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CONSTRUCTION RISKS AND PERFORMANCE OF KENYA URBAN ROADS AUTHORITY PROJECTS IN CENTRAL REGION OF KENYA

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Abstract: **The construction industry in Kenya and the world at large is subject to more risks and uncertainty than many other industries. The process of delivering a project from inception, completion and finally into use is complex. The complexity of the work involved in construction activities, therefore, makes construction projects more predisposed to risk events. In times of increasing global competition, the success of projects becomes more decisive to an organization's business performance. However, many projects still present delays, changes in their scope, failures and premature termination. The skills that enable firms to cope with uncertainty and gain performance through risk management are imperative. The study aimed at examining the influence of construction projects on performance of Kenya Urban Roads Authority projects in central region of Kenya i.e., Muranga, Kiambu, Kirinyaga, Nyeri, and Nyandarua counties. The study identified technical risks, client related risks, financial risks, and socio-political risks as the construction risks. Descriptive survey design was adopted where 217 respondents (engineers and contractors) working with Kenya Urban Roads Authority projects in central region of Kenya were targeted. A sample of 140 respondents was drawn and administered with questionnaires. both descriptive and inferential analysis was done. The response rate was 80%. The study inferential statistics established that constructions risk significantly influence performance of Kenya Urban Roads Authority projects in central region of Kenya. Specifically, technical risks had the highest influence on performance, followed by Client related risks, then financial risks. Socio-political risks had the least influence on performance of Kenya Urban Roads Authority projects in central region of Kenya. All the variables explained 76.5% of performance of Kenya Urban Roads Authority projects in central region of Kenya. The study recommends implementation of project risk management practices to turn the risks in to opportunities. The study also recommends a similar study to identify the other construction risks that explain the variation of 23.5% of performance in Kenya Urban Roads Authority projects in central region of Kenya.**

Keywords: **Kenya Urban Roads Authority, Construction Risk.**

I. INTRODUCTION

Investment in economic infrastructure is critical for the growth and development of any country. For a long time infrastructure projects have been under severe criticism for poor performance and inability to meet the objectives of the project, time delays, and cost related issues. Challenges related to quality, delays, and budget overrun are risky. Most critical is frustration to country's development. Complications normally arise which lead to cost and time overrun, cost escalations, contractual lawsuits which are detrimental to the progress of the society and the economy at large (Kerzner, 2017) [1]. The construction industry is faced with stiff competition, where contractors in addition are affected by change in technology, high risks, globalization and demanding customers. They are also faced with the fast change in trends, changes in laws and

regulations, and the difficult economies. In the constructon industry the performance of infrastructural projects are determined by the performance of construction companies and their ability to survive in the competitive market. Project Risks have been identified as the major cause of poor performance on construction projects. Such risks are numerous and vary at different stages of project life cycle depending on their complexity and dynamic nature. The construction industry is faced by a lot of risk including financial and environmental risks. Construction risks can be classified according to risks types, the origin of the risks, or depending on the phase of the project. Some researchers propose classification of risks based on the location, origin and the impact on the project [1] (Kerzner, 2017).

In these recent years, complexity and risk of construction projects has increased due to the activities involved. The challenges that these construction projects face is what we refer to as the risk. It is essential in managing those risks for decision making in the construction projects. In construction projects, risks are categorized based on their effects on the project main goals in terms of cost, time, and quality. In developing countries construction projects suffer from quality challenges, not meeting deadlines, and cost overruns (Bahamid, Doh, & Al-Sharaf, 2019)[2].

Kendrick (2016) [3] explains that the building of the Panama Canal wasn't a feasible project though it was completed. Thee Canal project undertaken by the French was meant to be across Panama. The canal project was faced with massive challenge of technology at the begnning. Further, the lack of project management propmpt the decion to continue with the project and thus, it was faced with numerous challenges and that led to its failure. There was unclear definiton of project, no thorough planning, informal management of changes, inacurate reporting, and the primary risk management strategy was 'hoping for the best'. The project had cost overrun of hundreds of milion US $ from initialy estimate of US$ 48 m.

Risk management of the project was inadequate from initiation and had little improvement during execution. Other risks such eather e.g. the torrential rains created floods which impeded the digging process and also made it a dangeorus a fair. Adequate funding was also a major problem as the money allocted for cnstruction most of it went to publicit. Tropical diseases like malaria and yellow fever were lethal to the workers and died in hundreds. The budget was revised a number of times from US $ 100m to US $ 300m. the project leadership was also in question as he wasn't technical and was misguided. He did poor analysis and used a lot of deception to report progress that wasn't real. Better project and risk management practices would be of much assistance to the project. Setting of initial objective, honest and frequent communication would have saved lives as well as a lot of money (Kendrick, 2016)[3].

KURA is State Corporation that was established in the Kenya Roads Act, 2007 and is mandated to manage rehabilitate and maintain, as well as development of all National Urban Trunk Roads. KURA has successfully delivered efficient and safe infrastructure since its inception which include a total of 172 km of new roads, constructed 228.8 km of walkways, 36 bridges and interchanges, rehabilitation of about 167.7 km of roads, 431.8km roads under periodic maintenance and 9,797km of roads under routine maintenance. The country's road asset has grown from Kshs 200 Billion in the year 2009 to Kshs 1 Trillion up to date. This has ensured ease and efficiency of movement of goods and services as well made possible to access various amenities and raw materials. The urban road network has also helped increase the investment in the construction infrastructure in the country. Due to the demand in efficient urban road network the authority has adopted strategies and initiatives for increasing connectivity as well improved access in order to attract investment geared towards the Big Four Agenda. This includes the construction of urban missing links, roads rehabilitations, construction of bypasses, road upgrading commercial and financial hubs. Currently the authority is implementing the intelligent Transport System (ITS) in the county of Nairobi as a way of embracing technology and innovation. The authority also initiated the developed of design and concept of the Bus Rapid Transit (BRT) in Kenya through feasibility studies and engineering designs. The development of urban roads in Kenya was boosted following a Public-Private-Partnership financing model famously known as Annuity program in March 2022 to help the government diversify financing of infrastructure developments. A lot covering 80km of urban network covering Murang'a, Laikipia, Embu, Nyeri, Tharaka Nithi, and Kirinyaga that is estimated to cost Kshs 4.5 b. another lot of 35 km urban road network that covers Kakamega, Vihiga, Busia, and Bungoma counties estimated to cost Kshs 3.5b and will have 24 months construction period and 8-year performance maintenance period where the contractor will receive a prescribed payment. The 2nd Nyali bridge will also be executed through PPP model (Kenya Urban Roads Authority, 2022)[4].

A. Statement of the Problem

The success of an infrastructural project is critically affected by the capacity of the implementing firms, the nature of the contract and stability of the economic environment. The Project Financing International (PFI) magazine (2019) [5] notes a 44% decrease in financing of infrastructural projects between the year 2008 and year 2009 with a financing of $250 billion

and $139.2 billion respectively, which reflects that funding is becoming less though the investment needs in infrastructure projects have become more. This is especially so in the developing countries where infrastructural projects require an estimate of $21.7 trillion (Project Finance International, 2019) [5]. According to KURA (2022) [4], there are many uncompleted projects as a result of issues related to customer conflicts, poor resource mobilization and unavailability of materials, incompetency of contracting companies, and even poor framework. Contractors and clients suffer losses resulting from cost overrruns and this have affecte the construction projects in general. Projects generally are faced with different kinds of risks including financial, liability, quality, safety and natural catastrophes. The government of Kenya in an effort to fund on-going infrastructure projects has stepped up its borrowing, raising debt from both domestic and international markets, including a US$2 billion Eurobond. Most of these funding was directed to infrastructure projects within the energy, infrastructure and ICT sectors which have been allocated about 30% of the 2016/17 budget (Deloitte, 2019).[6] According to KURA website (2022) [4] on-going project database has a total of 59 projects in various counties in Kenya. The progress for the projects shows 0% for some projects in Machakos, Murang'a, Nakuru; while other are below 10% (West Pokot, Nairobi, Embu, Kisii, Homabay). In central region it's only the construction of Nyahururu and Thika Bypass that are at 94% and 82,8% respectively. Other projects Nyeri (23%), Kirinyaga (42.7%), Murang'a (49%), and Kiambu (12.9%, 30%) are below 50%. With the change of political regime, most of these projects will be affected in one way or the other through financial risks and political risks. Further, majority of the contractors in the KURA database are foreign contractor especially Chinese. Several studies have been conducted on global, regional and local perspective on construction risks or project performance. Nguru and Yusuf (2018) [7]on project risk management practices on performance of civil engineers in Nairobi County; Macharia (2017) [8] on risk management strategies and performance of public-school construction projects in Muranga County

B. Objectives of the Study

The main objective of the study was to determine the influence of construction risks on performance of KURA projects performance in central region of Kenya.

Specific Objectives

The study was guided by the following objectives;

i). To establish the influence of Technical risks on performance of KURA projects in central region of Kenya.

ii). To explore the influence of Financial risks on performance of KURA projects in central region of Kenya.

II. THEORETICAL REVIEW

The study was founded on a number of theories which include, the prospect theory and stakeholders theory.

A. Stakeholder's Theory

The concept of stakeholder theory was formulated by Freeman (1984), it seeks to explain how organizations, institutes or projects should be conceptualized (Freeman, 1984) [9]. Friedman (2006)[10] stated that organizations, institutes or projects should be as groupings of stakeholders with diverse range interests, in a position to manage the interests, opinions and needs of the stakeholders. The scholar also argued that the management of stakeholders should be fulfilled by the project managers. First, from a stakeholder perspective, business can be understood as a set of relationships among groups that have a stake in the activities that make up the business (Freeman, Harrison, & Wick, 2007) [11]. Stakeholder theory emphasizes that values are necessary for doing any business. Managers must understand the shared sense of the value they create, and what attracts core stakeholders together. Thus, managers ought to be clear on how they want to do business more specifically the kind of relationship with their stakeholders needed to ensure achievement of the objectives (Freeman, 1984) [4].

B. Prospect Theory

The prospect theory was formulated in late 1970's and further developed in 1992 by Amos Tversky and Daniel Kahneman. The theory explains how individuals tend to be risk averse when things are going as expected or planned, and when in distress they tend to be risk seeking and are more likely to make risky decisions in the middle of a crisis. This is in other words is about judgement and decision making. The prospect theory is designed to explain the common pattern of choices that it is descriptive and empirical in nature. Prospect Theory is a psychological account that describes how people make decisions under conditions of uncertainty (Tversky & Kahneman, 1979) [12]. The simplest way to choose between risky

options is to choose the option with the highest expected value. These may involve decisions about nearly anything where the outcome of the decision is some how risky or uncertain. Prospect Theory predicts that people go through two distinct stages when deciding between risky options like these. In the first phase, decision makers are predicted to edit a complicated decision into a simpler decision, usually specified in terms of gains versus losses. In the second phase, decision makers choose between the edited options available to them. This choice is based on two dimensions, the apparent value of each attribute or option, and the weight (similar, although not identical to, the objective likelihood) assigned to those values or options. These two features—overall value its weight—are then combined by the decision maker, and the option with the highest combined value is chosen by the decision maker (Tversky, 1967)[13].

III. CONCEPTUAL FRAMEWORK

The conceptual framework model propose that client related and, financial all influence the performance of construction projects as shown in Figure 1 below.

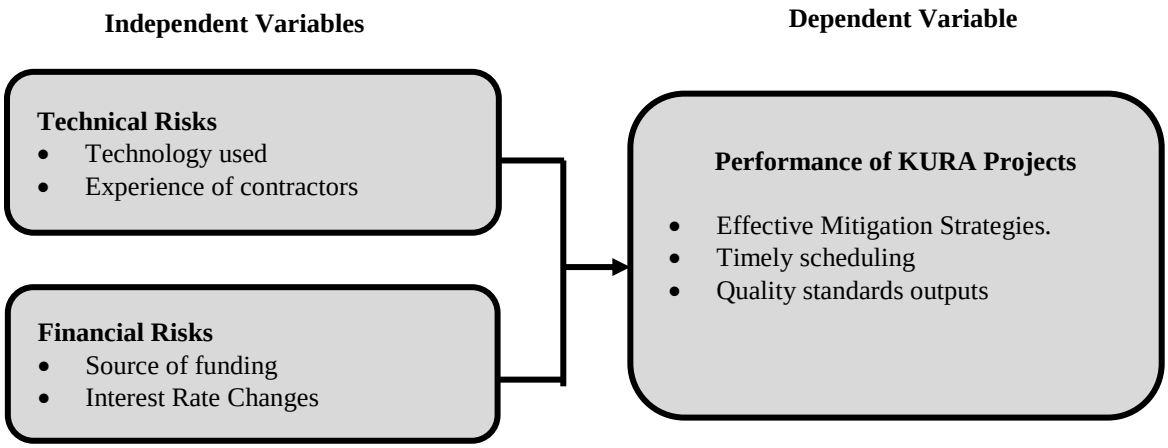

Figure 1: The Conceptual Framework

1) Technical Risks

These are the risks associated with the inadequate specification, incomplete design, inadequate site investigation, change in scope, construction procedures and insufficient resource availability etc (Lester, 2017)[14]. Technical risks are mainly oriented due to pure technical issues. For example engineering designed quality of the project can be one risk, new technology in the hands of untrained operator can be other risk, soil type and strata of the layer will be other type of risk. For example, during the site inspection time we estimated soft soil but there was hard rock in the foundation. This type of risk is technical risk (Bahamid, Doh, & Al-Sharaf, 2019)[2]. The risks related to technological problems are familiar to the design/construct professions which have some degree of control over this category. However, because of rapid advances in new technologies which present new problems to designers, engineers and constractors, technological risk has become greater in many instances. Certain design assumptions which have served the professions well in the past may become obsolete in dealing with new types of facilities which may have greater complexity or scale or both (Akoa, 2011)[15].

2) Financial Risks

These are the risks associated with payment delays, increase in material cost, unpredicted taxes estimations, low market demand, and flactuation of exchange rates (Mhetre, Konnur, & Landage, 2016)[16]. In construction projects, financial risks may relate to fiancial failure of the sponsor or even the sub contractor, availability of funds to the contractor or for the project when the finances are needed for progress or complietion of projects, taxation, inflation, and inadequate cash flow. In relation to the contractor, financial failure could be; inability to service a bank finance for the project as a result of high lending rates of the banks, inadequate capital for the project, low profit margins as a result of competitive computation, tendering criteria and contract awarding metholodology (Koirala, 2017)[17]. The increase of share investment funding by development and commercial banks among other capital market players in infrastructural projects has been a determiner of the complexity of the infrsastrural projects financing options and the diversification of the techniques for risk management.

The PFI have reported that, the value for investment in large complex infrastructural projects that were financed in 2009 to be $139.2 billion which is decrease of over 40% of the financing in 2008 (Anh & Hong., 2018)[18].

IV. RESEARCH METHODOLOGY

The study adopted a descriptive research design. Descriptive research design is used to describe an event or phenomena as it exists at present and is appropriate when the study is concerned in specific predictions, narrative of facts and characteristics concerning individuals or situations. Descriptive survey design will be suitable because it allows for both qualitative and quantitative surveys (Cherry, 2015)[19]. The target population for this study was registered consulting engineers who were mainly civil engineers because of their wide involvement in most of the aspects of construction such as the project design, quality control, and general project management roles and are well versed with the project risks. In this study, 165 project contractors and 52 engineers related to central region were targeted as reported in the KURA annual report of 2021. In this study, the sample size was obtained using Yamane (1967) [20] formula where 140 respondents comprising of engineers and project contractors that are involved in KURA projects in central region of Kenya. This study used both primary and secondary data. Semi structured questionnaires will be used to collect Primary data. The questionnaires have closed and open-ended questions that are designed to capture responses relevant to the objectives of the study.

V. RESEARCH FINDINGS AND DISCUSSION

A. Response Rate

A total of 140 questionnaires were administered to respondents, and 112 were returned representing a return rate of 80%. Out of the 112 respondents, 80 were contractors and consultants while 32 were project engineers. According to Kothari (2018) a response rate of 50% and above is significant to give reliable results. Figure 4.1 below shows the response rate.

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TABLE I: FONT AND PARAGRAPH SPECIFICATIONS

Fonts: Times New Roman	Font Size	Text	Align
Title of Paper	24	Bold	Centre
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Abstract And Keywords	10	Bold	Justify
Headings	11	Bold	Centre
Sub Headings	10	Bold or/and Italic	Left/Centre
Body Text, Equations	10	Normal	Justify
References	9	Normal	Justify
Acknowledgement	9	Normal	Justify

TABLE II: PAPER LAYOUT

Header	1.2 cm
Footer	1.2 cm
Line Spacing for Body Text	Single
Top Margins of Paper	2 cm
Bottom Margins of Paper	1.6 cm
Left Margins of Paper	2.1 cm
Right Margins of Paper	1.6 cm

B. Figures, Graphs and Tables

Figures, graphs and tables should be inside the margins of page. Figure caption is placed below the figures and written as Fig. 1. Similarly, Table caption is placed above the Tables and written as TABLE I. Do not use to put figure inside the border. Figures, Graph and Tables captions are flush centre and labels should be legible, 8 to 9 point. Fig. 1, is used for referring figure in the text body. Similarly, Tables and Graphs are used for referring table and graph in the text body. First figure starts from Fig. 1 and last figure ends with Fig. N (N is last figure of research paper).

C. Conclusion Acknowledgement and Appendix

Conclusion section is mandatory and contains advantages, disadvantages, review the main part of research paper and use of research work. If author want to acknowledge someone, then acknowledgement section should include in research paper after conclusion. Appendix section (if required) appears before acknowledgement section.

VI. CONCLUSION

This paper shows the basic format of research paper preparation and can be used as template writing research paper. Conclusion of research paper is between 150 to 350 words.

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