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EFFECT OF RISK MANAGEMENT PRACTICES ON THE PERFORMANCE OF INFRASTRUCTURE PROJECTS IN KIAMBU COUNTY, KENYA

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Abstract: **The general objective in this study was to examine the effectof risk management practices on the performance of infrastructure projects within Kiambu County. The main objectives included; determining the effect of risk identification oninfrastructure projects performance; to examine the effect of risk mitigationon the performance of infrastructure projects; to determine effect of the risk monitoring on the performance of infrastructure projects and finally, finding out the effect of risk assessmenton the performance of infrastructure projects. The study used descriptive design because it enhanced systematic description that is as accurate, valid and reliable as possible regarding the responses. The target population therefore comprised of 484 respondents who weredrawn from the infrastructure companies from Kiambu County. This study utilized a sample size of 145. The response rate was drawn from 121 questionnaires that were fully filled and returned. The researcher used questionnaires as the research instrument to gather the relevant data.The quantitative data was analyzed using descriptive statistics as well as multiple regression analysis. The analysis was conducted scientifically through SPSS (Statistical Package for the Social Sciences). The findings of the study concluded that risk identification has the highest positive influence on the performance of infrastructure projects in Kiambu County, followed closely by risk mitigation. The study also concluded risk monitoring and risk assessmenthad significant and a positive effect on infrastructure projects in Kiambu County. The study recommends that the management of infrastructure companies of Kiambu County should put in place cost-effective measures for timely risk identification to ensure that their performance of infrastructure projects are not impacted negatively.Among the recommendations to be considered, include proper risk mitigation planning, and putting in place risk control and monitoring management strategies. Moreover, the companies should consider having a risk analysis and evaluation management strategy to enhance performance of infrastructure projects.**

Keywords: **risk identification, risk mitigationon, risk monitoring and risk assessment.**

1. INTRODUCTION

Risk management practice (RMP) is a concept that is popular in all industries and hence not unique to the sector of construction. To achieve certain objectives each of the industries has created their own RMP standards but the similar thing is the idea of risk reduction. Project Management Institute (PMI) (2004) noted that risk management of any project remains a significant aspect during the commissioning and execution of a project. Nevertheless, Bakker & Wortmann (2012) noted that RMP is the most challenging aspect in the management of construction.

Many industries have grown to be greater proactive and aware of the use of analyses in initiatives. Likewise, RMP has emerged as a timely trouble extensively discussed across industries. But, with regard to the construction industry, risk management isn't usually used. Extra production businesses are beginning to turn out to be privy to the RMP, but they still no longer use the models and techniques aimed for dealing with risks. This contradicts the fact that the industry is attempting to be extra value and time efficient in addition to having extra managed tasks. Hazard is related to any task regardless of the industry. Consequently, RMP must be of interest to any assignment manager (Kutsch & corridor, 2010).

Risks range among initiatives due to the truth that each mission is precise, especially within the construction enterprise. However, there are nevertheless many practitioners that have not realized the significance of danger control within the system of delivering the task. Despite the fact that there is an awareness of risks and their effects, some groups do now not technique them with hooked up RMP methods (Bakker et al, 2010).

Statement of the problem

When the complexity and size of the infrastructure increases, coordination becomes complex meaning that the capability of managing risks via the construction process becomes significant in prevention of consequences that might be unwanted (Maytorena et al. 2017). SOU (2010), notes that there is need to allocate different risks depending on the qualifications of the project actor. Nonetheless, there has been evidence to reveal tendencies by some actors not reacting to the risk but leaving them for others within the value chain which is dangerous. When this happens, it means critical deviations in terms of the quality, cost, and time.

Kiambu County has seen a significant rise in infrastructure developments in the recent past, especially in the fieldsof transport, energy and power projects. However, many projects have failed to achieve success due to increased risk and uncertainty. Since the advent of devolution, Kiambu County initiated many development projects. Some of them are still ongoing; others failed to achieve the intended objective. This is despite there being talk of project risk management integrated into the projects. For instance there are more than 2000 infrastructure projects drawn in the County that have been undertaken since 2013 (CSK, 2018) and 68% of those infrastructure projects have experienced project failure despite adoption of project risk management strategies (KPMG, 2018). According to World Bank (2018), 60% of the county respondents complained that the infrastructure products from the county did not satisfy their requirements while 35% depicting the final infrastructu reservice failed to achieve the objective intended. ADB (2017) also indicated that almost 52% of these development projects registered loss forcing the County firms to decline in performance.

Despite previous studies focusing on roads, offices construction, gated communities, bridge works, and hospitality institutions among others, none has focused on the influence of risk management practices in the context of the performance of infrastructure projects in Kiambu County. This has created a shortage in empirical evidence and studies on the local scene. This study sought to fill this gap by investigating the influence of risk management practices on the performance of infrastructure projects in Kiambu County.

Objectives

i. To determine how risk identificationinfluences performance of infrastructure projects in Kiambu County

ii. To establish the influence of risk mitigationon the performance ofinfrastructure projects in Kiambu County

iii. To assess how risk monitoring influences the performance of infrastructure projects in Kiambu County

iv. To find out the influence of risk assessment on the performance of infrastructure projects in Kiambu County

2. THEORETICAL REVIEW

Prospect theory

The prospect theory depicts that area normally influences chances of propensity. On the other hand, losses possess additional emotional effects as compared to equivalent sums of profits; therefore, they highly influence our sense of selection (Tversky & Kahneman, 1975). Making decisions means that a choice maker has to multiply the value of each final result depending on the weight of a decision. Significantly, the selection weights serve a small role as determinants of ascertained outcomes but can constitute to evaluations that are empirically derived from the manner in which humans reach their feelings of likelihood. One important attribute of weighting is the fact that low possibilities get overweighed while medium and high possibilities are instinctively underweighted (Tversky & Kahneman, 1979).

Stakeholder Theory

Freeman (1984) developed the stakeholder theory as a tool for business management; however, the theory has further evolved into the grounded theory which elaborately explains risk management. The theory focuses on corporate policy determinants and how they influence the equilibrium of stakeholder interests. The implicit contract theory acts as an extension of employment to alternative contracts that include financing and sales (Cornell and Shapiro, 1987); in other

words, it acts as an avenue to strategic risk management. Klimczak (2005)points out that strategies for corporate risk management influence reductions in future costs as well as the company's value risks. In other words, the stakeholder theory offers advanced insight into the relevance of improved risk management. Smith & Stulz (1985) investigated the financial distress hypothesis and provided indirect evidence only. This theory is significant in understanding risk management because it offers an overview on the relevance of customer trust as well as financial strain costs to projects. Moreover, the stakeholder theory provides insight to the study because of its emphasis on the relevance of risk management in projects as well as its significance in enhancing a project's value. Nonetheless, the theory fails to show how risk management influence performance and the emerging association between both variables; it only suggests that risk management results in growth in the value of a project.

Network theory

A network is referred to as an abstract shape which projects the simplest fundamentals of all connection styles. Given the fact that there is a generalized sample, the tools that have evolved for reading, knowledge and modeling networks may be executes theoretically across all disciplines. On the other hand, the community theory has an originality that demonstrates its indicators to the field of challenge hazard control (Olsson, 2008). The tools which are currently being used for regular danger assessment are enough but the limitations of the computational energy and version complexity can influence danger assessors to limit additional causal connections as well as account for the Black Swan event influencers. Through applying the network principle techniques to risk assessments, the computational obstacles can be eliminated and the final outcome reflected on a wider range of events that have narrower uncertainty varieties. Selection-making techniques lack importance in routine threat examinations; however, they assume a critical role in these kinds of techniques. Consequently, it is essential for the risk assessors to limit affirmation bias through exhausting their analysis and revealing outcomes with little involvement of external components that include advocates, media, and politics.

Conceptual Framework

A conceptual framework may be defined as an end result of bringing together a number of related concepts to explain or predict a given event, or give a broader understanding of the phenomenon of interest – or simply, of a research problem. Thus, a conceptual framework is derived from concepts (Imenda, 2014)

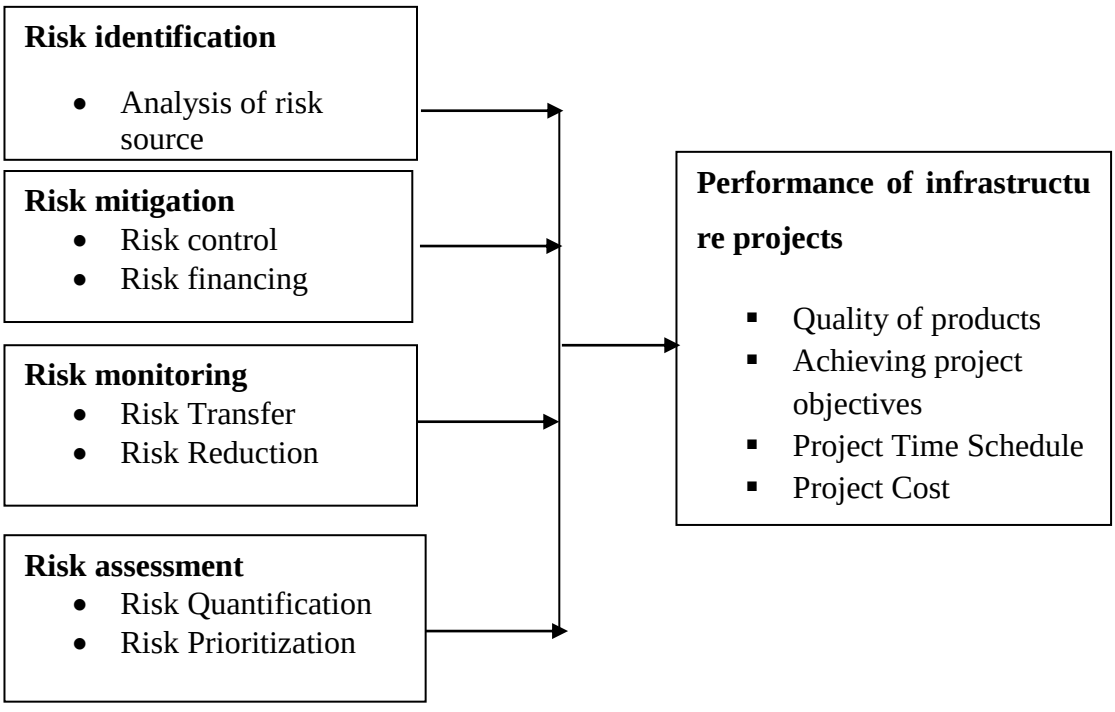

Figure 2.1: Conceptual framework

Critique of existing literature

It is apparent from the literature review that there is no common view of risks among the different players in the infrastructure projects. The estimation of orderly hazard administration of undertaking movement is not completely perceived by the foundation business (Walewski, Gibson, and Vine, 2002). Since no regular perspective of hazard exists, proprietors, financial specialists, originators, and constructors have contrasting goals and unfavorable connections between the gatherings are normal. The writing survey demonstrates that most scientists have concentrated on various strategies for hazard administration and the job of hazard management in foundation ventures.While most literature acknowledge that risk management is a process, the issue of how this process should be adapted to the construction process is not very clear. Most literature approaches the infrastructure process as an organized and standardized production process like manufacturing.

However the infrastructure process often has special features for every project that burden the process and makes changes leading to process improvement difficult. In many of the infrastructure projects, the duration for production processes is long which means it increases the chances of uncertainty and risky events both on schedule and costs involved. When process time is long, often many several years, risk management becomes theoretical and the only other way is to add an arbitrary contingency sum. While a lot of literature is accessible on risk calculation, there is lesspositive reception of the fact that extended process durations brings about risks that cannot be accurately analyzed and quantified.

While the infrastructure industry continues to mechanize, the fact that a lot of work is still manual makes change and process improvement slow compared to other industries. Most literature on infrastructure risk management does not address the need for other employee performance theories such as motivation theories as part of risk management. General production processes anticipate general or often unknown clients. Products are generally developed then marketed. However the infrastructure process is unique in that the client is known and plays a pivotal role in project success is often inexperienced. The investor or client stipulates the location, quality, size and purpose of a project and is therefore the first source of risk. Most literature ignore this source of risk and the fact that often these risks have to be accepted and may cause project failure.

Research Gap

A large portion of the studies assessed distinguish and organize risks through observational investigations with a specific end goal to propose relieving measures. In spite of the fact that they are critical to clients for future activities, the examinations neglect to offer any structure for peril administration from framework endeavor point of view. While there are a couple of research that have got structure of risk administration framework industry advancement, the majority of them are exhibited from customers' points of view and almost no endeavor has been made to coordinate this with the infrastructure industry improvement cycle. Reviewed literature on results of risk control methods on errand execution demonstrates that ground-breaking danger control systems affect decidedly on mission by and large execution. The review shows that risk undertakings are part and package of project improvement. In any case, the extent of hazard fluctuates with multifaceted nature, length both as far as motivation and spending plan, and territory. Extension creep, absence of know-how of inconveniences, equivocal necessities, and nonattendance of assets, equipment, systems administration, and insurance issues are some of the basic danger components in framework improvement assignments. In this way, there's a need to embrace actualize risk control strategies in framework industry change challenge.

Summary of Literature Review

In summary, the purpose of this chapter was reviewing relevant literature on the topic under investigation. The researcher has explored theories that explain the nature of risk management in addition to explaining the study's conceptual framework.

3. RESEARCH METHODOLOGY

This study adopted a descriptive research design.The study will be undertaken at Kiambu County. The target population therefore comprised of 484 respondents who were drawn from the infrastructure companies from Kiambu County.These respondents included project managers, contractors, engineers and sub-contractors.The sampling frame was drawn from the infrastructure companies of Kiambu County.The respondents wereidentified from the management and operative staff of infrastructure companies of Kiambu County.These respondents included project managers, contractors, engineers and

sub-contractors.The study targeted a sample of 145 respondents who were drawn from the infrastructure companies of Kiambu County. The use of 145 respondents in the study was be justified as it was in line with the recommendations of Mugenda and Mugenda (2009), who indicated that a descriptive study should include at least 30% of the total population. Since the sample size of 145 represented 30% of the population it was deemed appropriate.The sample obtained from the population was representative of the same population..The researcher used questionnaires and secondary data as the research instrument to gather the relevant information needed related to the study. For this research both primary and secondary data collecting methods was used. Primary data was collected through the administration of questionnaires to senior management bank employees. The study carried out a pilot test to test the validity and reliability of the questionnaires in gathering the data required for purposes of the study.The information gathered from the respondents was of a qualitative and quantitative nature. The data was summarized and then analyzed by the use of descriptive statistics comprising of tables, graphs and percentages. The MS Excel, statistical software was used to analyze the collected information. This is because the MS Excel provides simplified analysis that is easy to interpret and present.

Model

$Y=\beta_0+\beta_{1X1}+\beta_{2X2}+\beta_{3X3}+\beta_{4X4}+\varepsilon$

Where,

Y= Performance of infrastructure projects

X*1*: Risk identification

X*2*: Risk mitigation

X*3*: Risk monitoring

X*4*: Risk assessment

4. RESULTS

The coefficients in table 4.1 shows that risk identification,, risk mitigation, risk monitoring and risk assessment had a positive and significant had positive influence on the performance of infrastructure projects since they had significant value p value<0.05. The analysed data tried to analyse the following research objectives:

Firstly, the study was to determine how risk identification influences performance of infrastructure projects in Kitui County. From the table coefficients, it can be clearly noted that there was significant and positive relationship between risk identification and the performance of project (β = 0.196, t= 3.152, P value =0.002). the results it further shows that a unit change in risk identification causes project success to increase by 0.196 units

Secondly, the research sought to establish the influence of risk mitigation on the performance of infrastructure projects. The analyzed data showed that there was a positive relationship between risk mitigation and the project performance (β = 0.167, t= 2.837, P value =0.005). the results further reveals that a unit increase in risk mitigation can cause 0.167 increase in perfomance of projects.

Thirdly the research was trying to assess how risk monitoring influences the performance of infrastructure projects. Results in table 4.14, shows that project performance and risk monitoring had positive relationship (β = 0.135, t= 3.518, P value =0.001). this implies a unit change in risk monitoring has potential to cause 0.135 increase in project perfomance.

Lastly the study sought to find out the influence of risk assessment on the performance of infrastructure projects. From the analyzed data, it's evident that there is positive and significant association between risk assessment and infrastructure project performance (β = 0.129, t= 2.770, P value =0.007). this implies that a unit change in risk assessement causes project perfomamce to increase by 0.129 units

Table 4.1: Coefficients

Model	Unstandardized Coefficients		Standardized Coefficients	t	Sig.
	B	Std. Error	Beta		
(Constant)	.071	.115		.612	.541
Risk Identification	.196	.062	.277	3.152	.002

Risk Mitigation	.167	.059	.244	2.837	.005
Risk Monitoring	.135	.038	.236	3.518	.001
Risk Assessment	.129	.047	.215	2.770	.007

Using the results from the multiple regressions above, the equation;

$Y=\beta_{03}+\beta_{1X1}+\beta_{2X2}+\beta_{3X3}+\beta_{4X4}+\varepsilon$ become:

$Y= 0.071+ 0.196X_1+ 0.167X_2 + 0.135X_3 + 0.129X_4$ Where:

Y= Performance of infrastructure projects

X*1*: Risk identification

X*2*: Risk mitigation

X*3*: Risk monitoring

X*4*: Risk assessment

Based on this equation, when the independent factors are held constant, then performance of infrastructure projects becomes 0.71. When all the other independent variables are held at zero, a unit increased in risk identification, risk mitigation, risk monitoring, and risk assessment will lead to 0.196, 0.167, 0.135 and 0.129 increments in performance of infrastructure projects respectively.

5. CONCLUSION

Risk identification

This study came into a conclusion that risk identification had influenced the infrastructure projects carried out in Kiambu County in a positive way. Organizations begin with the unknown which means that risk identification has to be one of the most significant starting points, when using a risk management program. However, the risks have to be mitigated after they are identified to ensure that the effect on the organization is minimized. This variable was determined to have the greatest impact on the performance of infrastructure projects.

Risk mitigation

The research showed that risk mitigation had positively impacted infrastructure projects carried out in Kiambu County. Furthermore, this means that risks can be controlled using risk management methods which mitigate the loss exposures by risk financing and control thereby improving the results production of infrastructure projects. Organizations should embrace the risk mitigation process in order to reduce the company's exposure to uncertainties.

Risk monitoring

The study came into a conclusion that risk monitoring had important effects on the infrastructure projects of Kiambu County. Therefore, when the organization undertakes appropriate risk monitoring, the expected product pricing with the estimated risk put in place is achieved thereby influencing a positive performance of the infrastructure projects. Risk monitoring is also used to ensure that the risk management practices are effective. Moreover, monitoring of risk ensures that the firm takes note of any mistakes in the early stages. Productive risk management needs a review structure which, ensures that risks are identified and monitored while putting the appropriate responses, and controls where they are supposed to be.

Risk assessment

Finally, the research concluded that risk assessment had positive and significant impact on the infrastructure projects established in Kiambu County. This means that risk assessment allows the organizational management to separate risks which threaten the project's existence from those which can cause a few damages. Moreover, this means that risk assessment has to be done using Risk Quantification procedures, which involve calibration. Moreover, assessment can involve the development of probability distributions of results for all risks and risk prioritizations. Moreover, these developments can only be known through the determination of all risks contributions' using the appropriate prioritization thereby improving the performance of infrastructure projects in the process.

6. RECOMMENDATIONS

Risk identification

From the study, risk identification was found to have the highest impact on the performance of infrastructure projects.The study therefore, recommends that the management of infrastructure companies of Kiambu County should put in place cost-effective measures for timely risk identification so as to ensure that their performance of infrastructure projects are not impacted negatively. The study recommended that these companies should make risk identification a priority before getting into other aspects of risk management. Risk strategy development should be part of the business unit planning process.

Risk mitigation

The study recommends that infrastructure companies of Kiambu County should put proper risk mitigation planning in place. Some of the activities that the planning should be involved in include identification, evaluation, and selection of appropriate levels of risk. Risk mitigation was found to have the second highest impact on project performance.

Risk monitoring

The study also recommended that infrastructure companies of Kiambu County should put in place risk control and monitoring management strategies. They should embrace use of risk monitoring practices. This means adoption of the best innovations and technologies to keep track of the records.

Risk assessment

It was recommended that infrastructure companies of Kiambu County should put in place a risk analysis and evaluation management strategy to enhance performance of infrastructure projects. Companies should appoint individuals who are responsible for continuous assessment of the underlying risks for maximum mitigation.

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