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# EFFECTS OF PROCUREMENT RISK MANAGEMENT STRATEGIES ON PUBLIC PROCURING ENTITIES' PERFORMANCE

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## ABSTRACT

Organizations implement risk management to mitigate the effects of unforeseen events in their operation settings. The current study aims to investigate the relationship between procurement risk-management strategies and the performance of public higher-learning institutions registered by the National Council for Technical Education and Vocation Training in Tanzania. The findings of the study provide valuable insights that can influence the risk management strategies and performance management policies of public procuring entities. The Principal-Agent Theory guided the study. A convergent parallel mixed-method design was employed, utilizing a census method that included all 16 public high-learning institutions in Dar es Salaam as the sample. Primary data were collected through structured questionnaires and interviews. Quantitative data analysis involved descriptive statistics to compute percentages and means of school respondents. Multiple Regressions was employed for inferential statistics analysis. Qualitative data analysis was conducted using thematic analysis. The study identified risks affecting the performance of PEs including non-compliance risks, planning risks, managerial risks, contract management risks, and project delays. To address these challenges, the study recommends that entities should develop and adhere to their procurement plans, invest in capacity building to strengthen ethical practices to avoid unethical behavior, and address non-compliance issues. Entities should use a combination of strategies based on internal policies, experience, and the preferences of the procurement assignment.

**Keywords:** Risk Management Strategies. Procurement Risks. Investment. Performance.

**Edited in English.**

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## 1 INTRODUCTION

Public procurement is a vital function of government operations and plays a crucial role in achieving policy objectives, promoting economic development, and ensuring transparency and accountability (Panya & Awour, 2023). The efficient and effective procurement of goods, services, and works is essential for the government's core purposes such as infrastructure investment and delivering essential services to citizens (Fozia, 2022; Kutsch et al., 2020). In the countries that make up the Organization for Economic Co-operation and Development (OECD), public procurement accounts for about 29.1% of government expenditure (OECD, 2019b). However, the success of the investments is subject to various risks inherent in the procurement process.

Public procurement encounters significant risks attributed to the volume of procurement, the complexity of the process, and the involvement of numerous stakeholders (OECD-HAICOP, 2019). Procuring Entities (PEs) face various procurement risks including supplier dependency, unanticipated price volatility of raw materials, suppliers' quality issues, supply chain disruptions (Parast & Subramanian, 2020), currency exchange rate fluctuation, supplier bankruptcy, legal or regulatory issues, and supplier dependence on a company. Studies by (Kutsch et al., 2020) and (Ramasamy et al., 2017) have highlighted global procurement risks such as project delays, cost overruns, inadequate quality control, and supplier failures in public procurement projects. Similarly, (Uswege and Yamlinga, 2021) identified risks associated with public procurement to include insufficient funds, incomplete and inadequate specification, political or management intervention, biased evaluation price variations and corruption. Moreover, the COVID-19 pandemic increased additional challenges to procurement risk management globally as a result of supply chain disruptions (Ali et al., 2022; Sharma et al., 2020).

The African Development Bank [AfDB] (2020) emphasizes the need for efficient risk management practices in public procurement across the African continent as inadequate risk identification, assessment, and mitigation strategies can lead to project failures, and financial losses, and reduce public trust (World Bank 2020). Organizations need to adapt procurement processes to address emerging risks, such as supply chain disruptions and increased market volatility (World Bank, 2021). To achieve maximum outcomes, public procurement decisions are guided by the 'value for money' principle, which balances cost, quality, and sustainability (World Bank., 2021). PEs need to employ effective risk management practices such as identifying and mitigating risks related to quality, cost, and sustainability (Handayani & Rabihah, 2022).

The choice of risk management strategy depends on the specific discipline and context, as there are no clearly defined dimensions for these strategies. Owuor et al. (2018) identified postponement, speculation, control, avoidance, and hedging as procurement risk management strategies. A common risk management framework involves risk anticipation, monitoring, and mitigation (OECD, 2022). Procurement risk management strategies establish contract management practices to improve procurement performance in terms of on-time delivery, quality, cost and time, and the degree of customers' satisfaction with the procurement process (CIPS, 2013).

The East African Community (EAC) region faces unique social-economic, political, and legal contexts such as corruption, non-compliance with regulations, and limited procurement that affect the procurement process, hinder investment performance, and impede regional economic growth EAC Secretariat (2017). Similarly, In Tanzania, public procurement accounts for more than 75% of government expenditure (PPRA, 2021), and risk management remains a challenge.

The Public Procurement Regulatory Authority (PPRA) of Tanzania has made efforts to enhance transparency, fairness, effectiveness, and efficiency in the public procurement process but there are still gaps in risk assessment, utilization of risk management tools, and procurement planning (PPRA, 2021). Challenges can have adverse effects on investment performance, project delivery, and overall value for money in public procurement (ADB, 2021).

This study contributes to the improvement of procurement risk management strategies sector by identifying effective strategies to mitigate risks and improve investment outcomes in the public sector.

### 1.1 The Rationale of the Study

Public procurement risks need to be managed from early stage by developing a strategy for assessment, prevention and mitigation to ensure successful procurement processes and achieve maximum investment performance (OECD, 2019a). By examining the effects of procurement risk management strategies, the study shed light on how strategies affect the investment performance of higher learning institutions within PEs. The study provides empirical evidence to help decision-makers in higher learning institutions make informed choices regarding the adoption and implementation of effective risk management strategies.

The practical implications of the study's findings include identifying procurement risk in the public sector, evaluating the effectiveness of procurement risk management strategies, and understanding their effects on PEs investment performance.

### 1.2 The objectives of the study

The main objective was to investigate the effects of Procurement Risk Management Strategies on Public Procuring Entities' Performance.

Specific objectives were to:

i) Identify the existing procurement risks faced by PEs in the public sector.
ii) Examine the procurement risk management strategies PEs employ to mitigate risks and improve investment outcomes in the public sector.
iii) Determine the effect of procurement risk management strategies on PEs performance.

## 2 LITERATURE REVIEW

### 2.1 Theoretical Review

The principal-agent theory was in 1976 by economists Michael C. Jensen and William H. Meckling (1976) examining the link and relationship between principals (the owners or individuals with decision-making authority) and agents (PEs) the individuals or entities delegated to act on behalf of the principal (Ebekozien 2023). The theory focuses on the challenges that arise due to information asymmetry and conflicting interests between the two parties (Omar et al., 2017). The theory states that agents may not always act in the best interests of the principals due to their self-interest, risk aversion, or different objectives. Misalignment of interests can lead to agency problems, which may result in suboptimal outcomes for the principals (Amoah & Steyn, 2023).

The principle-agent relationship is pertinent to procurement risk management, although the supplier may have other objectives or interests, such as maximizing their earnings, the buyer expects the supplier to behave in the buyer's best interests (Amoah & Steyn, 2023).

In the current study, the theory helped to understand the challenges and risks associated with the delegation of procurement responsibilities from government agencies to PEs. The success of investments is subject to various risks inherent in the procurement process (Ali et al., 2022). While the theory highlights the potential for conflicts of interest between the principal and agents, risk management provides the strategies to mitigate those conflicts and protect the principal's interest including the investment (Parast & Subramanian, 2020). Effective risk management strategies involve designing appropriate contractual arrangements, monitoring and evaluating agent performance, and implementing incentive mechanisms to ensure that agents act in the best interest of principle (Ali et al., 2022). Furthermore, transparency, fairness, and efficiency in the procurement process establish strong contract management practices, anticipate and monitor risks, and engage in risk mitigation activities (Parast & Subramanian, 2020). By applying the principles-agency Theory, the study aims to identify effective procurement risk management strategies that can improve investment outcomes in the public sector.

## 2.2 Empirical literature review

A risk is an occurrence that has the potential to affect an organization's essential operations in one of three ways: by enhancing, inhibiting, or questioning their efficacy and efficiency (Hopkin, 2017). Nyamah and Ewusi (2022) found that various risks, including those related to planning and preparation, requisition reviews, supplier selection, managerial issues, and contract management, had a significant negative effect on procurement performance. Similarly, Amoah and Nkosazana (2023) revealed that risks associated with contracts were primarily attributed to unclear descriptions of the rights and responsibilities of the contract parties, ambiguous computation of contractual penalties for missing deadlines, and inadequately specific work and milestone specifications.

Root causes of risks in public procurement investments, include lack of a competition and transparency, embezzlement and mismanagement of public funds, slow bureaucracy, and bottlenecks, and a deficiency in skills and knowledge. Other contributing factors to risk are collusion, bid-rigging, price-fixing, cartel formation, corruption, lack of professionalism, excessive politicking, incompetence of tender boards, insufficient patriotism towards national service, and inadequate procurement capacity of public procuring entities (Ebekozien, 2023). Similarly, Amoah and Steyn (2023) indicated that construction professionals often face various unethical issues in their work duties, such as inflated tender prices, overpricing, tender-based kickbacks, bribes for projects, unethical project execution methods, use of substandard materials, discrimination, and a lack of knowledge about the code of conduct.

Effective procurement risk management (PRM) is crucial to mitigate risks and improve performance. PRM involves reducing exposure and uncertainty related to price, lead time, and demand to ensure the continuous flow of material, skills, capabilities, and facilities with minimum disruption (Hong et al., 2018). In higher learning institutions, PRM include encompasses activities such as supplier selection, contract management, and compliance with regulations, budgetary constraints, and technological risks. PRM involves risk identification, assessment, response planning, and risk monitoring and control to mitigate risks and enhance investment performance (ADB, 2021). Similarly, According to OECD (2022), risk management

activities involves risk identification, assessment of the likelihood and severity, implementation of control measures to mitigate the risk impact, and risk monitoring the risk.

Several scholars have proposed various risk management strategies to eliminate or reduce risks. Okonjo et al. (2016) suggest risk sharing as a primary strategy, emphasizing the importance of clearly specifying the obligations of both contractors and subcontractors in the contract clauses. Also, suggests creating products that meet the needs of various client segments to minimize the risk of financial loss, planning for insurance coverage for goods while in transit, and obtaining insurance against unforeseen natural disasters. Laryea (2018) found that successful project performance depends on the client team, procurement strategy, and delivery systems.

A collaborative procurement strategy contributes to successful project delivery and outcomes. Manu et al. (2021) demonstrate that effective management of the procurement process, including adherence to policy, legal frameworks, and anti-corruption measures, significantly contributes to procurement objectives and investment performance. The adoption of technology-enabled risk management tools such as e-procurement systems, can enhance transparency, efficient processes, reduce the likelihood of fraud and corruption, improve decision-making, achieve cost savings, and enhance performance in public procurement processes (EU, 2010).

Manuj and Mentzer (2008) proposed six risk management strategies including postponement, speculation, hedging, security, control, and avoidance, as effective approaches to managing risks. Similarly, (ADB, 2021) suggested four risk management strategies: avoiding the risk altogether by deciding not to proceed with the project or activity, reducing the likelihood of occurrence or minimizing the consequences of the risk, transferring the risk to another party, and accepting the risk without mitigation when the risk rate is low, no treatment options available or the treatment cost outweigh the benefits.

Numerous studies have examined the relationship between PRM strategies and the performance of Public Procuring Entities (PPEs) within higher learning institutions. A study by (Okonjo et al., 2016; Owuor et al., 2018) revealed that the implementation of effective risk management strategies positively influences procurement performance by reducing delays, cost overruns, and conflicts in the procurement process. Moreover, the study observed that procurement risk management enhances the overall operational efficiency and effectiveness of PPEs. The same was examined to affirm the effect of procurement risk management strategies on the performance of public sector procurement.

## 2.3 Hypothesis formulation

Reviewed literature shows that procurement risk management strategies affect the procurement process performance, which in turn improves overall PE performance (Manu et al., 2021). The effect has been observed in both private and public sectors (Ebekozien 2023), as well as in emerging economies and developed nations (Amoah & Steyn, 2023). This base has led to the formulation of a null hypothesis that guided the third quantitative objective.

*$H_0$: Procurement risk management strategies do not have a significant effect on investment performance in the public sector.*

## 3 RESEARCH METHOD

### 3.1 Research design

A convergent/concurrent parallel mixed method design was used in the investigation. Data collection employed both simultaneously, followed by separate analysis of each data type. The results from these analysis's were integrated during the interpretation phase, allowing for a comprehensive assessment of each research objective. The integration of results from both data types contributed to a deeper understanding of the research phenomenon and enhanced the credibility of the study's findings (Kothari & Garg, 2014).

### 3.2 Research Approach

The study adopted a mixed research approach which facilitates the integration of results from both qualitative and quantitative approaches and provides a richer and more comprehensive response to the research questions (Saunders et al., 2009). First, a qualitative approach was employed to address objectives one and two, which focused on the identifying procurement risks in the Tanzanian public sector and the risk management strategies used to mitigate these risks. Second, a quantitative approach was used to determine the effects of risk management strategies on PE performance.

### 3.3 Study Area

The study was conducted in Dar es Salaam. The selection of the region was justified based on the factor that Dar es Salaam has a higher concentration of public-owned higher learning institutions that are primarily funded by public resources (TVET, 2021). By focusing on Dar es Salaam, the study can tap into rich sources of relevant data and information from procuring entities involved in the implementation of these projects.

### 3.4 Population

The study involved all 16 NACTVET-registered public higher learning institutions in Dar es Salaam (TVET, 2021). The inclusion of all 16 institutions provides a sufficient sample size to obtain comprehensive data. The respondents included the procurement managers, planning managers, and any other senior-level staff that will deem fit the study to obtain sufficient and relevant information to achieve the study objective.

### 3.5 Sampling and Sample Size

Given the number of identified respondents and the desired level of detail required for the study, a census approach involving all 16 procurement managers was utilized to ensure no sampling bias. A saturation point during an interview with key informants helped to determine the interview sample.

### 3.6 Data Collection Technique

An administered semi-structured questionnaire with a five-point Likert scale for quantitative data was used to gather primary data. A qualitative data-gathering guide was employed to capture the understanding and perceptions of the procurement managers, on

procurement risk management strategies and how best to enhance public procurement entities' investment performance.

### 3.7 Credibility and Trustworthiness

Ensuring credibility and trustworthiness in research involved employing methods and practices to enhance the reliability and validity of the findings.

### 3.8 Validity

The generated questionnaire was designed and originated from well-known models, theories, and empirical studies to ensure face validity when collecting information regarding the influence of procurement risk management strategies on investment performance in higher learning institutions.

### 3.9 Reliability

Cronbach's alpha was used to assess internal consistency, which measures the extent to which items within the hypothesized variable are all measuring the same underlying construct of the scale (Cronbach, 1951). As shown in Table 1, all constructs related to the employed procurement risk management strategies scored above 0.7 on the alpha value.

**Table 1**
*Cronbach Alpha reliability test*

| Variable Construct | | Cronbach Alpha |
|---|---|---|
| Procurement risk management strategies | Risk sharing strategy | 0.836 |
| | Risk speculation strategy | 0.813 |
| | Risk control strategy | 0.817 |
| | Risk avoidance strategy | 0.783 |
| | Risk transfer strategy | 0.834 |
| | Risk postponement strategy | 0.911 |
| | Technology adoption strategy | 0.826 |
| | Risk hedging strategy | 0.799 |
| | Risk collaboration strategy | 0.910 |

### 3.10 Data analysis

Quantitative data analysis employed both descriptive and inferential statistics. Descriptive statistics including means and standard deviations provided a comprehensive overview of the respondents' answers. Thematic analysis was used to analyze qualitative data obtained from interviews. Inferential statistics, specifically Binary Logistic Regression were utilized to test the hypotheses formulated and to determine the influence of each identified strategy on PE performance.

The study identified various strategies in the early objectives and tested their impact on the performance of public procurement entities in Dar es Salaam, as shown in Equation 1.

$$\textbf{Logit p} = \textbf{Inp} = \frac{\mathbf{p}}{\mathbf{1-\rho}} = \beta_0 + \beta_1 x1 + \beta_2 x2 \ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots + \varepsilon \quad \text{Equation (1)}$$

Where:
P= Probability of the effect of procurement risk management strategies on PE's performance.
Odds=p/1-p= Probability of no effect of procurement risk strategies on PE's performance
$Logit\ p$ = Dependent variable (PE's performance)
$\beta_0$ = the intercept of the line of best of fit
$\beta_1$ = the regression parameter (coefficient) on X
X = Procurement Risk Management Strategies (x1, x2, x3, x4, x5, x6)
ε = Error term

## 4 FINDINGS AND DISCUSSION

The results are presented sequentially, starting with the qualitative findings from the interviews, which address the first two objectives, followed by quantitative findings.

### 4.1 Procurement Risks Facing PEs in the Public Sector

Respondents identified the most common procurement risks faced by many PEs face in managing projects. The risks include project delays, cost uncertainties, non-compliance issues, quality risks, and contract management risks. Contributing factors include poor planning, unethical behaviors, bid rigging, corruption, and mismanagement of funds. One of the interviewees stated;

*"Poor planning is the root cause of all these issues. Today, we agreed to procure an item with specific features, and the next day we decided to modify some of the those features. This leads to numerous variations and unnecessary inflation costs without proper justification." informant 1.*

The presence of risks cause achieving value for money to be questionable as adherence to the Public Procurement Act (PPA) is compromised which lead to various detrimental changes in the execution of the contract of purchase. The following statement illustrates the scenario:

*"Non-compliance with the law frequently arises, and many attribute it to the inadequate capacity of the procurement personnel. However, this is not the sole cause. Various risks undermine procurement projects and complicating issues such as contract management, supplier selection, cost, and quality. Informant 2.*

Another interviewee further disclosed:

*"....risk management strategies are sometimes used together in procurement projects or one at a time, depending on the needs of the PE. These strategies are employed from the initial procurement planning phases through contract execution and closure" informant 3.*

From the descriptive findings in Table 2, the most prevalent risks include quality risks, cost risks, and delay risks.

**Table 2**
*Procurement Risks Facing PEs in the Public Sector.*

| Risk | Mean | SD |
|---|---|---|
| Delays risks | 3.866 | 0.3637 |
| Costs risks | 2.936 | 0.4637 |
| Non-compliance risk | 4.642 | 1.3738 |
| Quality risk | 3.467 | 0.9874 |
| Contract management risk | 4.252 | 1.3562 |
| Delivery management risk | 2.987 | 0.4837 |
| Managerial risk | 4.362 | 1.4894 |
| Planning risk | 4.363 | 0.9474 |
| Requisition review risk | 3.867 | 0.3736 |

Based on the descriptive results presented in Table 2, the most dominant risks encountered by PEs in the public sector include non-compliance risk, planning risk, managerial risk, and contract management risk. According to Ebekozien (2023), the dominance of these risks is caused by embezzlement, mismanagement of public funds, and poor planning. The findings align with those of (Amoah and Nkosazana, 2023) and (Hopkin, 2017; Nokwazi & Prunella, 2017). Consequently, can be concluded that the procurement risks faced by PEs in the public sector are universal and caused by personnel actions, emphasizing the potential for mitigation through the enhancement of procurement ethics in the public sector as recommended by (Nyamah & Ewusi, 2022).

### 4.2 The Procurement Risk Management Strategies Employed By PEs to Mitigate Risks

The study involved data collection for the examination of procurement risk management strategies commonly employed by the procuring entities to enhance investment performance through the mitigation of risks in public sector procurement. In the conducted interviews, the most prevalent procurement risk management strategies employed in the public sector include risk transfer through engagement with various insurance services, risk sharing with other procurements, and risk avoidance by deciding to abandon projects associated with high risks. Interviewees clarified the situation with the following statement:

*Risk transfer has been our primary tool for mitigating risks, although we employ other strategies as needed. It is a challenge to address all risks with the resources available to PEs, without careful planning, the consequences can be catastrophic." informant 4.*

In addition to the risk strategies mentioned during the interview, the results in Table 3 indicate strategies such as risk avoidance, risk control, and risk speculation influence the investment outcomes of the PE.

During the analysis of the questionnaires, it was revealed that, in addition to the risk strategies mentioned in the interviews, other strategies such as risk avoidance, risk control, and risk speculation are also applicable in the public sector, influencing the investment outcomes of the procuring entities (PE).

**Table 3**
*Procurement Risk Management Strategies Used By PEs in the Public Sector*

| Procurement risk management | Mean | SD |
|---|---|---|
| Risk sharing strategy | 3.948 | 0.3874 |
| Risk speculation strategy | 3.288 | 0.2638 |
| Risk control strategy | 4.356 | 0.9253 |
| Risk avoidance strategy | 4.987 | 1.4762 |
| Risk transfer strategy | 4.675 | 1.3763 |
| Risk postponement strategy | 4.237 | 1.1276 |
| Technology adoption strategy | 4.118 | 0.9363 |
| Risk hedging strategy | 3.695 | 0.8462 |
| Risk collaboration strategy | 3.645 | 0.8134 |

The identified procurement risk management strategies from the perspective of Tanzania's higher learning institutions are compatible with those of Laryea (2018) who also had almost similar findings. The only difference is the dominance of the risk strategy for instance in Tanzania, the most mentioned risk strategies include risk avoidance, risk transfer, risk control, and technology acceptance unlike those mentioned by (Manu et al., 2021). The only reason for this divergence of findings can be the difference in procurement rules and regulations and the operating environment as highlighted by (ADB, 2021).

### 4.3 The Effects of Procurement Risk Management Strategies on Investment Performance in the Public Sector

Factor analysis was employed to assess the effect of each identified procurement risk management strategy on the investment performance of the procuring entity. Before utilizing the method, a check on sample adequacy and appropriateness of using the method was mandatory. The findings from the Kaiser-Meyer-Olkin (KMO) and Bartlett's Test indicate the adequacy of the sample with KMO scoring 0.812 and Bartlett's test of sphericity scoring a significant value of 0.000. Furthermore, the score of 0.419 for Nagelkerke $R^2$ and 0.273 for Cox and Snell $R^2$ illustrate that 41.9 % of the investment performance's magnitude is explained by the model and its variance of 27.3 % in the public sector procurement perspective.

**Table 4**
*KMO and Bartlett's Test*

| | | |
|---|---|---|
| Kaiser-Meyer-Olkin Measure of Sampling Adequacy. | | 0.812 |
| Bartlett's Test of Sphericity | Approx. Chi-Square | 1325.642 |
| | Df | 43 |
| | Sig. | 0.000 |

The binary logistic regression results contain several procurement risk management strategies that were tested to determine their influence on the investment performance of PEs in the public sector.

**Table 5**
*Binary Logistic Regression Results*

| Variables | β | SE | Sig | Exp (β) |
|---|---|---|---|---|
| Procurement risk mgt strategies | 0.432 | 0.345 | 0.000 | 1.532 |
| Risk sharing strategy | 0.725 | 0.274 | 0.002 | 2.610 |
| Risk speculation strategy | 0.035 | 0.299 | 0.000 | 3.301 |
| Risk control strategy | 0.867 | 0.261 | 0.000 | 2.337 |
| Risk avoidance strategy | 0.356 | 0.232 | 0.000 | 1.373 |
| Risk transfer strategy | 1.232 | 1.132 | 0.523 | 1.384 |
| Risk postponement strategy | 1.284 | 1.021 | 0.112 | 0.937 |
| Technology adoption strategy | 0.343 | 0.233 | 0.001 | 4.823 |
| Risk hedging strategy | 1.383 | 0.928 | 0.830 | 2.893 |
| Risk collaboration strategy | 0.829 | 0.736 | 0.211 | 1.873 |
| Constant | 0.113 | 0.196 | 0.000 | 3.124 |
| **Omnibus test – Chi-square** | 72.465 (9) (p=0.000) | | | |
| **Hosmer and Lemeshow – x2** | 12.324(9) (p = 0.240) | | | |
| **Cox & Snell $R^2$** | 0.273 | | | |
| **Nagelkerke $R^2$** | 0.419 | | | |
| **-2 Log Likelihood** | 234.654 | | | |

From the results presented in Table 5, the most effective procurement strategies in mitigating risk include, risk sharing, risk speculation, risk control, risk avoidance, and technology adoption strategy as all of them scored sig value less than 0.05. Among them, risk control and risk sharing emerged as the leading strategies, with a Beta coefficient of 0.867 and 0.725 respectively. The findings have also resulted in the acceptance of **($H_0$)** as a significance value of 0.000 confirming the influence of procurement risk management strategies on investment performance in the public sector.

This implies that the application of the five effective procurement risk management strategies improves the investment performance of the PE. The study aligns with the findings of (Hong et al., 2018) and (Okonjo et al., 2016), both indicating a positive effect of procurement risk management strategies on public sector performance. Additionally, the adoption of technology is reported to influence the investment performance of procuring entities (Manu et al., 2021). the selection and application of these procurement risk management strategies depend on many factors such as the internal policies (rules and regulations), of the PE, experience, and the expected outcome while considering the nature of the procurement assignment (Owuor et al., 2018). The findings also align with the agency theory, emphasizing the importance of risk management strategies to ensure the effectiveness of the operations conducted by the agent on behalf of the principal. It is proven that procurement risk management strategies improve

investment outcomes as indicated by a beta coefficient of 0.432 on the influence of procurement risk management strategies.

## 5 CONCLUSION

The objectives of the study were met, as the findings revealed the significant procurement risks faced by public sector PEs and strategies employed to manage these risks. The identified risks include non-compliance risks, planning risks, managerial risks, contract management risks, and project delays. To address these challenges, PEs employed various procurement management risk management strategies such as risk control, and risk transfer through the engagement of various insurance agencies; risk sharing, risk avoidance, risk speculation, and technology adoption were particularly influential in improving investment performance. Notably, risk control and risk sharing emerged as the risk with more effect on the performance of public sector performance.

The study concludes that ethical procurement practices are crucial for overcoming the identified risks and ensuring the successful execution of procurement projects. In addition, the selection and application of procurement risk management strategies depend on internal policies, experience, and desires of the procurement assignment.

The study revealed significant procurement risks faced by public sector PEs and the strategies employed to manage these risks. Identified risks include non-compliance risks, planning risks, managerial risks, contract management risks, and project delays. To address these challenges, PEs need to employ various procurement risk management strategies such as risk control and risk transfer through engagement with various insurance agencies. Risk sharing, risk avoidance, risk speculation, and technology adoption were particularly influential in improving investment performance. Notably, risk control and risk sharing emerged as the most effective strategies in enhancing the performance of public sector procurement.

The study concludes that ethical procurement practices are crucial for overcoming the identified risks and ensuring the successful execution of procurement projects. Additionally, the selection and application of procurement risk management strategies depend on internal policies, experience, and the preferences of the procurement assignment.

### 5.1 Practical implication

The findings validate the positive effect of risk management strategies such as risk control, risk transfer, risk sharing, risk avoidance, risk speculation, and technology adoption on investment performance. PEs can improve investment outcomes by incorporating the identified strategies into their procurement practices.

### 5.2 Recommendations

Since the risk issues are more associated with the agent and the internal control measures, public sector policies and regulations must allow easy procurement risk identification and improve communication and implementation of procurement procedures. Such initiatives will enhance the effectiveness and efficiency of public procurement for both managers and implementers.

To minimize risks and enhance investment performance, PEs need to develop and adhere to procurement plans that address the procurement risks that result in cost variations and inflation. PEs should invest in capacity building to strengthen ethical practices to address

unethical behavior and address non-compliance issues. PE should employ a combination of strategies tailored to the specific needs of each procurement project including comprehensive Risk Management Strategies.

### 5.3 Future studies

Analyze the role of blockchain in enhancing procurement risk management and its impact on performance.

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## CONFLICT OF INTEREST

The authors assert that there is no conflict of interest related to this submitted work.

## AUTHOR CONTRIBUTIONS

| Roles | 1st author | 2nd author |
|---|---|---|
| Conceived and designed the study. | ♦ | |
| Collected and analyzed the data. | ♦ | ♦ |
| Contributed to the interpretation of results and provided critical revisions. | ♦ | ♦ |
| Drafting the manuscript and approving the final version for publication. | ♦ | ♦ |