Influence of risk management strategy on implementation of road construction projects in Migori County, Kenya

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ABSTRACT

The purpose of this study was to establish the influence of risk management strategy on implementation of road construction projects in Migori County, Kenya. Implementation was measured as a function of project completion within the set time frame, meeting quality requirements and being within budget. This study was anchored on Risk Management theory. Descriptive research design was used. The target population for the study was 417 with a sample of 232 which included 39 contractors, 193 constituency roads committee members (CRCs). Simple random sampling method was applied in selecting Constituency Roads Committee members and the road contractors. Data was analyzed using both descriptive and inferential statistics with the help of statistical package for social sciences, SPSS. The study utilized the t-statistic to test the null hypothesis. Primary data was obtained through self-administered questionnaires to contractors and CRC members. Validity of research instruments was obtained through piloting and expert evaluation while reliability was tested using test retest method. Inferential statistics of Multiple Linear Regression was applied to determine the influence of risk management strategy on implementation of road construction projects by testing the hypotheses for the study. Statistical significance was assessed at $p<0.05$. According to the study, risk management strategy accounted for 70.0% of change in implementation of road construction projects. It also discovered that risk management strategy was moderately applied in the roads construction projects in Migori County. In summary, the study concluded that, most roads being implemented did not factor into consideration risk management strategy as a result, they faced multiple implementation challenges related to cost, timelines and quality, however, risk management has a positive and significant influence on implementation of road construction projects in Migori County, Kenya. The study therefore recommends formal integration of risk management into all stages of road construction projects and embedding risk management within county project implementation guidelines.

Keywords: Migori County, Risk Management Strategy, Road Construction Projects, Project Implementation, Project Performance

I. INTRODUCTION

Road infrastructure is widely recognized as a key driver of economic growth, social integration, and regional development. Efficient road networks enhance access to markets, health services, education, and employment opportunities, particularly in developing economies. As a result, governments across the world continue to invest heavily in road construction projects to stimulate economic development and reduce spatial inequalities. However, the successful implementation of road construction projects remains a persistent challenge due to the complex and uncertain environments within which such projects are executed (World Bank, 2020). Globally, road construction projects are exposed to numerous risks, including financial constraints, design changes, environmental conditions, technological challenges, and stakeholder conflicts. These risks, if not effectively managed, often result in cost overruns, schedule delays, quality compromises, and in some cases project abandonment. Consequently, risk management has emerged as a critical project management strategy aimed at identifying, analysing, mitigating, and monitoring uncertainties that may adversely affect project objectives. Empirical studies from developed and developing countries have demonstrated that effective risk management strategies significantly enhance project implementation performance (Mucheke & Paul, 2019).

In China implementation of Roads and Highway Construction industry has been growing rapidly, driven by China's urbanization, increases in automobile ownership, freight and passenger road transportation turnover volumes hence increasing government investment and involvement of risk management strategies (Shubina et al., 2020). In 2020, industry revenue is expected to amount to 263.2 billion dollars, up 12.1% from 2018. Over the past five years, revenue has been growing at an average annualized rate of 17.0%. The rate of road project implementation has increased twofold from 35% to 74%. The total length of road in China increased from 3.7 million kilometres in 2016 to an estimated 4.3 million kilometres in 2020. Meanwhile, the total length of highway in China rose from 60,300 kilometres to about 108,600 kilometres. By 2019, there were 46 industry enterprises operating 423 establishments and employing 739,696

workers with a payroll of 14.1 billion dollars, however the sector is faced by time and cost overruns (Adhikari & Mishra, 2019).

In Sub-Saharan Africa, road construction projects face additional risks arising from weak institutional capacity, limited technical expertise, funding unpredictability, and governance challenges. Environmental factors such as adverse weather conditions and difficult terrain further complicate project execution. While many countries in the region have adopted modern project management practices, the application of structured risk management strategies in public infrastructure projects remains inconsistent, often reactive, and inadequately institutionalized (Kamassi et al., 2020). In a study that focused on project risk management practice of Oromia roads construction Enterprise in Ethiopia, Teshome (2021) showed that risk management is very crucial in the implementation of the road projects and maintenance of the completed roads in the country. This view is supported by Chuzu-Mkandawire (2016) who carried out an investigation into risk management practices on road maintenance projects under roads jurisdiction in Malawi and found out that with an increased emphasis on project risk management systems, most construction firms have been meeting the project targets in terms of budget, time and quality.

In Kenya, road infrastructure development is a key pillar of national development frameworks such as Vision 2030 and successive Medium-Term Plans. The government has invested substantially in expanding and rehabilitating road networks through agencies such as the Kenya National Highways Authority (KeNHA), Kenya Urban Roads Authority (KURA), and the Kenya Rural Roads Authority (KeRRA). Despite these efforts, numerous road construction projects continue to experience implementation challenges, including delayed completion, escalating costs, poor workmanship, and contractual disputes. Studies conducted in the Kenyan construction sector suggest that inadequate risk management contributes significantly to these challenges (Wafula, 2017). A PwC research that covered 1,640 road projects in six counties in the lake region in 2020, found that in Kakamega County the rate of implementation and completion of road projects was at 90%, Kisumu County was at 80%, Busia County 79%, Kisii County 74%, Nyamira County 64% Homabay County 48% and Migori County 44%. Only three Counties completed their projects with a 100% on time and within budget success rate (PwC Kenya, 2020). In this category Kakamega County again led with 100% success rate while Migori was last with 47% the rest of the Counties either failed to meet the objectives and/or scope or did not meet the deadlines and budget. In another similar research study KPMG carried out an analysis of road infrastructure in Migori County and the Neighboring Kisii County in 2021, both KURA and KeRRA roads were included in the study. According to the report, approximately 71% of the roads in Migori Couty have suffered at least one project implementation failure within the year of study, on the other hand road projects implemented in Kisii County had posted 97% completion rate. So, the question is, why do the road projects fail? Major studies conducted based on critical success factors of project management have shown that risk management strategy is an important part of project implementation success (KPMG, 2021).

This study was anchored on risk management theory a review of risk management theory brings this study into perspective as it discusses the assumptions of the theory and its relevance to this study. The theory of risk management is based on three basic concepts: utility, regression and diversification (Ajupov et al., 2019). This approach was initially recommended in 1738 by Daniel Bernoulli, resulting in the decision making process where individuals had to pay more attention to the magnitude of the success of project implementation. Project managers employ project implementation theory to make planned changes in organizations by creating environments in which changes can survive and be rooted (Kaliba et al., 2009). Assaf and Al-Heijji (2006) argue that the theory as practiced today rests on an implicit and narrow argument that explains the other concerns of project management methods. Following the promulgation of the 2010 Constitution, the devolved system of governance assigned significant responsibilities for road construction and maintenance to county governments. While devolution has enhanced local participation and responsiveness, it has also introduced new implementation risks related to political interference, limited technical capacity, procurement inefficiencies, and stakeholder conflicts. County governments are therefore required to manage increasingly complex road projects within constrained institutional and financial environments, hence the need for a study focused on resolving the constraints.

Migori County, located in south-western Kenya, has prioritized road infrastructure development to support agriculture, trade, and cross-border commerce. However, the county's road construction projects have frequently encountered challenges such as funding delays, contractor performance issues, community resistance, and weather-related disruptions. These challenges suggest the presence of unmanaged or poorly managed risks that adversely affect project implementation. Despite the significance of road infrastructure to the county's development agenda, there is limited empirical evidence on how risk management strategies influence the implementation of road construction projects in Migori County. Construction management, as a field of research, has tended to focus on planning and managing the complex array of activities required in delivering a successful implementation of a construction project, such as a road or building (Odeck, 2004). Successful completion of construction projects is therefore dependent on meeting the expectation of the major financing authority. The area of risk management strategies and its relationship with road construction projects implementation have largely been ignored. Therefore, examining the influence of risk

management strategies on the implementation of road construction projects in Migori County is both timely and necessary. Such a study will provide empirical insights to inform policy, enhance project management practice, and contribute to improved delivery of road infrastructure within devolved governance systems in Kenya. The devolved governance framework in Kenya places significant responsibility for road construction on county governments. While devolution enhances local responsiveness, it also exposes projects to localized political pressures and capacity limitations (Fernando et al., 2020). In Migori County, political interference in project prioritization and contractor selection introduces additional risks that are rarely captured in formal risk management processes. Moreover, the limited integration of risk management into county project management policies suggests that risk strategies are not institutionalized but depend largely on individual project managers' competencies. This undermines consistency and reduces the overall effectiveness of risk management across projects.

1.1 Statement of the Problem

Road construction projects play a critical role in enhancing socio-economic development by improving mobility, trade, and access to essential services. In Kenya, the national and county governments have invested heavily in road infrastructure, particularly through agencies such as the Kenya Rural Roads Authority (KeRRA). Despite these investments, many road construction projects in Migori County continue to experience challenges such as cost overruns, delays, compromised quality, and incomplete works. These challenges undermine value for money and delay the realization of intended development benefits. Evidence from project audit reports, county implementation reviews, and public complaints indicates that road projects in Migori County are frequently affected by risks related to inadequate planning, funding delays, contractor capacity, stakeholder disputes, adverse weather conditions, and weak monitoring mechanisms (CIDP, 2020). A recent review of road construction projects in Machakos County by National Transport and Safety Authority (2020) revealed that when risk management strategies were put in place by the county Government few road construction projects fell behind implementation schedule. Although risk management strategies such as risk identification, risk assessment, risk mitigation, and risk monitoring are widely recognized as essential tools for improving project performance, their application in road construction projects at the county level remains inconsistent and poorly documented. According to Kenya Roads Board (2021) report on implementation of selected roads in Migori, road network in the County is made up of 1,928 kilometres out of which 25% is gravel and 75% is earth as at February 2020, the report estimates that 65 % of the roads in Migori County are in poor condition. Existing empirical studies on infrastructure project implementation in Kenya have largely focused on factors such as procurement processes, contractor performance, and financing, with limited attention to how structured risk management strategies influence the implementation of road construction projects, particularly within devolved units such as Migori County. Moreover, the contextual realities of county-based road projects including political interference, community expectations, and institutional capacity constraints necessitate localized empirical investigation. Therefore, there is limited empirical evidence on the extent to which risk management strategies influence the implementation of road construction projects in Migori County. This knowledge gap hampers policymakers, implementing agencies, and project managers from adopting evidence-based risk management practices that could enhance project performance. This study therefore seeks to examine the influence of risk management strategies on the implementation of road construction projects in Migori County, Kenya

1.2 Research Objective

To establish the influence of Risk Management Strategy on implementation of road construction projects in Migori County, Kenya.

1.3 Research Hypothesis

H_{O1}: Risk management strategy has no significant influence on implementation of road construction projects in Migori County, Kenya.

II. LITERATURE REVIEW

2.1 Theoretical Review

2.1.1 Risk Management Theory

This study was guided by the theory of risk management. This theory attempts to explain the rationale behind organizations putting in place the right level of controls for all material models supporting their project and decision-making processes for successful project implementation (Kirira et al., 2020). Considering this classification, risk is created by the dynamic change in the economic environment and depends on both, the evolution of external variables - the economy, competitors, industry membership and consumers and the decisions taken internally by the organization (Osman & Kimutai, 2019). Nevertheless, dynamic risk could affect a great number of individuals and they would believe

to be less predictable than static risks, because they do not occur with any extent of regularity. Unlike dynamic, static risks are predictable and would occur with some regularity (Perrow, 1986).

Risk management theory is based on three basic concepts: utility, regression and diversification (Jaskowski & Biruk, 2011). This approach was initially recommended in 1738 by Daniel Bernoulli, resulting in the decision making process where individuals had to pay more attention to the magnitude of the effects of different project outcomes. Secondly, use of regression approach began at the end of the 19th century. Later it was proved that the rule of regression operated in a variety of situations ranging from the calculation of the probability of risks, and ending with the prediction of project cycle fluctuations. Mathematical justification of the risk management strategy was introduced by Markowitz (1991). Markowitz showed the intelligent application of risk strategy minimizes the deviation from the expected rate of project implementation. Risk management is the process of adaptation and its implementation is often aimed at reducing the possibility of adverse effects afflicting projects (Ajupov et al., 2019).

This theory is relevant in this study as it assists in explaining how the contractors and those providing oversight manage risks they come across during implementation of road construction projects. road construction projects are prone to many risks and it is the responsibility of the contractors and Constituency Roads Committee members to find ways of assessing the risks, controlling them as well as strategizing on how to mitigate those risks. Risk management strategy help the contractors and project management committee to mitigate the risks hence enhancing the implementation of road projects. According to (El-Sayegh & Mansour, 2015), risk management theory is adequate in explaining implementation of risk controls that can involve externally triggered changes to operations, orders, standing operating procedures and external Stakeholders. The theory has strength on static risks that are not dependable on the evaluation of the competitive environment in which the organization operates but would rest merely on the internal factors of the entity. The results of putting in place risk management strategy can be seen in the successful implementation of road construction projects which is the main focus of this study.

2.2 Empirical Review

The implementation of road construction projects globally is often challenged by uncertainties and risks that affect performance in terms of cost, time, quality, and stakeholder satisfaction. Effective risk management has been widely acknowledged in academic and professional discourse as central to enhancing project outcomes. However, in developing contexts, especially within sub-national units such as counties in Kenya, the influence of risk management strategies is not yet well understood. This literature review synthesizes theoretical and empirical findings on risk management and infrastructure project implementation to establish a basis for investigating the case of Migori County. Many researchers (Moshesh et al., 2018; Al-Ajmi & Makinde, 2018) believe that few contractors practice formal risk management strategy in mitigating risks. In their study, the 'human problem' was identified as the initial hindrance for risk management. Furthermore, in examining the impact of projects' characteristics on risk mitigation measures in road construction enterprises, Baloyi and Ozumba (2020) stressed that the time commitment is related to many aspects of risk management strategy and analysis. In the same way, Fernando et al. (2020) concluded that contractors in the road construction industry irregularly practice formal risk management owing to the projects' just-in-time characteristics. Similarly, Renault et al. (2020) found out that Lack of time and indifference by managers were also identified as significant hindrances to adoption of risk management as a strategy. Shabbab et al. (2021) in another study asserted that the development of a risk management framework is a time-consuming process that is, at times, inconsistent with projects' allocated budgets. Recent research within the context of developing economies indicated that lack of experience, inadequate information, and awareness of risk management processes are the most significant challenges which affect the implementation and practice of risk management in the road construction industry (Jaskowski & Biruk, 2011; Rwelamila, 2020; Firmenich, 2017). Omer and Adeleke (2019) found that the low level of familiarity with techniques and the inability to recognize the benefits of the process were the most influential factors which impact the adoption of risk management strategies by most contractors. Teuma (2020) stated that due to the manpower size of most road construction projects, they mostly suffer from inadequacy of facilities to provide training in risk mitigation methods. In view of the above literature review there was need for an empirical study to determine the level of adoption of risk management as a strategy in risk mitigation in the Kenyan road construction industry.

Albasara et al. (2019) in a study on the impact of Effective Risk Management on Project Success in South Africa explained that construction professionals' inadequate level of knowledge in risk management and communication affected the implementation of risk mitigation. In line with this statement, Rehacek (2017) indicated that even other organizations with regular use of risk management finds it difficult to understand the rationale for and formal process of risk management in new projects. Diversity in parties' perceptions in a construction project invites undesirable biases in decision making, which makes the process of risk management as a mitigation method in road construction projects more complex (Naji & Ali, 2018). This study affirmed the important role of risk management as a strategy of ensuring project success, however, it did not clarify whether the management of risks influence success of project implementation. The current study focused on management and implementation in order to reveal the clarity.

Aduma and Kimutai (2018) studied project risk management strategies and project implementation at the national Hospital Insurance Fund, the objective of the study was to establish the effect of project risk management techniques on project implementation at National Hospital Insurance Fund (NHIF) in Kenya. The study sought to analyze the influence of risk management strategy on project implementation at NHIF projects in Kenya. The study revealed that risk management strategy influence implementation of NHIF projects in great extent. The study also revealed that in a great extent use of outsourcing, high cost of risk premium and stakeholder involvement in risk management influence implementation of NHIF projects. The study also found that use of insurance policy and contractual agreements to transfer risk influence implementation of NHIF projects in a great extent while legal agreements so as to transfer risks to a third party lowly influence implementation of NHIF projects. This study was hinged on the transaction cost economic theory, contingency theory, agency theory and uncertainty theory. The study concluded that risk preventions have the greatest effect on NHIF project implementation followed by risk control then risk management, and that risk management has the greatest effect on NHIF project implementation. There is need to carry out such a study in the roads construction sector as both industries are risk prone.

Similarly, Amemba (2019) did a study on the effect of implementing risk management strategy on supply chain implementation: a case of Kenya medical supplies agency. This study employed a descriptive research design using a case study. This study was based on transaction cost economic theory and contingency theory. The research established that the level of implementation of risk management strategy in the KEMSA supply chain was medium. The level of undertaking hazard considered worthy in each task might be founded on government or corporate rules. Measures representing a possibly more serious hazard ought to be hailed and exclusively assessed to bring out reasons why they are more likely to impede project implementation (Ogalo, 2017). The theories used in these studies were not adequately aligned to their dependent variables, in contrast, the present study however, was hinged on risk management theory, since it has been observed that being able to manage construction firm resources is a crucial skill for managers of construction projects as failure to address risks has resulted in countless project failures (Hove & Banjo, 2020).

Ochenge (2021) explored project management practices and implementation of road infrastructure projects done by local firms in the lake basin region of Kenya. The study area encompassed Migori County. While the literature supports the positive influence of risk management on project implementation, several gaps exist; Context-Specific Evidence; Few studies focus on county-level road projects in Kenya, especially in Migori County. Strategy-Outcomes Link; Limited empirical examination of which specific risk management practices influence key implementation metrics. Localized Risk Profiles; Most frameworks derive from developed economies and may not reflect the risk landscape in Kenya's devolved units. These gaps justify an empirical investigation into how risk management strategies influence implementation of road construction projects in Migori County. Existing research underscores the importance of risk management in improving construction project outcomes, yet there is insufficient evidence on its role within Kenyan county governments. By bridging this gap, this study will contribute to both academic understanding and practical policy formulation on risk management in devolved infrastructural delivery. The results indicated that project risk management had significant effects on the implementation of road infrastructure projects. Risk mitigation strategies such as contingency planning, contract structuring, insurance coverage, and stakeholder engagement are intended to minimize the impact of identified risks. Evidence from construction management literature suggests that proactive mitigation enhances project resilience. However, in Migori County, mitigation measures are often limited by budgetary constraints and rigid procurement frameworks. Furthermore, mitigation strategies are sometimes implemented selectively, focusing more on technical risks while neglecting social and political risks. Community resistance due to inadequate consultation, for instance, has led to work stoppages and redesigns in several county road projects. This highlights a critical oversight: risk management strategies that fail to integrate social and stakeholder-related risks are unlikely to achieve meaningful improvements in implementation.

III. METHODOLOGY

3.1 Research Design

The study adopted descriptive research design. Descriptive research design seeks to obtain information that describes existing phenomena by asking individuals about their opinions, perceptions, attitudes, behavior or values (Mugenda & Mugenda, 2019). The study was carried out in Migori County. Random sampling technique was used to select the respondents who included road contractors and constituency roads committee members (CRC). Primary data was collected using self-administered questionnaires to 39 contractors and 193 CRC members drawn from the 8 sub counties of Migori County. Statistics on the contractors and CRC members were obtained from the Department of roads, transport and public works in Migori County.

3.2 Study Area

Migori county is located in south western part of Kenya. It borders Homabay County to the North, Kisii County to the North East, Narok County to the South East, the People's Republic of Tanzania to the South West and Lake Victoria to the West. It lies on Latitude -1.06^0 South and Longitude 34.47^0 to the East. Migori County is approximately 2,586km^2 in size and has a population of about 1,116,436 people (Kenya National Bureau of Statistics, 2019). Administratively, the County is made up of eight Sub-Counties namely, Rongo, Awendo, Uriri, Suna West, Suna East, Nyatike, Kuria East and Kuria West. The road network is not well developed. The total road length in Migori County is about 3,979km, out of this, 5% is bitumen, 43% is gravel/murram, about 52% of roads in the County is earth road (Kenya National Bureau of Statistics, 2015)

3.3 Target Population and Sample Size Determination

The target population for this study was 417. Out of this 43 comprised of 34 road contractors and 9 sub-contractors with construction projects listed in the Department of Roads, Transport and Public Works register in Migori County as having been awarded contracts between 2023 and 2025. Also targeted were sub county roads committee members who normally carry out monitoring of road projects. There are eleven members per project hence, the 34 projects give a total of 374 respondents. According to information obtained from County Public Works Offices in Migori and confirmed from available reports, a total of 250 road contractors were prequalified and registered to perform road works in the county, though only 43 were awarded contracts within the study period, 34 of them to work on roads as main contractors and 9 as sub-contractors (CIDP, 2020).

Table 1

Target Population

No	Respondent	No. * Sub Counties	Total
1	Road contractors (companies)	34 Contractors and 9 Subcontractors	43
2	Constituency Roads Committee members	34 projects * 11 members of CRC	374
	Total		**417**

Table 2

Sample Size

No	Target category	Target	Sample size
1	Road Contractors (companies)	43	39
2	Constituency Roads Committee members (CRC)	374	193
	Total		**232**

Source: Migori County Public Works Office (2025)

3.4 Sampling Procedures

Sampling is the process of choosing a section of the accessible population from which the study is done through use of various techniques (Saunders et al., 2020). The sampling procedure guarantees that the inferences of the study can be generalized to the whole population, which was not selected (Segal, 2019). In selecting respondents for the investigation, probability sampling methods was used. Simple random Sampling method was applied in selecting Constituency Roads Committee members and the road contractors. This sampling technique allows each object or element in the sample frame to have an equal chance of being selected based on the proportion of their number in the target population. This design involved identifying a suitable sample frame, deciding on a suitable sample size, choosing the most apposite sampling method and ensuring that the sample represents the whole population under investigation (Ajupov et al., 2019).

In order to select 39 out of 43 contractors, simple random sampling method was applied to select the respondents through use of lottery technique. This involved writing the contractors codes in sheets of paper (43) and thoroughly mixing the codes after which only 39 selections were made as representatives of the whole population. The procedure was repeated for CRC members, where a sample of 193 CRC members was obtained, giving a total sample of 232. The advantage of this method is that it allowed the researcher to obtain a sample that best represented the entire population under study (Lincoln et al., 2020). This method ensured that each respondent had equal chance of being selected based on the proportion of their representation in the target population.

3.5 Data Analysis Techniques

Quantitative data was analyzed by using descriptive and inferential statistics. Inferential statistics was used to analyze data from the Likert scale. Under descriptive analysis statistics frequencies, mean and standard deviation are used to answer the research objectives (Collins, 2018). Data coding and entry of quantitative data was assisted by use

of Statistical Package for Social Science (SPSS) Version 25.0 computer software. Quantitative analysis begun by editing, coding, cleaning and transforming data. The hypothesis was analyzed as follows: Pearson correlation coefficient was used to test the influence of hypothesis; Risk management Strategy has no significant influence on implementation of road construction projects in Migori County.

Once data was properly entered, analysis of data was undertaken. Regression analysis was done to determine the effect of the independent variable and its influence on the implementation of road Construction projects. This was to establish the single significant relationship and strength between risk management strategy and implementation of road construction projects. This was tested at 95% confidence level, implying that 95 times out of 100 we can be sure that there was a significant influence between two variables, and there was a 5% chance that the relationship does not exist. This error margin of 5% was used to test the null hypothesis. For the variables whose calculated p value was less than 0.05, the null hypothesis that corresponds to it was accepted.

This model examined the influence of the independent variable on the dependent variable that was Likert scaled. The model is based on the assumption that, any specific value of independent variable, the value of the Y variable is normally distributed-normality assumption, and that the variance for the Y variables is the same for the dependent variable-equal-variance assumption (Gujarati, 2019). The model aids in understanding how much of a variance in the dependent variable explained by a set of predictor (independent variable).

IV. FINDINGS & DISCUSSION

4.1 Descriptive Statistics

This section describes the results of level of implementation of road construction projects in Migori County, Kenya. The descriptive results are provided in Table 3. Key: SD-Strongly Disagree, D-Disagree, NE-Neutral, A-Agree and SA-Strongly Agree.

Table 3

Implementation of Roads Construction Projects in Migori County

Items	SD	D	NE	A	SA	Mean %	Std. Dev.
The project is implemented according to the set budget.	39	53	1	42	94	3.43 68.6%	1.60
Project is implemented according to the details in the bill of quantities.	50	99	2	38	40	2.65 53%	1.43
The road construction is being implemented according to the planned timelines.	42	122	7	15	39	2.49 49.8%	1.33
Project supervisors have a way of ensuring that the project is always on track.	37	57	5	89	41	3.18 63.6%	1.41
The road project being implemented meets value for money returns for on road and off-road users.	119	53	5	10	42	2.14 42.8%	1.54
The project is being implemented according to the quality specifications in the road contract.	132	41	2	7	47	2.11 42.2%	1.60
Composite score						2.46 49.2%	1.49

Statistics in Table 3 indicate that respondents are above average (M=3.43, 68.6%, SD=1.60) on the statement that road projects are implemented based on set budgets. It suggests that a significant number of respondents appear to agree that the road projects are done according to the set budgets, a substantial number also disagrees (31.4%). This implies that there is constant variation in road projects costs since the budget approved at the tender award stage is changed until the project is finished. This could explain the delays in completion of road construction projects and escalation of their costs.

Secondly, respondents appear to disagree (M=2.65, 53%, SD=1.43) on the question of construction projects by respective Government agencies are being done according to the details in bills of quantities. Whereas it is the expectation that all projects are properly designed and details included in the bill of quantities before it is awarded to the contractor, a significant number of respondents felt that this is not the case as some project details are changed from the original bill of quantities which could affect the final outcome of the project once completed. It is, therefore, clear that details on a project contract are at times changed by the officials in charge of supervision, which results to construction of sub-standard road networks. Most respondents appear to disagree (M=2.49, 49.8%, SD=1.33) that road construction projects are being implemented according to the planned timelines. This means that the issue of delays is

a common feature associated with road projects in Migori County. To get a clear picture of this situation, key informant number one stated that time overrun was factored in through establishing deadlines according to phases by contractors. Nevertheless, these time overruns' cost burden is often borne by the taxpayer.

The study results indicate that sometimes (*M*=3.18, 63.6%, *SD*=1.40) project supervisors, that is roads engineers have a way of ensuring that a project is always on track (supervision and monitoring). This means that there are times when roads engineers are unavailable to inspect ongoing road construction activities which jeopardizes project quality considering some contractors do not follow the required guidelines during construction. Most respondents disagree (*M*=2.14, 42.8%, *SD*=1.53) that road projects being implemented by Government agencies in different areas of Migori County meet the value for money invested for on-road and off-road users mainly motor vehicles and pedestrians. This suggests that most projects constructed through KeRRA and other bodies in the county are not to the level of expectation of the end users. Some of them do not have markings, others do not have proper drainage systems, thus resulting to clogging of culverts and bridges while others have no pavements and walkways for pedestrians.

Further, the respondents seem to disagree (*M*=2.46, 49.2%, *SD*=1.48) with the assertion that road projects being implemented in Migori County are done based on the quality specification in the road contracts. This means that low quality roads are constructed because the contractors appear to be the ones left to implement the projects as Government personnel appear not to be keen on details. Composite values show that the mean values were 2.46 (49.2%), with a standard deviation of 1.48, which suggest that respondents neither agree nor disagree fully on the level of implementation. It can be concluded that the performance of road project implementation is at below average level in Migori County.

4.1.1 Risk Management Strategy for Roads in Migori County

Nine statements given on a Likert scale of five were provided to respondents who were expected to indicate how they believed that the risks posed by certain threats have been understood and handled in the construction of roads in Migori County. The results are provided in Table 4.

Table 4

Risk Management Strategy for Roads in Migori County

Statement	**N**	**SD**	**D**	**NE**	**A**	**SA**	**Mean %**	**Std. Dev.**
Numerous additional risk management reports were prepared and various mitigation actions implemented throughout the road construction process	232	35	9	1	87	96	3.88 77.6%	1.40
System for risk reporting and action to be taken are active during road project implementation process	232	41	16	3	137	31	3.45 69%	1.32
The tender documents clearly stipulate that contractors bear the financial risks if project execution is delayed, thereby safeguarding public funds.	232	49	84	10	82	3	2.59 40%	1.22
Road projects have fixed budgets to reduce cost overruns	232	6	7	5	150	60	4.10 82%	.80
Certain post-budgeting functions and activities are outsourced to help minimize the likelihood of project delays	232	11	4	5	117	91	4.20 84%	.94
Forward contracts are utilized to lock in material supply prices, helping to control cost overruns and minimize price fluctuation	232	14	5	9	192	8	3.77 75.4%	.82
Legal agreements are established to safeguard the project against disputes stemming from cost variations, particularly those caused by inadequate risk management provisions that could lead to delays	232	18	3	7	196	4	3.73 74.6%	.86
All personnel, equipment, and the project as a whole are closely monitored and insured through regular premium payments to protect the government from costs arising from injuries, theft, fire, or damage	232	9	14	8	137	60	3.99 79.8%	.96
Projects are continuously monitored, and any cost variations are reported throughout the project lifecycle to prevent overruns	232	13	10	8	182	15	3.78 75.6%	.86
Composite scores							**3.72 74.42%**	**1.02**

In Table 4 respondents agree (*M*=3.88, 77.6%, SD=1.39) that there are numerous other risk management reports and set actions undertaken when constructing roads in Migori County. This means that there exists documented evidence of how risk management occurs during road construction. They also appear to be aware (*M*=3.45, 69% *SD*=1.32) on the system of risk reporting and action to be taken during road construction project implementation process, though a

substantial percentage, 31%, are not aware. This means that some roads have while others do not have a system for risk reporting and actions to be taken during road construction processes in Migori County. On whether tender documents clearly stipulate that contractors bear all financial risks in case of delays in the execution of projects, most respondents appear to be unsure *M*=2.59, 40% with a high standard deviation of *SD*=1.22, suggesting that tender documents are not clear at times on financial risk transfer. The failure to include how financial risks can be transferred to contractors in case of their failure to complete the projects puts taxpayers at a loss as the contractors normally end up transferring the risks to taxpayers hence increasing the cost of road construction. This action tends to save taxpayers money by ensuring that contractors perform and execute the projects without delay once money for construction has been disbursed to their accounts according to the tranches agreed in the deed of contract. It is also agreed by most respondents (*M*=4.10, 82%, *SD*=0.79) that road projects have fixed budgets which help to reduce cost overruns. This means that contractors have to put in place robust risk prevention practices to ensure that cost overruns are addressed during road construction.

Another strategy of forward contracts is utilized to lock in material supply prices, helping to control cost overruns and minimize price fluctuation, respondents agree (*M*=4.20, 84%, *SD*=0.94) that some activities of road construction after budgeting are outsourced to reduce incidents of project delays. This means that as a way of transferring the risks, road contractors outsource and sub contract various tasks in order to minimize risks and ensure that the issue of projects cost overruns or delays are addressed. Most respondents agree (*M*=3.77, 75.4%, *SD*=0.81) that forward contracts which fix material supplies prices are utilized to address the cost overruns and reduce price volatilities. This helps contractors to negotiate with suppliers and other entities at the beginning of the contract on prices of supplies to be purchased at a future date. The use of forward contracts helps to address price shocks in case of increased inflation and product price surge.

The statistics in Table 4 reveals also that respondents agree (*M*=3.73, 74.6%, *SD*=0.86) that legal agreements are established to safeguard the project against disputes stemming from cost variations coming from roads project construction which may cause cancellation, abandonment or delays in project implementation. Therefore, risks associated with disputes that could arise and lead to court litigation processes are always avoided at the beginning by sealing all loopholes that can be used. This is done by having all agreements in the tendering, process and set standards of construction of roads by legally instituted. The statistics further show that respondents agree (*M*=3.99, 79.8%, *SD*=0.95) that every person and machine used during road construction projects is always monitored to ensure that they are insured in order to shield the government from extra costs associated with injuries, theft, breakages and fire. As a way of shifting the risks, the Constituency Roads Committee members ensure that all road construction equipment and workers are insured. Lastly, respondents agree (*M*=3.78, 75.6%, *SD*=0.86) that Projects are continuously monitored, and any cost variations are reported throughout the project lifecycle to prevent overruns, changes are reported to the concerned authorities during project lifetime to avoid cost overruns. Composite scores show that respondents agree (*M*=3.7220, 74.42%, *SD*=1.0198) that risk management strategies are implemented during construction of road projects in Migori County.

4.2 Hypothesis Testing

A regression analysis was computed to examine the relationship between risk Management (RM) and implementation of road construction projects while holding other variables constant. The results are presented in Table 5. (a, b & c). The study used multiple regression model to test the hypothesis.

Implementation of road construction projects = f (risk management strategy and random error)

$IP = \beta_{01+} \beta_1 RM+\varepsilon$ (Equation 1)

Equation 1 is used to establish the significance or otherwise, of effect of the independent variable on the implementation of road construction projects. The model summary results are provided in Table 5 (a).

Table 5 (a)

Model Summary of RM and IP

Model 1	R	R Squared	Adjusted R Squared	Std. Error of the Estimate
1	.840[a]	.705	.700	.54792717

a. Predictors: (Constant), RM

The theoretical t at the same degree of freedom and at the 5 percent level of significance is $|t_{05}| = 1.943$

Table 5 (a) shows that the adjusted R-squared is 0.700, which means that 70.0% of the variation in the implementation of road construction projects is explained by the risk management strategy. The remaining 30.0% is attributable to other variables that were not included in the model. The F-test results are presented in Table 5(b)

Table 5 (b)
ANOVA[a] of RM and IP

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	160.750	4	40.187	133.858	.000[b]
	Residual	67.250	224	.300		
	Total	**228.000**	**228**			

a. Dependent Variable: IP
b. Predictors: (Constant), RM

There are 228 (N-4) total degrees of freedom with the predictor. The prediction model is statistically significant, F (4, 224) =133.858, p=0.001. This means that there is sufficient evidence to conclude that the regression model fits the data better than the model with no predictor variable. Hence, the predictor variable in the model actually improve the fit of the model. Table 5 (c) presents the regression coefficient results for the model.

Table 5 (c)
Coefficient[a] of RM and IP

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		β	Std. Error	Beta		
1	(Constant)	8.727	.036		.000	1.000
	RM	.262	.044	.262	5.892	.000

a. Dependent Variable: IP

The theoretical t at the same degree of freedom and at the 5 percent level of significance is $|t_{05}| = 1.943$. The multiple linear function can be written as:
IP=8.727++0.262RM+ε…

The results in table 5 (c) show that the regression coefficients of risk management strategy are positive and significant for; risk management (β=0.262, |t| =5.892, p=0.001). Therefore, risk management strategy has significant effects ($|t| > |t_{05}|$) on the implementation of road construction projects in Migori County.

4.3 Discussion

The study discovered that in many road projects, CRC and contractors were aware of the number of expected risks and devised methods of mitigating them. The understanding of expected risks helped the road project implementers to develop alternative ways of managing the risks hence improved level of implementation of road projects. However, the respondents indicated that they rarely took action unless the risk was triggered regularly during road construction. As a way of spreading and mitigating risks, it is common that some functions and activities are outsourced to other sub-contractors in order to reduce project delays associated with road constructions projects. The study finding reveals that risk management activities are undertaken (M=3.72, SDv 1.01) during implementation of KeRRA road construction projects in Migori County. The t-statistic indicates that there is a significant relationship (β = 0.262, |t| = 5.892, p=0.001) between risk management interventions and implementation of KeRRA road construction projects in Migori County, resulting to rejection of the null hypothesis. The finding corresponds well to Sebestyen and Tamas (2020) study on broader view of risk management process in projects in Hungary. Their study employed panel research design which is non experimental in nature. They discovered in their study that when conducted, risk management, helps quantify and place risks in some order of priority and highlights remedial decisions to be made early, hence increases the likelihood of successful project implementation. They added that the effectiveness of subsequent stages of risk management usually depends on the evaluation of the likelihood and magnitude of risk. Equally, Dandage et al. (2018) also conducted a study in India on analysis of interactions among barriers in project risk management. The study used cross-sectional survey research design and found that to totally maintain a strategic distance from dangers; hazard shirking requires the deserting of the entire undertaking. By and by, it is dangerous to dismiss the entire task; and that risk management can be performed in several ways even by changing the venture design or technique to keep away from inadmissible dangers. Deloach (2012) in a study of key elements of the risk management process asserted that in order to increase chances of project success, risk management strategy must be infused at the initial stages of project implementation and run through the entire project lifecycle.

Also in agreement with the findings, Gain and Mishra (2021) argued that as long as a project continued within its allocated budget, there existed no impact on cost overrun risk leading to project success, similarly, to protect road construction projects against costs related to injuries, theft, breakages and fires, the current study discovered that the

Constituency Roads Committee members ensures that every individual, machinery and materials are properly insured leading to project success. On the same note, Mukamwezi's (2022) regression results revealed that risk management had a significant positive effect on road construction performance in Rwanda. In conformity to the study results, Kimani (2017) also found out that risk management strategies (β=.114, t=1.982, *p*=0.050) have significant influence on performance of public secondary school's construction projects in Murang'a County. The study found out that some construction functions which could cause delay when being performed by the main contractor were outsourced as part of enhancing the implementation process. Kimani (2017) further found out that schools purchased insurance premiums on some construction items and ensured that no unforeseen risks would cause delay in project implementation. Furthermore, little room for adjustment of budgets for road construction were allowed and this helped in reducing cost overruns associated with road construction projects, these further cemented the crucial role risk management plays in project implementation.

Findings of Aduma and Kimutai (2018) on project risk management strategies and project implementation at the national Hospital Insurance Fund supports the finding of the current study. The objective of the NHIF study was to establish the effect of project risk management techniques on project implementation at National Hospital Insurance Fund (NHIF) in Kenya. The study revealed that putting in place risk management strategy influences implementation of NHIF projects to a great extent. The study also found out that, use of outsourcing, high cost of risk premium and stakeholder involvement as a risk management strategy influences successful implementation of NHIF projects. Though the study was hinged on the transaction cost economic theory, contingency theory, agency theory and uncertainty theory, the current study was solely hinged on risk management theory, but, both studies underscore the significant influence of risk management on project success. In its final conclusion, the study observed that effective risk management strategy put in place has the greatest effect on NHIF project implementation success. The current study therefore lends validation of the effectiveness of risk management strategy on successful road projects implementation. The findings of the current study also concur with Kirira et al. (2020) study which revealed that management of risks influenced performance of KeNHA road constructions projects in the Coast region of Kenya to a great extent. These studies therefore reaffirm that risk management strategy if carefully instituted increases the chances of project success.

In a contrasting view though, Dikman, (2020) in a study of construction of a Swedish pharmaceutical plant, asserted that success of implementation of any construction project depends on the competence of the key players such as the owners, the consultants and the contractors at project scope management level and not necessarily on observing risk management strategies among other things. In support of this view, PMI (2021) asserts that project scope management is the processes required to ensure that the project includes all the work required, and only its observance is crucial to successful completion of projects and that disregard for other processes have little consequence on project implementation success. In a similar observation, Abdul-Rahman et al. (2009) in a study demonstrated the relationship between the dependent variable, road project implementation delays and the independent variables. The independent variables included late payment, disregard for risk management, poor cash flow management, insufficient financial resources and financial market instability. The results of the study indicated that risk management had the least influence on project implementation success. Despite all the above contradictions, the current study, as further confirmed by Ochenge (2021) in a study which explored project management practices and implementation of road infrastructure projects done by local firms in the lake basin region of Kenya, empirically indicated that project risk management, have a significant and positive influence on the implementation of road infrastructure projects in the region.

V. CONCLUSION & RECOMMENDATIONS

5.1 Conclusion

The study examined the influence of risk management strategy on implementation of road construction projects in Migori county Kenya. It found out that most respondents rated the implementation level of road projects in the county was at average level occasioned with delays, increased costs, substandard works and unfinished sections. The study showed that most roads being implemented did not factor into consideration risk management strategies and therefore faced multiple implementation challenges related to cost, timeline and also quality of workmanship. The null hypothesis was rejected ($p<0.05$) resulting to the conclusion that risk management had significant influence on implementation of road construction projects in Migori county. This meant that, risk management strategy when put in place have a significant influence on the way roads are being implemented in the county of Migori. The findings underscore that risk management plays a critical role in shaping project implementation outcomes, particularly with regard to timeliness, cost control, quality of works, and overall project completion. Effective risk management strategy instituted was found to be essential in minimizing disruptions arising from financial, technical, environmental, and even stakeholder-related uncertainties.

As revealed from the study, although risk management practices and their benefits are widely recognized across departments within county leadership, their application remains largely fragmented and reactive in nature. Inadequate

institutional frameworks, limited technical capacity, and insufficient integration of risk management into planning and monitoring systems constrain the effectiveness of the strategy. Consequently, road construction projects in Migori County continue to experience delays, cost overruns, and implementation inefficiencies that could otherwise be mitigated through structured and proactive risk management approach. Overall, the study concluded that strengthening and institutionalizing risk management strategy within county road construction projects is imperative for improving project implementation performance. Embedding risk management into policy, project planning, and monitoring processes, while addressing contextual challenges such as stakeholder dynamics and environmental conditions, will enhance the sustainability and success of road infrastructure development in Migori County. The findings contribute valuable empirical insights to the body of knowledge on infrastructure project management within devolved governance systems and provide a foundation for improved practice and future research.

5.2 Recommendations

The County Government of Migori should formally integrate risk management into all stages of road construction projects by developing and enforcing a standardized risk management framework. This framework should require mandatory risk identification, analysis, mitigation, and monitoring plans for every road project, from feasibility to completion. Embedding risk management within county project implementation guidelines will ensure consistency and reduce reliance on individual project managers' discretion. There is a need for continuous capacity building for county engineers, project managers, and technical staff especially KeRRA, KeNHA and KURRA engineers on practical risk management tools and techniques. Training should focus on risk assessment methods, use of risk registers, scenario analysis, and climate-resilient planning. Enhancing technical capacity will enable project teams to anticipate and manage risks more proactively, thereby improving implementation performance.

Risk monitoring should be strengthened through regular risk review meetings and integration of risk indicators into project monitoring and evaluation (M&E) systems. Early warning mechanisms should be established to detect emerging risks such as contractor underperformance or escalating material costs. Continuous risk tracking will enable timely corrective action and improve project implementation outcomes. Risk management should be explicitly linked to project M&E frameworks by including risk-related indicators such as frequency of risk events, effectiveness of mitigation measures, and impact of risks on time and cost performance. This will enhance learning, accountability, and evidence-based decision-making in road project implementation.

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