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PROJECT RISK MANAGEMENT ON THE PERFORMANCE OF ROAD CONSTRUCTION PROJECTS IN KENYA

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ABSTRACT

This study sought to investigate the effect of project risk management on the performance of road construction projects in Kenya, and to find out the moderating effect of organizational culture on the relationship between project risk management and performance of road construction projects in Kenya. This study adopted cross-sectional research design and used a positivist research paradigm. The unit of analysis was the road construction projects implemented by National Government road agencies (KURA, KeRRA, and KeNHA) in Kenya while the unit of observation was management employees involved in the implementation of these road construction projects. Therefore, the target population for the research was 695 respondents comprising of director generals, directors, project engineers, resident engineers, site engineers and surveyors involved in the implementation of these projects. The overall sample size for this study was determined using a formula by Krejcie and Morgan which obtains 248 respondents. This study employed stratified random sampling to select study sample. Primary data was used and was collected using a semi structured questionnaire. Samples of questionnaire was pilot tested to 24 respondents to test for reliability and validity. Data was analyzed using the Statistical Package for Social Sciences (SPSS) version 25 software. Qualitative data collected was analyzed using thematic analysis and presented in prose form. Quantitative data was analyzed using descriptive statistics and presented in tables and figures. The study also computed correlation and regression analysis to test the relationship between study variables and test the research hypothesis. The study found that project risk management has a positive and significant relationship with performance of road construction projects in Kenya. In addition, organizational culture was found to have a positive significant moderating effect on the relationship between Project risk management and performance of road construction projects in Kenya. Based on the findings of the study, it is recommended that organizations involved in road construction projects in Kenya should prioritize project risk management and organization culture.

Key Words: Project Risk Management, Performance, Road Construction Projects, Organizational Culture

Background of the Study

Within the realm of project governance, the integration of risk management plays a crucial role in steering organizational activities effectively (Kanyane & Sausi, 2015). Governance frameworks, characterized by principles such as accountability, transparency, and sound decision-making, provide the essential structure for ethical and efficient management actions (Müller & Turner, 2017). Despite significant strides in project management methodologies, challenges persist in ensuring the success of projects, particularly in complex endeavors like road construction projects (Pinyarat et al., 2018). The importance of robust governance mechanisms becomes evident in addressing these challenges, as they offer oversight and risk management frameworks to navigate uncertainties and mitigate potential disruptions (Sanderson, 2016).

In the context of large-scale government projects, including road construction projects in Kenya, the absence of effective governance often leads to performance shortcomings and project failures (Khan, Turner & Maqsood, 2019). Ambiguous project goals, inadequate risk management frameworks, and deficient management controls are cited as significant contributing factors to these outcomes. To address these concerns, standardized approaches to project risk management have been advocated (Eliwa et al., 2018). By aligning project activities with organizational strategies, frameworks such as the Enterprise Project Governance offer a pathway to enhancing risk management and project performance (Dinsmore & Rocha, 2013).

This study aimed to delve into the role of project risk management within the governance framework of road construction projects in Kenya. By examining the influence of risk management practices on project performance, it sought to contribute to the understanding of how governance mechanisms can be leveraged to enhance the success of infrastructure projects in the region.

Statement of the Problem

Road construction projects play a pivotal role in the socio-economic development of Kenya, facilitating trade, enhancing connectivity, and fostering regional integration. However, the successful execution of these projects is often impeded by a myriad of risks that jeopardize their performance and undermine their intended benefits. One of the primary challenges in road construction projects in Kenya lies in the inadequate identification and assessment of risks. According to Mwaura et al. (2018), the absence of robust risk identification mechanisms results in project teams being ill-prepared to address potential threats effectively. Consequently, risks such as political instability, funding challenges, and poor planning often manifest during project execution, leading to delays and cost escalations.

Environmental challenges pose another significant risk to road construction projects in Kenya. Ondieki et al. (2020) emphasize the detrimental effects of unpredictable weather patterns, soil erosion, and inadequate waste management on project timelines and costs. Additionally, disruptions in the supply chain, including material shortages and labor disputes, further exacerbate project risks, leading to delays and compromised quality (Ogutu et al., 2017). Data from the Kenya National Bureau of Statistics (KNBS) reveals that extreme weather events, such as floods and landslides, occur frequently in Kenya, affecting infrastructure projects, including road construction, with an estimated economic loss of 1.5% of the country's GDP annually.

Despite existing risk management frameworks, the effectiveness of risk mitigation strategies remains suboptimal, leading to project delays, cost overruns, and compromised outcomes (Nanto, 2022). According to the annual report for Financial Year 2020-2021, the Kenya National Highway Authority (2022), indicates that 42% of the projects had a Cost Performance Index (CPI) of less than 1 which signifies that these projects were utilizing more funds than budgeted and were likely to experience cost overruns. In addition, the Office of the Auditor General (2021) indicates that

the Kenya Urban Roads Authority had targeted to implement 43.2 Km of Low Volume Seal roads during Financial Year 2019-2020 but only 35Km were implemented. Addressing these challenges requires proactive risk identification, robust planning, enhanced stakeholder collaboration, and improved governance mechanisms.

Various researchers have studied project risk management. Carvalho and Rabechini (2015) conducted a study on the impact of risk management on project performance. This study failed to show the influence of risk identification, risk assessment and risk monitoring and control on project performance. In addition, the study used descriptive research design while the current study used cross-sectional research design hence the study findings cannot be adopted in this study. A study by Ali et al (2019) demonstrated that adopting effective risk management practices positively impacts project performance thus leading to project success. However, this study was limited to Malaysia hence inhibiting generalization of the study findings to a study being conducted in Kenya. Alsadi and Norhayatizakuan (2021) revealed that practicing risk management improve the performance of construction project significantly. However, this study failed to show how risk identification, risk assessment and risk monitoring and control influence project performance hence the study findings cannot be generalized to the current study. In addition, the moderating influence of organization culture on risk management and performance of road construction projects in Kenya has not been reviewed. Therefore, this study sought to fill the prevailing knowledge and contextual gaps by examining the influence of project risk management on road construction projects in Kenya.

Objectives of the Study

1. To assess the influence of project risk management on the performance of road construction projects in Kenya.
2. To examine the moderating effect of organization culture on the relationship between Project risk management and performance of road construction projects in Kenya.

Research Hypothesis

The study sought to test the following research hypothesis;

Ho1: There is no significant influence of project risk management on performance of road construction projects in Kenya.

Ho2: There is no significant moderating effect of organizational culture on the relationship between project risk management and performance of road construction projects in Kenya.

LITERATURE REVIEW

Enterprise Risk Management Theory

Enterprise Risk Management (ERM) theory according to Nocco and Stulz (2006), advocates for the measurement and management of notable risk facing a given entity as a whole rather than the management of each risk independently. The primary objective is fundamentally to integrate risk mitigation in the company into a single, comprehensive framework. This theory insists that top management and the other employees ought to be part of risk management process and measuring and reverting to big organizational risks (Augustine, *et al,* 2018). According to Amandin and Kule, (2016) this theory confirms if ten companies implement procedure and rules which govern appetite of risk, plan of action objectives, well arranged processes, they would enhance capability of managing risks by ascertaining, evaluating, and responding to the risks. This theory emphasis on formation of risk management philosophy that empowers all employees to play part in mitigating risks. Bennett, Chekaluk, and Batchelor (2016) recommended that ERM activities enhance competitiveness, customer satisfaction and organizational sustainability. Cagliano, Grimaldi, and

Rafele (2015) points out that applications of ERM concept in the construction sector is prudent because it's done to sectors with very high chances of collapsing such as construction sector. Enterprise Risk Management is therefore essential in identifying and managing risks in road construction projects.

Enterprise Risk Management (ERM) theory provides a broader framework for managing risks across an organization, including project risk management (Ali *et al*, 2019). In the context of road construction projects in Kenya, the application of project risk management principles influenced by ERM theory can have a significant impact on project performance. ERM theory promotes a holistic approach to risk management, considering risks at both the organizational and project levels (Alsadi & Norhayatizakuan, 2021). By applying ERM principles, road construction agencies in Kenya can identify and assess risks not only specific to the project but also those arising from external factors, such as regulatory changes, political instability, or economic conditions. This broader perspective allows for a more comprehensive risk management strategy that takes into account both project-specific risks and broader organizational risks (Didraga, 2017). This theory was therefore used in this study to assess the influence of project risk management on the performance of road construction projects in Kenya.

Conceptual Framework

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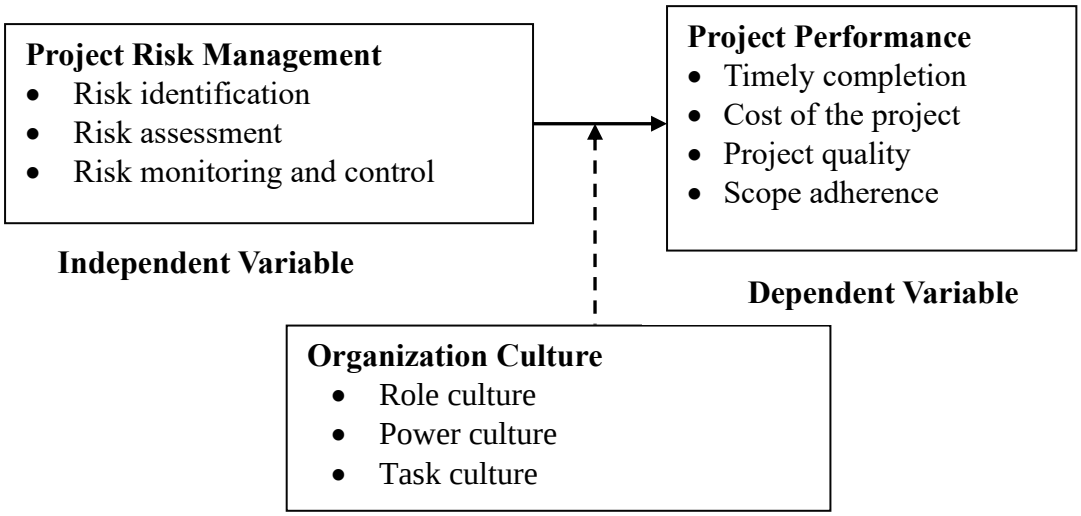

Figure 1: Conceptual Framework

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Project Risk Management

Project risk management is the process of identifying, assessing, prioritizing, and mitigating risks that may affect the successful completion of a project (Haniff & Galloway, 2022). According to Eliwa et al. (2018) project risk management involves proactive planning, monitoring, and controlling of risks throughout the project lifecycle to minimize their impact and increase the likelihood of project success. Effective project risk management helps project managers and teams proactively address potential challenges and uncertainties. It increases the project's chances of success by minimizing the impact of risks, improving decision-making, and enabling better resource allocation and contingency planning (Alsadi & Norhayatizakuan, 2021). Project risk management entails; risk identification, risk assessment and risk monitoring and control

Risk identification is a critical component of project risk management (Yung-Chang & Wu, 2019). McCardle *et al.* (2019) indicate that risk identification involves systematically identifying and documenting potential risks that could impact the success of a project. By proactively identifying

risks, project managers and teams can develop appropriate strategies to mitigate, avoid, or manage those risks effectively. McCardle *et al.* (2019) argue that conducting brainstorming sessions or workshops is a common technique to identify risks.

According to Vundi (2020), risk identification is a foundational step in project risk management. By systematically identifying potential risks through stakeholder involvement, brainstorming sessions, documentation review, external factors analysis, expert judgment, and various analytical techniques, project teams can proactively address risks and increase the chances of project success. Kibe and Wanyoike (2016) indicates that it is important to involve relevant stakeholders, including project team members, subject matter experts, and key stakeholders, in the risk identification process. According to McCardle *et al.* (2019) different perspectives and expertise can help in identifying a comprehensive range of risks. This involves gathering project team members and stakeholders to generate ideas and identify potential risks associated with various project elements such as scope, schedule, resources, technology, and external factors.

Risk assessment involves analyzing and evaluating identified risks to understand their potential impacts, likelihood of occurrence, and prioritize them based on their significance to the project (Yung-Chang & Wu, 2019). According to McCardle et al. (2019), the goal of risk assessment is to provide a quantitative or qualitative understanding of the risks, enabling project teams to make informed decisions regarding risk response strategies and resource allocation. Vundi (2020) holds that risk assessment involves evaluating the potential impact of each identified risk on project objectives such as scope, schedule, cost, quality, and stakeholder satisfaction. The impact analysis helps in understanding the magnitude of the consequences if a risk event occurs (Kibe & Wanyoike, 2016). According to Haniff and Galloway (2022) assessing the likelihood or probability of each risk occurrence is essential. This involves considering factors such as historical data, expert judgment, project characteristics, and external influences. The likelihood assessment helps in determining the chances of risks materializing during the project's lifecycle (Eliwa *et al*., 2018).

Risk monitoring and control is concerned with the ongoing tracking, review, and control of identified risks throughout the project lifecycle (Haniff & Galloway, 2022). The goal of risk monitoring and control is to ensure that risks are effectively managed, responses are implemented, and new risks are identified and addressed promptly (Eliwa et al., 2018). According to Carvalho and Rabechini (2018) risk monitoring involves tracking identified risks, including their current status, potential impacts, likelihoods, and response strategies. This includes maintaining a risk register or risk log that serves as a central repository for all project risks. Regularly updating the risk register ensures that project teams have an accurate and up-to-date view of the project's risk profile (Yung-Chang & Wu, 2019). According to McCardle et al. (2019) risk control involves implementing the planned risk response strategies that were identified during the risk assessment phase. This includes executing risk mitigation actions, contingency plans, or fallback plans as necessary. Effective risk response implementation ensures that the project team takes appropriate actions to minimize the impact of identified risks (Vundi, 2020).

Organizational Culture

The influence of different organizational cultures are usually reflected in numerous factors including style, structure, competence, shared values, norms and beliefs, policies and procedures, the view of relationships with authority, and work ethics, to mention but a few (Mugo & Moronge, 2018). In addition, organizational culture influences organizational performance through shaping the behavior of organization members (Ochiel, Iravo, Wandera, 2016). Obeidat, (2016) points out that, an organization’s culture is considered to be an important factor affecting organizational success or failure. Tam, *et al*, (2020) argue that organizational culture has a strong association with

the organization's sense of uniqueness, its values, mission, aims, goals and ways of building shared values. Therefore, ignoring organizational culture in plans for any changes within the organization would yield unforeseen and negative consequences (Naeem *et al*, 2018). This study focuses on role culture, power culture and task culture.

Role culture, also known as a bureaucratic or functional culture, is an organizational culture that places a strong emphasis on hierarchical structures, clearly defined roles and responsibilities, and adherence to established rules and procedures (Nguyen Luong & Watanabe, 2017). In a role culture, individuals are assigned specific roles based on their expertise, and decision-making authority is typically concentrated at the top levels of the organization. Role culture emphasizes specialization and a clear division of labor. Employees are assigned specific roles and responsibilities based on their skills and expertise. Each role has well-defined tasks and functions, which helps create a sense of order and clarity within the organization (Ochiel, Iravo, Wandera, 2016). Role culture is characterized by a hierarchical structure, where authority and decision-making power are concentrated at the top levels of the organization. The reporting relationships are clearly defined, and individuals are expected to follow the chain of command (Ackon, Kheni, & Mensah, 2022).

Project Performance

Project management is an art and a science; an art because it requires the skills, tact and finesse to plan, lead, coordinate, and communicate with various departments and personnel and, a science because of the use of specific knowledge, skills, tools, and techniques to achieve project objectives (Xian & Bakhtnia, 2022). According to Alade et al. (2016) timely delivery of projects within budget and to the level of quality standard specified by the client is an index of successful project delivery. This involves balancing competing demands among: scope, time, cost and quality; stakeholders with different needs and expectations; identified requirements and expectations (Pieter, 2018). Citing the Project Management Body of Knowledge [PMBOK] (2011) Mandy and Immerwahr, (2018) argued that a project is considered underperforming when it has not delivered what was required, in line with expectations of cost, quality and time. Consistent with this argument, Pinto and Winch, (2016) submits that one of the biggest problems of project managers is to harmonize project cost, time and quality. However, it is difficult to achieve this because cost, time and quality are related in the way that a change of one influence on the other two. In this study, project performance is measured in terms of timely completion, cost of the project, project quality and scope adherence.

Project cost focuses on evaluating whether the project is completed within the approved budget and managing costs effectively throughout the project lifecycle (Mohindra, & Srivastava, 2019). Effective cost management ensures optimal allocation of resources. By controlling project costs, resources such as funds, personnel, equipment, and materials can be efficiently allocated to meet project requirements and priorities (Pinto & Winch, 2016). Cost management mitigates financial risks associated with the project. It involves identifying potential cost risks, such as budget overruns, and implementing strategies to mitigate those risks before they impact the project's financial health. To effectively manage project costs, project managers should develop accurate and comprehensive cost estimates, establish a robust cost tracking and reporting system, monitor costs regularly, and proactively address cost deviations. Collaboration between project managers, finance teams, and stakeholders is crucial for successful cost management throughout the project lifecycle (Pieter, 2018).

Scope adherence refers to the degree to which a project stays within the defined scope boundaries throughout its lifecycle (Pinto & Winch, 2016). Scope adherence measures the project team's ability to deliver the agreed-upon scope of work without unnecessary additions, changes, or

omissions. Adhering to the project scope helps manage stakeholder expectations. When the project team delivers within the agreed-upon scope, it minimizes the risk of stakeholders expecting additional work or deliverables that were not initially planned (Mandy & Immerwahr, 2018; Mohindra & Srivastava, 2019). Scope adherence contributes to effective time and cost management. When the project team sticks to the defined scope, it minimizes the likelihood of scope creep, which can result in schedule delays, cost overruns, and resource inefficiencies (Pieter, 2018).

Empirical Review

Project Risk Management and Project Performance

In Mayasia, Ali *et al* (2019) focused on the influence of risk management on construction project performance. The aim of the study was to determine the influence of risk management on construction project performance of Malaysian companies based on these three primary measures. The degree of diffusion of risk management practice in the chosen construction project in Malaysia was also examined. The methodological approach used in the study was a case study approach involving analysis of documented data and face-to-face interviews with key players that hold different roles and responsibilities. The respondents included a director, project managers, finance managers, contract managers and quantity surveyor managers. The results indicate that adopting effective risk management practices positively impacts project performance thus leading to project success. Conversely, lack of knowledge and poor communication of risk management practices in construction projects contribute to the weak implementation of an effective and systematic risk management practices in Malaysia.

Alsadi and Norhayatizakuan (2021) conducted a study on the Impact of risk management practices on the Performance of Construction Projects. The study applied quantitative methods to examine the relationship. Construction companies from excellent grade to second grade in Oman were included in the survey. The result revealed that practicing risk management improve the performance of construction project significantly. Based on this result it is essential to hire qualified project managers who have sufficient knowledge in risk management and its main activities.

Carvalho and Rabechini (2018) conducted a study on the impact of risk management on project performance. The hypotheses were tested based on a field study involving 263 projects distributed among eight industries. The fieldwork involved interviews with project managers and risk managers and an analysis of internal company documents about the projects' performance. The structural model was used to correlate the hard and soft sides of risk management with project success with project complexity as the moderator. The study indicated that the soft side of risk management was most prominently and explained 10.7% of the effect on project success. Moreover, the soft side supports the hard side, since there was a significant correlation that explains 25.3% of the effect on the hard side.

Didraga (2017) assessed the role and the effects of risk Management in IT projects success. The paper emphasized the role of risk management and its contribution to projects success in the existing literature. The methodology adopted was based on literature review and analysis of the concepts used in literature published between 1978 and 2012 from the main IT project management journals and publications. The study also performed a quantitative analysis of how risk management processes affect the subjective and objective performance of IT projects in Romanian IT companies. The results were that risk management is a very important component of the project management process and it is assumed implicitly to work in favor of project success.

Pimchangthong and Boonjing (2017) researched on effects of risk management practice on the success of IT Project. Data were collected from 200 project managers, IT managers, and IT analysts in the IT firms through questionnaires and analyzed using the Independent Sample t-test, One-way ANOVA, and Multiple Linear Regression at the statistical significance level of 0.05. The results demonstrated that the differences in organizational types affected the success of IT projects in all aspects, while the differences in organizational sizes affected the success of IT projects in terms of the aspect of product performance as well as total aspects.

Crispim, Silva, and Nazaré (2018) conducted a study on measuring project risk management process for construction contractors with statement indicators linked to numerical scores. To ascertain the degree to which project risk management processes were used, a questionnaire survey was employed. The study found out that the application of project risk management processes was significantly influenced by the various categories of size and experience of the surveyed construction contractors at $p<0.01$.

Byoun, Kim and Yoo (2019) conducted a study on risk management with leverage: evidence from project finance. The study developed a model for stage astute venture planning and booking under vulnerability. On the other hand, ventures which include culturally diverse groups cooperating from remote areas regularly require a general arrangement and spending which is executed through entwining of stage shrewd arranging and planning and about the significance of contingency designs that constitutes a genuine danger to the effective finishing of a product improvement venture. Further the study propose that contingency designs help venture groups to manage vulnerabilities, for example, taking care of new item advancement, upholding creative activities, increment design adaptability.

Aduma and Kimutai (2018) conducted a study on project risk management strategies and project performance at the national hospital insurance fund in Kenya. The study adopted a descriptive research design. The target population for this study was 651 management staff who were drawn from the following departments: finance, health insurance and legal affairs, public procurement, human resources, pharmaceuticals and logistics since all their functions are centralized. The study concluded that risk preventions have the greatest effect on National Hospital Insurance Fund (NHIF) project performance followed by risk control then risk acceptance while risk transfer having the least effect on NHIF project performance.

Organizational Culture on Project Performance

Yosinta (2016) researched on organizational culture and good governance in the public sector: the case of provincial administration in Thailand. The research used a mixed methods approach of questionnaire surveys and semi-structured interviews, based on the Competing Values Framework (CVF). Questionnaire surveys were carried out with 480 civil servants within 16 provinces. Semi-structured interviews – in-depth and focus group – were conducted within four provinces. A distinction was made between the low and high KPI scoring provinces. The findings of the research suggest that there was no dominant type of culture in the low and high KPI scoring provinces. Instead, a strong culture was found to be important in gaining high KPI scores, supported by participative leadership and appropriate management. Leadership style appeared to influence whether the public services performed to a high level, which seemed to be achieved through a balance between task focused and people focused. Therefore, a transformational cultural shift may not be required, but instead more effective leadership and management.

Ekung et al. (2017) studied the influence of project risk management on project performance: Evidence from Nigerian case studies. Data were collected using structured questionnaire and

examination of project archives. The study data were analyzed to determine the level of adherence to Project risk management essentials and the protracted implications on project performance. Respondents' assessment of the projects' performance using Kerzner's criteria, cost and time overrun were analyzed using the mean score and the test of hypothesis involved Spearman Correlation test. The result indicated that project risk management structure must be improved and such improvement will increase the performance of mega projects. To improve project risk management in mega projects therefore, the study suggests the need for stakeholders to ensure effective implementation and selection of Project risk management structure using industry's established principles and based on prioritized needs. The study provides useful insight into the problem inhibiting mega project performance and efficient use of project risk management in the public sector in developing countries.

RESEARCH METHODOLOGY

According to Cooper and Schindler (2018), the positivist research paradigm is founded on real facts, objectivity, impartiality, measurement, and the validity of results. The current study was therefore anchored on the positivism paradigm because it is highly structured in methodology which enables generalization of quantifiable observations and evaluation of results with the help of statistical methods. Cross-sectional research design analyses the cause-effect relationship between two or more variables. The study adopted cross-sectional since it uses theories and hypothesis to account for the forces that causes a certain phenomenon to occur (Cooper & Schindler, 2018).

The unit of analysis was the road construction projects implemented by National Government road agencies (KURA, KeRRA, and KeNHA) in Kenya while the unit of observation was management employees involved in the implementation of these road construction projects. The management employees include; top managers (director general and directors), middle managers (project engineers and resident engineers) and low level managers (site engineers and surveyors). Therefore, the target population for the research was 695 respondents comprising of director general, directors, project engineers, resident engineers, site engineers and surveyors involved in the implementation of these projects.

The participants were targeted in the research as they are well versed with the management of road projects in Kenya and more particularly in the three road agencies in Kenya. The overall sample size for this study was determined using a formula by Krejcie and Morgan (1970).

Therefore, using the Krejcie and Morgan formula, the sample size for the study was 248 respondents. Stratified random sampling was used in selecting the sample for this study. Primary data was obtained utilizing a semi-structured questionnaire. For purposes of this study, data collection was done through the use of web-based questionnaires (Google forms). According to Lütfi, (2020), the sample size for high precision pilot studies should be between 1% and 10%. Twenty-four respondents from the three road authorities were given questionnaire samples or pilot tested.

The Statistical Package for Social Sciences (SPSS) version 25 software was used to analyze the data. The research used descriptive analysis. Quantitative data was analyzed using descriptive statistics such as frequency, percentages, and means and summary graphs, pie charts, and frequency distribution tables to depict the data's sets of categories. This study conducted inferential statistics through correlation analysis. A multiple regression model was used to test the significance of the influence of the independent variables on the dependent variable. if the p-value is less than 0.05, the researcher concluded that the entire model is significant and has solid predictors of the dependent variable, and that the results are not random. The model was not significant if the p-

value was more than 0.05, thus could not be used to explain the fluctuations in the dependent variable.

RESEARCH FINDINGS AND DISCUSSION

Descriptive Analysis

They used a 5-point Likert scale where 1-strongly disagree, 2-disagree, 3-moderate, 4-agree, 5-strongly agree. The means and standard deviations were used to interpret the findings where a mean value of 1-1.4 was strongly disagree, 1.5-2.4 disagree, 2.5-3.4 neutral, 3.5-4.4 agree and 4.5-5 strongly agree. Standard deviation greater than 2 was considered large meaning responses were widely spread out and not tightly clustered around the mean. In other words, there was a lot of variability in the responses, which may suggest that participants had different interpretations or perceptions of the questions being asked.

Project Risk Management

The first objective of the study was to assess the influence of project risk management on the performance of road construction projects in Kenya. Respondents were therefore requested to indicate their level of agreement with various statements on project risk management and performance of road projects. Table 1 presents summary of the findings obtained.

In relation to risk identification, the respondents agreed that the authority ensures external factors such as weather conditions, regulatory changes, and political stability are considered in the risk identification process (M= 4.006, SD= 0.758); that project team members are actively involved in the identification of risks related to road projects (M= 3.891, SD= 0.816); and that the authority ensures potential risks and uncertainties on road projects are identified and documented (M= 3.853, SD= 0.921). The study findings are consistent with those of Ali *et al* (2019) which emphasize the need for organizations to establish well-defined and structured project risk identification process to enhance project performance and ensure successful project outcomes. It also agrees with Alsadi and Norhayatizakuan (2021) that effective project risk identification is important as it systematically identifies and documents potential risks that could impact the success of a project. Kibe and Wanyoike (2016) adds that by proactively identifying risks, project managers and teams can develop appropriate strategies to mitigate, avoid, or manage those risks effectively.

On risk assessment, respondents agreed that risks are assessed based on their likelihood of occurrence in road projects (M= 3.923, SD= 0.732). In addition, the respondents agreed that risks are assessed in terms of their potential impact on the successful completion of road projects (M= 3.885, SD= 0.794). Further, it was found that project team members use quantitative and/or qualitative methods to assess the magnitude of risks in road projects (M= 3.731, SD= 0.790). These results are in line with the findings of Yung-Chang and Wu (2019) who revealed that risk assessment plays a key role in establishing the potential impacts, likelihood of occurrence, and prioritizing risks based on their significance to the project. According to McCardle et al. (2019), the goal of risk assessment is to provide a quantitative or qualitative understanding of the risks, enabling project teams to make informed decisions regarding risk response strategies and resource allocation

On risk monitoring and control, respondents agreed that the authority ensures that risk mitigation measures are effective implemented and monitored to ensure their effectiveness in addressing identified risks (M= 3.769, SD= 0.818). In addition, the respondents agreed that the authority ensures response strategies are reviewed and updated to address evolving risks in road projects (M= 3.615, SD= 0.974). Further, the respondents agreed that project team members regularly review and update risk registers to reflect the current status and progress of risk management activities in road projects (M= 3.558, SD= 0.952). These results are in line with the findings of

Haniff and Galloway (2022) who revealed that risk monitoring and control is a key aspect of project risk management that facilitates project success. Eliwa et al. (2018) added that risk monitoring tracks identified risks, including their current status, potential impacts, likelihoods and response strategies. This includes maintaining a risk register or risk log that serves as a central repository for all project risks.

Table 1: Descriptive Statistics on Project Risk Management

Statements	Mean	Std. Dev.
Risk Identification		
The authority ensures potential risks and uncertainties on road projects are identified and documented	3.853	0.921
Project team members are actively involved in the identification of risks related to road projects	3.891	0.816
The authority ensures external factors such as weather conditions, regulatory changes, and political stability are considered in the risk identification process	4.006	0.758
Risk Assessment		
Risks are assessed in terms of their potential impact on the successful completion of road projects	3.885	0.794
Risks are assessed based on their likelihood of occurrence in road projects	3.923	0.732
Project team members use quantitative and/or qualitative methods to assess the magnitude of risks in road projects	3.731	0.790
Risk Monitoring and Control		
The authority ensures that risk mitigation measures are effective implemented and monitored to ensure their effectiveness in addressing identified risks	3.769	0.818
Project team members regularly review and update risk registers to reflect the current status and progress of risk management activities in road projects	3.558	0.952
The authority ensures response strategies are reviewed and updated to address evolving risks in road projects	3.615	0.974
Aggregate Score	**3.803**	**0.839**

The study also sought to establish additional ways in which project risk management affect performance of road construction projects in Kenya. The study found that all risks must be identified through a thorough assessment and a ledger prepared and updated as applicable from unforeseen incidents. This helps develop proper workplace safety protocols and standard operating procedures (SOPs) and to tailor-make safety capacity building materials. In addition, the respondents revealed that a good risk management system reduces the frequency and severity of accidents in construction sites. In addition, a strong risk warning system ensures smooth implementation of projects. The respondents agreed that good project risk management ensures roads are constructed to suit the prevailing and future needs and hence guarantees adequate performance.

The study found that project risk management helps the project management team achieve their targets of project completion against the constraints of time, scope and budget. In addition, project risk management reduces the magnitude of risks when there's an occurrence thus reducing the impact on road projects. The respondents indicated that risk management encourages a culture of continuous improvement. By incorporating lessons learned into future projects, risk management contributes to organizational knowledge and project performance enhancement. However, the respondents indicated that emerging risks are not addressed effectively, this leads to slow project

implementation. In addition, the respondents indicated that if risks are not identified in time, this may affect the progress or lead to more damages of structures and hence cost implications may go high.

Organizational Culture

The second objective of the study was to examine the moderating effect of organization culture on the relationship between projects governance projects governance and performance of road construction projects in Kenya. Respondents gave their level of agreement on statements on organizational culture on performance of road construction projects. Table 2 presents summary of the findings obtained. From the findings on role culture, the study found that respondents agreed that in their organization, roles are delegated according to individual education qualification and specialization (M= 3.846, SD= 1.008); that individuals have authority in positions they occupy (M= 3.885, SD= 0.909); and that when assigning tasks, individual educational qualification and interests are considered (M= 3.500, SD= 1.030). The findings agree with those of Nguyen, Luong and Watanabe (2017) that assigning tasks based on individual education qualification and interests was critical for project success in the construction industry. It also agrees with Yosinta (2016) that that giving individuals authority in positions they occupy was important for job satisfaction and employee performance. Also, Ekung *et al*. (2017) emphasized the importance of assessing individual educational qualification and specialization when delegating tasks in construction project management. The authors suggest that project managers should prioritize assessing individual skills and expertise to ensure that the right person is assigned to the right task, which can improve project outcomes and reduce the risk of errors and delays.

On power culture, respondents agreed that subordinates in their organization have to strictly follow their superior's instructions (M= 3.769, SD= 0.765). This is consistent with Weber (1947) concept of authority which argues that legitimate power is based on a belief in the legitimacy of the rules and the individuals who enforce them. In this view, power is not inherently negative or oppressive, but rather it is a necessary aspect of organizational functioning. Therefore, subordinates may agree that they have to strictly follow their superiors' instructions because they believe in the legitimacy of their superiors' authority. The findings further showed that the respondents were neutral on the statement that in their organization, power remains in the hands of few individuals (M= 3.308, SD= 1.258); and that decision making in their organization is made by few individuals who have power (M= 3.231, SD= 1.177). This is consistent with Abdullahi and Luketero (2018) observations on organizational power and decision-making, which suggests that power can be both centralized and decentralized in organizations.

Further, the study found on task culture that respondents were in agreement that in their organization, teams are formed to achieve set targets (M= 3.923, SD= 0.796) and that critical problems are solved in teams (M= 3.731, SD= 0.874). Findings also showed that respondents also agreed that their organization depends on teamwork to produce results (M= 3.615, SD= 0.983). This agrees with Ingosi and Juma (2020) on the importance of teamwork and collaboration has been highlighted in the literature on organizational culture, where it is argued that a task-oriented culture can enhance organizational effectiveness and performance. Respondents were however neutral on the idea that team members in their organization have to contribute equally to accomplish tasks (M= 2.923, SD= 1.129). This could suggest that there may be some uneven distribution of work or contributions in the team. This is consistent with Abdullahi and Luketero (2018) who suggested that issues such as free-riding, social loafing, and unequal contributions can be detrimental to team effectiveness.

Table 2: Descriptive Statistics on Organizational Culture

	Mean	Std. Dev.
Role culture		
In my organization, roles are delegated according to individual education qualification and specialization	3.846	1.008
When assigning tasks, individual educational qualification and interests are considered	3.500	1.030
Individuals have authority in positions they occupy	3.885	0.909
Power culture		
In my organization, power remains in the hands of few individuals	3.308	1.258
Decision making in my organization is made by few individuals who have power	3.231	1.177
Subordinates in my organization have to strictly follow their superior's instructions	3.769	0.765
Task culture		
In my organization, teams are formed to achieve set targets	3.923	0.796
In my organization, critical problems are solved in teams	3.731	0.874
Team members in my organization have to contribute equally to accomplish tasks	2.923	1.129
My organization depends on teamwork to produce results	3.615	0.983
Aggregate Score	**3.573**	**0.993**

The study also sought to establish other ways in which organizational culture can affect projects governance on performance of road construction projects in Kenya. The study found that a culture that values innovation, risk-taking, and continuous improvement may encourage project teams to take calculated risks and explore new approaches to improve project outcomes. In contrast, a culture that is bureaucratic, hierarchical, and risk-averse may hinder innovation and limit project team creativity. Moreover, organizational culture can also influence the projects governance by shaping the decision-making processes and practices within the organization. For example, a culture that values transparency, accountability, and stakeholder engagement may encourage more open and participatory decision-making processes, which can improve project risk management and reduce the risk of corruption or unethical behavior. On the other hand, a culture that prioritizes individual interests, political influence, and favoritism may lead to opaque and exclusive decision-making processes that undermine project risk management and performance.

In addition, the culture of an organization can also shape the communication patterns and practices within project teams and with external stakeholders. For example, a culture that values open and honest communication may encourage project teams to share information and feedback more freely, which can improve collaboration and decision-making. Conversely, a culture that is characterized by mistrust, secrecy, and blame-shifting may lead to poor communication and collaboration, which can undermine project performance.

Performance of Road Projects

The main objective of the study was to examine the influence of projects governance on performance of road construction projects in Kenya. Respondents were therefore requested to indicate their level of agreement with statements on performance of road construction projects. Table 3 presents summary of the findings obtained. The findings show the mean values and standard deviations for various aspects of project performance, including timely completion, cost of the project, project quality, scope adherence, and stakeholder satisfaction. The mean values for most of the performance aspects were below the neutral range of 2.5-3.4, indicating a negative

perception of project performance by the respondents. The standard deviations were within an acceptable range, indicating a moderate level of agreement among the respondents.

The results suggest that there is room for improvement in various aspects of project performance in road construction projects in Kenya. For instance, the mean values for timely completion and cost of the project were below the neutral range, indicating that the projects are not being completed on time or within budget. This finding is consistent with those of Abdullahi and Luketero (2018) that identified time and cost overruns as major challenges in road construction projects. On the other hand, project quality had means above 3.5 meaning the project quality was satisfactory (M= 3.539, SD= 1.029); and that stakeholders are satisfied with completed projects (M= 3.654, SD= 0.797). This finding aligns with Ekung *et al.* (2017) that emphasized the importance of project quality and stakeholder satisfaction as key measures of project success. Further, scope adherence had means below 3.5, meaning some projects are completed as per the defined scope while others are not (M= 3.385, SD= 1.023); and in some cases projects execution adheres to all of a project's key elements and in other cases projects execution does not adhere (M= 3.346, SD= 0.977). Pinto and Winch, (2016) argued that a project is considered underperforming when it has not delivered what was required, in line with expectations of cost, scope adherence, quality and time. Consistent with this argument, Mohindra, and Srivastava, (2019) submits that one of the biggest problems of project managers is to harmonize project cost, time, scope and quality

The findings suggest that there is a need to improve project performance in various aspects, particularly timely completion and cost management. These findings are consistent with previous research (Mohindra, & Srivastava, 2019) that has identified time and cost management as critical challenges in road construction projects. Therefore, efforts should be made to address these challenges to improve the overall performance of road construction projects in Kenya.

Table 3: Descriptive Statistics on Performance of Road Projects

	Mean	Std. Dev.
Timely completion		
Projects are finished on time.	2.350	0.689
Projects activities were carried out as scheduled.	2.423	0.857
Cost of project		
The projects are finished within budget.	2.423	0.758
There are no project cost overrun incurred	1.885	0.766
Project quality		
The project quality was satisfactory	3.539	1.029
Stakeholders are satisfied with completed projects	3.654	0.797
Scope adherence		
The projects was completed as per the defined scope	3.385	1.023
Project execution adheres to all of a project's key elements.	3.346	0.977
Aggregate Score	**2.875**	**0.862**

Correlation Analysis

Correlation analysis measures the strength and direction of the linear relationship between two variables. Pearson correlation coefficient was used for testing associations between the independent and the dependent variables. If the correlation values are r = ±0.1 to ±0.29 then the relationship between the two variables is small, if it is r = ±0.3 to ±0.49 the relationship is medium, and when r= ±0.5 and above there is a strong relationship between the two variables under consideration. Table 4 presents the findings obtained.

The findings further indicate a positive and significant correlation between project risk management and the performance of road construction projects (r = 0.796, p = 0.002). This implies that higher project risk management can lead to improved project performance. This finding is supported by literature, which suggests that effective project risk management practices like risk identification, risk assessment and risk monitoring and control can enhance project success. Eliwa *et al.* (2018) argue that project risk management is a critical success factor in projects and that effective project risk management helps project managers and teams proactively address potential challenges and uncertainties.

Table 4: Correlation Analysis

		Performance	Project Risk Management
Performance of road construction projects	Pearson Correlation	1	
	Sig. (2-tailed)		
	N	222	
Project risk management	Pearson Correlation	.796**	1
	Sig. (2-tailed)	.002	
	N	222	222

Test for Hypothesis One

The first objective of the study was to assess the influence of project risk management on the performance of road construction projects in Kenya. The associated null hypothesis was that there is no significant influence of project risk management on performance of road construction projects in Kenya. A univariate analysis was conducted to test the null hypothesis.

R is the correlation coefficient, which indicates the strength and direction of the relationship between the predictor and outcome variables. In this case, R = .788 suggests a strong positive relationship between project risk management and the outcome variable (performance of road construction projects in Kenya). R Square is the coefficient of determination, which indicates the proportion of variance in the outcome variable that can be explained by the predictor variable. In this case, R Square = .621 suggests that 62.1% of the variation in the performance of road construction projects in Kenya can be explained by project risk management.

The remaining 38.4% variation in performance of road construction projects suggests that there are other important factors that influence the outcome variable, and further research may be needed to identify these factors and improve the predictive accuracy of the model.

Table 4: Model Summary for Project Risk Management

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.788[a]	.621	.619	.40181

a. Predictors: (Constant), Project risk management

The analysis of variance was used to determine whether the regression model is a good fit for the data. From the analysis of variance (ANOVA) findings in Table 4.22, the study found out that Prob>F (1, 220) = 0.000 was less than the selected 0.05 level of significance. This suggests that the model as constituted was fit to predict performance of road construction projects in Kenya. Further, the F-calculated, from the table (38.545) was greater than the F-critical, from F-distribution tables (3.884) supporting the findings that project risk management can be used to predict performance of road construction projects in Kenya.

Table 5: Analysis of Variance for Project Risk Management

Model		Sum of Squares	Df	Mean Square	F	Sig.
1	Regression	6.413	1	6.413	38.545	.000[b]
	Residual	36.52	220	.166		
	Total	42.933	221			

a. Dependent Variable: Performance of road construction projects

b. Predictors: (Constant), Project Risk Management

From the results in Table 6, the following regression model was fitted.

$$Y = 1.279 + 0.725 X_1$$

(X_1 is Project risk management)

The coefficient results showed that the constant had a coefficient of 1.279, suggesting that if project risk management was held constant at zero, performance of road construction projects in Kenya would be 1.279 units. In addition, results showed that the project risk management coefficient was 0.725, indicating that a unit increase in project risk management would result in a 72.5% improvement in performance of road construction projects in Kenya. It was also noted that the P-value for project risk management coefficient was 0.000, which is less than the set 0.05 significance level, indicating that project risk management was significant.

Based on these results, the study rejected the null hypothesis and accepted the alternative that there is positive significant influence of project risk management on performance of road construction projects in Kenya. The finding is consistent with that of a study by An et al. (2018) who found that project risk management had a positive significant influence on project success, and that effective project risk management was positively associated with project performance. Similarly, a study by Hermano, Martin-Cruz, and Pajares (2022) examined the relationship between project risk management and project success in the construction industry in Kuwait and found that project risk management had a positive significant influence on project success.

Table 6: Beta Coefficients for Project Risk Management

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	1.279	0.226		5.659	.000
	Project risk management	.725	.117	.785	6.208	.000

a. Dependent Variable: Performance of road construction projects

Hierarchical Regression Model

Hierarchical regression model was done to test for the moderating effect. This helped to test the fifth research hypothesis. The fifth objective of the study was to examine the moderating effect of organization culture on the relationship between project risk management and performance of road construction projects in Kenya. The study therefore computed moderating effect regression analysis.

Ho2: There is no significant moderating effect of organizational culture on the relationship between project risk management and performance of road construction projects in Kenya.

The findings in the second model which project risk management, organization culture and interaction term (X*M) as predictors, the r-squared was 0.711. This implies that the introduction of organization culture in the second model led to a 0.100 increase in r-squared, showing that organization culture positively moderates the relationship between project risk management and performance of road construction projects in Kenya. This agrees with Yosinta (2016) who found that a positive organizational culture, characterized by teamwork, communication, trust, and openness, moderated the relationship between project risk management and project performance, such that effective governance practices had a greater impact on project success in organizations with positive cultures. Similarly, a study by Ahmed and Noor (2018) found that effective project risk management, including project planning, monitoring, and control, had a positive significant influence on project success, and that this relationship was moderated by organizational culture, such that organizations with positive cultures achieved greater project success.

Table 7: Model Summary for Moderation Effect

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate	Change Statistics				
					R Square Change	F Change	df1	df2	Sig. F Change
1	.832[a]	.693	.634	.39019	.612	37.814	1	24	.000
2	.844[b]	.711	.672	.36941	.100	18.085	2	22	.038

a. Predictors: (Constant), Project risk management

b. Predictors: (Constant), Project risk management , organization culture , X*M

From the model summary findings in Table 8, the F-calculated for the first model, was 37.814 and for the second model was 18.085. Since the F-calculated for the two models were more than the F-critical, 3.884 (first model) and 2.650 (second model), the two models were good fit for the data. Also, the p-values for both models were less than 0.05 an indication that they were significant. Therefore, the model could be used in predicting the moderating effect of organizational culture on the relationship between project risk management and performance of road construction projects in Kenya.

Table 8: ANOVA for Moderation Effect

Model		Sum of Squares	Df	Mean Square	F	Sig.
1	Regression	6.366	1	6.366	37.814	.000[b]
	Residual	36.96	220	.168		
	Total	43.326	221			
2	Regression	7.404	3	2.468	18.085	.000[c]
	Residual	26.928	198	.136		
	Total	34.332	221			

a. Dependent Variable: Performance of road construction projects

b. Predictors: (Constant), Project risk management

c. Predictors: (Constant), Project risk management, organization culture, X*M

Further, by substituting the beta values as well as the constant term from the coefficient's findings in Table 9 for the first step regression modelling, the following regression model will be fitted:

$$Y = 1.435 + 0.884\,X$$

By substituting the beta values as well as the constant term from model 2 emanating from the second step in regression modelling the following regression model was fitted:

$$Y= 1.861 + 3.986\,X + 3.209\,M + 0.868\,X*M$$

Where X is Project risk management, M is organization culture, X*M is the interaction term between Project risk management and organization culture and Y is Performance of road construction projects.

In Model 1, the results indicate that Project risk management has a significant positive influence on the performance of road construction projects (Beta = .884, $p < .05$). In Model 2, the results show that Project risk management (Beta = 3.989, p = .002) and organizational culture (Beta = 3.209, p = .012) have significant positive effects on the performance of road construction projects. Additionally, the interaction effect between Project risk management and organizational culture (X*M) is also significant and positive (Beta = .868, p = .012).

These findings suggest that effective project risk management and a positive organizational culture are important factors in enhancing the performance of road construction projects in Kenya. The positive interaction effect between Project risk management and organizational culture indicates that a positive organizational culture can amplify the positive effects of effective project risk management practices on project performance. These findings are consistent with previous research in project management (Ahmeda, Hussain, & Philbin, 2021) which has emphasized the importance of effective project risk management and a positive organizational culture in achieving project success.

Table 9: Beta Coefficients for Moderation Effect

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	1.435	.544		2.638	.002
	Project risk management	.884	.144	.782	6.149	.000
2	(Constant)	1.861	.379		4.910	.010
	Project risk management	3.989	1.139	3.530	3.502	.002
	Organization culture	3.209	1.168	2.066	2.746	.012
	X*M	.868	.315	3.878	2.752	.012

a. Dependent Variable: Performance of road construction projects

Conclusions

The null hypothesis for this variable was 'There is no significant influence of project risk management on performance of road construction projects in Kenya.' However, the study found that project risk management is statistically significant in explaining performance of road construction projects in Kenya. The influence was found to be positive, indicating that an increase in project risk management would lead to an increase in project performance. Therefore, the study concluded that project risk management has a positive and significant relationship with performance of road construction projects in Kenya.

The second research hypothesis tested was that 'There is no significant moderating effect of organizational culture on the relationship between Project risk management and performance of road construction projects in Kenya. However, the study found that organizational culture is statistically significant in explaining the Project risk management and project performance in road

construction projects in Kenya. The influence was found to be positive, indicating that an organization culture that values innovation, risk-taking, and continuous improvement would lead to better project outcomes. Conversely, an organizational culture that is bureaucratic, hierarchical, and risk-averse would hinder innovation and limit project team creativity. Therefore, the study concluded that organizational culture has positive significant moderating effect on the relationship between Project risk management and performance of road construction projects in Kenya.

Recommendations

The study found that project risk management is a critical success factor for road construction projects in Kenya. Therefore, it is recommended that organizations should invest in developing project risk management skills and expertise, particularly in areas such as risk identification, risk assessment and risk monitoring and control. Additionally, organizations should implement a comprehensive and integrated approach to project risk management that encompasses identification, assessment, mitigation, and monitoring of risks throughout all phases of the project. This proactive approach will help identify potential challenges early and allow for timely adjustments to minimize negative impacts.

The study found that organizational culture can have a significant impact on the success of road construction projects in Kenya. Therefore, it is recommended that organizations should introduce shared governance models where decisions are made collectively by representatives from different departments or units. This ensures that decisions are more representative of the organization as a whole and not limited to a select few. In addition, the organization should rotate leadership roles and decision-making responsibilities periodically among qualified individuals. This not only prevents power from being concentrated but also provides individuals with a broader perspective on the organization. Organizations should also avoid favoritism in allocation of duties which instead should be based on individual's level of education, interest and experience.

Recommendations for Further Studies

Based on the findings and limitations of the current study, there are several areas that could be explored in further research:

The current study focused on the immediate impact of the variables on project performance. Further research could investigate the long-term impact of these variables on project performance and outcomes.

The study did not explore the mediating variables that could be influencing the relationship between the variables and project performance. Future studies could examine the mediating variables that affect project performance, such as team dynamics, motivation, and organizational structure. The study examined the moderating effect of organization culture. Future studies could explore the moderating variables that affect project performance, such as project complexity, size, and scope.

The current study used a cross-sectional research approach to explore the impact of the variables on project performance. Future studies could use mixed-methods research to gain a deeper understanding of the impact of the variables on project performance, including qualitative data collection methods such as interviews, focus groups, and case studies.

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