



PROJECT MANAGEMENT TRIPLE CONSTRAINTS AND PERFORMANCE OF AFFORDABLE HOUSING PROGRAM IN KENYA

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Abstract

Access to adequate affordable housing and reasonable standards of sanitation has been identified as an economic and social right. Kenya requires approximately 200,000 new affordable housing units annually to meet demand, yet only 50,000 homes are built, leaving the housing deficit growing by 150,000 units per year. Most of these housing projects have shown time and cost overruns thus not beneficial to the users. These projects have been performing poorly which could be attributed to the management of project triple constraints. The study intended to examine how project management triple constraints and performance of the affordable housing program in Kenya. Specifically, the study aimed to examine how project scope management, project time project cost management, project quality management, and moderating influence of community participation on affordable housing programs in Kenya. The study adopted a descriptive research design and the target population was 24,000 social housing project units. A sample of 393 social housing project units from the target population was selected using a simple random sampling technique. The study found that: project scope management; project cost management significantly influenced the performance of the

affordable housing program in Kenya. Community participation has a moderating influence on the relationship between project management triple constraints and the performance of affordable housing programs in Kenya.

Keywords: Project management triple constraints, performance, affordable housing program

INTRODUCTION

Projects are time bound endeavors that are supposed to be completed within the planned and stipulated period covering a predetermined scope, within the planned budget and quality specified by the customer or client Cheng, (2014). Project success is controlled by time, cost, and scope, commonly referred to as Project Triple Constraint (Baymount, 2015; Wanjau, 2015). For every successful project, considerations are based on the triple constraint before, during, and after project implementation. The project constraints sometimes referred to as the iron triangle are common in construction projects (Nasir, Nawi & Radzuan, 2016). The failure to understand and interpret the iron triangle appropriately may affect a construction project though project activities are carried out effectively (Omondi, 2017). Construction projects include the design and build of the new structure (Sheshu and Akitonye,2015) In many countries in the world construction activity constitute 6-9% of gross domestic product (GDP) and more than half of the fixed capital formation as infrastructure and public utilities required for economic development (Cohen,2013). The program performance is based on a set-criteria anchored on the standards or principles from which stakeholders can judge the project's success (Rugenyi & Bwisa, 2016). These are the key predictors that are very crucial for every successful project in terms of achievement of the goals and objectives.

According to Osedo (2015) stated the county government-funded projects in Kenya have indicated puzzling statistics that 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 regarding project scope management. Studies have reported that time and cost overruns are common in most projects (Omondi, 2017). For example; according to a 2018 IBM survey on project management change, it was established that about 40% of the projects were able to be accomplished within time, scope, and cost. In another report, it was found out that one in six of the 1,471 projects carried out had an average of time plus cost overrun that is 200% and 70% respectively (Flyvbjerg & Budzier, 2018). Further, the Standish Group in 2012 reported that an estimated 43% of projects had cost and time overruns,

and 18% failed to be completed. In other words, they were terminated prematurely. In another study of 5400 large government-funded projects, 45% indicated cost overruns and 7% of the projects had time overruns and 56% of these projects had values than the ones earlier predicted (Bloch, Blumberg & Laartz, 2014).

In Kenya, the focus has been mainly on construction projects undertaken by the government and parastatals. The time and cost performance of projects in Kenya are unacceptable with over 70% of established projects that are likely to reach time overruns of over 50%. Further, it is reported that 50% of the projects are likely to have a cost overrun of over 20% (Rugenyi, 2016). For example, Thika Road (KARA, 2016), and Langata Road projects have finished late and over budget, just to mention a few. These reports contradict the inverse proportionality between time and cost as envisioned by the 'iron triangle' and the direct proportionality between scope and time and cost.

Affordable Housing Program in Kenya

The Government of Kenya (GoK) has committed to deliver a series of ambitious social programs to promote long-term economic development for Kenyan citizens through its Big Four agenda: (1); affordable housing; (2) universal health coverage; (3) enhancing manufacturing; and (4) food security and nutrition. As part of this vision, the State Department for Housing and Urban Development (SDHUD) has been mandated to deliver the Affordable Housing Program (AHP) and will manage the delivery throughout the project lifecycle. The GoK will act as the key facilitator in providing instruction on how the vision and policies of the GoK, through the SDHUD, will be implemented and how progress will be monitored and reviewed.

The initiative of the affordable housing program christened Boma Yangu, is under the government's Big Four Agenda, and aims to facilitate ownership of affordable and decent housing for Kenyans in the low and middle-income brackets that are unable to own decent homes due to the prohibitive land and construction costs and stringent financing requirements. The first of its kind in Kenya's history, the project will be bankrolled and constructed by private entities on government and private land in all 47 counties. The project, launched in January this year, aims to roll out 500,000 units by 2022 to try and plug the housing gap in the country. The 2010 Constitution of Kenya identifies access to adequate affordable housing and reasonable standards of sanitation as an economic and social right (Manji, 2015).

Affordable housing as a basic human right demands that all citizens should have access to decent housing, defined as one that provides a foundation for, rather than being a barrier to, good physical and mental health, personal development, and the fulfillment of life objectives (Hays, 2012). It is estimated that the current housing deficit stands at 2 million houses with

nearly 61% of urban households living in slums. This deficit continues to rise due to fundamental constraints on both the demand and supply side and is exacerbated by an urbanization rate of 4.2%, equivalent to 0.5 million new city dwellers every year. With this level of growth, Kenya requires approximately 200,000 new affordable housing units annually to meet demand, yet only 50,000 homes are built, leaving the housing deficit growing by 150,000 units per year. As a result of this mismatched supply and demand, housing prices have increased by 100% since 2004 (KNBS, 2017).

Statement of the Problem

The 2010 Constitution of Kenya identifies access to adequate affordable housing and to reasonable standards of sanitation as an economic and social right (Manji, 2015). It is estimated that the current housing deficit stands at 2 million houses with nearly 61% of urban households living in slums. This deficit continues to rise due to fundamental constraints on both the demand and supply side and is exacerbated by an urbanization rate of 4.2%, equivalent to 0.5 million new city dwellers every year. With this level of growth, Kenya requires approximately 200,000 new housing units annually to meet demand, yet only 50,000 homes are built, leaving the housing deficit growing by 150,000 units per year. As a result of this mismatched supply and demand, housing prices have increased by 100% since 2004 (KNBS, 2017).

The actual expenditure on housing by the national housing corporation went down to Ksh 5.9 billion in 2014/2015 from Ksh 6.1 billion in 2013/2014 due to fewer projects been completed (KNBS, 2017). According to Korir, (2013) poor performance of construction housing projects has led to project delays of up to 184.7% and cost overruns of up to 152.3%. Gacheru, (2015) established that poor program performance in the housing sector can be attributed to; unqualified technicians, incompetent contractors, non-compliance to specifications, poor project designs, lack of quality control measures, poor cost estimation, and use of substandard materials. The construction projects fail in the project triple constraint considerations which are very crucial in projects' decision making in the country. The failure to understand, interpret, and apply this criterion is regarded as one of the factors which have led to underperformance of the projects being funded by the governments (Omondi, 2017). Lukale (2018) found out that project triple constraints management significantly improves the performance of projects by more than 70%.

Local studies related to project triple constraints management 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 were on project triple constraint and the project manager's

perspective on the 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 performance. A gap this study sought to fill. It is on this premise this study, therefore, examined project triple constraints management (cost, time, quality, and scope) on the performance of affordable housing programs in Kenya.

Objective and Hypotheses of the Study

The purpose of this study was to examine project management triple constraints and the performance of affordable housing programs in Kenya. The statistical null hypotheses to guide the above-stated objectives included:

- i. H_{01} : Project scope management does not significantly influence the performance of the affordable housing program in Kenya.
- ii. H_{02} : Project cost management does not significantly influence the performance of the affordable housing program in Kenya.
- iii. H_{03} : Community participation has no moderating influence on the relationship between project management triple constraints and the performance of an affordable housing program in Kenya.

LITERATURE REVIEW

This study sought to be guided by the following theories namely; Theory of Triple Constraints, Complexity Theory, Goal Setting Theory, ABJ Sticky Theory, and The Pareto Principle in Time management. The theory of triple constraints is derived from the very definition of a project which states that a project is a temporary group activity that 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 bring complications in project management, needs, and constraints, and therefore for effective project management, constraints have to be managed. Projects take place inside organizations with a finite amount of resources to accomplish infinite tasks resulting 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 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 desired 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). The theory enhances the understanding of the project manager contribution deliverables per the client's satisfaction. Though the theory of the triple constraints has been accepted as a measure of project success, it is difficult to manage three factors which most of the time are contrasting. Each of the three factors has limitations and impact on the execution of projects (Hamid et al, 2012), government-funded projects have cost overruns, delays being common thus being costly to the government and the public as well as affecting contracting parties (Ondari & Gekara, 2013).

The complexity theory as discussed by Curlee & Gordon (2011) is based upon the management believes that total order does not allow for enough flexibility to address every possible situation. The complexity theory acknowledges that projects by nature have parts that work together as a system though some people would be unhappy with the changes; a lot of processes have to result from the changes. The theoretical foundation of complexity theory is made of program performance (Koskela, 2000 cited by Richards (2010). Complexity theory states that critically interacting components self-organize to form potentially evolving structures exhibiting a hierarchy of emergent system properties, (Lucas,2009). During the project life cycle, many team members will be concerned about how the project achievements were met as expected. The project team sometimes can be behind the schedule, delay challenge, and the project will probably end over budget. The complexity of the project requires an understanding of the management of the triple constraints to improve the performance of the construction projects. Due to disruption from change requests the project team stops the motion of the project to analyze the requests. This means little work is done on the project as they seek answers.

The goal-setting theory was developed by Latham and Locke (1994) which states that the project team can deliver the project deliverables within time, cost, and quality when the project team feels 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 desired 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 finds that the program performance is not achievable to the desired goals, they will find a new strategy not compromise the project constraints (goals) (Locke & Latham, 2006).

Goal-setting theory is premised on human interaction with the projects, which is directed to conscious goal achievement. Purposefully aimed at ensuring the project constraints is achieved as they are the ultimate goals of a construction project. 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. The county government construction projects require adequate participation in goal setting as a means of achieving the desired goals (Armstrong, 2005).

CONCEPTUAL FRAMEWORK

The study will use be guided by the following conceptual framework as illustrated in figure 1.

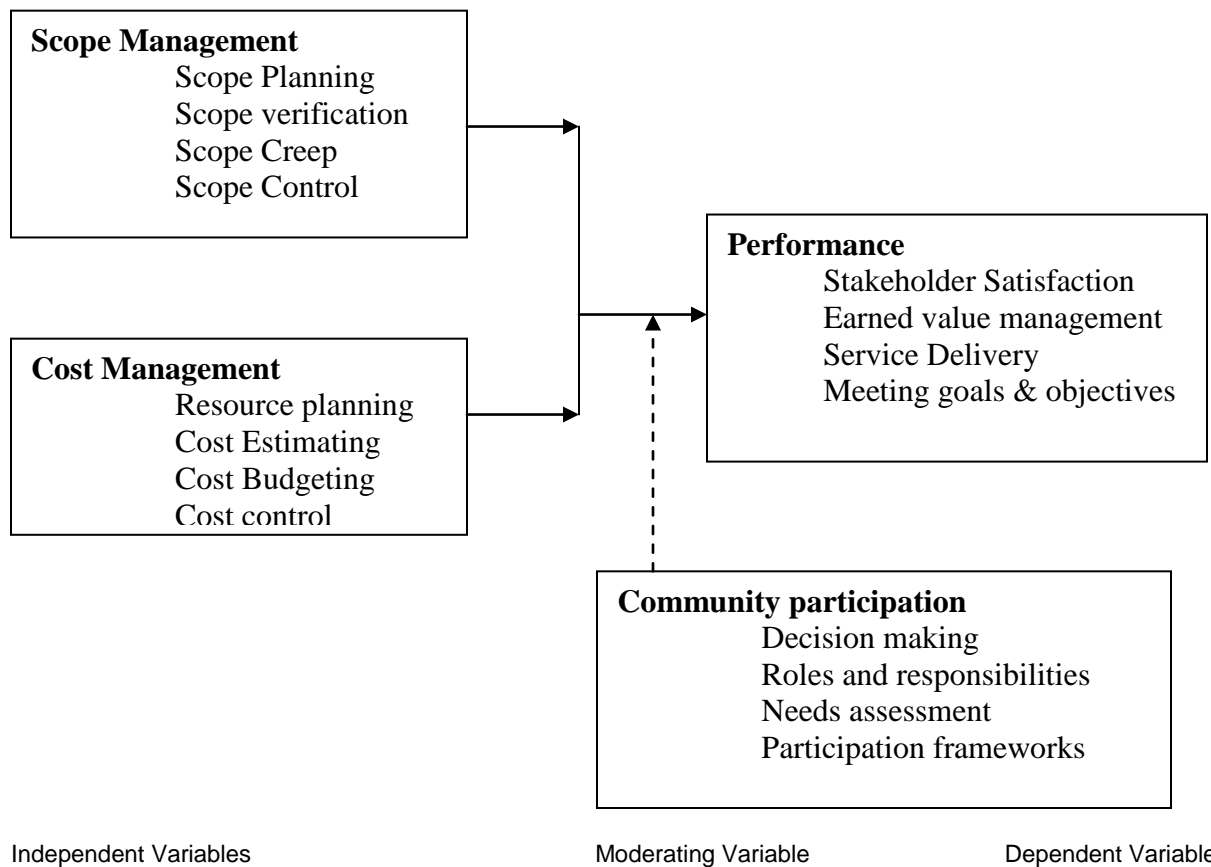


Figure 1: Conceptual Framework

REVIEW OF VARIABLES

Project Scope Management

Project scope management is a process that involves definition and mapping appropriately. It is the procedure of ensuring that a project comprises all of the necessary activities for the

achievement of specific targeted objectives. Scope management in projects includes ascertaining that the project has all tasks and activities necessary for it to be completed successfully (PMI, 2014). Project scope planning is defining the project boundaries and the expected deliverables from the project (Adek, 2016). Scope inputs require the description of program deliverables, selection program criteria, planning, strategically, and historical information. Tools and techniques involved are methods of program selection and expert judgment of the same. The initiation phase output involves the identification program charter, project manager assignment, and the constraints and assumptions identification (Baymount, 2015). The project scope planning also includes the deliverables descriptions, assumptions and constraints, program charter. The project tools and techniques involved consist of a benefit/cost, identification of alternatives deliverable analysis (Apiyo & Mburu, 2014).

Omondi (2017) posits that uncontrolled variations in a project's scope (scope creep) represent the propensity of a program or project to incorporate a larger number of tasks or duties as compared to the initial planned tasks and duties which were specified, and this can frequently lead to higher than arranged project costs and addition of the project duration. Jones, Snyder, Stackpole & Lambert (2011) add that scope change is common on projects, meaning that it is not a harm to make changes during the lifecycle of the project. Sikudi and Otieno (2017) argue that project activities can be well controlled through an effective scope that is well planned and tracked. The scope control is the monitoring of duties and tasks of the project to ensure they are achieved as per the scope management plan. The expected outputs of the scope controlling process can lead to changes in the request, updating of the project management plan, updates on the documentation of the project activities, updating of the asset's organization process, and work performance (Rugenyi, 2016).

Project Cost Management

This is ensuring the project is kept within its defined budget (cost). It is also an essential part of project management. Cost estimating, cost budgeting, and cost control are three cost-related processes that interact with each other and with other areas of project management (Lukale, 2015). All of these processes require effort and a working knowledge of project costing. The complexity of the project determines the requirements in such a way it may require one person, and they may occur more than once during the life of a project (Khwesira, Wambugu & Wanyoike, 2016). This process of cost estimating involves resource planning with the knowledge that scope change can affect project tasks and activities means rework costs for work that has already started or wasn't, been completed.

Rugenyi (2015) argues that the activities in the project cost estimating knowledge area establish cost estimates for resources, establish budgets, and keep watch over those costs to ensure that the project stays within the approved budget (cost). This knowledge area is primarily concerned with the costs of resources, but project managers should think about other costs as well. Project cost budgeting can be very simple, or extremely complex. If scrimping of the project is likely to increase the project maintenance costs after the end of the project, as the budgeting strategy needs to be factored (Osedo, 2015). This approach is sometimes called life cycle costing, and can reduce the cost of a project and improve the quality of the deliverable. But Project management should also consider what the project stakeholders think about the cost of the project. They will measure cost in different ways and at different times. Like looking at a brick from a different angle (Muriithi, Makokha & Otieno, 2017).

Community Participation

A community may be defined as a group of people living in a geographical area, who have identical cultures, beliefs, values, traditions and are united with a common interest. It is this common interest that brings them together to share a territory. According to Anyanwu (2009), a community is a social group, occupying a more or less defined geographical area, and based on the feeling that people have for one another. Community participation involves bringing people together with the common goal of improving their social, legal, economic, political, educational, and cultural wellbeing for a better living livelihood. Thus, peoples' participation is an indispensable element for effective community development. People's participation cannot be dispensed within development efforts (Mohammad, 2010).

Participation and other related concepts like sustainability and empowerment are at the center of development discourse (Blackman, 2003) and it may be argued that participation is as old as democracy itself. For the communities to enhance the realization of community participation development goals, especially where government patronage was not easy to get all the time whereas organized development efforts through community development programs have become popular today. Dan (2011) stated that a situation where community bodies are mere small organizations operating within a larger social environment that is plagued with poverty, low standard of living, and economic vagaries. Hence they may lack the basic economic resources to initiate or sustain the project. Community efforts have been carried out to tackle local problems in different localities with external support or intervention. Zaden, (2010) stated that the Community development program is influenced by the ability of major stakeholders to mobilize people for participation.

Performance

Program performance is quite ambiguous especially in the construction projects, which are considered and evaluated from the project management triangle perspective (Njau & Ogolla, 2017). Performance is the accomplishment of a given task in this case a project measured against preset known standards of accuracy, completeness, cost, and speed (Omondi, 2017). This is the success level of a program based on the following criteria: effectiveness, relevance, impact, efficiency, timeliness, and sustainability. This model suggested that a project is successful when it is completed on time, budget estimates, and meets all predetermined specifications. However, the concept of program performance has been enriched and expanded beyond the three project constraints c

Kabirifar and Mojtahidi (2019) recommended the inclusion of stakeholder satisfaction and realization of benefits as an additional measure of program performance. They noted that a project may be completed on time, budget, and meet all pre-established requirements, but fail to meet the expectations of key stakeholders such as the customer. Stakeholders' satisfaction can be an important measure of project success in the building construction industry (Rugenyi, 2016). Due to its technical nature, key stakeholders may not be able to articulate their expectations and preferences at the beginning of the projects. Therefore, project managers have the responsibility of ensuring that key stakeholders are involved at every step of the project so as they can clarify their expectations continually (Osedo, 2015; Sikudi & Otieno, 2017). The current study will measure the performance of county-funded construction projects by focusing on the achievement of the objectives, stakeholder satisfaction, benefits realization, and completion within cost.

METHODOLOGY

This study was guided by positivistic research philosophy which holds the view that reality is stable and can be observed and explained from an objective point of view (Flick, 2018). This research philosophy reflects the crucial hypotheses of the researcher and these hypotheses serve as the research strategy's base (Saunders, Lewis & Thornhill, 2012). The study also used a combined descriptive survey research design and correlational research design. Social housing caters to low-income users, low-cost housing cater to middle-income users, while mortgage gap and market cater to high-income users as a result this study target population was 24,000 social housing projects implemented by the affordable housing program. The unit of analysis was project managers.

A sample of 393 social housing units was obtained using Slovin's sample size determination formula for categorical data. Questionnaires were designed and balanced

between the quality and quantity of the data to be collected. Data collected was checked for completeness, accuracy and consistency then presented for editing, classification, cleaning, transformation tabulation, and coding, quantitative and qualitative techniques were used. Qualitative data were analyzed through the 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 shown below) were also fitted.

$$Y = \beta_0 + \beta_1 X_1 + \beta_2 X_2 + \beta_3 X_3 + \beta_4 X_4 + \varepsilon \dots\dots\dots(i)$$

Where:

- Y = Dependent variable (Performance).
- β_0 = Intercept is the value of P when independent variables are zero.
- β_{1-4} = Regression coefficients for each explanatory variable.
- X_1 = Project Scope Management
- X_2 = Project Time Management
- X_3 = Project Cost Management
- X_4 = Project Quality Management
- ε = Error term.

The study used multiple regressions analysis (stepwise method) to establish the moderating effect of organizational culture (z) on the relationship between the independent variable and the dependent variable.

H₀₅: The relationship between Community participation between project management triple constraints and the performance of affordable housing programs in Kenya.

The statistical model used for analysis will be as follows:

$$Y = \beta_0 + \beta_1 X_1 + \beta_2 X_2 + \beta_3 X_3 + \beta_4 X_4 + \beta_5 Z + \beta_{1z} X_1 Z + \beta_{2z} X_2 Z + \beta_{3z} X_3 Z + \beta_{4z} X_4 Z + \varepsilon$$

Where:-

Y is the dependent variable, performance

β_0 is the constant

β_i is the coefficient of X_i for $i=1,2,3,4$

X_1 = project scope management

X_2 = project time management

X_3 = project cost management

X_4 = project quality management

Z is the hypothesized moderator (community participation)

β_z Is the coefficient of $X_i * Z$ the interaction term between community participation and each of the dependent variables for $i=1,2,3,4$

ε is the error term

RESULTS

The descriptive statistics of two independent variables, the moderating variable, and the dependent variable were summarized as follows:

Project Scope Management

The study obtained an aggregate mean value was 3.842 suggesting that on average, the respondents agreed with the statements on project scope management on the performance of the affordable housing program in Kenya. Specifically, respondents agreed that all project stakeholders are engaged in scope management (M= 3.982, SD= 1.370). They also agreed that scope control is one of the key factors considered before and after the implementation of the project (M=3.948, SD=1.263); there is a clear scope definition to avoid scope creep in the project (M=3.889, SD=1.381); they also agreed that a clear scope plan is shared with the project team before the project is implemented (M=3.863, SD=1.326). Besides, respondents agreed that: scope is well initiated among all relevant stakeholders in the project (M=3.777, SD=1.275); scope verification is normally conducted during the implementation of every project (M=3.738, SD=1.320); and that they can manage all types of services required by clients within the shortest time possible (M=3.698, SD=1.331). The findings concur with PMI (2014) who postulates that scope management in projects includes ascertaining that the project has all tasks and activities necessary for it to be completed successfully. Also, the basic matrix that is used for scope planning analysis involves the initiation, planning, and definition. This can call for verification and change control when interspersed. It also agrees with Band and Pretorius, (2016) that scope inputs require the description of program deliverables, selection program criteria, planning, strategically, and historical information.

Project Cost Management

The respondents generally agreed that project cost management influenced the performance of affordable housing programs in Kenya as indicate by an aggregate mean score of an aggregate score of 3.933. The findings further showed that the duties assigned to respondents are well defined and clear to them (M=4.007. SD=1.251). The county government defines cost plan before every project begins (M=3.994, SD=1.343); that there is a department set aside to ensure that project costs are controlled (M=3.988, SD=1.475); and that financing of projects is

normally secured before the beginning of every project in the county ($M=3.961$, $SD=1.6740$). Besides, respondents agreed that determination of the required budget is considered mandatory before any project is initiated ($M=3.830$, $SD=1.441$); and that projects are normally completed within the approved budget in the county ($M=3.817$, $SD=1.142$). The findings agree with Lukale (2015) that cost estimating, cost budgeting, and cost control are three cost-related processes that interact with each other and with other areas of project management and that all of these processes require effort and a working knowledge of project costing. It also concurs with Khwasira, Wambugu, and Wanyoike, (2016) that the process of cost estimating involves resource planning with the knowledge that scope change can affect project tasks and activities means rework costs for work that has already started or wasn't completed.

Community Participation

Respondents agreed ($M= 3.882$, $SD =1.248$) that community participation has a moderating effect on the relationship between project management iron triangle and the performance of the affordable housing program in Kenya. The findings specifically showed that there is a timely response to information with regards to community issues ($M=3.961$, $SD=1.149$); that projects objectives, role, and responsibilities are clearly understood by the community ($M=3.955$, $SD=1.199$); and that community members are involved in the decision making of the projects ($M=3.902$, $SD=1.345$). The study further established that the project team in collaboration with the community they take part in corporate social responsibility ($M=3.836$, $SD=1.234$); the community have proper knowledge and skills on project implementation ($M=3.836$, $SD=1.313$); and that community needs are well-identified within the project implementation ($M=3.803$, $SD=1.248$). The study findings concur with Mohammad, (2010) that peoples' participation is an indispensable element for effective community development. He further explained that community participation brings people together with a common goal of improving their social, legal, economic, political, educational, and cultural wellbeing for a better living livelihood. It also concurs with Christenson, (2005) that the common objective of community participation is to bring people together to develop some awareness and feeling for the need to work together at solving their common problems.

Performance

The findings of the study indicated that on average ($M=3.894$, $SD = 1.205$), the respondents agreed with various statements regarding the performance of the affordable housing program in Kenya. Specifically, the findings showed that respondents agreed that there is always a higher percentage in achieving the project milestones ($M=4.021$, $SD=1.265$); the project is well

scheduled within a specified time, cost, and quality ($M=3.988$, $SD=1.182$); and that before the beginning of any project, all stakeholders must agree on project deliverables ($M=3.902$, $SD=1.235$). The findings further showed that respondents agreed that there are proper monitoring and evaluation of projects deliverables and performance ($M=3.902$, $SD=1.235$); projects implemented are normally done within the planned scope ($M=3.896$, $SD=1.21$); projects delivered normally satisfy their stakeholder's expectations ($M=3.81$, $SD=1.142$); and that there is earned value for money on projects implemented ($M=3.738$, $SD=1.168$). The findings concur with Rugenyi (2016) who explained that a project may be completed on time, budget, and meet all pre-established requirements but fail to meet the expectations of key stakeholders such as the customer. Stakeholders' satisfaction is therefore an important measure of project success in the building construction industry. It also agrees with Osedo (2015) that project managers have the responsibility of ensuring that key stakeholders are involved at every step of the project so as they can clarify their expectations continually.

Correlation Analysis

The study computed correlation analysis to establish the link between the dependent and the independent variables. The findings as shown in Table 1 below indicate that project scope management and performance have a strong positive and significant relationship ($r=0.669$, $p=0.00$). The relationship was significant since the p-value was less than the selected level of significance. The findings also showed that cost management has a strong positive and significant relationship with performance ($r=0.744$). The p-value (0.000) was less than the selected level of significance (0.05) and therefore, the relationship was considered to be significant. These findings further suggested that all the independent variables scope management, cost management have a strong relationship with the performance of the affordable housing program in Kenya. Table 1 below presents the findings.

Table 1: Correlation Analysis

		Performance
Performance (P)	Pearson Correlation	1
	Sig. (2-Tailed)	
Scope Management	Pearson Correlation	.669**
	Sig. (2-Tailed)	.000
Cost Management	Pearson Correlation	.744**
	Sig. (2-Tailed)	.000

** . Correlation Is Significant At The 0.01 Level (2-Tailed).

Diagnostic Tests

The underlying assumptions in linear regression include normality, no autocorrelation, little or no multicollinearity, homoscedasticity, and linear relationship. In case of violation of the regression assumptions, the confidence intervals as well as other scientific insights derived from the regression model may be regarded as misleading, biased, or inefficient and therefore the inferences derived incapable of being generalizable on other data.

Multicollinearity

In this study, tolerance was applied in testing multicollinearity. The tolerance provides measures of the effect caused by a single independent variable on other independent variables. Tolerance is; $T = 1 - R^2$. If the value of T is less than 0.01 then it is certain that multicollinearity is present. The findings presented in Table 2, the VIF values for all the variables was less than 5, a clear indication that there was weak multicollinearity between the study variables. The variables were found to lack high multi-correlations among themselves; therefore, multiple regression analysis can be conducted.

Table 2: Multicollinearity Test Statistics

Model	Collinearity Statistics	
	Tolerance	VIF
Scope Management	.726	1.378
Cost Management	.471	2.124
Performance	.634	1.578

Autocorrelation Test

Autocorrelation was checked using the Durbin-Watson test. The null hypothesis for the Durbin-Watson's d tests is that the residuals aren't linearly autocorrelated. The d value ranges from 0 to 4, if the value is found to be less or equal to 2 then it implies the absence of autocorrelation. If the d values are; $1.5 < d < 2.5$ it implies the absence of autocorrelation in the data. Durbin-Watson test was used to analyze linear autocorrelation for only direct neighbors being the effects of the first order.

Table 3: Durbin-Watson Autocorrelation Test

Model	Std. Error of the Estimate	Durbin-Watson
1	1.29748	1.990

Findings presented in Table 3 show that the d-value was 1.990; since the value lies within the range $1.5 < d < 2.5$, then we conclude that there was acceptable autocorrelation in the data and therefore regression analysis can be computed.

Normality Assumption

The study used the Shapiro Wilk test to determine if the variables follow a normal distribution (Cooper & Schindler, 2006). The null-hypothesis for the Shapiro Wilk test is that the population follows a normal distribution. Therefore, if the p-value is less than the selected alpha (0.05), we reject the null hypothesis and the alternative accepted that the data is not normally distributed.

Table 4: Tests of Normality

	Shapiro-Wilk			Test
	Statistic	df	Sig.	
Performance	.579	215	.127	Normal
Scope Management	.968	215	.607	Normal
Cost Management	.966	215	.565	Normal

From the findings in Table 4, the results of the analysis shows that performance had p-value=0.127>0.05; scope management had p-value=0.607>0.05; cost management had p-value=0.565>0.05. Since the p-values are greater than 0.05 we fail to reject the null hypothesis and conclude that all the variables were normally distributed and hence the data meets the regression analysis assumption of normality of data.

Regression Analysis

Regression analysis is used to determine the influence of the independent variable on the dependent variable. The study computed simple regression analysis to test the study hypothesis. For $p < 0.05$, H_0 will be rejected; and H_A accepted.

Influence of Project Scope Management on Performance of Affordable Housing Program

A univariate analysis was conducted to investigate the influence of project scope management on the performance of affordable housing programs in Kenya. The null hypothesis stated:

H₀₁: Project scope management does not significantly influence the performance of the affordable housing program in Kenya.

Table 5: Model Summary for Project Scope Management and Performance

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.669 ^a	.448	.443	.26099

a. Predictors: (Constant), Scope Management

Adjusted R² shows the variation in the dependent variable due to changes in the independent variable. Table 5 shows that adjusted R squared was 0.443; this is an indication that at a 95% confidence interval, there was a variation of 44.3% in the performance of an affordable housing program in Kenya. This implies that 63.7% of the performance of the affordable housing program in Kenya is accounted for by other factors not considered in the model.

Table 6: Analysis of Variance for Project Scope Management and Performance

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	0.637	1	0.637	9.362	.000 ^b
	Residual	25.16	370	0.068		
	Total	25.797	371			

a. Dependent Variable: performance

b. Predictors: (Constant), Scope Management

From the analysis of variance (ANOVA), the study found out that the regression model was significant at 0.000 which is less than the selected level of significance (0.05). Therefore, the data was ideal for concluding the population parameters. The F calculated value was greater than the critical value (9.362>3.867), an indication that project scope management significantly influences the performance of affordable housing programs in Kenya. The significance value was less than 0.05 indicating that the model was significant.

Table 7: Coefficients for Project Scope Management and Performance

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	1.988	.219		9.062	.000
	Scope Management	.486	.058	.451	8.328	.000

a. Dependent Variable: performance

The regression equation was:

$$Y = 1.988 + 0.486 X_1$$

The above regression equation revealed that holding scope management to a constant zero, performance will be at a constant value of 1.988. The findings also show that scope management is statistically significant in explaining performance ($\beta = 0.486$, $P = 0.000$). This indicates that scope management positively and significantly relates to the performance of the affordable housing program in Kenya. The findings also suggest that a unit increase in project scope management would lead to an increase in the performance of affordable housing programs in Kenya by 0.486 units. The relationship is statistically significant as the p-value (0.000) was less than the significance level (0.05). Therefore we can reject the null hypothesis that "Project scope management does not significantly influence the performance of affordable housing program in Kenya".

Influence of Project Cost Management on Performance of Affordable Housing Program

A univariate analysis was conducted to investigate the influence of project cost management on the performance of the affordable housing program in Kenya. The null hypothesis stated:

H₀₂: Project cost management does not significantly influence the performance of the affordable housing program in Kenya.

The findings were discussed in the tables here-under.

Table 8: Model Summary for Project Cost Management and Performance

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.744 ^a	.553	.541	.24599

a. Predictors: (Constant), Cost Management

Adjusted R² shows the variation in the dependent variable due to changes in the independent variable.

Table 8 shows that adjusted R squared was 0.541; this is an indication that at a 95% confidence interval, there was a variation of 54.1% in the performance of the affordable housing program in Kenya as a result of changes in cost management. This shows that 54.1% of changes in performance can be explained by changes in project cost management. R is the correlation coefficient which shows the relationship between cost management and performance affordable housing program in Kenya. Therefore, there was a strong positive relationship between the two variables as shown by 0.744.

Table 9: ANOVA for Project Cost Management and Performance

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	0.748	1	0.748	12.262	.000 ^b
	Residual	22.570	370	0.061		
	Total	23.318	371			

a. Dependent Variable: performance

b. Predictors: (Constant), Cost Management

From the analysis of variance (ANOVA), the study found out that the regression model was significant at 0.000 which is less than the selected level of significance (0.05). Therefore, the data was ideal for concluding the population parameters. The F calculated value was greater than the critical value ($12.262 > 3.867$), an indication that cost management significantly influences the performance of the affordable housing program in Kenya. The significance value was less than 0.05 indicating that the model was significant.

Table 10: Coefficients for Project Cost Management and Performance

Model		Unstandardized		Standardized	t	Sig.
		Coefficients		Coefficients		
		B	Std. Error	Beta		
1	(Constant)	1.779	.192		9.252	.000
	Cost Management	.531	.050	.541	10.595	.000

a. Dependent Variable: Performance

The regression equation was:

$$Y = 1.779 + 0.531 X_3$$

The above regression equation revealed that holding cost management to a constant zero, performance will be at a constant value of 1.779. The findings also show that cost management is statistically significant in explaining performance ($\beta = 0.531$, $P = 0.000$). This indicates that cost management positively and significantly relates to performance. The findings also suggest that a unit increase in project cost management would lead to an increase in the performance of the affordable housing program in Kenya by 0.531 units. Therefore we can reject the null hypothesis that "Project cost management does not significantly influence the performance of affordable housing program in Kenya".

Moderating Influence of Community Participation on the Relationship between Project Management Triple Constraints and Performance

A stepwise regression analysis was conducted to examine the moderating effect of community participation on the relationship between project management triple constraints and the performance of the affordable housing program in Kenya.

The null hypothesis stated:

H₀₃: Community participation has no moderating influence on the relationship between project management triple constraints and the performance of the affordable housing program in Kenya.

Table 11: Model Summary for Community Participation, Project Management Triple Constraints, and Performance

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.873 ^a	.762	.754	.08185
2	.894 ^b	.799	.787	.12613

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

b. Predictors: (Constant), Scope Management, Time Management, Cost Management, Project Quality Management, Scope Management*Community Participation, Time Management*Community Participation, Cost Management*Community Participation, Project Quality Management*Community Participation

The R squared for the relationship between project management triple constraints and performance of the affordable housing program in Kenya was 0.754, which implied that 75.4% of the performance of the affordable housing program in Kenya can be explained by scope management, time management, cost management, and project quality management. However, in the second model, in the Table 11, which constituted scope management, time management, cost management, project quality management, scope management*community participation, time management*community participation, cost management*community participation, project quality management*community participation the r-squared was 0.784. This implies that the introduction of community participation in the second model led to an increase in r-squared, showing that community participation moderates the relationship between project management triple constraints and the performance of the affordable housing program in Kenya.

Table 12: ANOVA for Community Participation, Project Management
Triple Constraints, and Performance

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	1.796	4	0.449	26.423	.000 ^b
	Residual	6.239	367	0.017		
	Total	8.035	371			
2	Regression	4.568	8	0.571	35.705	.000 ^c
	Residual	5.808	363	0.016		
	Total	10.376	371			

a. Dependent Variable: Performance

b. Predictors: (Constant), Scope Management, Time Management, Cost Management, Project Quality Management

c. Predictors: (Constant), Scope Management, Time Management, Cost Management, Project Quality Management, Scope Management*Community Participation, Time Management*Community Participation, Cost Management*Community Participation, Project Quality Management*Community Participation

From the findings, the F-calculated for the first model, as shown in Table 12, was 26.423 and the second model was 35.705. Since the F-calculated for the two models were more than the F-critical, 2.396 (first model) and 1.964 (second model), the two models were a good fit for the data and hence they could be used in predicting the moderating effect of community participation on the relationship between project management triple constraints and performance of affordable housing program in Kenya.

Table 13: Coefficients for Community Participation, Project Management
Triple Constraints, and Performance

Model	Unstandardized Coefficients		Standardized Coefficients	t	Sig.
	B	Std. Error	Beta		
	(Constant)	1.484	.153		
Scope Management	.245	.075	.256	3.242	.001
1 Time Management	.195	.036	.208	5.475	.000
Cost Management	.328	.105	.296	3.118	.002
Project Quality Management	.539	.071	.601	7.619	.000

	Scope Management*Community Participation	0.308	0.066	0.226	4.667	.002
	Time Management*Community Participation	0.265	0.083	0.057	3.193	.036
2	Cost Management*Community Participation	0.401	0.074	0.947	5.419	.000
	Project Quality Management*Community Participation	0.571	0.079	0.397	7.228	.000

a. Dependent Variable: Employee Performance

From the coefficients table, the following regression model was fitted:

$$Y = 1.484 + 0.245 X_1 + 0.195 X_2 + 0.328 X_3 + 0.539 X_4 + 0.308 X_1 * M + 0.265 X_2 * M + 0.401 X_3 * M + 0.571 X_4 * M + \epsilon$$

From the findings, it can also be seen that scope management*community participation has a positive influence on the performance of the affordable housing program in Kenya ($\beta = 0.308$). The influence was significant since the p-value obtained ($P = 0.002$) was less than the selected level of significance (0.05). Therefore, the introduction of community participation as a moderating variable for project scope management explains 0.308 units of performance compared to 0.245 explained when the variable is not moderated (model 1). Therefore community participation has a positive influence on the relationship between project scope management and performance of the affordable housing program in Kenya. Therefore, we reject the null hypothesis that: *Community participation has no moderating influence on the relationship between project scope management and performance of the affordable housing program in Kenya.*

Regarding cost management, the findings show that when the variable is moderated (cost management*community participation) it has a positive influence on the performance of the affordable housing program in Kenya ($\beta = 0.401$). The influence was significant since the p-value obtained ($P = 0.000$) was less than the selected level of significance (0.05). Therefore, the introduction of community participation as a moderating variable on competence levels explains 0.401 units of performance compared to 0.328 explained when the variable is not moderated (model 1). Therefore community participation has a positive influence on the relationship between project cost management and the performance of the affordable housing program in Kenya. Thus, we reject the null hypothesis: *Community participation has no moderating influence on the relationship between project cost management and performance of the affordable housing program in Kenya.*

SUMMARY OF FINDINGS

Influence of Project Scope Management on Performance of Affordable Housing Program

The study found that all project stakeholders are engaged in scope management as indicated. Also, scope control is one of the key factors considered before, and after the implementation of the project; there is a clear scope definition to avoid scope creep in the project; a clear scope plan is shared with the project team before the project is implemented. Besides, the study established that scope is well initiated among all relevant stakeholders in the project; scope verification is normally conducted during the implementation of every project; and that they can manage all types of services required by clients within the shortest time possible. Also, the basic matrix that is used for scope planning analysis involves the initiation, planning, and definition. This can call for verification and change control when interspersed.

The study also found challenges project managers encounter in project scope management and their solutions. Change in scope was one of them. Another challenge is unidentified goals. There is also the challenge of unrealistic deadlines. The project scope can be improved by setting clear goals and objectives. The challenge of unrealistic deadlines can be resolved by having open communication with the clients to determine whether other factors drive the project deadline. Also, through the adoption of impeccable planning, alternative analysis, and proper communication on the project's real-time progress to project participants, project managers can deal with project deadlines. To deal with the challenge of changing scope, project managers should develop a clear schedule, determine project goals, ensure everyone is on the same page, make realistic assumptions regarding the availability of resources, and deadlines to achieve quality results.

Influence of Project Cost Management on Performance of Affordable Housing Program

The study established that the duties assigned to project managers are well defined and clear to them. The study also found that the county government defines cost plan before every project begins; that there is a department set aside to ensure that project costs are; and that financing of projects is normally secured before the beginning of every project in the county. Besides, it was found that determination of the required budget is considered mandatory before any project is initiated in the county; and that projects are normally completed within the approved budget in the county. The study also found key things to be considered in project cost and ways project cost management can be improved.

There is the challenge of budgeting is one of the greatest challenges that project managers deal with ineffective project cost management. Cost estimation is another important consideration as project managers must conduct continuous cost control. To deal with the

challenge of budgeting issues, project managers need to adopt proper planning procedures and making realistic assumptions to avoid any cost overruns. To ensure there is effective cost control; project managers can adopt earned value management (EVM) which is the most popular approach to measuring cost performance. To deal with the complexity of project cost management, the use of project management software can simplify this process considerably.

Moderating Influence of Community Participation on the Relationship between Project Management Triple Constraints and Performance

The study found that there is a timely response to information with regards to community issues; that project's objectives, role, and responsibilities are clearly understood by the community; and that community members are involved in the decision making of the projects. The study also established that the project team in collaboration with the community they take part in corporate social responsibility; the community has proper knowledge and skills on project implementation, and that community needs are well-identified within the project implementation. The study also identified the challenges faced with the community during program performance. It was found that it is a challenge to ensure that the community is represented. Not all members can engage in programs to the same degree, and many interventions actively involve only a small number of people (although the whole community is expected to benefit). Ensuring equity is a major challenge when dealing with community participation. Communities are diverse, and particular care needs to be taken to ensure that the less powerful voices and groups are engaged and not marginalized. Community engagement can be time-consuming, create potential conflict, lead to directional shifts, and promise high expectations.

Therefore, for participants to be representative of the wider community it is necessary either that they are elected, or that they identify with it and have its interests at heart. To ensure equity, project managers must include people of diverse backgrounds, people with disabilities, youth, people from non-English-speaking backgrounds, and Indigenous people. Before starting a project, it is important to establish the views of the community. This is through summing the separate opinions of individual community members (e.g., via surveys) or by seeking to establish the collective views of community members (e.g., by focus groups or community forums). There is a much greater likelihood of obtaining a good understanding of the collective views of community members if they already meet regularly and have an opportunity to share experiences and develop emergent opinions about what they need. The challenges that come with community participation can be overcome through the development of a comprehensive public engagement plan.

CONCLUSION

The study explained 75.4% variation in performance of affordable housing program in Kenya; the study recommends further study to be conducted on other factors that can influence performance such as project control, project communication, earned value management and project motivation. The study focused on housing projects; this study can be replicated in other government projects such as dams, roads and stadium construction. A study can also be conducted incorporating the use of secondary data where financial records on project performance can be used.

REFERENCES

- Abegunde A. A. (2009). The role of community-based organizations in economic development in Nigeria: The case of Oshogbo, Osun state. Nigeria international Non-Governmental Organization. Journal 4 V (5) 256-252 Also available online at <http://www.academicjournal.org/INGOJ>
- Adek, R.T. (2016). Determinants of successful Projects Implementation of Infrastructure Projects in Devolved Units: A Case Study of Mombasa County, Kenya. Unpublished Master's Degree, The University of Nairobi.
- Akinyede, I. J. (2014). Framework for effective management of cost constraint on building project delivery in South Africa (Doctoral dissertation, Cape Peninsula University of Technology).
- Anyanwu, C.N. (2009). Introduction to community development: Ibadan: Gabesther Educational Publishers.
- Apiyo, R. O., & Mburu, D. K. (2014). Factors affecting procurement planning in county governments in Kenya: a case study of Nairobi City County. International Journal of Economics, Commerce and Management, 2(11), 1-34.
- Banda, R. K., & Pretorius, L. (2016). The effect of scope definition on infrastructure projects: a case in Malawi's public and private implementing agencies. South African Journal of Industrial Engineering, 27(4), 203-214.
- Barbalho, S. C. M., Carvalho, V. G., Silva, G. L., & Toledo, J. C. (2016). Analyzing the impact of the functions of Project Management Offices on triple constraints performance of new product projects. Product: Management & Development, 14(2), 85-94.
- Basu, R. (2017). Quality management tools and techniques in major infrastructure projects. In the 2017 6th International Conference on Reliability, Infocom Technologies and Optimization (Trends and Future Directions)(ICRITO) (pp. 114-126). IEEE.
- Baymout, M. (2015) Measuring results of project management triangle constraints: the case of the engineering building at Effat University.
- Beleiu, I., Crisan, E., & Nistor, R. (2015). Main factors influencing project success. Interdisciplinary Management Research, 11(2), 59-72.
- Blackman R (2003) in Ghazala, M. and Vijayendra, R. (2004), (eds) Community-base and-driven development.
- Bhonde, C., & Shaikh, F. (2015). Review of Project Quality Plan. International Journal for Research in Emerging Science and Technology, 2(1), 26-34.
- Bryman, A. (2016). Social research methods. Oxford university press.
- Catania, J. T., Armstrong, G., & Tucker, J. (2013). The effects of project management certification on the triple constraint. International Journal of Information Technology Project Management (IJITPM), 4(4), 93-111.
- Constitution, K. (2010). Government printer. Kenya: Nairobi.
- Chin, L. S., & Hamid, A. R. A. (2015). The practice of time management on the construction project. Procedia Engineering, 125, 32-39.
- Creswell, (2014). Research Design: Qualitative, Quantitative, and Mixed Methods Approaches. Second edition. University of Nebraska, Lincoln.
- Dan E. (2011). Community participation in financing education in Nigeria: A synthesis of issues, challenges, and imperative. Enugu: Timex Enterprises.

- Gacheru, E. N (2015); an investigation into the national construction authority's challenges in regulating building contactors; the case of Mombasa County, JKUAT, doctoral dissertation, 2015
- Gichuki, C. W. (2014). Effect of cost management strategies on the financial performance of manufacturing companies listed on the Nairobi securities exchange. Unpublished Dissertation.
- Gio, P. U., & Caraka, R. E. (2019). Normality Assumption Test Using STATCAL (R), SPSS, Eviews, and Minitab.
- Gitee, P. W., & Muchelule, Y. (2018). Effect of Building Information Modelling on Projects Implementation: A Case of Nairobi County. *International Journal of Civil and Structural Engineering Research* Vol.6 (1), 83-90.
- Goswami, S. (2015). Role of quality management system in project completion. *Pipeline & Gas Journal*, 242 (5), 101-109
- Hassan, A. K., & Adeleke, A. Q. (2019). The effects of Project Triple Constraint on Malaysia Building Projects. *Social Science and Humanities Journal*, 1222-1238.
- Kabirifar, K., & Mojtahedi, M. (2019). The impact of Engineering, Procurement and Construction (EPC) Phases on Program performance: A Case of Large-scale Residential Construction Project. *Buildings*, 9(1), 15.
- Kalnins, A. (2018). Multicollinearity: How common factors cause Type 1 errors in multivariate regression. *Strategic Management Journal*, 39(8), 2362-2385.
- Kariungi, S. M. (2014). Determinants of Timely Completion of Projects in Kenya: A Case of Kenya Power and Lighting Company, Thika. *ABC journal of advanced research*, 3(2), 9-19.
- Kenya, L. O. (2013). The Constitution of Kenya: 2010. Chief Registrar of the Judiciary.
- Kiarie, A. W., & Wanyoike, D. (2016). Determinants of Successful Implementation of Government Funded Projects in Kenya: A Case Study of Integrated Financial Management Information System. *International Journal of Innovative Research and Development*, 5(10).
- Korir, E.J; Factors affecting contractor performance in government ministries in Kenya, a case of ministry of transport and infrastructure, JKUAT, Nairobi, master thesis, 2013.
- Kozak, M., & Piepho, H. P. (2018). What's normal anyway? Residual plots are more telling than significance tests when checking ANOVA assumptions. *Journal of agronomy and crop science*, 204(1), 86-98.
- KNBS –(2017) Economic Survey 2017, World Bank Publication 2017)
- Kwasira, L. A., Wambugu, D. G., & Wanyoike, D. M. (2016). Influence of Quality Management Practices on Successful Completion of Building Construction Projects in Nakuru Town, Kenya. *International Journal of Innovation and Scientific Research*, 27(1), 16-22.
- Kweyu. F. X (2018). Influence of Project Management Processes on Performance of Kenya Power Last Mile Connectivity Projects in Nakuru County, Kenya. Unpublished Master's Degree. The University of Nairobi.
- Mohammad N. (2010). Participation in development projects at grassroots: A case study of Alampur and Jaganather Union Parishad. A master thesis in the Department of General and Continuing Education, North South University, Bangladesh.
- Miniti, F.M., & Moronge, M. (2018). Influence of Project management Practices on implementation of County Government projects in Kenya; A case of Nakuru County, *Strategic Journal of Business Change Management*, 5(2), 58-82.
- Muchelule, Y. (2018). Influence of Monitoring Practices on Projects Performance of Kenya State Corporations. Nairobi: Jomo Kenyatta University of Agriculture and Technology.
- Mwakajo, I. S. & Kidombo, H. J. (2017). Factors influencing program performance: A case of county road infrastructural projects in Manyatta Constituency, Embu County, Kenya. *International Academic Journal of Information Sciences and Project Management*, 2(2).
- Leong, T. K., Zakuan, N., Mat Saman, M. Z., Ariff, M., Md, S., & Tan, C. S. (2014). Using program performance to measure the effectiveness of quality management system maintenance and practices in the construction industry. *The scientific world journal*, 2014.
- Lukale, A. M. (2018). Determinants of cost overruns in rural road infrastructure projects in Kenya (Doctoral dissertation, Strathmore University).
- Manji, A. (2015). Bulldozers, homes, and highways: Nairobi and the right to the city. *Review of African Political Economy*, 42(144), 206-224.

- Munyoki, S. K. (2014). Factors Influencing Completion of Construction Projects: A Case of construction projects in Nairobi Kenya. The University of Nairobi.
- Muriithi, S.H., Makokha, E, N & Otieno C. Factors affecting timely completion of public construction projects in Trans Nzoia County. International Journal of Scientific and Research Publications, 7(4), 404-434
- Musau, P. M., & Kirui, C. (2018). Project management practices and implementation of government projects in Kenya, case of Machakos County government. International Academic Journal of Information Sciences and Project Management, 3(2), 58-79.
- Mwangi, K. J. (2018). Factors Influencing Performance of County Government Projects: A Case of Gatundu Modern Market, Kiambu County, Kenya.
- Njau D. N, & Ogolla P. (2017). Factors influencing Project scope performance; A case of Kenya National Youth Service Projects in Kenya. Strategic Journal of Business and Change Management, 4(2), 207-220
- Nasir, N., Nawi, M. N. M., & Radzuan, K. (2016, August). Relationship between time management in the construction industry and project management performance. In AIP Conference Proceedings (Vol. 1761, No. 1, p. 020079). AIP Publishing.
- Nibyiza, F. A. B. I. O. L. A. (2015). Analysis of project scope change management as a tool for project success (Doctoral dissertation, Doctoral dissertation, Jomo Kenyatta University of agriculture and technology).
- Nyakundi, N, N (2015). Project Management Process on Outcomes: Case of Public Sector Infrastructure Projects at Telkom Kenya Limited. Unpublished master's Degree. The University of Nairobi.
- Ogutu, B.O.& Muturi, W(2017).Factors Influencing Successful Completion of Road construction Projects in Kenya: The Case of Kisumu County. International Journal of Economics, Commerce, and the Management United Kingdom. 5(6).
- Omondi, E. F. (2017). Influence of Triple Constraint Management on Completion of Non-Governmental Organizations Water Sanitation and Hygiene (Wash) Projects in Nakuru County, Kenya.
- Osedo, A. A. (2015). Determinants of Effective Implementation of County Construction Projects in Kenya: A Case of Nairobi City County.
- Raza, S. A., & Shah, T. Z. (2012). Work environment and its impact on the triple constraint of project management. Information Management and Business Review, 4(10), 545-552.
- Rugenyi, F. (2015). Assessment of the Triple Constraints in Projects in Nairobi: The Project Managers' Perspective. International Journal of Academic Research in Business and Social Sciences, 5(11), 1-16.
- Rugenyi, F., & Bwisa, H. (2016). Effects of triple constraint on the management of projects in Nairobi, the project manager's perspective. Strategic Journal of Business and Change Management, 3(2).
- Sikudi, L. A., & Otieno, D. M. (2017). Factors Influencing Implementation of County Funded Development Projects by County Governments, In Kenya. (A Case of Kilifi County Government).
- Tabish, S.Z. S& Jha, K. N, (2011). Identification and evaluation of performance factors for public Construction projects, Construction Management and Economics, 29 (8).
- Tamura, R., Kobayashi, K., Takano, Y., Miyashiro, R., Nakata, K., & Matsui, T. (2019). Mixed integer quadratic optimization formulations for eliminating multicollinearity based on variance inflation factor. Journal of Global Optimization, 73(2), 431-446.
- Van Manen, M. (2016). Phenomenology of practice: Meaning-giving methods in phenomenological research and writing. Routledge.
- Yaghootkar, K., & Gil, N. (2012). The effects of schedule-driven project management in multi-project environments. International Journal of Project Management, 30(1), 127-140.
- Yin, R. K. (2017). Case study research and applications: Design and methods. Sage publications.
- Wanjau, B. N. (2015). Factors influencing completion of building projects in Kenya, the ministry of land, housing, and urban development, Nairobi county. University of Nairobi Unpublished MA thesis in Project Planning and Management Thesis, 21-34.
- Zaden, B.S. (2010). Participation and community development: Current Research Journal of Social Science, 2 (1), 13-14.