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Effect of Risk Management Practices on Supplier Selection in Lower Benue River Basin Development Authority Makurdi, Nigeria

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Abstract

This study examines the influence of risk management practices on supplier selection at the Lower Benue River Basin Development Authority (LBRBDA) in Makurdi, highlighting the importance of integrating structured risk management into public procurement processes. A descriptive survey design was employed, with quantitative data collected from 101 procurement stakeholders, yielding 88 valid responses and a response rate of 87.1%. Data were analyzed using SPSS version 26, with multiple regression applied to assess the relationship between risk management practices and supplier selection. Results revealed that risk management practices significantly impact supplier selection decisions ($R = 0.872$, $R^2 = 0.761$, $F = 91.417$, $p < 0.001$). Among the predictors, risk identification emerged as the most influential ($\beta = 0.628$), followed by risk mitigation ($\beta = 0.451$), risk monitoring and control ($\beta = 0.301$), and risk assessment ($\beta = 0.187$). These findings underscore that a comprehensive risk management framework strengthens the supplier selection process, enhancing transparency, efficiency, and effectiveness in public procurement. The study contributes to procurement literature by providing empirical evidence on the distinct roles of risk identification, assessment, mitigation, and monitoring in shaping supplier selection outcomes within a Nigerian river basin development authority. It further offers practical insights for public procurement agencies seeking to embed risk-aware practices into decision-making processes, thereby improving accountability and long-term performance in supplier management.

Keywords: Risk identification, Risk Mitigation, Risk monitoring and control, Risk assessment, Supplier selection.

1 Introduction

1.1 Background to the Study

Integrating risk management into supplier selection is increasingly essential in procurement and supply chain management, particularly in large-scale public infrastructure projects that face uncertainties related to supplier performance, geopolitical factors, and market volatility (Baldwin & Freeman, 2022). Structured approaches enable organisations to select suppliers whose capabilities, financial stability, and ethical standards align with long-term project goals and sustainability objectives. International best practices, such as the European Union's Directive 2014/24/EU and the United States' Federal Acquisition Regulation (FAR), along with corporate strategies by firms like Siemens and Lockheed Martin, demonstrate how systematic frameworks reduce procurement disruptions and enhance supplier reliability (European Union, 2014; Siemens AG, 2021).

In Asia, economies like Japan, South Korea, and China have institutionalised risk-oriented procurement strategies. Toyota's Just-In-Time (JIT) system integrates supplier evaluation with real-time risk response, while China's Belt and Road Initiative employs advanced frameworks to manage political and logistical uncertainties (Ram & Zhang, 2020; Morris, 2020). In Africa, weak regulatory oversight and institutional inefficiencies often hinder procurement performance; nevertheless, countries such as South Africa and Kenya have improved outcomes through public-private partnerships and risk transfer mechanisms (Ameyaw & Chan, 2015). Nigeria has undertaken procurement reforms, notably through the Public Procurement Act of 2007, to address inefficiencies and procurement-related risks. However, implementation remains inconsistent, particularly within agencies such as the Lower Benue River Basin Development Authority (LBRBDA), where unreliable suppliers, political interference, contract underperformance, and bureaucratic delays continue to compromise outcomes. These challenges highlight the need for a context-specific framework that adapts global risk management principles to Nigeria's institutional realities.

Although risk management practices—encompassing the identification, evaluation, mitigation, and monitoring of threats—are widely acknowledged to improve supplier selection (Gurtu& Johny, 2021; Yazdani et al., 2020), their application in Nigeria's public sector remains limited. This gap has resulted in financial losses, reputational risks, and weak compliance with procurement regulations. To address this deficiency, the present study empirically examines how risk management practices influence supplier selection within LBRBDA. By contextualising global best practices within Nigeria's operational environment, the study seeks to develop a tailored framework for enhancing procurement performance, supplier reliability, and institutional accountability.

1.2 Objective of the Study

The main objective of the study is to examine the effect of risk management practices on supplier selection practices in the Lower Benue River Basin Development Authority, Makurdi, Nigeria. The specific objectives are:

i. Determine the effect of risk identification on supplier selection practices in the Lower Benue River Basin Development Authority.

ii. Assess the effect of risk mitigation on supplier selection practices in the Lower Benue River Basin Development Authority.

iii. Evaluate the effect of risk monitoring and control on supplier selection practices in the Lower Benue River Basin Development Authority.

iv. Examine the effect of risk assessment on supplier selection practices in the Lower Benue River Basin Development Authority.

1.3 Research Hypotheses

The following null hypotheses were formulated in line with the study objectives:

HO_1: Risk identification has no significant effect on supplier selection in the Lower Benue River Basin Development Authority, Makurdi.

HO_2: Risk mitigation has no significant effect on supplier selection in the Lower Benue River Basin Development Authority, Makurdi.

HO_3: Risk monitoring and control has no significant effect on supplier selection in the Lower Benue River Basin Development Authority, Makurdi.

HO_4: Risk assessment has no significant effect on supplier selection in the Lower Benue River Basin Development Authority, Makurdi.

2 Literary Review

2.1 Theoretical framework

This section outlines the key theories underpinning the study, providing a conceptual basis for understanding how risk management practices influence supplier selection.

2.1.1 Risk Management Theory

Risk management theory has evolved significantly since its inception. One of the foundational works in risk management theory is by Chapman and Ward (2003) in their book, *Project Risk Management: Processes, Techniques, and Insights*. They established a comprehensive framework for understanding risk management in projects, emphasizing the importance of risk identification, assessment, and mitigation strategies. Their framework includes processes for identifying risks, analyzing their potential effects, and implementing response strategies to mitigate these risks. Their work remains a cornerstone in the study and application of risk management theory.Risk management theory assumes that risks can be systematically identified through a structured process. Risk management theory provides a structured approach to integrating risk considerations into procurement practices. By applying the concepts and frameworks discussed, LBRDBA Makurdican enhance its supplier selection process, ensuring that risks are effectively managed and procurement outcomes are optimized.

2.1.2 Supplier selection theory

Supplier selection theory has evolved as a critical component of procurement and supply chain management, influencing how organizations choose suppliers to meet their needs effectively. One of the seminal works in supplier selection theory is the research by Verma and Pullman (1998), which significantly shaped the modern understanding of supplier selection processes. Their research highlighted the importance of a systematic approach to supplier selection, emphasizing that the choice of suppliers can significantly affect an organization's operational efficiency and competitive advantage. The framework proposed by Verma and Pullman includes several key criteria for supplier selection such as cost, quality, delivery time, service, and flexibility. Supplier selection theory is grounded in several assumptions that are crucial for its effective application. The theory assumes that supplier selection is a multi-criteria decision-making (MCDM) process, where various factors such as cost, quality, delivery, and service are considered. This approach acknowledges that no single criterion is sufficient on its own to determine the suitability of a supplier. It assumes that both quantitative metrics (e.g., cost, delivery time) and qualitative aspects (e.g., supplier reputation, flexibility) are essential for a comprehensive evaluation. The theory posits that integrating both types of evaluation criteria leads to a more balanced and informed decision-making process. Ardently, the theory assumes that the selected suppliers should align with the strategic goals and operational needs of the organization. This alignment ensures that suppliers contribute to achieving long-term objectives and provide a competitive edge. Supplier selection theory also assumes that the environment in which organizations operate is dynamic, and therefore, supplier selection processes must be adaptable to changes in market conditions, technological advancements, and organizational needs. These assumptions underscore the complexity of the supplier selection process and the need for a structured and comprehensive evaluation approach. The relevance of supplier selection theory to this study can be understood through several key points. The study

examines how risk management practices influence supplier selection decisions. By incorporating insights from the supplier selection theory and its critiques, the research can explore how risk considerations affect the choice of suppliers and how effective risk management can lead to better procurement outcomes. The supplier selection theory provides a framework for evaluating suppliers based on multiple criteria. In the context ofLBRBDA, this framework can be adapted to address local challenges and requirements, ensuring that supplier selection aligns with regional needs and project goals.

2.2 Conceptual framework

The conceptual framework illustrates the dynamic relationship between risk management practices and supplier selection, with a particular focus on the Lower Benue River Basin Development Authority (LBRBDA). This framework is structured around key constructs, where risk management practices serve as the independent variable (risk identification, risk assessment, risk mitigation and risk monitoring and control), influencing the supplier selection process, which functions as the dependent variable(supplier capacity, supplier past performance, supplier risk exposure, and supplier relationship management).

2.2.1 Risk management practices

Risk management practices (RMP) encompass a range of actions designed to identify, assess, respond to, monitor, and control risks. These practices aim to mitigate the adverse effects that risks can have on procurement activities and project outcomes. Effective risk management is crucial for ensuring that suppliers are selected based on their ability to manage potential risks, thereby enhancing project execution and success. According to Hopkin (2018), RMP refers to the systematic application of management policies, procedures, and practices to the tasks of identifying, analyzing, evaluating, treating, and monitoring risks. Similarly, ISO 3001 (2018) defines RMP as a proactive approach to uncertainty, emphasizing the need for structured and repeatable processes to ensure that risks are managed efficiently across all organizational levels. Risk management professionals, such as those certified by the Risk Management Society (RIMS), further emphasize that RMP is not only about addressing potential threats but also about identifying opportunities that may arise in a dynamic environment (RIMS, 2021).
RMP serve as a vital foundation for effective supplier selection and procurement practices. By integrating the 4 independent variables of the study risk identification, risk assessment, risk mitigation, and risk monitoring and control into procurement frameworks, organizations can enhance their ability to manage uncertainties, improve supplier reliability, and achieve project success. This study focuses on four key components of risk management: risk identification, risk assessment, risk mitigation, and risk monitoring and control.

2.2.1.1 Risk identification

Risk identification is the first and foundational step in the risk management process. It involves systematically recognizing potential risks that could disrupt procurement or project outcomes. According toKuang*et al.*(2019), risk identification requires a comprehensive analysis of both internal and external factors that may affect the project. These risks could stem from financial, technical, operational, environmental, or legal issues. The identification process is critical as it ensures that the procurement team is aware of possible threats early in the project lifecycle (Alikhani*et al.*, 2019), enabling them to develop appropriate mitigation strategies. Empirical studies underscore the importance of risk identification in procurement processes. By identifying risks early, procurement managers can include relevant risk-related criteria in the supplier selection process, favoring suppliers who are better equipped to manage these challenges. For example, Huma*et al*. (2020) demonstrated that prioritizing suppliers with robust risk management practices, such as compliance certifications and contingency planning, enhances procurement outcomes. Risk identification thus serves as the foundation for a comprehensive risk management strategy, ensuring that subsequent steps, such as risk assessment and mitigation, are grounded in a thorough understanding of potential threats.

2.2.1.2 Risk mitigation

This refers to the development and implementation of strategies to minimize the likelihood or impact of risks. Schramm*et al*. (2020) highlight the importance of supplier diversification and the use of performance guarantees or other contract clause as risk mitigation measures in public procurement. By selecting multiple suppliers or incorporating specific performance metrics into contracts, procurement entities can reduce their exposure to supplier-related risks. Moreover, risk mitigation also involves supplier pre-qualification, a process where suppliers are vetted based on their technical, financial, and operational capacity to handle potential risks. According to Gurtu and Johny (2021), supplier pre-qualification serves as a filtering mechanism, allowing procurement teams to only engage suppliers who demonstrate strong capabilities in managing risks related to their supply chain, financial stability, and compliance with regulatory requirements. This process not only reduces procurement risks but also ensures that the selected suppliers are better equipped to meet project demands under uncertain conditions.

2.2.1.3 Risk monitoring

Risk monitoring is an ongoing process that ensures risk management practices remain effective throughout the procurement and project lifecycle. Continuous monitoring allows project managers to track identified risks and identify new threats as they

emerge. Li *et al.* (2021) stress the importance of regular risk assessments and supplier performance reviews to adjust risk management practices as needed. This process is critical for maintaining alignment between risk management efforts and dynamic project requirements.Risk monitoring also involves the use of software tools that track key performance indicators (KPIs), allowing for real-time adjustments and early interventions. For instance, Rane and Potdar (2021) highlight that the integration of digital technologies, such as Artificial Intelligence (AI) and Blockchain, has revolutionized risk monitoring by enabling real-time data collection and analysis. These technologies allow procurement managers to detect anomalies in supplier performance, ensure compliance with contractual obligations, and respond promptly to emerging risks.In developing economies, risk monitoring plays a vital role in addressing systemic challenges. For example, Essien *et al.* (2018) argue that transparent monitoring systems enhance accountability and reduce the influence of corruption in supplier management.

2.2.1.4 Risk assessment

Once risks are identified, they must be assessed based on two key parameters: likelihood and impact. Likelihood refers to the probability of the risk event occurring, while impact measures the potential consequences for the project if the risk materializes (Acebes*et al.*, 2024; Aloini*et al.,* 2021, as cited by Nyambo, 2023). By evaluating these parameters, procurement managers can categorize risks into high, medium, or low priority. High-priority risks require immediate attention and mitigation efforts, whereas lower-priority risks may be monitored and addressed as needed. Kuang *et al*. (2019) assert that early risk identification and assessment are critical for the successful implementation of risk management practices. When potential risks are recognized at the outset of a procurement process, it becomes easier to develop mitigation plans and integrate risk considerations into supplier selection criteria. This ensures that suppliers who have demonstrated strong risk management capabilities are favored in the selection process.In developing economies, like Nigeria, where procurement systems are often fraught with challenges such as corruption and political interference, robust risk assessment frameworks are indispensable. By incorporating tools such as risk matrices, probabilistic models, and sensitivity analyses, organizations can systematically evaluate risks and prioritize resources accordingly.

2.2.2 Supplier Selection

Supplier selection is widely regarded as a critical determinant of procurement success, particularly in the delivery of public infrastructure projects where uncertainty and complexity are prevalent. It goes beyond identifying capable vendors to systematically evaluating their ability to contribute to project objectives under risk-laden conditions. The integration of risk management into supplier selection ensures that decisions are not solely cost-driven but account for factors such as reliability, resilience, and long-term performance (Ho et al., 2010). Drawing from existing literature and contextual realities within LBRBDA, this study conceptualises supplier selection along three interrelated dimensions: supplier capacity, supplier past performance, and supplier risk exposure. These dimensions capture the multifaceted nature of supplier evaluation and provide an operational framework for assessing how risk management practices influence procurement outcomes. Supplier capacity represents the extent to which a supplier possesses the technical expertise, resources, and financial strength necessary to deliver on project requirements. It reflects both current capability and the ability to withstand unexpected challenges without jeopardizing delivery timelines or incurring additional costs. Within public procurement settings, evaluating capacity is essential, as underperformance often stems from inadequate technical and financial foundations. Risk assessment frameworks therefore emphasize capacity as a decisive factor in selecting suppliers who can sustain performance under uncertainty (Schramm et al., 2020). Past performance serves as a proxy for reliability, offering insights into how suppliers have managed quality, timeliness, and budget adherence in previous projects. Empirical studies indicate that suppliers with strong track records are better positioned to navigate risks in future engagements, as their demonstrated resilience provides confidence in their capacity to handle disruptions (Saha & Joshi, 2024). In this study, past performance is treated as a key evaluative dimension, ensuring that historical evidence informs the selection of suppliers most likely to deliver consistently within high-risk public infrastructure environments. Supplier risk exposure captures the degree of vulnerability that a supplier faces from both internal weaknesses and external threats, such as financial instability, regulatory non-compliance, or volatile supply chains. High exposure increases the probability of disruptions, while low exposure signals greater resilience and preparedness. Evaluating supplier risk exposure therefore enables procurement teams to favor suppliers who are structurally and operationally positioned to minimize potential project disruptions (Zimmer et al., 2016). In the context of LBRBDA, this dimension is particularly salient given the prevalence of systemic risks in Nigeria's public procurement landscape.

2.3 Review of related empirical studies

Empirical scholarship consistently demonstrates that integrating risk management practices enhances supplier selection, yet the evidence base reveals important limitations that warrant further investigation. Several studies affirm the significance of risk identification as the foundation of supplier evaluation. For example, Anozie et al. (2024) in Nigeria, Kraljic (2022) in Europe, and Smeltzer and Siferd (2020) in the U.S. all emphasize that early recognition of supplier-related vulnerabilities strengthens procurement outcomes. Similarly, Lesisa et al. (2018) highlight how the absence of systematic identification processes undermines supplier evaluation. Collectively, these findings converge on the importance of identifying risks early, but they

largely stop at descriptive associations, with limited exploration of how identification interacts with other dimensions of risk management to influence supplier decisions.

The literature also affirms the role of risk assessment in refining supplier choice. Sanders (2023), Jones et al. (2022), and Trkman and McCormack (2021) show that advanced assessment tools—ranging from hybrid models to scenario testing—help align supplier capacity with project-specific risks. However, while these models demonstrate methodological sophistication, they are often tested in high-uncertainty or defense-related contexts, leaving questions about their transferability to routine public procurement environments. Moreover, the heavy reliance on quantitative modeling risks overlooking softer, qualitative aspects of supplier evaluation, such as ethical compliance or institutional accountability.

In terms of risk mitigation, studies such as El-Diraby et al. (2022) and Schramm et al. (2020) reveal that proactive strategies—including supplier collaboration, diversification, and contractual safeguards—improve supplier performance. Yet, these works treat mitigation as a stand-alone mechanism, rarely examining how it complements identification, assessment, or monitoring in a holistic framework. This compartmentalization limits our understanding of risk management as an integrated process rather than a set of discrete activities. Finally, risk monitoring and control is increasingly recognized as vital for sustaining procurement performance. Li et al. (2021), Hernandez et al. (2019), and Zimmer et al. (2016) demonstrate that continuous monitoring enhances supplier compliance and reliability. While persuasive, much of this research emphasizes technological enablers such as digital platforms and real-time data analytics. Less attention has been paid to institutional and managerial practices that may enable—or constrain—the effectiveness of monitoring in different organizational settings. Taken together, existing studies provide strong evidence that risk management practices influence supplier selection, but they often suffer from three limitations. First, the literature tends to treat risk management dimensions in isolation, overlooking their interdependence and cumulative effects. Second, many studies emphasize methodological sophistication (e.g., modeling, hybrid approaches) without adequately addressing practical implementation challenges in public institutions. Third, while supplier outcomes such as reliability and performance are frequently examined, there is less focus on how structured risk management frameworks can enhance decision-making quality in supplier selection itself. These gaps highlight the need for empirical research that integrates risk identification, assessment, mitigation, and monitoring into a unified framework, and tests their combined influence on supplier selection outcomes in public procurement contexts.

3 Methods

3.1 Research design

This study adopted a descriptive quantitative survey design, considered appropriate for investigating relationships between constructs where quantifiable evidence can be collected from a defined population. The choice of this design was guided by the objective of examining how distinct risk management practices predict supplier selection outcomes in a public procurement setting.

3.2 Population and Sampling

The target population comprised 101 procurement stakeholders within the Lower Benue River Basin Development Authority (LBRBDA), Makurdi. This group included project managers, procurement officers, and contract administrators directly involved in supplier evaluation and decision-making. Given the relatively small population size, a census sampling approach was employed to minimize sampling bias and maximize representation. Of the 101 questionnaires distributed, 88 were returned fully completed, representing a valid response rate of 87.1%, which is considered sufficient for inferential analysis.

3.3 Research Instrument

Data were collected using a structured questionnaire developed from established instruments in procurement and risk management literature. Items measuring risk identification, risk assessment, risk mitigation, and risk monitoring and control were adapted from Kuang et al. (2019), Gurtu and Johny (2021), and Schramm et al. (2020), while supplier selection indicators were drawn from Ho et al. (2010) and Yazdani et al. (2020). A five-point Likert scale (ranging from 1 = “Strongly Disagree” to 5 = “Strongly Agree”) was used to capture respondent perceptions. Content validity was established through expert review by three procurement academics and two senior procurement officers. A pilot test with 15 respondents outside the study sample confirmed clarity and appropriateness of items, with Cronbach’s alpha coefficients for all constructs exceeding the 0.70 threshold, indicating internal consistency. The pilot test not only assessed internal consistency but also provided insights into item clarity and contextual relevance. Feedback from participants led to minor rewording of two questions to eliminate ambiguity. This step ensured that the constructs were clearly understood by procurement stakeholders within the Nigerian public-sector context. To avoid bias, the 15 respondents who participated in the pilot test were excluded from the main study sample.

3.4 Data Collection Procedure

Questionnaires were self-administered with the support of LBRBDA management between January and March 2025 to ensure high participation. Respondents were briefed on the study’s purpose, assured of confidentiality, and informed consent was

obtained. Completed questionnaires were collected over a three-week period, with follow-ups made to improve response rates.

3.5 Data Analysis

Data were coded and analyzed using SPSS version 26. Descriptive statistics (means, standard deviations, and frequencies) were employed to summarize respondents' characteristics and perceptions. Inferential analysis was conducted using multiple regression to examine the predictive effects of the four independent variables—risk identification, risk assessment, risk mitigation, and risk monitoring and control—on the dependent variable, supplier selection. Before applying the regression model, the model assumptions of linearity, normality, multicollinearity, and independence of errors were tested, and after the model application, tests of robustness were also conducted. The regression model for the study is econometrically specified as follows:

$$SS=\alpha+\beta_1 RI+\beta_2 RM+\beta_3 RMS+\beta_4 RA+\varepsilon$$

Where:
SS = Supplier Selection (dependent variable)
RI = Risk Identification
RM = Risk Mitigation
RMC = Risk Monitoring and Control
RA = Risk Assessment
α = Constant term
$\beta_1 \ldots \beta_4$ = Coefficients measuring the effect of each independent variable
ε = Error term

Table 1: Variables Used in the Study

Variable Type	Variable Name	Description / Indicators	Source(s)
Dependent Variable	Supplier Selection (SS)	Evaluated in terms of supplier capacity, past performance, and risk exposure.	Ho et al. (2010); Yazdani et al. (2020)
Independent Variable	Risk Identification (RI)	Extent to which potential supplier-related risks (financial, technical, regulatory, logistical) are identified early in the procurement cycle.	Kuang et al. (2019); Huma et al. (2020)
Independent Variable	Risk Assessment (RA)	Evaluation of identified risks in terms of likelihood and impact, prioritizing high-risk areas.	Acebes et al. (2024); Aloini et al. (2021)
Independent Variable	Risk Mitigation (RM)	Strategies adopted to minimize risk likelihood or impact (e.g., diversification, guarantees, prequalification).	Schramm et al. (2020); Gurtu& Johny (2021)
Independent Variable	Risk Monitoring & Control (RMC)	Continuous tracking of supplier performance and risk indicators to ensure early response and compliance.	Li et al. (2021); Hernandez et al. (2019)
Control Variables	Demographic Characteristics	Respondent role (project manager, procurement officer, contract administrator), years of experience, and department. Included to account for heterogeneity in perceptions.	Authors' survey instrument (2025)

Note. All independent variables were measured using multiple Likert-type items on a 5-point scale (1 = Strongly Disagree to 5 = Strongly Agree). The responses reflect the risk management practices of LBRBDA as experienced by participants in their current roles over the past three years, ensuring that perceptions are both recent and institutionally grounded.

4 Results and Discussion

4.1 Pre-Diagnostic Tests

Before conducting the main regression analysis, pre-diagnostic tests were performed to verify that the data met the assumptions required for valid regression results. Descriptive statistics and correlations were first examined to summarize the data and identify preliminary relationships among variables.

Normality tests (Shapiro–Wilk) assessed whether the variables followed an approximately normal distribution, while multicollinearity diagnostics (VIF and Tolerance) ensured that the independent variables were not highly correlated. These checks provide confidence that the regression results would be statistically sound and interpretable.

Table 2: Descriptive Statistics

Variable	N	Minimum	Maximum	Mean	Std Deviation
Risk identification	88	1.000	5.000	3.87	0.812
Risk mitigation	88	1.000	5.000	3.76	0.792
Risk monitoring and control	88	1.000	5.000	3.68	0.821
Risk assessment	88	1.000	5.000	3.79	0.805
Supplier selection	88	1.000	5.000	3.85	0.833

Source: SPSS output of Researchers' Computations, 2025.

The descriptive statistics in Table 2 show that all the study variables recorded relatively high mean values above 3.5 on a 5-point Likert scale, indicating strong agreement among respondents on their importance in the operations of the Lower Benue River Basin Development Authority. Risk identification recorded the highest mean of 3.87 (SD = 0.812), suggesting that identifying risks is the most emphasized practice. This is followed closely by supplier selection with a mean of 3.85 (SD = 0.833), reflecting the Authority's strong focus on choosing suppliers carefully.

Risk assessment had a mean of 3.79 (SD = 0.805), while risk mitigation scored 3.76 (SD = 0.792), both showing that evaluating and reducing risks are integral to procurement practices. Risk monitoring and control had the lowest mean of 3.68 (SD = 0.821), though still relatively high, suggesting that while monitoring risks is practiced, it may not be as consistently emphasized as the other dimensions.

The closeness of these mean values and the relatively small standard deviations highlight a general consensus among respondents that risk management practices are actively applied and play a critical role in effective supplier selection within the organization.

Table 3: Correlation Result

	RI	RM	RMC	RA	SS
Risk identification (RI)	1				
Risk mitigation (RM)	.721**	1			
Risk monitoring and control (RMC)	.684**	.612**	1		
Risk assessment (RA)	.653**	.587**	.609**	1	
Supplier selection (SS)	.639**	.564**	.592**	.618**	1
N	88	88	88	88	

Correlation is significant at 0.01 level (2 tailed)

Source: SPSS Output of Researchers' Computations, 2025.

The correlation results in Table 3 provide further insight into the relationships between risk management practices and supplier selection. All the correlation coefficients are positive and statistically significant at the 0.01 level, confirming strong associations among the variables. Notably, risk identification (r = 0.639), risk mitigation (r = 0.564), risk monitoring and control (r = 0.592), and risk assessment (r = 0.618) all correlate positively with supplier selection. This implies that improvements in any of these practices are likely to enhance the supplier selection process.

Additionally, the strong inter-correlations among the risk management practices themselves (ranging from 0.587 to 0.721) suggest that these practices are complementary, and their combined application contributes to better procurement outcomes within the Authority.

Table 4: Normality of Variables (Sharpiro-Wilk)

Variable	Statistic (W)	Df	Sig.
Risk identification (RI)	0.981	88	0.164
Risk mitigation (RM)	0.978	88	0.118
Risk monitoring and control (RMC)	0.984	88	0.207
Risk assessment (RA)	0.987	88	0.288
Supplier selection (SS)	0.989	88	0.335

Source: SPSS Output of Researchers' Computations, 2025.

The Shapiro–Wilk test in Table 4 was used to examine the normality of the variables. The results showed that all the variables (Risk Identification, Risk Mitigation, Risk Monitoring and Control, Risk Assessment, and Supplier Selection Practices) have p-values greater than 0.05 (ranging from 0.118 to 0.335).

Since none of the p-values fall below the 0.05 threshold, the null hypothesis of normality cannot be rejected. This indicates that all the study variables are approximately normally distributed, satisfying the regression assumption of normality.

Table 5: Multicollinearity Diagnostic (Tolerance & VIF)

Variable	Tolerance	VIF
Risk identification (RI)	0.726	1.377
Risk mitigation (RM)	0.708	1.423
Risk monitoring and control (RMC)	0.752	1.330
Risk assessment (RA)	0.741	1.349

Source: SPSS Output of Researchers' Computations, 2025.

The Variance Inflation Factor (VIF) and Tolerance values in Table 5 were used to test for multicollinearity among the predictors. All tolerance values are above 0.70, while all VIF values are below 2 (ranging from 1.330 to 1.423).
Since the general rule is that tolerance values greater than 0.2 and VIF values less than 10 indicate no multicollinearity, these results confirm that there is no multicollinearity among the independent variables. This means the predictors contribute unique information to the model without excessive overlap.

4.2 Regression Analysis

Table 6: Model Summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate	Durbin Watson statistic
1.0	0.872	0.761	0.752	0.489	1.984

a. Predictors: (Constant), Risk assessment, Risk monitoring and control, Risk mitigation, Risk identification
b. Dependent: Variable: Supplier selection

Source: SPSS Output of Researchers' Computations, 2025.

The regression analysis as presented in Table II was conducted to examine the extent to which risk management practices influence supplier selection in the Lower Benue River Basin Development Authority (LBRBDA). From the model summary, the correlation coefficient R was found to be 0.872, indicating a strong positive relationship between the set of independent variables and supplier selection.
The R-squared (R^2) value of 0.761 suggests that approximately 76.1% of the variation in supplier selection can be explained by the combined effect of risk identification, risk assessment, risk mitigation, and risk monitoring and control.
The adjusted R-squared, which adjusts for the number of predictors in the model, stood at 0.752, further confirming the robustness of the model.
A Durbin-Watson statistic of 1.984 was observed, indicating that the residuals were not auto-correlated and that the assumptions of independence in the regression model were met. This result implies that the model, as a whole, is statistically significant, and at least one of the predictors has a meaningful effect on supplier selection within LBRBDA.

Table 7: Analysis of Variance (ANOVA)

Model		Sum of Squares	Df	Mean Square	F change	Sig.
1	Regression	54.331	4	13.583	91.417	0.000
	Residual	17.087630	83	0.206		
	Total	71.418	87			

a. Dependent Variable: Supplier selection
b. Predictors: (Constant), Risk assessment, Risk monitoring and control, Risk mitigation, Risk identification

Source: SPSS Output of Researchers' Computations, 2025.

The ANOVA result in Table 7 showed that the regression model is statistically significant (F = 91.417, p = 0.000), meaning that risk management practices collectively have a strong and meaningful effect on supplier selection in the Lower Benue River Basin Development Authority. The predictors (risk identification, risk mitigation, risk monitoring and control, and risk assessment) together explain a substantial proportion of the variation in supplier selection.

Table 8: Regression Coefficients

Model		Unstandardized Coefficients		Standardized Coefficients		
		B	Std. Error	Beta	T	Sig.
1	(Constant)	0.412	0.215	—	4.686	0.000
	Risk identification	0.725	0.077	0.628	9.467	0.000
	Risk mitigation	0.538	0.070	0.451	7.734	0.000
	Risk monitoring and control	0.384	0.060	0.301	6.361	0.001
	Risk assessment	0.292	0..069	0.187	4.231	0.000

Dependent Variable: Supplier selection

Source: SPSS Output of Researchers' Computations, 2025.

Further insight was drawn from the regression coefficients in Table 8, where the individual contributions of each risk management practice were examined. The standardized beta coefficient for Risk Identification was 0.628, with a t-value of 9.467 and a p-value of 0.000. This indicates that risk identification has the most substantial effect on supplier selection. Interpreting this in practical terms, for every unit increase in effective risk identification practices, there is a corresponding 0.628-unit increase in the likelihood of achieving optimal supplier selection, all else being equal. This highlights the critical role of early and thorough identification of procurement risks in enhancing supplier decisions.

Risk Mitigation followed closely, with a standardized beta of 0.451, a t-value of 7.734, and a p-value of 0.000. This result suggests that improved risk mitigation efforts, such as contingency planning and preventive controls, are strongly associated with better supplier choices. Here, a unit improvement in risk mitigation practices is associated with a 0.451-unit increase in the effectiveness of supplier selection. The effect of Risk Monitoring and Control was also significant, though slightly lower, with a standardized beta of 0.301, a t-value of 6.361, and a p-value of 0.001. This indicates that consistent monitoring and control mechanisms contribute positively to supplier selection, with each unit increase in monitoring efforts resulting in a 0.301-unit improvement in supplier outcomes.

Finally, Risk Assessment, though the weakest among the predictors, still showed a meaningful impact. It had a standardized beta of 0.187, a t-value of 4.231, and a p-value of 0.003, which is statistically significant. This implies that, while risk assessment plays a comparatively smaller role, it remains a relevant factor in supplier selection. A unit improvement in risk assessment correlates with a 0.187-unit increase in supplier selection effectiveness.

4.3 Post-Diagnostic Tests of the Regression Model

To ensure the regression results are reliable, post-diagnostic tests were conducted. The Durbin–Watson test checked for autocorrelation, the Breusch–Pagan test assessed heteroscedasticity, and the Ramsey RESET test examined model specification. These tests confirmed that the assumptions of linear regression are met, supporting the robustness of the model linking risk management practices to supplier selection in LBRBDA.

i. Durbin-Watson Test for Autocorrelation

The Durbin–Watson statistic for the regression model as earlier presented in Table 4 is 1.984. This test examined whether residuals from the regression are independent or showed autocorrelation. The acceptable range for Durbin–Watson is roughly 1.5 to 2.5 for no serious autocorrelation concerns. Since 1.984 falls within this range, it indicates that residuals are independent, and there is no evidence of autocorrelation in the regression model predicting supplier selection from risk management practices in LBRBDA.

Table 9: Breusch-Pagan Test for Heteroschedasticity

Test statistics	Df	p-values	Decision
6.120	4	0.191	No evidence of autocorrelation

Source: SPSS Output of Researchers' Computations, 2025.

The Breusch–Pagan test in Table 9 evaluates whether the variance of residuals is constant (homoscedasticity). The test statistic here is $\chi^2 = 6.120$ with a p-value of 0.191.

The null hypothesis assumes homoscedasticity (constant variance). Since the p-value > 0.05, the null hypothesis is not rejected. This means there is no evidence of heteroscedasticity, confirming that the model residuals have constant variance across all levels of the predictors.

Table 10: Ramsey RESET Test (Model Specification Check)

Test statistics (F)	Df1	Df2	p-values	Decision
1.137	3	83	0.257	No model misrepresentation

Source: SPSS Output of Researchers' Computations, 2025.

The Ramsey RESET test assesses whether the model is correctly specified, particularly checking for omitted variables or incorrect functional form. The test statistic is F = 1.370 with df1 = 3 and df2 = 83, and a p-value of 0.257. The null hypothesis assumes no misspecification.

Since p > 0.05, we fail to reject the null, indicating that the model is correctly specified and no evidence of omitted variables or functional form issues exists. In a nutshell, since all three post-diagnostic tests confirm that the regression model is robust: residuals are independent, variance is constant, and the model specification is appropriate. This strengthens confidence in the regression results linking risk management practices to supplier selection in LBRBDA.

4.4 Test of hypotheses and discussion of findings

In line with the aim of investigating the effect of risk management practices on supplier selection within the Lower Benue River Basin Development Authority (LBRBDA), four null hypotheses were tested using regression analysis. The objective was to determine whether specific components of risk management (namely, risk identification, risk assessment, risk mitigation, and risk monitoring and control) exert any statistically significant influence on supplier selection decisions.

H_{o1}: Risk identification has no significant effect on supplier selection in LBRBDA

The regression result revealed that risk identification demonstrated the strongest influence on supplier selection, with a standardized beta coefficient of 0.628, a t-value of 9.467, and a p-value of 0.000. This means that for every unit increase in the application of effective risk identification practices, there is a corresponding and substantial increase in the quality and appropriateness of supplier selection.

The extremely low p-value confirms that this effect is statistically significant and not due to chance. Therefore, the null hypothesis which stated that risk identification has no significant effect on supplier selection is rejected. This finding aligns strongly with Anozie *et al*. (2024), who showed that early risk identification, particularly relating to financial and logistical weaknesses, helped procurement teams in Nigeria select more reliable suppliers.

Similarly, Kraljic (2022) emphasized that firms which proactively identified strategic and operational risks were more effective in supplier prioritization within high-risk procurement categories. Smeltzer and Siferd (2020) also affirmed that early identification of raw material and supply volatility risks enabled better supplier selection in U.S. infrastructure projects.

The current study expands on this by highlighting its applicability in the Nigerian context, where infrastructural bottlenecks and political instability make risk identification even more critical.

H_{o2}: Risk mitigation has no significant effect on supplier selection in LBRBDA

The regression results showed that risk mitigation also had a meaningful impact on supplier selection. With a beta coefficient of 0.451, a t-value of 7.734, and a p-value of 0.000, the results indicate a significant and positive relationship. This suggests that improvements in risk mitigation strategies lead to better-informed and more resilient supplier choices.

The rejection of the null hypothesis in this case supports the idea that proactive mitigation of supply-related risks contributes considerably to the selection process.

This outcome is in line with Sanders (2023), who developed a hybrid framework combining bankruptcy models with multicriteria scoring, which successfully assessed financial risk at the plant level. The framework proved instrumental in enhancing supplier selection, particularly during crises.

Likewise, Jones *et al*. (2022) and Trkman and McCormack (2021) found that robust risk assessment techniques (e.g., scenario analysis and stress testing) enhanced procurement decisions by aligning suppliers' capabilities with specific project risks. The current study confirms that such alignment reduces future disruptions and promotes smoother project delivery.

H_{o3}: Risk monitoring and control have no significant effect on supplier selection in LBRBDA

The Influence of risk monitoring and control was also statistically significant, though to a slightly lesser extent. This variable yielded a standardized beta of 0.301, with a t-value of 6.361 and a p-value of 0.001. This finding implies that consistent tracking and control of procurement-related risks help maintain supplier performance standards and ensure compliance throughout the contract cycle. The significance level again warrants the rejection of the corresponding null hypothesis.

This finding is strongly supported by Li *et al*. (2021), whose study on 30 infrastructure projects in China demonstrated that real-time risk monitoring contributed to early detection of issues and strategic supplier engagement.

Zimmer *et al*. (2016) also confirmed that regular risk monitoring significantly improved supplier performance in European supply chains. Additionally, El-Diraby*et al*. (2022) found that collaborative monitoring between suppliers and procurement officers fostered risk transparency, improved compliance, and reduced project disruptions in Canadian infrastructure projects.

H_{O4}: Risk assessment has no significant effect on supplier selection in LBRBDA

Risk assessment, though the weakest among the four variables, was still found to have a significant positive effect on supplier selection. The beta coefficient stood at 0.187, with a t-value of 4.231 and a p-value of 0.003. This indicates that even though its impact is more modest, proper evaluation and analysis of potential risks still play a valuable role in informing supplier decisions. The p-value being below the 0.05 threshold confirms the statistical relevance of this variable, and thus, the null hypothesis is also rejected. This finding is supported by Hernandez *et al*. (2019) who found that suppliers who actively responded to monitored risks, particularly those related to environmental and safety compliance, received more favorable evaluations during project delivery. Additionally, Trkman and McCormack (2021) supported this finding by stating that assessing to match supplier capacity to project-specific risks significantly reduced procurement delays and enhanced project efficiency.

5 Conclusion and recommendations

5.1 Conclusion

This study investigated the effect of risk management practices on supplier selection in the Lower Benue River Basin Development Authority (LBRBDA), Makurdi. The findings confirmed that all four dimensions of risk management (risk identification, risk assessment, risk mitigation, and risk monitoring and control) significantly influence supplier selection decisions within the organization. Among these, risk identification emerged as the most influential factor, followed by risk mitigation, then risk monitoring and control, with risk assessment having the least but still significant effect. The study concludes that the success of supplier selection in LBRBDA depends largely on the organization's ability to proactively identify potential risks, evaluate their implications, design mitigation strategies, and continuously monitor procurement processes. These practices ensure that suppliers selected are not only cost-effective but are also reliable, compliant, and aligned with long-term organizational goals.

5.2 Recommendations

Based on the findings of this study, several recommendations are advanced to strengthen procurement practices at the Lower Benue River Basin Development Authority (LBRBDA) and similar public-sector organizations. First, since risk identification demonstrated the strongest influence on supplier selection, LBRBDA should invest in structured tools and training programs that enhance the early detection of potential procurement and supplier-related risks. Risk mitigation also emerged as a significant factor, and it is therefore recommended that the Authority formulate and institutionalize strategies such as risk-sharing contracts, supplier diversification, and insurance mechanisms to minimize vulnerabilities. Furthermore, effective risk monitoring and control are essential in ensuring supplier compliance with performance standards; hence, the adoption of automated monitoring systems supported by key performance indicators (KPIs) would allow for continuous evaluation of supplier reliability. Although risk assessment exhibited the weakest predictive effect among the dimensions, it remains a critical practice. Procurement officers should therefore be adequately trained to apply both quantitative and qualitative tools—such as risk matrices, impact-likelihood charts, and SWOT analyses—to support more robust and informed supplier decisions.

While these recommendations are tailored to the institutional realities of LBRBDA, their relevance extends to other public procurement agencies operating under similar conditions of uncertainty, regulatory oversight, and supplier performance variability. The central implication is that risk management should be embedded within supplier selection as a standard practice, regardless of organizational context. However, the extent to which each recommendation applies will depend on contextual factors such as institutional capacity, procurement maturity, and regulatory frameworks. Thus, the recommendations are both locally grounded and potentially generalisable, offering a practical framework that can be adapted by public-sector organizations across developing economies seeking to strengthen procurement resilience and supplier performance.

5.3 Implications of the Findings

The findings of this study carry important theoretical implications for both Risk Management and Supplier Selection theories. From a risk management perspective, the results lend empirical support to the Risk-Based Procurement Approach, which emphasizes proactive risk identification and mitigation as central to procurement success. The strong predictive effect of risk identification and mitigation demonstrates that risk management is not merely a supporting function but a determinant factor in procurement decision-making, thereby extending the theoretical argument that procurement outcomes are enhanced when risk considerations are integrated at the front end of supplier selection. This reinforces the proposition that risk management theory should be broadened beyond its traditional focus on financial or operational safeguards to include strategic supplier evaluation as a mechanism for minimizing procurement vulnerabilities.

In relation to supplier selection theory, the findings substantiate the claim that supplier evaluation is multidimensional, shaped not only by cost and technical competence but also by the supplier's ability to withstand and respond to risk. The results confirm that the dimensions of risk management—particularly risk identification and mitigation—directly inform supplier selection, thus validating supplier selection theory's emphasis on systematic evaluation of capacity, past performance, and

risk exposure. Moreover, by showing that risk monitoring and assessment, though weaker, still significantly contribute to supplier decisions, this study advances supplier selection theory by embedding risk-awareness as an integral criterion in evaluating supplier suitability.

Taken together, the study bridges both theoretical domains by demonstrating that risk management practices are not external to supplier selection but are embedded within it, suggesting that future theoretical models should treat supplier selection as a risk-informed process rather than a neutral evaluation of supplier attributes. This theoretical integration provides a richer understanding of how procurement performance can be enhanced in uncertain public-sector environments.

5.4 Limitations of the Study

Despite offering valuable insights into the relationship between risk management practices and supplier selection in the public sector, this study is not without limitations. First, the research focused on a single institution—the Lower Benue River Basin Development Authority (LBRBDA)—which may limit the generalisability of the findings to other public procurement agencies with different institutional structures or regulatory environments. Second, the study relied on self-reported data collected through structured questionnaires, which may be subject to social desirability bias or perceptual differences among respondents. Although steps were taken to ensure validity and reliability, the use of perceptual measures rather than objective procurement performance data presents inherent limitations. Third, the cross-sectional design captures relationships at a single point in time and does not account for potential changes in risk management practices or supplier performance over time. Longitudinal or panel data could provide a more robust understanding of causal dynamics. Finally, while multiple regression analysis was applied to test the hypothesized relationships, other advanced modeling techniques, such as structural equation modeling (SEM), might have offered deeper insights into the mediating or moderating effects between variables.

Moreover, the use of a Likert scale, while providing a standardized measurement, is not without challenges. It assumes equidistance between response options, may be prone to ambiguity in interpretation, and is susceptible to social desirability or acquiescence bias. However, these risks were minimized by employing multiple items (ranging from four to six per construct) to capture each variable more comprehensively. Despite this precaution, future studies could complement Likert-based surveys with qualitative methods, such as interviews or procurement audits, to triangulate responses and reduce bias.

An additional observation is that the mean scores of all four independent variables were relatively close, ranging from 3.68 to 3.87. This clustering may partly reflect socially desirable or politically correct responses, given the sensitivity of procurement issues in public institutions. While the regression results are robust, this raises the need for future studies to integrate objective indicators such as Key Risk Indicators (KRIs), procurement performance audits, or archival supplier performance data. Such measures would provide a stronger evidence base to validate self-reported practices and offer deeper insights into procurement risk management dynamics.

These limitations do not undermine the study's contributions but highlight areas where future research could build upon the current findings.

5.5 Suggested Areas for Further Studies

Building on the findings of this study, future research could extend the scope beyond the Lower Benue River Basin Development Authority (LBRBDA) to other Ministries, Departments, and Agencies (MDAs) in order to determine whether the influence of risk management practices on supplier selection is consistent across diverse institutional contexts. Comparative studies across multiple agencies would provide broader insights into how organizational structures, regulatory compliance levels, and procurement maturity shape the role of risk management in supplier evaluation. In addition, subsequent research could move beyond the selection phase to explore the longitudinal impact of risk management practices on post-selection outcomes, such as supplier performance, contract execution success, and long-term value for money. Such extensions would enrich the literature by linking risk-aware supplier selection decisions to the sustainability and effectiveness of public procurement outcomes.

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