# EFFECT OF RISK IDENTIFICATION ON PERFORMANCE OF ROAD CONSTRUCTION PROJECTS IN GARISSA COUNTY, KENYA

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*Abstract:* **Road construction projects are key pillars to achieve Vision 2030 and form essential components of the economic growth of the country. The study focused on the effects of risk mitigation practices on performance of road construction projects in Garissa County, Kenya. Though there exist studies that have found risk mitigation ideal and brings efficiency, this study looks deeper into the effect of such on roadway building and construction jobs which is the niche regarding previous studies. The gap between performance of road construction projects with a success rate of 20.8 % and a failure of 70.2% further brought out the gap to be filled. Therefore, this study sought to investigate the effect of risk identification on performance of road construction projects in Garissa County, Kenya. The study intended to use descriptive research design and targeted 8 road construction projects within Garissa County comprising of 14 road engineers, 4 road supervisors, 8 road inspectors, 12 road surveyors and 146 contractors. The study sample size was 145 respondents as achieved by Slovin sample size determination formular. The study adopted a stratified random sampling technique to determine a sample size distribution for the respondents. The researcher administered questionnaire as the data collection tool for primary data collection. The data collection instrument was pilot tested to confirm whether it was valid and reliable for data collection before carrying out the actual study. The study collected both qualitative and quantitative data. The descriptive and inferential analysis was used to analyze the quantitative data. The study findings indicated that there existed strong positive relationship between the indepedent variables and depedent variable (performance of road projects in Garissa County, Kenya) as shown by R value (0.895). It was concluded that there is a significant relationship between risk mitigation practices (risk identification, evaluation, handling and control) and performance of road construction projects in Garrisa Count, Kenya. The study recommends that management in road projects should increase level of project risk identification as it enhances the risk mitigation activities on each significant risk. Project risk management should become part of the culture in project management activity and routine component in any project plan and review activity in the road projects.**

*Keywords:* **Risk Identification, Project Performance.**

## 1. INTRODUCTION

A project risk is an uncertainty likely to have a devastating effect on the project (Smith, Merna & Jobling, 2014; Gitau, 2015). The Project Management Institute define a project risk as an event or uncertainty and a condition which could have a negative or positive effect on the performance of a project (Ndumia, 2015). The project managers strive to ensure that their projects are free from risks and find out the appropriate measures to eliminate the devastating effects (Osei-Kyei, & Chan, 2015; Rwemila, 2014). This calls for analysis of the risks in projects being carried out in attempt to reduce the unexpected consequences or uncertainties which will affect the success of the projects.

Odeyinka, Lowe and Kaka (2012) argued that the significant issue affecting building roadway projects efficiency was the uncertainty as well as ambiguity pertaining to expected construction work progress and completion. For complex building and construction works, Hassan (2017) observed that uncertainty and also obscurity, as well as subsequent effect on firm efficiency, were even extra noticeable, as a result of the effect of unexpected modifications on building job progress. Uncertainty and also uncertainty are generally characterized by the different macro-economic parameters, mostly social, technological, financial, political, ecological and also lawful concerns.

Sambasivan and Soon (2007) elaborated that in Malaysia, inadequate experience poor site mitigation, improper planning by the contractors, inconsistent flow of payments for completed work, inadequate payment of the sub-contractors, shortage of construction materials, poor communication among the parties led to poor implementation of infrastructural projects. In Qatar, according to Public Works Report of 2019 stated that lack of risk mitigation practices such as risk evaluation, handling and prevention led to about one-third of road infrastructural projects failing to be completed within time, costs and budget. The risk which affected projects escalation of construction material prices, contractor's lack of capacity, ownership and land rights, delay in payments and other legislative issues

McNair (2014) conducted a study in Australia and established that implementation of road projects had issues with various risks. This affected the contractor delivering the project within time and cost. This led to the contractor also incurring more expenses and monetary losses. Fapohunda and Stephen (2015) also indicated that in the UK some of the implemented road projects experienced issues with quality, time and budget as a result of lack of adherence to project risk mitigation practices. In South Africa, most of the road construction project delays were linked to poor risk mitigation practices which affected project designs, flow of financial resources, lack of contractors' capacity to deliver the project in time and (Government of South Africa, 2019).

Similarly, Olatunji (2015) established that the infrastructural projects had issues with the project mitigation practices and projects did not meet the stakeholders' expectations from the inception to their completion. In Ghana, risk mitigation led to improvement of road projects. This enhanced the payment of contractors in time, improved technical specifications, lowered escalation of prices of construction materials and as such about 80% of of the road projects met the expected goals (Frimpong, Olowoye, & Crawford, 2013). Gaba (2013) found out that in Ghana due to improvement on project risk mitigation practices it reduced time overruns and cost overruns of the road projects.

Karim (2011) established that project risk management could improve financial management of the road projects. This reduced cost and time overruns of the implemented road projects in Dar es Salaam. Omran, Abdalrahman and Pakir (2012) also noted that due to poor risk mitigation practices in road construction projects in South Sudan, there reported cases of increased cost and time overruns of the projects being implemented in the country. In addition, the Kenyan roads have witnessed time and cost overruns for a long period of time (Klug et al., 2017). While lack of project risk mitigation practices some time is inevitable to be adopted in some projects, there exist some degree of poor cost and time management of the road projects in the country. This could have been minimized through adoption of project mitigation practices (Kambi, 2015; Osei-Kyei, & Chan, 2015). Wambui, Ombui and. Kagiri (2015) confirmed that most of the road construction projects were failing to meet their objectives in terms of being completed in time and budget. The study reported that due to poor project risk mitigation practices. Most of the road construction projects failed to adopt and use enhanced modern equipment, hire appropriate technical expertise, project financiers and adoption of improved technology to enhance performance of the road projects.

Abidin and Pasquire, 2018 established construction industry is environmentally unfriendly as its production consumes natural resources and generates wastes and pollution. The construction of Nairobi expressway in Nairobi City County missed on various aspects that led to overloading of the road under the expressway. Upon completion, the construction left the road under it more destroyed than it was making the government to float another tender for repair of Mombasa Road. The construction of Thika superhighway left a design fault between Juja and Weteithia which has not been rectified years after its inception. This has led to more resources being put in in order to correct the flaws.

## 2. STATEMENT OF THE PROBLEM

Advancement of road construction jobs in Kenya is extremely vital and kind part of the key motorists of advancement as well as economic growth in the direction of attaining Vision 2030. The completion of roadway construction jobs is important to help in economic improvement of a nation as well as additionally stakeholders try to make certain that the jobs are finished in time, rate as well as likewise top quality. The various roads construction opens up various places and offer

interconnectedness facilitating movements of various factors of production enhancing trade and investments in addition to security. Road construction jobs should be finished within the stated timeline and budgets and the government at all levels hedged against extreme additional costs in the likelihood of a risk occurring. However, the majority of roadway projects in Garissa are not completed within the first collection targets of time because of a variety of facets that affect negatively on the efficiency of these highway jobs (Hussein & Kisimbii, 2019). Even more, kept in mind that only 20.8 percent of the roadway jobs were implemented promptly as well as spending plan, while 79.2 percent displayed some form of failure. According to Gitau (2015) the roadway construction jobs in the county still remains to experience substantial expense overruns, schedule hold-ups as well as low quality output, resulting in poor time, price and high-quality efficiency. The poor performance of roadway building and construction jobs is attributed to risk reduction methods (Wafula, 2017).

## 3. LITERATURE REVIEW

**Theoretical Literature Review**

**Prospect Theory**

Daniel Kahneman and Amos Tversky (1979) put forward the Prospect theory based on the decision making during the uncertainties in an organization (Noga, Raczkowski & Klepacki, 2015). This borrows from the concept of the conflict and value trade-offs. The tenets are grounded that an individual will make a decision based on the choices he or she makes in this world of risks or uncertainties. This theory expounds that the decision-making process should be well framed and evaluated to mitigate uncertainties in time. Further this theory is based on the patterns of choices which are common to influence decision making (Krisnawati, Yudoko & Bangun, 2016).

In project management, the prospect theory especially in the construction projects. The evaluation phase of a prospect theory in project management especially in the is used to predict the domain of risk propensity handling. It calls for the evaluation of the losses related to the gains to enhance decision making (Han & Peng, 2019). During the decision making the project manager will multiply value of each outcome by its decision weight to make the right decision. The project manager should weigh the risks likely to affect the performance of the project in time and arrive at the risk handling mechanisms from the prevention of the occurrence. Projects are subjected to possibility of gains and losses, injury or damages associated with risks.

The project managers should make data collection and analyze on how the risks should be handled appropriately. If the there is no adequate data it means decisions arrived will not commensurate well with the mitigation measures to be undertaken to control the risks occurrences (Noga, Raczkowsk i& Klepacki, 2015). The current study adopted this theory to explain the relationship between risk handling and performance of road construction projects.

**Empirical Literature Review**

R. Khaleaf, IH El-Adaway and R. Assaad (2021). Contracts used in the construction industry allocate numerous risks among the different contracting parties. Primary data was collected by the use of semi-structured interviews and documentary evidence complemented the interviews. The study findings showed that road construction projects in Kenya were facing numerous project risks associated parties assigned through the contract clauses. The study results also showed that the parties had no allocation of risks in consideration with their consequences.

Gitau (2015) study sought to investigate a relationship between project risk mitigation practices especially at the project planning phase and its effect on the schedule and cost performance. The risks the focused on involved the risk identification during needs identification, profiling, site selection, architect or engineer selection and validation and schedule development. The system of observation included the job managers, quantity land surveyors, service providers, architects, designers and regulatory authorities in the Rwandese construction sector. Both the measurable and also qualitative approaches for data collection were adopted as well as surveys and interviews were utilized to gather key data. From the results of correlation analysis, it was established that risk identification practice especially at the planning phase affected Rwandese Construction industry.

Muchelue, Gregory and Asinza (2019) research study focused on exactly how risk administration practices influenced performance of roadway construction projects in Kakamega County, Kenya. The research specific purposes included risk recognition and analysis. Structured questionnaires were the data collection instruments and were utilized to gather sights from the 80 participants who were project managers, designers, managers, surveyors and inspectors, roadway land surveyors

and service providers in Kakamega County. The research findings showed that risk identification and analysis had a favorable as well as considerable effect performance of road building jobs in Kakamega County, Kenya.

## 4. RESEARCH METHODOLOGY

The study intended to use descriptive research design and targeted 8 road construction projects within Garissa County comprising of 14 road engineers, 4 road supervisors, 8 road inspectors, 12 road surveyors and 146 contractors. The study sample size was 145 respondents as achieved by Slovin sample size determination formular. The study adopted a stratified random sampling technique to determine a sample size distribution for the respondents. The researcher administered questionnaire as the data collection tool for primary data collection. The data collection instrument was pilot tested to confirm whether it was valid and reliable for data collection before carrying out the actual study. The study collected both qualitative and quantitative data. The descriptive and inferential analysis was used to analyze the quantitative data.

## 5. FINDINGS

The descriptive statistics results on risk identification are presented in Table 1.

**Table 1: Risk Identification**

| Statement | Mean | Std |
|---|---|---|
| There is a standardized document for risk identification processes | 3.990 | .008 |
| Risk identification processes is fully integrated in the project processes and procedures | 3.987 | .521 |
| There is always brainstorming, meetings and interviewing of project team to identify potential risks | 3.789 | 1.128 |
| The project design is made such a way to identify risks in time | 3.214 | 1.325 |
| Pilot sites are always carried out to identify potential risks in time | 3.078 | 1.467 |
| **Composite Mean** | **3.906** | |

Table 1 presented the percentages, mean and standard deviation statistics connecting to the information measuring the participants' level of agreement as to just how the provided indicators of risk identification affected performance of roadway building and construction projects. The worth that had the best frequency ratings among the respondents were the occurrence, concur (value of 4.00 on the monadic array), as all the signs for danger acknowledgment under this column had high ranges of respondents. This recommended that a great deal of participants commonly had a tendency to concur that danger recognition influenced performance of highway building jobs. Table 4.5 likewise provided the mean values for private indicators of identification and also the individual's level of agreement on their influence on performance of road structure jobs. These were prepared in order from the most significant to the tiniest mean values. The initial 4 mean values all had values over 3.5 as well as also rounded off to a mean of 4.00 (which represented agree on the monadic measurement array). Hence, the individuals usually decided on the perceived impact of the initial four risk identification indicators on performance of road construction projects, and these had the highest possible ranking among all the participants.

Mean values less than 3.50 settled to a mean of 3.00, indicating that these respondents disagreed on the impact of these risk recognition indicators on performance of road construction projects. The standard deviations represented the level to which the feedbacks were spread around the mean values. The lower the standard deviation values, the closer ball games clustered together and this was easily observed by contrasting the scores for each and every risk identification indication. Similarly, the project design is made such a method to identify dangers in time as well as Pilot websites are constantly carried out to recognize possible dangers in time, had actually the lowest perceived impact on performance of road building jobs.

The research study findings are in line with the findings by Chen et al. (2014) that task managers were motivated to recognize the resources of the risks particularly via pilot websites to lessen price escalation throughout project execution, hence minimizing price difference. Additionally, danger identification strategies suggested by Ali (2007), including the recognizing the type of the risk, would certainly improve the building and construction value-chain. These would certainly regularize the formulation of supervisory approaches to decrease risks to boost the efficiency of the projects. This is in contract with the current study's findings where identification of risks' sources ranked highly.

**Inferential Statistics Results**

**Correlation Analysis**

**Table 2: Correlation Analysis**

|  |  | Performance of Road Projects |
|---|---|---|
| Performance of Road Projects | R | 1.000 |
|  | Sig. (2-tailed) | . |
| Risk Identification | R | .326 |
|  | Sig. (2-tailed) | .000 |
|  | N | 100 |

The study sought to establish the relationship between risk identification and performance of road projects in Garissa County, Kenya. A Pearson Correlation was performed and the result of the Pearson correlation test as presented in Table 2 show a correlation (r (100) = 0.326; p<0.05) between the risk identification and performance of road projects in Garissa County, Kenya. This implies that the risk identification is positively and significantly correlated with the performance of road projects in Garissa County, Kenya. The study findings corroborate with the findings by Zou, Zhang and Wang (2007) carried out a study where they utilized an all-natural as well as methodical approach to identify building job risks, their chance of occurrence, effect of the dangers and mitigating elements. Their research, as opposed to focusing on the standard aspects of expense, time and also high quality took a stakeholder as well as task life process method and also focused on a broader collection of quantitative and also qualitative variables, among these, those that affected task price performance. Zouetal. (2007) proposed holistic risk administration strategies where customers, developers and government bodies work en masse from the expediency stage onwards to resolve prospective cost and also time dangers. Zouet al. (2007) also recommended that contractors and also subcontractors with durable building and construction as well as administration understanding be utilized early to make sound prep work for executing risk-free, reliable and also quality building tasks.

**Regression Analysis Results**

**Table 3: Model Summary**

| Model | R | $R^2$ | Adjusted $R^2$ | Std. Error of the Estimate |
|---|---|---|---|---|
| 1 | .895 | .801 | .789 | .001 |

According to the model summary in Table 3, R is the correlation coefficient which reveals the partnership in between the risk identification and dependent variable. It is noteworthy that there exists solid positive partnership in between the independent variables as well as dependent variable (efficiency of roadway jobs in Garissa Region, Kenya) as shown by R value (0.895). The coefficient of resolution (R2) is used to gauge how far the regression model's capability to explain the variant of the independent variables. The coefficient of determination is between zero and also one. The information showed that the high R square is 0.801. It revealed that the risk identification in the study had the ability to describe 80.10% variation in the efficiency of road jobs in Garissa Region, Kenya while the remaining 19.90% is described by the variables or other facets outside the model.

**Table 4: Analysis of Variance**

| Model | Sum of Squares | d.f | Mean Square | F | Sig. |
|---|---|---|---|---|---|
| Regression | 28.018 | 1 | 28.018 | 304.875 | .000 |
| Residual | 9.013 | 98 | .0919 |  |  |
| Total | 34.890 | 99 |  |  |  |

The results of multiple regression analysis obtained regression coefficients t value and significance level as indicated in Table 4. The study conducted a multiple regression analysis so as to determine the relationship between the dependent variable (performance of road projects in Garissa County, Kenya) and independent variable (risk identification).

**Table 5: Regression Coefficients**

| Model | Unstandardized Coefficients | | Standardized Coefficients | | |
|---|---|---|---|---|---|
| | B | Std. Error | Beta | t | Sig. |
| (Constant) | 7.897 | 1.987 | | 3.974 | .000 |
| $X_1$_Risk Identification | .878 | .178 | .465 | 4.933 | .000 |

Findings in Table 4.20 showed that risk identification had coefficients of estimate which was significant basing on $\beta1 = 0.878$ (p-value = 0.000 which is less than $\alpha = 0.05$). Also, the effect of risk identification is more than the effect attributed to the error and supported by the t values whereby t cal= 4.933> t critical =1.96 at a 5 percent level of significance, thus we conclude that risk identification significantly affect performance of road construction projects in Garissa County, Kenya. The study findings corroborate with the findings by Perera, Dhanasinshe and Rameezdeen (2009) that risk identification affected performance of Sri Lankan Road projects. The study findings showed that road construction projects in Kenya were facing numerous project risks associated parties assigned through the contract clauses. The study results also showed that the parties had no allocation of risks in consideration with their consequences;

This indicates that performance of road projects in Garissa County, Kenya = 7.897 + 0.878*Risk Identification

## 6. CONCLUSIONS

From the study findings the study concludes that risk identification is the first most important factor that influences performance of road projects in Garissa County, Kenya. The regression coefficients of the study show that risk identification has a significant influence on performance of road projects in Garissa County, Kenya. This shows that risk identification has a positive influence on performance of road projects in Garissa County, Kenya.

## 7. RECOMMENDATIONS

The study recommends that management in road projects should increase level of project risk identification as it enhances the risk mitigation activities on each significant risk. The road projects are facilitated a distinctive project risk identification effort as they undertook risk identification for the purposes of mitigating risk facing projects to a very great extent. Thus, project risk identification function is established throughout the whole project and insuring against financial loss and develop risk management strategy to allocate resources efficiently and influence less costing of the project.

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