
# EFFECT OF PROJECT MANAGEMENT PRACTICES ON PERFORMANCE OF PUBLIC HOUSING CONSTRUCTION PROJECTS IN KENYA: A CASE STUDY OF MOMBASA COUNTY

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# EFFECT OF PROJECT MANAGEMENT PRACTICES ON PERFORMANCE OF PUBLIC HOUSING CONSTRUCTION PROJECTS IN KENYA: A CASE STUDY OF MOMBASA COUNTY

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**ABSTRACT**

*The objective of this study was to establish the effect of project management practices on performance of public housing construction projects in Kenya, a case study of Mombasa County. Descriptive survey design was adopted in this study. Fisher formula was used to select the study sample size of 116 from a target population of 164. The primary data for this study was collected using closed structured questionnaires. The collected data was examined and checked for completeness and comprehensibility and tabulated. The data was analysed using descriptive statistics, spearman correlation and regression coefficient. Statistical Package for Social Sciences (SPSS) version 24 was used to analyse the data. The findings indicated that there was a strong positive and significant correlation between project planning and performance of public housing construction projects; between project team competence and performance of public housing construction; between project funding and performance of public housing construction projects; between project risk planning and performance of public housing construction projects). In general, the results revealed that project planning, project team competence, project funding and project risk planning have significant and positive effects on performance of public housing construction projects in Kenya. The study concluded that adhering to project planning practices in construction projects is paramount to a projects success and involvement of all stakeholders in project planning contributes to the project's success. The level of experience of the project team determines successful project implementation. Project funding plays a significant role in performance of public housing construction projects. The study recommended that public housing construction projects must ensure that adequate plans and resources exist to recruit, motivate, train and develop employees; Key risk management skills are needed to hedge projects against uncertainties such as resource shortage, contractors' inability to meet completion dates and other risks like design and contract variations. Effective communication structures in project organizations are essential to meet the project triple constraints of time, cost and quality. Ensure that project teams have the necessary project management skills such as planning, communication, risk management, monitoring and control and sufficient funding so as to cushion the project against failure.*

***Key Words:*** *Project Planning, Project Team Competence, Project Funding, Project Risk Planning*

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## INTRODUCTION

The role of the project management professionals is now vital in global business and construction industry, including many front-end services, which increases the required skill set of new graduates (Adeyemi, 2014), Project management is no longer a special-need management (Eleanorv Bash, 2015) Alternative contractual delivery systems, new management initiatives, collaborative partnerships, and global product markets require professionals to have a broader awareness of construction methods and project management skills (Adeyemi,2014), defined project management as the application of knowledge skills, tools and techniques to project activities in order to meet or exceed stakeholder needs and expectations from the project.

Housing isn't just the building of maintainable networks, however concerns the remodel of networks and making places where individuals would ceaselessly live and work for present and who and what is to come (Kabir & Bustani, 2012). Housing likewise gives the fundamental conveniences and infrastructural offices of need among the essential human requirements for a protected, secure and agreeable life and living in the manufactured condition. Viable and proficient social housing bequest arrangement gives proof of the social and financial commitment towards the development and improvement of a nation; just as giving a connection between the physical development of a urban manufactured condition, and its social and monetary results. from the built environment view gives: settlement; occupations; education; and wellbeing services; which in the research setting must be: accessible; safe; clean; stylishly satisfying; and economical (Jiboye, 2011)

While concerns about housing conditions and the affordability of housing are not new, the issue of affordability has been recently elevated to a 'global urban housing crisis' (Wetzstein, 2017; Rohe, 2017; King et al., 2017) characterized by unresponsive housing supply, scarcity of affordable housing, and the proliferation and persistence of precarious dwellings, in rapidly urbanizing low- and middle-income countries (Collier and Venables, 2013).

Kenya's monetary recovery has seen construction and real estate grow quickly and is anticipated to develop every year by 16.7 percent all factors considered. It's GDP ascending from 2.3 percent in 2002 to 4.2 percent in 2007, as indicated by the Economic Recovery Strategy for Employment and Wealth Creation government report (2009). The legislature through the National Housing Corporation plans to keep creating modalities of financing housing, so as to give legitimate system to advance further housing improvement. Throughout the most recent 20 years, Kenya's urban housing has ended up in a condition of deterioration, which has had the thump on impact of creating informal settlements.

Housing assumes an enormous job in reviving financial development in any nation, with safe house being among key markers of improvement (Ireri, 2010). Housing as a fundamental human right requires that urban inhabitants ought to approach respectable housing, characterized as one that gives an establishment as opposed to being an obstruction to, great physical and psychological well-being, self-improvement and the satisfaction of life goals. The absence of a framework to guarantee and support proper housing activities may frequently lead to water, air and land contaminations along these lines influencing the common habitat wellbeing and personal satisfaction.

The government of Kenya plans to deliver 1 million units over the next 5-years out of which, 20.0% will be social housing while 80.0% will be affordable housing. In his speech, the President promised that through the delivery of 1 million housing units, half a million more Kenyans will own homes by the end of his second term in the year 2022. Out of these units, 800,000 will be affordable houses costing between Kshs 0.8 million and Kshs 3.0 million and 200,000 will be social housing units costing between Kshs 0.6 million and Kshs 1.0 million, according to the Big 4 Agenda Blueprint. This is not

entirely a new initiative and previous plans and proposals for the same have not been realised to date. For example, Kenya's first medium-term goal (2009-2012) of the Vision 2030 strategy had a target of increasing housing production from 35,000 units annually to 200,000 units annually for all income levels. However, the Kenyan Government delivered approximately 3,000 units only during that period, compared to a target of 800,000 houses, according to the World Bank Economic Update of 2017. This then begs the question of whether the delivery of affordable housing can be a reality this time around. (Cytonn, 2018)

**Statement of the Problem**

The total annual cost of worldwide project failures is $7.5 trillion dollars, according to Maylor (2009); whereas governments invest heavily on projects but the outcome is poor quality works and unfinished or failed projects. Population growth statistics paint a rosy future for the construction industry. With the global population predicted to hit 9 billion by 2050 and two out of every three people living in cities by 2050 (Price Water House Coopers, 2015) the demand for housing construction has never been greater. Mombasa county has spelt out an important plan in the management process for any project within the construction industry to adopt risk management and analysis practice by identifying, analyzing and addressing them to reduces the probability of unfavorable negative events, maximize realization of emerging opportunities, helping towards mitigation of the likelihood of risk occurring and the negative impact when it happens.

Despite all these efforts in Mombasa county towards sustainable housing and housing estates provision the construction industry is at a crossroads as the demand for housing continue increasing, construction challenges and volatilely changing technologies in the built environment put construction parties at stake of delivering projects meeting timelines, quality and budget. Various construction firms and property developers have used project management skills and techniques as a means of bridging the gap between failure and success in implementation of projects. Even though there is increased awareness of construction project management skills, by these construction firms and property developers, projects still fail. The economic stimulus programme (ESP) of 2010 have some of its projects unfinished to date, with no clear indication of when they will be completed, and this has resulted in loss of value of public funds. These include the Changamwe and Mtongwe national housing expansion projects, Kaa Chonjo house upgrading project, the Kenya Prisons Service (KPS) which has failed to provide more than 20,000 wardens with decent housing, leaving majority of them accommodated in temporary structures. (GOK 2019 audit report) All these experienced failure raising questions despite the diverse exposure to project management skills by the construction firms and property developers. The Kibera house upgrading scheme had its cost increased from 1billion to 2billion when one of the contractors was terminated for lack of performance. Cases of stalled prison and police staff houses have been noted yet the contract documents have clauses that stipulated how to handle project deficiencies in the course of project implementation. This is according to the Office of the Auditor General (OAG 2018) report on performance audit on provision of housing to police and prison officers in Kenya.

Previous studies on housing projects have been conducted by Mungai (2011) who looked at the challenges of housing development and sustainability for the low income market and identified challenges such as the complicated land acquisition process, high transaction costs relative to the level of income, outdated planning and building regulations and the lack of stakeholder involvement. Wanjohi & Mugure, (2008) found that construction companies have implemented Project risk management strategies to minimize project delays, overruns and failures. Brandon & Lombardi (2011), in their study, Evaluating Sustainable Development in the Built Environment, suggest that sustainable development is conceived in many

different ways; and predominantly in the context of: environmental issues, economic, social, political developments and sustaining created assets benefits. From all the above previous research topics, no one has covered on the effects of project management practices on performance of public housing construction projects. This study sought to assess the effect of project management practices on performance of public housing construction projects in Kenya.

**Study Objectives**

The purpose of the study was to assess the effect of project management practices on performance of public housing construction projects in Kenya, a case study of Mombasa County. The specific objectives were;

- To determine the effect of project planning on performance of public housing construction projects in Kenya
- To establish the effect of project team competence on performance of public housing construction projects in Kenya
- To examine the effect of project funding on performance of public housing construction projects in Kenya
- To determine the effect of project risk planning on performance of public housing construction projects in Kenya

This study was guided by the following null hypotheses:

- **$H_{01}$**: Project planning has no significant effect on performance of public housing construction projects in Mombasa County.
- **$H_{02}$**: Project team competence of has no significant effect on performance of public housing construction projects in Mombasa County.
- **$H_{03}$**: Project funding has no significant effect on performance of public housing construction projects in Mombasa County.
- **$H_{04}$**: Project risk planning has no significant effect on performance of public housing construction projects in Mombasa County.

**LITERATURE REVIEW**

**Uncertainty Theory**

Uncertainty theory was presented by Liu (2010) because of speculation of space of vulnerability. Uncertainty theory was likewise connected to questionable rationale by Li & Liu (2010) in which uncertainity is described as the unsure measure that the recommendation is valid. Moreover, unsure entailment was proposed by Liu that is a philosophy for computing reality estimation of a risk occurrence when reality estimations of other questionable equations are given.

Uncertainty is obviously not a dismissed idea in task execution. Early advancement of movement arranges systems during the 1950s, for example, PERT (Program Evaluation and Review Technique), perceived the likelihood of variety in undertaking lengths. These systems were reached out during the 1960s to join probabilistic spreading for example Graphical Evaluation and Review Technique. Subjective methodologies, for example, the Synergistic Contingency Evaluation and Review Technique, and Analysis of Potential Problems, were created to guide venture chiefs to get ready for vulnerability with hazard anticipation and possibility arranging (Henriksen and Uhlenfeldt, 2006).

**Project Management Theory**

The theory describes project management as the application of knowledge, skills, tools and techniques to project activities to achieve project goals or objectives. It is accomplished through the application and integration of the project management processes in terms of initiating, planning, executing, monitoring and controlling, and closing the project (Lewis, 2007,). A project can be defined as a transformation of inputs and outputs. Project management seems to be based on three theories of management namely management as planning, the dispatching model and the thermostat model.

With action as the key word in the definition of project and as a main subject of the three theories


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of management, one can summarize classical (project)management as "management of action" or "the use of a closed system" (Boonstra, 2005). Management-as-planning, conceptualizes that in planning a project, there is a managerial part and an effector part (Koskela & Howell, 2012a). The primary function of the managerial part is planning, and the primary function of the effector part is to translate the resultant plan into action Management at the operations level consists of creation, revision and implementation of plans (Koskela & Howell, 2012a). Several studies attribute Nigerian Indigenous Contractors (NICs) poor performance to inadequate project planning due to the adoption of a non-project (traditional) management approach despite its shortcoming (Inuwa, 2015)

**Theory of Change**

Theory of change is an on-going process of reflection to explore change and how it happens – and what that means in a particular context, sector, and/or group of people. From thought view it's a structured way of thinking about change and impact organizations would like to achieve. It's an integrated approach to program design, implementation, M+E, and communication (Graig 2015, Green 2015), Comic Relief, 2011) Steps towards Building a Theory of Change include; 1. Situation analysis, 2. Clarify the program goal, 3. Design the program/product, 4. Map the causal pathway, 5. Explicit assumptions, 6. Design SMART indicators, 7. Convert to Logical Framework. In another format, 1. What is the problem you want to solve? 2 Who are your key audience? 3 What's your entry point to reaching your audience? 4. What steps are needed to bring about change? 5. What is the measurable effect of your work? 6. What's the wider benefit of your work? 7. What is the long term effect you see as your goal?

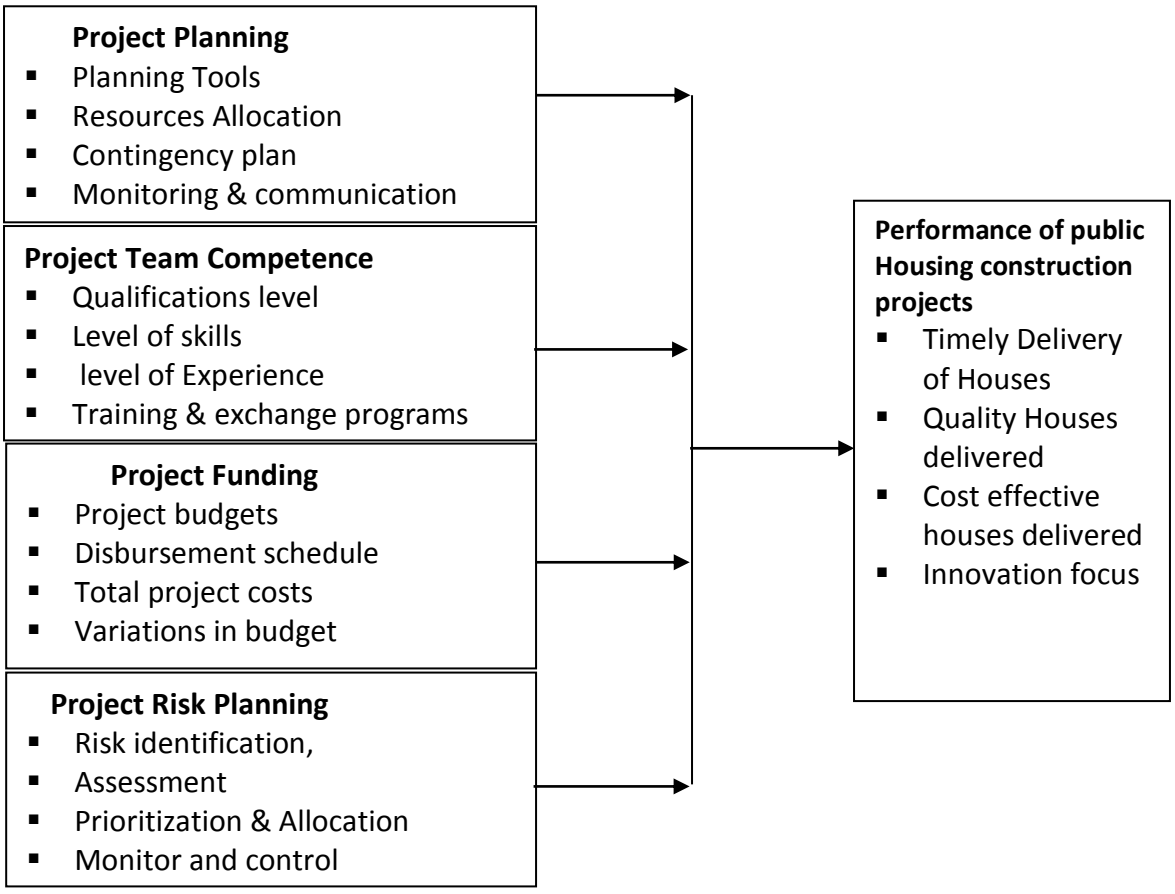


**Figure 1: Conceptual Framework**


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**Empirical Review**

Hamzah, (2011), in construction projects risks play a significant part in decision making and may affect the performance of a project. If they are not dealt with sensibly, they may cause cost overruns, delays on schedule and even poor quality. Each project has a different level and combination of risks and sites will adopt different strategies to minimize them because the characteristics of projects are unique and dynamic.

Poor risk management, poor supervision, unforeseen site conditions, slow decision making involving variation, and necessary variation works are the principle delay factors in Hong Kong (Hamzah, 2011). Unforeseen soil condition, poor site supervision, low speed of decision making involving all project teams, client initiated variations, necessary variations of work, and inadequate contractor experience are the six significant factors contributing to timely, quality project delivery and within budget in building and civil engineering works. Materials-, equipment-, and labour-related issues were identified as major causes of contractors 'challenge of delay in delivering quality project works within time and budgeted costs. Design changes, poor labour productivity, and inadequate planning and resources were found to be factors causing poor project performance in Indonesia (Kaliba,2009). In Saudi Arabia, contractor performance, owner's administration, early planning and design, government regulation, site and environment conditions, and site supervision were found to be the important project performance factors. Whereas, poor contract management, change in site conditions, and shortages of materials were found the most important risk items causing project failure in Nigeria, (Bramble, 2011). Incomplete drawing, slow response by consultant, variation orders, late issuance of instruction, and poor communications were classified as consultant-caused delays. Inclement weather, act of God, labour dispute, and strikes were found to be extraneous factors responsible for delays. Bramble & Callahan (2011) studied owner-, designed-, contractor-, and others-related delays in U.S.A. Late release of site to the contractor, late approval, financial difficulties, contract administration responsibilities, change orders, and interference were found to be owner-caused risks leading to delay and poor project performance. Design defects, slow correction of design errors, tardy shop drawings review, and delays due to test and inspection were considered to be design caused risk**.** Failure to evaluate the site and design, construction defects, contractor management problems, and inadequate resources were found to be contractor-related risks**.** Weather, act of God, strikes, and labor disputes were found to be risk not caused by the design and construction parties. In Egypt, (Kazaz, 2011) studied the major risks causes for construction projects which they are: poor contract management, unrealistic scheduling, lack of owner's financing/payment for completed work, design modifications during construction, and shortages in materials such as cement and steel. Hamzah, (2011) studied risk related to engineering factors which arise due to design development, workshop drawings, and change then he developed a knowledge based expert system for assessing the engineering related delay claims. Kazaz et al. [2011] conducted a study on the causes of time extensions in the Turkish construction industry and levels of their importance, considering 34 factors. A questionnaire survey was conducted with 71 construction companies in Turkey, and the outcomes were evaluated by means of statistical analyses.

**METHODOLOGY**

The study adopted a descriptive survey design. The population for the study was National Construction Authority officers, Ministry of Lands, Housing and Urban Development officers, KENSUP officers, project managers and construction team. They comprised of 164 respondents. The study adopted Fisher et al., (1972) formula in determining the sample size and stratified random sampling in selecting the respondents in the sample size of 384.

The information was assembled using surveys to gather both quantitative and subjective data. Qualitative data was analysed by the use of Statistical Package for Social Sciences (SPSS) version 24 to guide the study. The relevancy and relationships was then determined by simple regression and correlation analysis technique given by the equation below.

$$Y = \beta_0 + \beta_1 X_1 + \beta_2 X_2 + \beta_3 X_3 + \beta_4 X_4 + e$$

Whereby Y = Performance of Public Housing Construction Projects

$X_1$= Project Planning

$X_2$= Project Team Competency

, $X_3$= Project Funding,

$X_4$= and Project Risk Planning

## RESULTS AND DISCUSSIONS

### Project Planning

The study sought to investigate the effects of project planning on performance of public housing construction projects in Kenya. Table 1 below summarized respondents' level of agreement on how project planning affects performance of public housing construction projects in Kenya. Most of the respondents agreed that the Contingency plans, solving of conflicts and mediating between groups reduces delays in construction of public housing projects in Mombasa County as shown by mean of 4.33. Most of the respondents also agreed to the fact that resources allocation both human, capital and material in sufficient quantities determine timely and quality delivery of public housing projects as shown by a mean of 4.23. Most of the respondents also agreed to the fact that monitoring, communication, building cooperation between various stakeholders and involving users in the project implementation process determines the project' success as shown by a mean of 4.22. Planning tools (high quality software and hardware) Approval of project budget by management determines success or failure of construction of public housing projects in Mombasa county reported a mean of 4.17. These results are in agreement with Githenya and Ngugi, (2018) study that established that project planning have a great influence on housing project implementation in Kenya.

**Table 1: Project Planning**

| Statement | N | Mean | Std. Dev. |
|---|---|---|---|
| Planning tools (high quality software and hardware) Approval of project budget by management determines success or failure of construction of public housing projects in Mombasa county | 100 | 4.17 | .378 |
| Resources allocation both human, capital and material in sufficient quantities determine timely and quality delivery of public housing projects | 100 | 4.23 | .423 |
| Contingency plans, Solving of conflicts and mediating between groups reduces delays in construction of public housing projects in Mombasa county | 100 | 4.33 | .473 |
| Monitoring, Communication, building cooperation between various stakeholders and involving users in the project implementation process determines the project' success | 100 | 4.22 | .416 |

### Project Team Competence

The second objective sought to investigate the effects of project team competency on performance of public housing construction projects in Kenya. From the findings indicated in table 2, most of the respondents agreed that the experience, leadership style of the project manager and team work determine level of success of the project as shown by a mean of 4.32, the statement that levels of administrative skills and good communication skills of project team members motivation and attitude determine adherence to set time schedules of the project had a mean score of 4.31, the statement that qualification level, skills and experience in housing construction determine level of success of public housing projects had a


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mean of 4.19. The statement that training, exchange programmes, motivation and competency of project team are required for the projects to succeed had a mean of 4.18. These results concur with Nyaga and Otieno (2018) study that found out that Projects are constrained by inadequate planning skills that are required for effective planning for project success; Project planning is complicated and risky, hence requires varying skills sets for successful project implementation and management; Increasing complexity in the projects with pressure of time and costs has led to the introduction of high quality software and hardware which requires skilled planning.

**Table 2: Project Team Competence**

| Statement | N | Mean | Std. Dev. |
|---|---|---|---|
| Qualification level, skills and experience in housing construction determine level of success of public housing projects | 100 | 4.19 | .394 |
| Levels of administrative skills and good communication skills of project team members motivation and attitude determine adherence to set time schedules of the project | 100 | 4.31 | .465 |
| Experience, leadership style of the project manager and team work determine level of success of the project | 100 | 4.32 | .490 |
| Training, exchange programmes, motivation and competency of project team are required for the projects to succeed | 100 | 4.18 | .386 |

**Project Funding**

The third objective sought to investigate the effects of project funding on performance of public housing construction projects in Kenya. As illustrated in Table 3 below, the statement that delays in disbursement of funds by financiers lead to project delays, timely release of project finances in required amounts promote project success had a mean score of 4.32. The statement that variation of project costs results in stringent approval procedures of additional funding leading to delays in project implementation had a mean score of 4.28, The statement that poor estimation of project costs leads to unrealistic low project budgets that lead to project failure. Lack of transparency and accountability in management of project funds lead to conflicts and project failure had a mean score of 4.22, the statement that contractual claims by contractors increases total project budget and can lead to project delays. Poor project financial management reduces project costs control thus inflated project budgets had a mean score of 4.16.

**Table 3: Project Funding**

| Statement | N | Mean | Std. Dev. |
|---|---|---|---|
| Poor estimation of project costs leads to unrealistic low project budgets that lead to project failure. Lack of transparency and accountability in management of project funds lead to conflicts and project failure | 100 | 4.22 | .416 |
| Delays in disbursement of funds by financiers lead to project delays. Timely release of project finances in required amounts promote project success | 100 | 4.32 | .469 |
| Variation of project costs results in stringent approval procedures of additional funding leading to delays in project implementation | 100 | 4.28 | .494 |
| Contractual claims by contractors increases total project budget and can lead to project delays. Poor project financial management reduces project costs control thus inflated project budgets | 100 | 4.16 | .368 |

**Project Risk Planning**

The fourth objective sought to investigate the effects of project risk planning on performance of public housing construction projects in Kenya. As illustrated in Table 4 below, the statement that inappropriate risk identification, assessment and ranking leads to project delays or failure in case a risk materialises had a mean score of 4.33, the statement that risk planning and allocation of resources to mitigate against risks reduces occurrence of project failure had a mean score of 4.30, the statement that effective risk identification process enables organization to make budget allocation for risk management in the project thus corrective measures that influence projects to succeed had a mean score of 4.19, the statement that inadequately monitoring and control of risks due to lack of competent staff to take corrective measure leads to project failure had a mean score of 4.17.

**Table 4: Project Risk Planning**

| Statement | N | Mean | Std. Dev. |
|---|---|---|---|
| Effective risk identification process enables organization to make budget allocation for risk management in the project thus corrective measures that influence projects to succeed | 100 | 4.19 | .394 |
| Risk planning and allocation of resources to mitigate against risks reduces occurrence of project failure | 100 | 4.30 | .461 |
| Inappropriate risk identification, assessment and ranking leads to project delays or failure in case a risk materialises | 100 | 4.33 | .514 |
| Inadequately monitoring and control of risks due to lack of competent staff to take corrective measure leads to project failure. | 100 | 4.17 | .378 |

**Performance of Public Housing Construction Projects**

The main objective sought to investigate the effects of project management practices on performance of public housing construction projects in Kenya. The respondents were requested to state their individual opinions on four specific statements regarding the effects of project management practices on performance of public housing construction projects in Kenya. The results were as shown in table 5 below. The statement that construction projects are delivered within the prescribed budgets had mean score of 4.30. This is in line with Nibyiza's (2015) observation that successful construction projects are those that are delivered on time and within budget. Zenger (2017) adds that the final cost of a construction project should not exceed the approved budget. The statement that construction projects are delivered on time, in accordance with the contract schedule had a mean score of 4.27. The statement that construction projects are delivered in compliance with the specifications and standards on quality anticipated had a mean score of 4.18.

**Table 5: Performance of Public Housing Construction Projects**

| Statement | N | Mean | Std. Dev. |
|---|---|---|---|
| Construction projects are delivered in compliance with the specifications and standards on quality anticipated | 100 | 4.18 | .386 |
| Construction projects are delivered on time, in accordance with the contract schedule | 100 | 4.27 | .446 |
| Construction projects are delivered within the prescribed budgets | 100 | 4.30 | .482 |
| Innovation focus improves the performance of public housing construction projects | 100 | 4.17 | .378 |

**Inferential Statistics**

**Coefficient of Correlation**

Pearson Bivariate correlation coefficient was used to determine the correlation between the dependent variable, performance of public housing construction projects and the independent variables; project planning, project team competency, project funding and project risk planning. As stated by Sekaran, (2015), the correlation is assumed to be linear with correlation coefficient ranging from -1.0 (perfect negative correlation) to +1.0 (perfect positive relationship). The correlation coefficient was computed to establish the strength of the relationship between dependent and independent variables (Kothari and Gang, 2014).

In trying to establish the relationship between the study variables, the study used the Karl Pearson's coefficient of correlation (*r*) as indicated in Table 6 below. The study findings showed that there was a positive correlation between the independent variables; project planning, project team competency, project funding and project risk planning and the dependent variable, performance of public housing construction projects. The analysis indicated that Pearson (*r*) data analysis yielded a positive correlation coefficient *r* equal to 0.717, 0.627, 0.700 and 0.801. As illustrated below, it shows that there is a positive and significant relationship between the independent variables, namely; project planning, project team competency, project funding and project risk planning and the dependent variable, performance of public housing construction projects.

**Table 6: Pearson Correlations**

| | | PP | PTC | PF | PRP | PPHCP |
|---|---|---|---|---|---|---|
| **PP** | Pearson Correlation | 1 | | | | |
| | Sig. (2-tailed) | | | | | |
| | N | 100 | | | | |
| **PTC** | Pearson Correlation | .717** | 1 | | | |
| | Sig. (2-tailed) | .000 | | | | |
| | N | 100 | 100 | | | |
| **PF** | Pearson Correlation | .627** | .743** | 1 | | |
| | Sig. (2-tailed) | .000 | .000 | | | |
| | N | 100 | 100 | 100 | | |
| **PRP** | Pearson Correlation | .700** | .799** | .702** | 1 | |
| | Sig. (2-tailed) | .000 | .000 | .000 | | |
| | N | 100 | 100 | 100 | 100 | |
| **PPHCP** | Pearson Correlation | .801** | .907** | .815** | .893** | 1 |
| | Sig. (2-tailed) | .000 | .000 | .000 | .000 | |
| | N | 100 | 100 | 100 | 100 | 100 |

** Correlation is significant at the 0.01 level (2-tailed)

Key: PP=Project Planning, PTC=Project Team Competency, PF=Project Funding, PRP=Project Risk Planning, PPHCP=Performance of Public Housing Construction Projects

**Coefficient of Determination ($R^2$)**

To ascertain the research model, a confirmatory factors analysis was conducted. The independent variables were subjected to linear regression analysis in order to measure the success of the model and predict causal relationship between the independent variables; project planning, project team competency, project funding, project risk planning, and the dependent variable, performance of public housing construction projects.

The model, shown in table 7 below, explains 93.6% of the variance (Adjusted R Square = 0.933) on


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performance of public housing construction projects. Clearly, there are factors other than the four proposed in this model which can be used to predict performance of public housing construction projects. However, this is still a good model as pointed out by Cooper and Schinder (2013) the model is acceptable in social science if adjusted R square value is not lower than 0.10.

This implied that 93.6% of the relationship is explained by the identified four factors namely; Project Risk Planning, Project Planning, Project Funding, Project Team Competency. The rest 6.4% is explained by other factors in project management not studied in this research. In summary the four factors studied namely; Project Risk Planning, Project Planning, Project Funding, Project Team Competency and the dependent variable, performance of public housing construction projects, determines 93.6% of the relationship while the rest 6.4% is explained by other factors.

**Table 7: Model Summary**

| Model | R | R Square | Adjusted R Square | Std. Error of the Estimate |
|---|---|---|---|---|
| 1 | .967[a] | .936 | .933 | .0805 |

a. Predictors: (Constant), Project Risk Planning, Project Planning, Project Funding, Project Team Competency.

**Regression Analysis**

**Analysis of Variance (ANOVA)**

The ANOVA result displays the sum of squares due to regression and due to residuals. It also displays the F ratio value and its significance. The F depicts the significance or the fitness of the regression model. It indicates how significant the predictors can predict the dependent variable. The ANOVA were shown in table 8 below.

**Table 8: ANOVA**

| Model | | Sum of Squares | df | Mean Square | F | Sig. |
|---|---|---|---|---|---|---|
| 1 | Regression | 8.969 | 4 | 35.745 | 345.678 | .000[b] |
| | Residual | .616 | 95 | .006 | | |
| | **Total** | **9.585** | **99** | | | |

a. Dependent variable: Performance of Public Housing Construction Projects

b. Predictors: (Constant), Project Risk Planning, Project Planning, Project Funding, Project Team Competence.

The results findings showed that the Regression Model is significant (F = 345.678, p = 0.000). The significance of a regression model is considered significant if its p-value is less or equal to 0.05. A regression model established with its p-value of 0.000 significance which is less than 0.05. This indicated that the regression model was statistically significant in predicting the effect of project management practices on performance of public housing construction projects in Kenya. Since F is greater than the F critical value, it showed that the overall model was significant and that project risk planning, project planning, project funding, project team competence has an effect on Performance of Public Housing Construction Projects.

**Multiple Regression**

Table 9 below presented the Regression Coefficients and the Significance of the Regressions (p-value). From the regression result, the coefficient of project planning is 0.169. This implies that one unit change in project planning, increases performance of public housing construction projects by 0.169 units holding other factors constant. This explains Al-Khawaldah (2017) findings that there is a strong correlation between construction industry's project planning and performance of public housing construction projects. Ocharo and Kimutai (2018), in their study concluded; project planning forms an integral part of project management practices and implementation, and that, many projects in Kenya

are not implemented on schedule while only a few achieve project goals and objectives. The coefficient of project team competency is 0.348, thus a one-unit increase in project team competency would result to 0.348 increase in performance of public housing construction projects, holding other factors constant. The coefficient of project funding is 0.198. The result implied that one-unit increase in project funding increases performance of public housing construction projects by 0.198 units. The coefficient for project risk planning was 0.346. This implied that a unit increase in project risk planning increases performance of public housing construction projects by 0.346 units.

**Table 9: Multiple Regression (Coefficients)**

| Model | | Unstandardized Coefficients | | Standardized Coefficients | t | Sig. |
|---|---|---|---|---|---|---|
| | | B | Std. Error | Beta | | |
| 1 | (Constant) | .274 | .124 | | 2.220 | .029 |
| | Project Planning | .169 | .037 | .183 | 4.623 | .000 |
| | Project Team Competency | .348 | .049 | .358 | 7.163 | .000 |
| | Project Funding | .198 | .041 | .194 | 4.777 | .000 |
| | Project Risk Planning | .346 | .047 | .343 | 7.358 | .000 |

a. Dependent Variable: Performance of Public Housing Construction Projects

The results findings for the hypostasized regression model, and the interpretation of the results findings was as indicated below.

$$Y = \beta_0 + \beta_1 X_1 + \beta_2 X_2 + \beta_3 X_3 + \beta_4 X_4 + e$$

Therefore, from the regression findings, the research model becomes;

$$Y = 0.274 + 0.169 X_1 + 0.348 X_2 + 0.198 X_3 + 0.346 X_4$$

Whereby Y = Performance of Public Housing Construction Projects

$X_1$= Project Planning $X_2$= Project Team Competency, $X_3$= Project Funding, $X_4$= and Project Risk Planning.

**Test of Hypotheses**

As indicated in table 10 below, it is evident that the predictor coefficient is statistically significant since their p-values are less than the alpha level 0.05.

**Table 10: Summary of Regression Coefficient and Test of Hypothesis**

| Model | | Standardized Coefficients | t | Sig. | Deductions |
|---|---|---|---|---|---|
| | | Beta | | | |
| 1 | (Constant) | | 2.220 | 0.29 | |
| | Project Planning | .183 | 4.623 | 0.00 | Reject $HO_1$ |
| | Project Team Competency | .358 | 7.163 | 0.00 | Reject $HO_2$ |
| | Project Funding | .194 | 4.777 | 0.00 | Reject $HO_3$ |
| | Project Risk Planning | .343 | 7.358 | 0.00 | Reject $HO_4$ |

a. Dependent Variable: Performance of Public Housing Construction Projects

**Hypothesis one**

**$H_{01}$**: Project planning has no significant effect on performance of public housing construction projects in Kenya.

**$H_{A1}$**: Project planning has a significant effect on performance of public housing construction projects in Kenya.

$B_1 \neq 0$

In relation to the variable, project planning management, the results above supported by regression analysis t-value of 4.623 which was greater than the critical value 2.0 and p-value of 0.00 at 95% level of significance which was less than 0.05. After testing the hypothesis, calculated t-value

for project planning, which is greater than the critical $t_{36}$ (0.05) = 2.0, the study rejected the null hypothesis that project planning has no significant effect on performance of public housing construction projects in Kenya. Therefore, the study accepted the alternative hypothesis; Project planning has a significant effect on performance of public housing construction projects in Kenya.

**Hypothesis Two**

**$H_{02}$**: Project team competency has no significant effect on performance of public housing construction projects in Kenya.

**$H_{A2}$**: Project team competency has a significant effect on performance of public housing construction projects in Kenya.

$B_1 \neq 0$

In relation to the variable, project team competency, the results above supported by regression analysis t-value of 7.163, which is greater than the critical value, 2.0 and p-value of 0.00 at 95% level of significance, which is less than 0.05. After testing the hypothesis, calculated t-value for project team competency, which is greater than the critical $t_{36}$ (0.05) = 2.0, the study rejected the null hypothesis that project team competency has no significant effect on performance of public housing construction projects in Kenya. Therefore, the study accepted the alternative hypothesis; Project team competency has a significant effect on performance of public housing construction projects in Kenya. This confirms Block (2013) argument that project team competency is one of the pillars of construction in project management and helps to steer the organization achieve its goals.

**Hypothesis Three**

**$H_{03}$**: Project funding has no significant effect on performance of public housing construction projects in Kenya.

**$H_{A3}$**: Project funding has a significant effect on performance of public housing construction projects in Kenya.

$B_1 \neq 0$

In relation to the variable, project funding, the results above supported by regression analysis t-value of 4.777, which is greater than the critical value, 2.0 and p-value of 0.00 at 95% level of significance, which is less than 0.05. After testing the hypothesis, calculated t-value for project funding, which is greater than the critical $t_{36}$ (0.05) = 2.0, the study rejected the null hypothesis that project funding has no significant effect on performance of public housing construction projects in Kenya. Therefore, the study accepted the alternative hypothesis; project funding has a significant effect on performance of public housing construction projects in Kenya.

**Hypothesis Four**

**$H_{04}$**: Project risk planning has no significant effect on performance of public housing construction projects in Kenya.

**$H_{A4}$**: Project risk planning has a significant effect on performance of public housing construction projects in Kenya.

$B_1 \neq 0$

In relation to the variable, project risk planning, the results above supported by regression analysis t-value of 7.358, which is greater than the critical value, 2.0 and p-value of 0.00 at 95% level of significance, which is less than 0.05. After testing the hypothesis, calculated t-value for project risk planning, which is greater than the critical $t_{36}$ (0.05) = 2.0, the study rejected the null hypothesis that project risk planning has no significant effect on performance of public housing construction projects in Kenya. Therefore, the study accepted the alternative hypothesis; project risk has a significant effect on performance of public housing construction projects in Kenya.

**Discussion of the Key Findings**

Pearson Bivariate correlation was used to compute the correlation between project planning and performance of public housing construction projects. The findings indicated that there was a strong positive and significant correlation between project planning and performance of public housing construction projects ($r = 0.801$, $P < 0.05$). Standard

multiple regression was conducted and there was positive and significant effect of project planning on performance of public housing construction projects (β = 0.169; t = 4.623; p < 0.05). On hypothesis testing, standard multiple regression analysis was carried out and the results failed to provide support for $\mathbf{H_{01}}$ hence the $\mathbf{H_{01}}$ was rejected and instead the $\mathbf{H_{A1}}$ was accepted.

Pearson Bivariate correlation was used to compute the correlation between project team competence and performance of public housing construction projects. The findings indicated that there was a strong positive and significant correlation between project team competence and performance of public housing construction projects (r = 0.717, P < 0.05). Standard multiple regression was conducted and there was positive and significant effect of project team competence on performance of public housing construction projects (β = 0.348; t = 7.163; p < 0.05). On hypothesis testing, standard multiple regression analysis was carried out and the results failed to provide support for $\mathbf{H_{02}}$ hence the $\mathbf{H_{02}}$ was rejected and instead the $\mathbf{H_{A2}}$ was accepted.

Pearson Bivariate correlation was used to compute the correlation between project funding and performance of public housing construction projects. The findings indicated that there was a strong positive and significant correlation between project funding and performance of public housing construction projects (r = 0.627, P < 0.05). Standard multiple regression was conducted and there was positive and significant effect of project funding on performance of public housing construction projects (β = 0.198; t = 4.777; p < 0.05). On hypothesis testing, standard multiple regression analysis was carried out and the results failed to provide support for $\mathbf{H_{03}}$ hence the $\mathbf{H_{03}}$ was rejected and instead the $\mathbf{H_{A3}}$ was accepted.

Pearson Bivariate correlation was used to compute the correlation between project risk planning and performance of public housing construction projects. The findings indicated that there was a strong positive and significant correlation between project risk planning and performance of public housing construction projects (r = 0.700, P < 0.05). Standard multiple regression was conducted and there was positive and significant effect of project risk planning on performance of public housing construction projects (β = 0.346; t = 7.358; p < 0.05). On hypothesis testing, standard multiple regression analysis was carried out and the results failed to provide support for $\mathbf{H_{04}}$ hence the $\mathbf{H_{04}}$ was rejected and instead the $\mathbf{H_{A4}}$ was accepted.

## CONCLUSIONS AND RECOMMENDATIONS

The study concluded that there was a strong positive link between project planning and performance of public housing construction projects in Kenya. The study also concluded that adhering to project planning practices in construction projects would contribute to project success. The study also concluded that involvement of all stakeholders in project planning contributes to project success.

The study concluded that the level of experience of the project team is paramount to the project implementation. The level of education of the project team has a great impact to the project implementation. That certification of previous or ongoing projects of the project team has a great impact to the project implementation. The study also concluded that project managers with good project management and technical skills are able to deliver projects within a specified time schedule (Oguulana & Bach ,2017).

The study concluded that there was a strong positive link between project funding and performance of public housing construction projects in Kenya. The study also concluded the following; that lack of transparency and accountability in management of project funds lead to conflicts and project failure, contractual claims by contractors increases total project budget and can lead to project delays and that poor project financial management reduces project costs control thus inflated project budgets. When project funding was correlated with performance of public housing construction projects, there was a strong positive

correlation. This demonstrates that project funding plays a significant role on performance of public housing construction projects in Kenya.

The study concluded that there was a strong positive link between project risk planning and performance of public housing construction projects in Kenya. The study also concluded the following; that inappropriate risk identification, assessment and ranking leads to project delays or failure in case a risk materialises, risk planning and allocation of resources to mitigate against risks reduces occurrence of project failure, and that inadequately monitoring and control of risks due to lack of competent staff to take corrective measure leads to project failure. When project risk planning was correlated with performance of public housing construction projects, there was a strong positive correlation. This demonstrated that project risk planning plays a significant role on performance of public housing construction projects in Kenya. Effective communication structures in project organizations are essential to meet the project triple constraints of time, cost and quality. Ensure that project teams have the necessary project management skills such as planning, communication, risk management, monitoring and control and sufficient funding so as to cushion the project against failure.

Based on the findings and the subsequent analyses from the study, it was established that project management practices positively affect performance of public housing construction projects in Kenya. For that matter, the following recommendations are imperative:

The study recommended that public housing construction projects must ensure that adequate plans and resources exist to recruit, motivate, train and develop employees; Key risk management skills are needed to hedge projects against uncertainties such as resource shortage, contractors' inability to meet completion dates and other risks like design and contract variations.

It is essential that all organizations that are involved in projects, trains its project management team so as to raise the standards of results emanating from every project. Government agencies, parastatals, non-governmental organizations and corporate, community and faith-based organizations should ensure that their project teams have the necessary project management skills such as planning, communication, risk management, monitoring and control and sufficient funding so as to cushion the project against failure.

Investing in high quality hardware and software compliments the planning skills of the project management team. Project management software are necessary when handling complex projects as it can determine the shortest and longest period the project can be implemented at the same time showing activities that can be undertaken together. Sometimes the total project duration can be reduced in what is referred to as 'crashing' by increasing the resources needed to carry out an activity.

Research should also be carried out on the effect of training project planning, risk management, and project funds monitoring and control in Kenyan specific sectors projects. This information would be important for increasing the rate of success in projects within the public and private sectors and parastatals.

**Suggestions for further Studies**

This study focused on effect of project management practices on performance of public housing construction projects in Kenya. From the analysis, study variables explained only 93.6%. Since only 93.6% was explained by the independent variables in this study; it is prudent that other studies be carried out to focus on other aspects of policy framework like ethical practices and how they affect performance of public housing construction projects in Kenya. This is because ethical practices are a component that was not covered in this study.

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