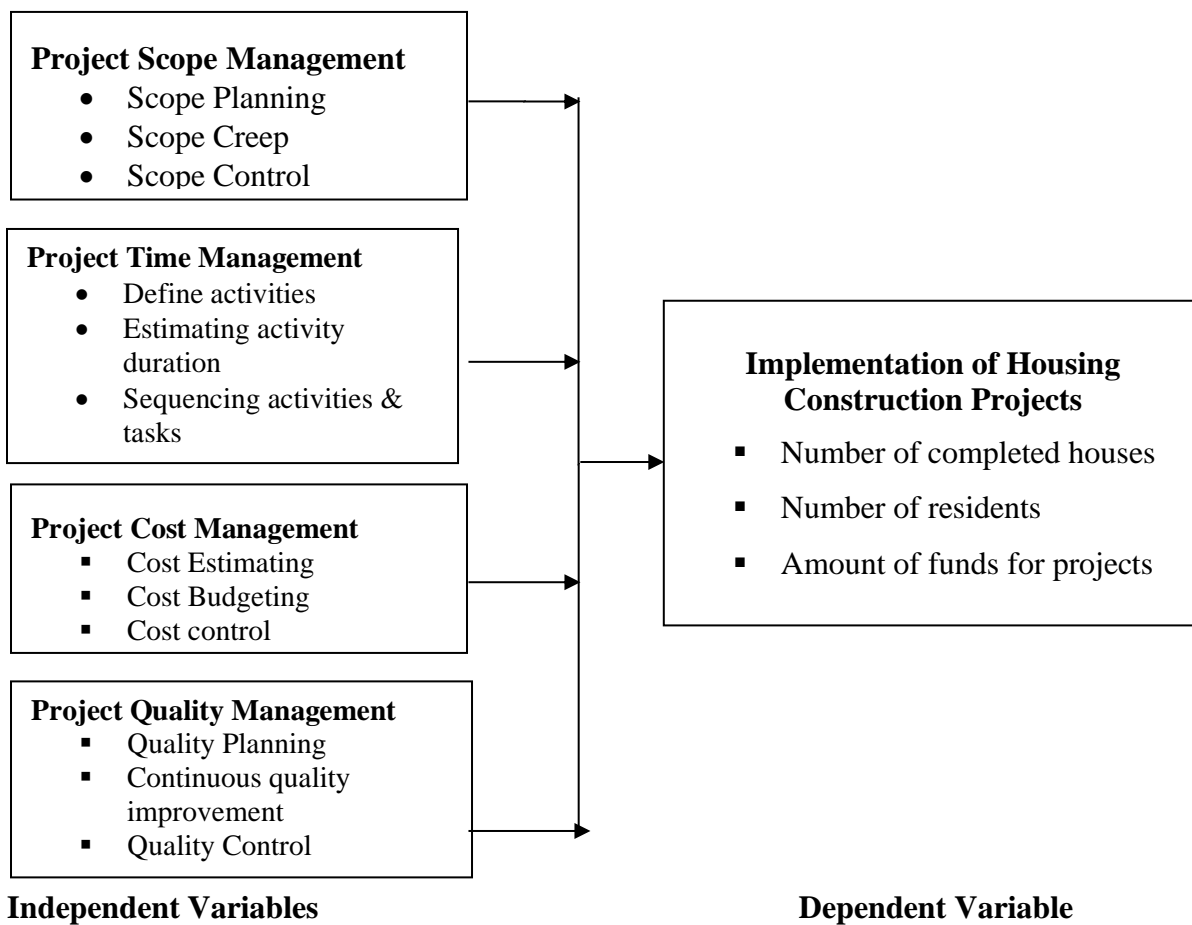**The Pareto Principle of Time Management**

In 1895, Vilfredo Pareto, an Italian economist, noted that about 80% of the land in Italy was owned by about 20% of the people. As he examined his ideas, he noticed that this 80/20 rule was equally valid in other ways (Wells, 2012). The idea, which is now called the Pareto principle, relates to time management because 20% of work usually generates about 80% of positive results. Zwikael and Globerson (2006) define time management as the process of determining needs, setting goals to achieve these needs, prioritising and planning tasks required to achieve these goals. Wells (2012) defines time management as behaviours that aim at achieving an effective use of time while performing certain goal-directed activities.

Time management is not controlling every seconds of life, but it is showing new ways through which people can use the time properly to improve their lives (Cheng, 2014). Thus, by focusing on the vital few (the critical 20%) rather than the trivial many (the remaining 80%), one can get far more accomplished. The 80/20 Rule is therefore a shortcut that helps to manage our affairs and focus our energies since the ability to choose the important tasks is the key to success (Ward & Daniel, 2013). The Pareto principle of time management differs with the 100% rule states that 100% of the work needed to accomplish the project objective must be included in the work

breakdown structure. In large, complex projects, there are typically multiple phases and multiple levels of work that must be done to achieve the project objective. This theory will guide the study to establish the relationship between project triple constraints and implementation of public housing construction projects in Kenya.

Conceptual Framework

According to Chepkwei (2019) when conducting a study, a conceptual framework should be developed to show the relationship between the independent variables (project scope, time, cost and quality) and dependent variable (implementation of construction housing Projects). Out of the literature reviewed various variable were suggested, but in this study the variables are project scope management (scope planning, creep and control), project time management (define activities, estimating activity duration and sequencing activities & tasks), project cost management (cost management plan, estimation or budgeting and control), project quality management (quality planning, continuous improvement and control). This is illustrated in Figure 1.

Project Scope Management
- Scope Planning
- Scope Creep
- Scope Control

Project Time Management
- Define activities
- Estimating activity duration
- Sequencing activities & tasks

Project Cost Management
- Cost Estimating
- Cost Budgeting
- Cost control

Project Quality Management
- Quality Planning
- Continuous quality improvement
- Quality Control

Implementation of Housing Construction Projects
- Number of completed houses
- Number of residents
- Amount of funds for projects

Independent Variables   **Dependent Variable**

Figure 1: Conceptual Framework

Critique of the Existing Literature

From the past studies such as Rugenyi and Bwisa (2016) accentuated that project triple constraints had influence on the project performance. The study highlighted that there is a significant relationship between constraints management of the project and performance of NGOs projects. The relationship between projects constraints management and performance of county funded projects is yet to be comprehensively covered. The current study seeks to show how project constraints management can influence construction projects performance. Goswami (2015) view, the distinction between the project triple constraints and project performance there is no clear cut. They give an illustration of meeting site personnel in a construction site which can be regarded as an element of both project execution and project management. It is therefore concluded that project constraints, which involve project scope, time, cost and quality management, has vital implications on a project's fate, success or failure.

It is suggested to make the most verified choice of methods or standards resulting from explanation of the task on optimizing the project's scope to the following measures: profit, time, cost and quality (Adek, 2016). In Kenya, Gwaya, Wanyona, and Masu (2014) suggested the need for Kenya to adopt a different approach in the application of project management, in its construction industries. In comparing the difference between certified and uncertified project managers in their likelihood of project success in terms of meeting the triple constraint, Catanio, Armstrong and Tucker (2013) found no significant difference between the two.

Studies by Mwakajo and Kidombo (2017); Adek (2016); Tabishl and Jha (2011); Osedo,(2017) and Ogutu and Muturi (2017) study examined the factor and project successful implementation determinants in infrastructure county government funded projects of in terms of costs and time, and monitoring, however, they are case based studies, while applying little or none a cross-sectional survey research methods and the role of stakeholders participation is scanty. Nyakundi (2015), Kweyu (2018) and Justin,et al, (2016) concluded that project management process is significantly correlated to project success, however, the studies were case studies based on state entity, power and HIV AIDS projects respectively and the delivery of project was on 'iron triangle'. The current study seeks to examine the relationship between project triple constraints and implementation of housing construction projects in Isiolo County, Kenya.

Research Gaps

A review of the existing literature showed that research has been done on project triple constraints and project performance (Hassan & Adeleke, 2019; Catanio, Armstrong & Tucker, 2013; Lukale, 2018; Kabirifar & Mojtahidi, 2019). However, most studies examining the influence of project triple constraints on project performance have been conducted in developed countries (Barbalho*et al*., 2016; Ahmed, 2018; Yahootkar& Gil, 2012). To fill this gap, and to establish existence of such

a relationship, it is imperative to conduct research in developing economies context such as Kenya with specific reference to county construction projects. The reviewed literature pointed out a number of conflicting understandings on the relationship between project triple constraints and project performance which is also one of the key concerns of government funded construction projects research. This provides evidence that much research is needed to add to the debate in this area.

Additionally, literature reviewed indicates there is imbalance on the attention that has gone into studies on project triple constraints and performance of projects. In measuring performance of projects, most studies tend to concentrate on implementation aspects and disregards other dimensions of performance such as stakeholder satisfaction, benefit realization and service delivery (Mwakajo & Kidombo, 2017; Adek, 2016; Tabishl & Jha, 2011; Osedo, 2017; Ogutu & Muturi, 2017). Empirical evidence on the links between project triple constraints and project performance measured by stakeholder satisfaction, benefit realization and service delivery is evidently lacking. One notable exception is a study in Kenya by Rugenyi and Bwisa (2016) which examined the role of project triple constraints and project performance. The researchers used accessibility, availability, reliability and quality of services of the projects as a measure of performance of construction projects. However, the findings of this study could not be generalized due to different sectoral context. It would therefore be prudent for other researchers to make a remarkable contribution in this field by establishing the impact of project triple constraints on performance of county government funded construction projects (measured by stakeholder satisfaction, benefit realization and service delivery).

Moreover, there is need to question the veracity of the link between project triple constraints and performance of construction projects. Analysis of previous research relating to the question of a link between project triple constraints and performance of construction projects reveals there is uncertainty as to the direction of the link. Empirical evidence on the impact of project triple constraints on project performance is mixed and inconclusive. A cross section of studies provides evidence that project triple constraints leads to improved project performance (Mwakajo & Kidombo, 2017; Adek, 2016; Tabishl & Jha, 2011; Osedo, 2017). In contrast, other studies found that project trple constraints negatively influence project performance (Osedo, 2017; Ogutu & Muturi, 2017). The inconclusive nature of evidence suggests that more empirical work is required on the relationship between project triple constraints and performance of construction projects. It is on this premise the current study seeks to establish the influence of project triple constraints on implementation of housing construction projects: a case of Isolo County Government, Kenya.

Research Methodology

This study used a combined descriptive survey research design and correlational research design. The target population for the study was 140 public housing construction projects in Isiolo, based

in the different constituencies within Isiolo county undertaken from the year 2013 to 2019 focusing on two key units of respondents per each project comprising of project manager and one end user representative per project. The census approach is justified since data gathered using census contributes towards gathering of unbiased data representing all individuals' opinions on a study problem (Lewis, 2015).This study collected both primary and secondary data. Thus, questionnaires are important tools for collection of primary data due to their many positive attributes discussed herein. Qualitative data analysis by use of content analysis. The data was presented using frequency tables, pie charts and graphs and interpreted appropriately (Crewell, 2014), Correlation analysis (Pearson) was used to carry out inferential data analysis to determine the direction and strength of the relationship among the variables. Regression models (as show below) was also fitted.

Results and Discussions

The study was able to get a total of 140 questionnaires administered and a total of 103 were returned for analysis. This constituted a return rate of 73.57% which is a reliable score. This return rate was obtained because the researcher and research assistant delivered and collected the questionnaires in person. This is an acceptable coverage in a census study because it is more than 50% of the expected coverage (Portney, 2020). The researcher was confident that with such a percentage, the findings are realistic and views from the respondents are representative enough of the target population. The return rate was thus calculated as: Return Rate=Number of questionnaires returned*100/sample R = 103*100/140= 73.57%. It is important for the researcher to understand the response so as to know how the questions were answered.

Pilot Study Results

Table 1presents the alpha values of the questionnaire items. This study adopted the alpha coefficients ranges in value from 0 (no internal consistency) to 1 (complete internal consistency) to describe reliability factors extracted from formatted questionnaires on Likert scale (rating from scale 1 to 5). The study used alpha value of 0.70 as the minimum acceptable. The results for all the variables are above the 0.70 threshold from these results, it is inferred that the measurement items for each variable are internally consistent.

Table 1: Internal Consistency Reliability

Variable	Cronbach's Alpha	Remark
Project Scope Management	.908	Reliable
Project Time management	.982	Reliable
Project Cost Management	.798	Reliable
Project Quality Management	.887	Reliable
Project Performance	.911	Reliable

Correlation Analysis

Correlation is a bivariate analysis that measures the magnitude of linear association between two variables and the direction of the association. The correlation analysis to determine influence of scope management on implementation of county funded public housing construction projects shows a significant correlation existed (r= 0.676; p<0.05). This implies that scope management is positively correlated to the implementation of county funded public housing construction projects. In addition, the correlation between these two variables was significant, that is p<0.5 implying a linear relationship between scope management and implementation of county funded public housing construction projects. This shows that scope management had a significant influence on implementation of county funded public housing construction projects. The study findings are in agreement with the findings by Nazya (2015) that project scope management leads to changes in project activities provoke the changes in project cost, time and quality of the product/service of the project. The study indicated that when activities are changes without changing project cost or time; it increases the risk of not completing the project on time as well risk of not having enough resources. When the project scope management is increased, it gives the opportunity to provide quality product by using quality materials/services and using advanced technology. This leads to beneficiaries' satisfaction because of receiving product/service of the good quality

Table 2: Correlation Coefficient Table

		SM	TM	CM	QM	PI
Scope Mgt.	Pearson Correlation	1				
	Sig.(2-tailed)					
	N	103				
Time Mgt.	Pearson Correlation	.378**	1			
	Sig.(2-tailed)	.000				
	N	103	103			
Cost Mgt.	Pearson Correlation	.786**	.310**	1		
	Sig.(2-tailed)	.000	.007			
	N	103	103	103		
Quality Mgt.	Pearson Correlation	.432**	.287**	.763**	1	
	Sig.(2-tailed)	.005	.012	.004		
	N	103	103	103	103	
Project Performance	Pearson Correlation	.676**	.798**	.701**	.555**	1
	Sig.(2-tailed)	.003	.000	.001	.005	
	N	121	121	121	121	121

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

SM = Scope Management; TM = Time Management; CM = Cost Management; QM= Quality Management; PI = Project Implementation

In addition, the study sought to examine the relationship between time management and implementation of county funded public housing construction projects. A Pearson Correlation was performed, and the result of the Pearson correlation test showed a correlation of (r = 0.798; p<0.05) between time management and implementation of county funded public housing construction projects. This implies that time management is positively correlated to project performance. In addition, the correlation between these two variables was significant, that is p<0.5 implying a linear relationship between the time management and the implementation of county funded public housing construction projects. This shows that time management had a significant influence on implementation of county funded public housing construction projects. The study results are in line with findings by NyQvist (2015) that time management can be viewed as an initial study to address time management challenges in a construction project. The results display late project implementation and overruns of assembly and erection durations as the most common reasons of delay.

Further, the study sought to establish the relationship between cost management and implementation of county funded public housing construction projects. A Pearson Correlation was performed and the result of the Pearson correlation test as presented in Table 4.12 show a correlation (r = 0.701; p<0.05) between cost management and implementation of county funded public housing construction projects. This implies that cost management is positively correlated to implementation of county funded public housing construction projects. In addition, the correlation between these two variables was significant, that is p<0.5, implying a linear relationship between cost management and implementation of county funded public housing construction projects. This shows that cost management had a significant influence on implementation of county funded public housing construction projects. The study results are in line with the findings by Miri and Khaksefidi (2015) observed that Project Cost Management is one of the key tasks of the project managers and it would not be possible without the knowledge of cost structures and management techniques. The next step in the project cost management is awareness of the actual cost. Due to the nature of construction work, develop a framework that have all the costs is very difficult and at the same time vital issue. Knowing the actual cost of rework caused clarifying the rework issues and knowing rework issues cause to find key problems in manufacturing. Knowing this will avoid many future problems, and ultimately a significant portion of the capital will be maintained.

Finally, the study sought to determine the relationship between quality management and implementation of county funded public housing construction projects. A Pearson Correlation was performed and the result of the Pearson correlation test as presented in Table 4.12 show a correlation (r = 0.555; p<0.05) between quality management and implementation of county funded public housing construction projects. This implies that quality management is positively correlated

to the implementation of county funded public housing construction projects. In addition, the correlation between these two variables was significant, that is p<0.5 implying a linear relationship between the quality management and implementation of county funded public housing construction projects. According to Oyoo and Kising (2019) the quality management had a significant influence on implementation of county funded public housing construction projects. The study revealed that quality management in terms of monitoring and evaluation practices, stakeholder's participation, risk management and project planning and design practices play a vital role in determining the success in project implementation. The study concluded that project quality management is important for success of any project implementation, yet in most projects it has not been adopted effectively.

Multiple Regression Analysis

The R-Squared is the variations proportion in the project performance that can be explained by the all the project constraints: the larger the R-squared the larger the effect of the independent variable on the dependent variable. The R Square can range from 0.000 to 1.000, with 1.000 showing a perfect fit that indicates that each point is on the line. From the study findings, it is notable is notable that there exists a strong positive relationship between the project management constraints and implementation of county funded public housing construction projects as shown by R value (0.899). The study results imply that project constraints jointly accounted for 80.80% of the implementation of county funded public housing construction projects as represented by the R^2. This therefore means that other factors not studied in this research contribute 19.20% to the implementation of county funded public housing construction projects. This implies that these variables are very significant and need to be factored to improve implementation of county funded public housing construction projects.

Table 3: Model Summary

					Change Statistics				
Model	R	R Square	Adjusted R Square	Std. Error of the Estimate	R Square Change	F Change	df1	df2	Sig. F Change
1	.899a	.808	.781	.453	.456	113.610	4	109	.000

a. Predictors: (Constant), Scope, Time, Cost, Quality

Further, the analysis of variance was used to examine whether the regression model was a good fit for the data. It also gives the F-test statistics; the linear regression's F-test has the null hypothesis that there is no linear relationship between the two variables. The F-critical (4, 108) was 98.321

while the F-calculated was 113.610 as shown in Table 4. This shows that F-calculated was greater than the F-critical and hence linear relationship between the project constraints and implementation of county funded public housing construction projects. 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 triple constraints) on the dependent variable (implementation of county funded public housing construction projects).

Table 4: Analysis of Variance

Model		Sum of Squares	d.f	Mean Square	F	Sig.
1	Regression	79.802	4	19.950	113.610	.000
	Residual	18.963	108	.1756		
	Total	98.765	102			

NB: F-critical Value = 13.876;

Further, the study ran the procedure of obtaining the regression coefficients, and the results were as shown on the Table 4. The coefficients or beta weights for each variable allows the researcher to relative importance comparatively of the project triple constraints. In this study the unstandardized coefficients and standardized coefficients are given for the multiple regression equations. However, discussions are based on the unstandardized coefficients.

Table 5: Regression Coefficient Results

Model		Unstandardized Coefficients		Standardized Coefficients	T	P-value.
		B	Std. Error	B		
1	(Constant)	16.898	1.987		8.504	.000
	Scope Mgt	0.671	0.245	0.556	2.739	.003
	Time Mgt.	0.809	0.111	0.781	7.288	.000
	Cost Mgt.	0.754	0.276	0.615	2.731	.002
	Quality Mgt.	0.654	0.298	0.406	2.194	.004

The Multiple regression model equation would be ($Y = \beta_0 + \beta_1 X_1 + \beta_2 X_2 + \beta_3 X_3 + \beta_4 X_4 + \varepsilon$) becomes: $Y = 16.898 + 0.671 X_1 + 0.809 X_2 + 0.754 X_3 + 0.654 X_4$. This indicates that Performance of county funded public housing construction projects = 16.898 + 0.671 (Project Scope Management) + 0.809 (Project Time Management) + 0.754 (Project Cost Management) + 0.654 (Project Quality Management).According to the regression equation established, taking all factors

into account (project management constraints) constant at zero, implementation of county funded public housing construction projects was 16.898.

Findings in Table 45 showed that project scope management had coefficients of estimate which was significant basing on $\beta_1 = 0.671$ (p-value = 0.003 which is less than $\alpha = 0.05$). Also, the influence of project scope management is more than the effect attributed to the error, this is shown by the t-test value = 2.739, thus we conclude that there is a significant relationship between project scope management and implementation of county funded public housing construction projects. The study results are in agreement with the findings by Oluoch (2018) that project scope management improves implementation of construction projects. Very few projects are ever completed in line with original plans and budgets. Unforeseen changes are inevitable in project management. But putting proper change control processes in place can drastically minimize their impact. Poorly managed or uncontrolled changes can harm your project severely, leading to missed deadlines, budget overruns, and even project failure. Adding extra work and requiring extra budget and resources may impact your ability to deliver on target.

In addition, the findings in Table 5 indicates that project time management had coefficients of estimate which was significant basing on $\beta_1 = 0.809$ (p-value = 0.000 which is less than $\alpha = 0.05$). Also, the influence of project time management is more than the effect attributed to the error, this is indicated by the t-test value = 7.288, thus we conclude that there is a significant relationship between project time management and implementation of county funded public housing construction projects. Olarndo (2017) based on study, it was found that knowledge, commitment, cooperation are the main criteria as an overall to manage the project into a smooth process during project execution until completion. It can be concluded that, the strength between project manager and team members in these main criteria while conducting the project towards good time performance is highly needed. However, there is lack of establishment towards factors of poor time performance which strongly related with project time management. Hence, this study has been conducted to establish factors of poor time performance and its relations with project management.

Further, the findings in Table 5 indicates that project cost management had coefficients of estimate which was significant basing on $\beta_1 = 0.754$ (p-value = 0.002 which is less than $\alpha = 0.05$). Also, the influence of project cost management is more than the effect attributed to the error, this is indicated by the t-test value = 2.731, thus we conclude that there is a significant relationship between project cost management and implementation of county funded public housing construction projects. he results agree with (James, 2014) who noted that project cost management is an important contributor to project success. This was also supported by (Agheneza, 2013; Khang, & Moe,2014) who indicated that the process of project cost management and implementation is able to resolve inherent challenges ranging from project inception to the end if there are well thought out. Gibson, Wang, Cho and Pappas (2016) also concluded that effective pre-project planning leads to improved performance in terms of cost, schedule, and operational characteristics.

The findings in Table 5 indicates that project quality management had coefficients of estimate which was significant basing on $\beta_1 = 0.654$ (p-value = 0.004 which is less than $\alpha = 0.05$). Also, the influence of project quality management is more than the effect attributed to the error, this is indicated by the t-test value = 2.194, thus we conclude that there is a significant relationship between project quality management and implementation of county funded public housing construction projects. The study results are in agreement with the findings by Song, Lee and Park (2016) that the data-based quality management as a solution to the foregoing problems and discusses the methods of measuring and analyzing the performance related to quality in a construction company. It establishes the quality indicators to measure quality performance objectively. The management objectives and CSFs are defined according to the three management levels: strategic level; project level; and operational level, and the indicators to measure and manage them are listed subsequently. The indicators are assigned to each quality management level and the level of quality is expressed with Sigma values. Through the quality performance management, managers will be able to improve the construction quality by monitoring the major indicators of construction project success and ultimately increase the competitiveness of the overall construction organization.

Conclusions of the Study

The findings confirm that statistically significant scope management significantly influenced implementation of county funded public housing construction projects, Kenya. From the study results it was concluded that county funded construction projects in Isiolo lacked adequate scope planning, scope control which leads to scope creep as evidenced by the descriptive statistics. Further it can be explained by the fact that, although county funded construction projects have conducted scope management, they fail to use the same to improve their project triple constraints (time, cost and scope) in the projects being implemented.

The study concluded that time management significantly influenced implementation of county funded public housing construction projects. Therefore, time management does significantly predict the implementation of county funded public housing construction projects, Kenya. This is explained by the descriptive results which revealed that implementation of county funded public housing construction projects, Kenya are concerned about the definition of project activities, estimation of activity duration and sequencing of activities and tasks.

On cost management from the results it can summarized that it does significantly influence the implementation of county funded public housing construction projects, Kenya. This is explained by the fact that implementation of county funded public housing construction projects, Kenya are aware of cost management issues that may pose project risks. For example, lack of cost budgeting and estimation can pose a major risk to the project's completion yet the majority of the projects

being implemented have not enhanced cost control. This is because project managers are able to respond to the increasing cost control and this improves their performance.

Further, the findings of this study confirm that quality management significantly influences the implementation of county funded public housing construction projects, Kenya. It was possible to infer from the study findings that the relationship between management and the implementation of county funded public housing construction projects was positive and significant. We can therefore conclude that as quality management increases, the implementation of county funded public housing construction projects increases.

All the independent variables (project triple constraints) are significant predictors of the implementation of county funded public housing construction projects in Isiolo County, Kenya. This can be explained proper involvement of the project practitioners in the development of county funded public housing construction projects. This can result to project implementation decisions been made which significantly impacts the implementation of county funded public housing construction projects.

Recommendations of the Study

The study established that scope management significantly influenced implementation of county funded public housing construction projects. The study recommends for enhancement of scope control, planning and creep in the projects. The projects should be improved in terms of scope changes to avoid cost plus time overruns. This is due to scope control being one of the key factors that was not considered before implementation of any project. There should be a clear scope plan which should be shared with the project team before projects are being implemented.

The study recommends that there is need to adhere to the definition of activities before any project takes off. Sequencing of activities should be normally conducted for all the projects and activities so that they are performed in an order of priority. Activity duration of every task and activity resources estimation should be a key item in schedule of activities of the project. The scheduling and control needs to be considered a key activity to ascertain variations between planned versus actual to improve implementation of county funded public housing construction projects.

The study recommends that that the county government should cost plan before every project begins. Determination of the required budget should be considered as mandatory before any project is initiated in county. There was a department set aside to ensure that project costs were controlled. Financing of projects should be secured before the beginning of every project to avoid collapsing of projects prematurely.

The study findings indicated that quality management influence implementation of county funded public housing construction projects. The county government should to some extent plan for

quality before any project is initiated. There should be continuous quality verification in all the inputs in the projects conducted by the county government. There should be continuous quality improvement and control to ensure standards and requirements are well defined and approved before completion of projects

Areas for Further Research

The study limited itself to the four projects constraints, namely, project scope management, project time management, project cost management and project quality management, from the literature that influence the implementation of county funded public housing construction projects in Isiolo County, Kenya. This meant that the empirical review that supports project triple constraints among the county funded construction projects in Isiolo was only limited to these four variables identified in the study. Therefore, similar study should be conducted with other variables that affect the project management constraints and the implementation of county funded public housing construction projects of the other projects in different sectors. This study was also conducted in Isiolo County in Kenya and data was collected in that County projects only. This study recommends that a similar study should be conducted in other counties in Kenya in order to come up with a variety of outcomes.

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