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Influence of Risk Management on Performance of Government Construction Projects in Kenya

David Onyango Ogogo

Ph.D. Student, Department of Project Management,
Jomo Kenyatta University of Agriculture and Technology, Kenya

Jane Queen Omwenga

Senior Lecturer, Department of Entrepreneurship Leadership and Management,
Jomo Kenyatta University of Agriculture and Technology, Kenya

Samson Nyangau Paul

Senior Lecturer, Department of Entrepreneurship Leadership and Management,
Jomo Kenyatta University of Agriculture and Technology, Kenya

Abstract:

Kenya has witnessed a surge in the number of capital-intensive projects being implemented by the Government. There is therefore a need to ensure that these government projects succeed in order to realise the country's dream of transforming Kenya into a newly industrializing middle-income nation providing a high quality of life to all its citizens by the year 2030. However, the performance of government Projects in Kenya has not been wholly successful due to the experienced delays and cost overruns amongst other uncertainties. Risk management is justified in almost all projects. If risk management is set up as a continuous disciplined process of planning, budgeting, cost control, quality and scheduling, surprises that become problems in projects will be diminished because the emphasis will be on proactive rather than reactive management of projects. The specific objective was to establish the influence of risk management on the performance of government construction projects in Kenya. The study adopted a descriptive research design and used simple random sampling to select a sample from the registered Architects/projects managers practicing in Nairobi Kenya and involved with government projects. The unit of analysis therefore was government construction projects while unit of observation was 728 Registered Architects/projects managers within Nairobi. A sample size of 251 was used. The study generated both qualitative and quantitative data. Data was collected using questionnaires and analysed using SPSS. The study results show that risk management statistically significantly influences the performance of government construction projects in Kenya.

Keywords: Project, risk, management, performance, Kenya

1. Introduction

Risk management in the construction project management context is a comprehensive and systematic way of identifying, analyzing and responding to risks to achieve the project objectives. (Nerija & Audrius 2012). The benefits of risk management process include identifying and analyzing risks, and improvement of construction project management processes and effective use of resources (Edmund, 1995).

1.1. Statement of the Problem

According to McKinsey, (2013) insufficient or underdeveloped infrastructure presents one of the biggest obstacles for economic growth and social development worldwide. A successful project can be defined as having achieved project objectives: within time, within cost, at the desired performance/technology level, while utilizing the desired resources efficiently and accepted by the customer (Kerzner, 2010). However, constraints are a part of any project. To guarantee success, constraints have to be identified and effectively addressed. It is constraints that have not been identified and planned for that crop up during the project to cause challenges and problems. (International Risk Management Institute, Inc. (IRMI), 2010). Construction risks affects government projects in Kenya like anywhere else in the world. According to the Kenya National Highway Authority (KENHA), (2011) the construction of the Thika super highway in incurred cost overruns due to among other factors, the rising exchange rate of the dollar which rose to the all-time high of KSh.107 per USD from KSh.70 per USD at the time of project commencement. The standard gauge railway project has experienced challenges of land compensation as well as financing difficulties on the remaining phases to the Kenya-Uganda border. Without the full phases, the project might not realise its full potential and yet it is one of the flagship projects anchoring Kenya's hope of regional integration. The Government of Kenya and its development partners continue to allocate huge financial resources to finance infrastructural development projects. There is therefore a need to ensure that these projects are successfully implemented by minimizing and or eliminating the impact of risks from these projects. This study

therefore seeks to understand the influence of risk management on the performance of government construction projects in Kenya.

1.2. Objective of Study

The purpose of this study was to examine the influence of risk management on the performance of government construction projects in Kenya.

1.3. Research Hypothesis

- H_0 : Risk management has no significant influence on performance of government construction projects in Kenya.

2. Theoretical Review

The study was grounded on the Complexity Theory.

2.1. Complexity Theory

Complexity is the property of a real-world system that is manifest in the inability of any one formalism being adequate to capture all its properties. This carries major implications in the ability of project managers to follow through on each project parameter. Complexity theory aims to define how order and patterns arise out of seemingly chaotic systems and how complex behavior and structures emerge from simple underlying rules. Its focus is to determine how systems consisting of many elements can lead to well organized and predictable behavior. Removing the focus from traditional project controls and looking toward managing the social network will assist project managers with project goal attainment (Burnham, 2017). There are risks associated with the complex nature of projects. Management of these risks is key to attainment of project success.

2.2. Empirical Review

Scholars have undertaken different studies on the relationship between risk management and successful completion of government construction projects. Gitau, (2015) undertook a study on the effects of risk management at project planning phase on performance of construction projects in Rwanda. His study found that construction projects in Rwanda and generally in the region and the world run a high risk of being well over budget and significantly late. The study found that the consulting engineers and architects were often selected before the design phase of a project. This meant that many projects did not benefit from professional input at planning stage.

Hassan, (2008) conducted a research to establish the effect of project risk management process on the success of construction project. The study found that the traditional success factors of cost, scope, time and quality are universally inherent in all construction projects and should always be considered as a base for all other forms of critical success factors. However, these factors alone cannot guarantee the success of a construction project without proper coordinated risk management in a project.

By identifying risks in an early stage of planning and assessing their relative importance, project managers can identify methods used to reduce risks and allocate the best people to mitigate them. Time constraints and project managers with sufficient experience are critical when identifying the level of risk for large and/or complex projects. The most considerable types of risk in construction projects are financial risks, construction risks, and demand or product risks. (Mehdi, Mastura & Ehsan, 2012).

According to Duggan (2016) effective risk management strategies allow you to identify your project's strengths, weaknesses, opportunities and threats. By planning for unexpected events, you can be ready to respond if they arise. To ensure your project's success, define how you will handle potential risks so you can identify, mitigate or avoid problems when you need to do. Successful project managers recognize that risk management is important, because achieving a project's goals depends on planning, preparation, results and evaluation that contribute to achieving strategic goals.

Roque and Marly (2013) adopted non-probability sampling and a questionnaire based on respondent perception in their study "understanding the impact of project risk management on project performance in brazil". The results demonstrate that adopting risk management practices has a significant positive impact on project success. They also show a positive impact from the presence of a risk manager on project success.

3. Methodology

The study adopted a descriptive research design and used simple random sampling to select a sample from the registered Architects/projects managers practicing in Nairobi Kenya and involved with government projects. The unit of analysis therefore was government construction projects while unit of observation was 728 Registered Architects/projects managers within Nairobi. A sample size of 251 was used. The study generated both qualitative and quantitative data. Data was collected using questionnaires and analysed using SPSS. Analysed data was presented using tables and charts.

3.1. Sampling Techniques and Sample Size

The study was limited to an industry expert survey group consisting of Architects/Construction projects managers. There are 728 registered Architects in Nairobi County where the study was focused on for the investigation. A sample size of 251 was utilized for the study by applying $n = (z^2pq)/d^2$ and an adjusting formula, $nf = n/(1+n/N)$ by Mugenda and Mugenda, (2003). The study adopted a simple random sampling technique. According to, Starnes (2008) a

simple random sample is a subset of individuals (a sample) chosen from a larger set (a population). Each individual is chosen randomly and entirely by chance, such that each individual has the same probability of being chosen at any stage during the sampling process, and each subset of k individuals has the same probability of being chosen for the sample as any other subset of k individuals. A simple random sample is an unbiased surveying technique. This technique is free of classification error, and requires minimum advance knowledge of the population other than the frame. Its simplicity also makes it relatively easy to interpret data collected in this manner.

Sample calculation formula:

$$n = (z^2pq)/d^2$$

Where:

n = the desired sample size when the target population is greater than 10,000

z = standardized normal deviations at a chosen confidence level, for this study, confidence level is 95%, and $z = 1.96$.

p = the proportion in the target population that assumes the characteristics being sought.

q = The balance from p to add up to 100%. That is $1 - p$, which in this case yield $1 - 50\%$ (0.5)

d = Appropriate significance level, for this study at 95%, the significance level is 0.05.

Using this procedure, the sample size is found to be $n = (1.96^2 \times 0.5 \times 0.5)/0.05^2 = 384$. Since the population is less than 10,000, an adjusting formula, $nf = n/(1+n/N)$ is used where: nf = the desired sample size after adjustment.

n = the desired sample size

N = an estimate of the population size

The adjusted sample size is therefore $nf = 384 / (1 + 384/728) = 250.9$, taken as 251

3.2. Measurement of the Variables

The study conducted a statistical analysis of the variables to establish the influence of risk management on performance of government construction projects in Kenya

3.3. Sample Description

The study adopted a simple random sampling technique for the unit of observation since the population drawn from the construction industry was homogenous.

4. Findings

The study results show that risk management statistically significantly influences the performance of government construction projects in Kenya. This is shown by the regression analysis value $F(1, 209) = 49.301$, $p < .01$, $R^2 = .596$. Correlation analysis revealed that there is a statistically significant positive correlation between risk management X_4 and the performance of government construction projects in Kenya ($r = 0.437$, $p < 0.01$).

According to the descriptive analysis results, in 37% of Kenyan government construction projects, risk planning is not undertaken at all and to a less extent at 44%. In these projects, 31% do not undertake risk monitoring at all and 51% only do monitoring of risks to a less extent. The study revealed that 27% of these projects do not conduct risk mitigation at all and 49% only do this to a less extent.

The study revealed twenty-seven risks affecting government construction projects in Kenya. The top four most prevalent are; inadequate funding and poor financial management at 12.2%, cost variations and unrealistic cost estimates at 11.7%, time overlap and unrealistic project schedules at 8.1% and Political interference at 6.1%. The table below summarizes the risks affecting government construction projects in Kenya.

Responses	n	%
Inadequate funding and poor financial management	24	12.2
Cost variations and unrealistic cost estimates	23	11.7
Time overlap and unrealistic project schedules	16	8.1
Political interference	12	6.1
Unstable political climate	8	4.1
Corruption	8	4.1
Court cases	8	4.1
Poor workmanship	8	4.1
Negative impact on the environment	3	1.5
Adverse weather condition	7	3.6
Substandard materials	5	2.5
Scope creep	7	3.6
Delay in issuing site instructions by project consultants	3	1.5
Inadequate site and building design knowledge	7	3.6
Vandalism/theft	5	2.5
Lack of proper stakeholder participation	7	3.6
Unskilled workforce and overreliance on manual labor	6	3.0
Resource reallocation midway through projects	5	2.5
Lack of coordination in the project team	2	1.0
Delayed government disbursement of funds	5	2.5
Flawed procurement processes	2	1.0
Inadequate project monitoring	6	3.0
Market Inflation	6	3.0
Delayed procurement of imported fittings and materials	3	1.5
Failure to select the right person as project manager	5	2.5
Failure to establish clear specifications and designs	3	1.5
Poor technology and Over optimism	3	1.5

Table 1: Common Risks That Have Significant Effects on Government Construction Projects

According to McKinsey, (2013). The structuring and delivery of modern infrastructure projects is extremely complex. The long-term character of such projects requires a strategy that appropriately reflects the uncertainty and huge variety of risks they are exposed to over their life cycles. An effective risk management process encourages the construction company to identify and quantify risks and to consider risk containment and risk reduction policies. Construction companies that manage risk effectively and efficiently enjoy financial savings, and greater productivity, improved success rates of new projects and better decision making. (Nerija and Audrius 2012).

4.1. Results of Correlation Analysis

The Pearson correlation coefficient was used to analyse the relationship between risk management and performance of government construction projects in Kenya. The results indicate that risk management has a positive significant relationship with performance of government construction projects in Kenya at a $\alpha = 0.01$. The relationship was represented by a correlation coefficient of 0.437. The number of respondents considered was 211. This concurs with the findings of Zou, Zhang and Wang, (2007) which indicated that managing risks in construction projects is a very important process in order to achieve project objectives in terms of time, cost, quality, safety and environmental sustainability.

4.2. Results of Regression Analysis

The coefficient of determination R-Square is 0.596 at 0.05 significance level. The coefficient of determination indicates that 59.6 % of the variation in the performance of government construction projects in Kenya is influenced risk management while 40.4% is influenced by other factors. The analysis of variance (ANOVA) results also confirms the appropriateness of the model fit at p-value of 0.000 which is less than 0.05 the significance level. The degree of freedom is 209. This implies that there is a significant positive relationship between risk management and performance of government construction projects in Kenya.

The fitted model is $Y = 3.960 + 0.434X_4 + \epsilon$. This implies that there is a linear relationship between risk management and performance of government construction projects in Kenya. A unit change in risk management will increase the performance of government construction projects in Kenya by the rate of 0.434. When $X_4 = 0$ then $Y = 3.960$. This agrees with the findings of Nerija and Audrius, (2012) that Construction companies that manage risk effectively and efficiently enjoy financial savings, and greater productivity, improved success rates of new projects and better decision making. According to Kerzner, (2010) if risk management is set up as a continuous, disciplined process of planning, identifying, analyzing, developing risk responses and monitoring and controlling, then the system will easily supplement other processes such as planning, budgeting, cost control, quality, and scheduling. Surprises that become problems will be diminished because the emphasis will now be on proactive rather than reactive management.

4.3. Hypothesis Testing

The hypothesis of the study stated that Risk management has no significant influence on performance of government construction projects in Kenya. The findings of the study showed a significant and positive relationship between risk management and performance of government construction projects in Kenya. The hypothesis is therefore rejected.

The conventional view of project success based on cost, time and quality is no longer sufficient. To increase the chances of a proposed project succeeding, it is necessary for the organisation to have an understanding of potential risks, to systematically and quantitatively assess these risks, anticipating possible causes and effects, and then choose appropriate methods of dealing with them. (Kishk, & Ukaga, 2008).Haitham, (2013) found that risk management has positive relationship with construction projects success.

5. Discussions

The objective of the study was to examine the influence of risk management on the performance of government construction projects in Kenya and to test the hypothesis that Risk management has no significant influence on performance of government construction projects in Kenya. The study sought to understand the contribution of aspects of risk management such as; planning, monitoring and mitigation towards success of government construction projects in Kenya. The study found that for risk management to be able to contribute to the success of construction projects, its role must be emphasized alongside other control measures put in place. Risk management should also be undertaken throughout the life cycle of the project and continuously reviewed to mitigate for emerging risks. The study also found the need for assignment of a risk manager/officer to construction projects. This is as opposed to the traditional practice where the role of risk management is not clearly designed thereby leading to lapses in risk management.

The Cronbach's alpha was 0.762, which indicates a high level of internal consistency of the study instrument and data. The statistical analysis and findings showed a linear relationship between risk management and performance of government construction projects in Kenya.

The results echo those of Hassan, (2008) who found that the instrument of risk management is employed in projects in order to secure project success, regardless of all the unknown and uncertain events that may occur during project execution. In order to determine the value of project management in general for business, it is always important to take into account each individual process element that influences the project outcome.

6. Conclusions

From the findings of the study, it can be concluded that risk management enhances the performance of government construction projects in Kenya. This is in line with Kerzner, (2010) who stated that good project management should be structured to identify hazards and to allow safeguards to be developed to overcome them. If suitable safeguards are available then the risk can be reduced to an acceptable level.

The findings of this study support the complexity theory whose focus is to determine how systems consisting of many elements can lead to well organized and predictable behavior. There are risks associated with the complex nature of projects. Management of these risks is key to attainment of project success.

7. Recommendations

The following recommendations were made drawing from the findings and conclusions of the study. The study has highlighted the positive relationship between risk management and performance of government construction projects. There is therefore a need to adopt risk management as a full-time management aspect throughout the life cycle of the construction project as opposed to the current practice where risk management is not directly identified and practiced as a standalone discipline in construction projects. In order to undertake continuous review of anticipated and emerging risks, risks reports should be adopted as part of the periodic progress reports in construction projects. Currently, the aspects of projects risks are not conspicuous in progress reports and yet most of the topics of discussions are drawn from the contents of progress reports. There is therefore a need to have risk reporting as part of the standard progress reports.

8. Areas of Further Research

It is therefore recommended from this research that further studies can be conducted to establish the relevant tools and modules of efficient risk management on Kenyan government construction projects.

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