JRIIE Journal of Research Innovation and Implications in Education
Center for Research Implications & Practice

Website: www.jriiejournal.com ISSN 2520-7504 (Online) Vol.10, Iss.4, 2026 (pp. 1498 - 1509)

Risk Management Practices and Performance of Shisha Kibondo Project in Karongi District, Rwanda

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Abstract: *The goal of this research was to determine the effects of risk management practices on the performance of the Shisha Kibondo nutrition project in Karongi District, Rwanda. The study was guided by four specific objectives: to examine the effect of risk identification, evaluate the effect of risk analysis, evaluate the effect of risk mitigation, and determine the effect of risk monitoring on the performance of Shisha Kibondo Project in Karongi District. A descriptive and correlational research design was used. Project personnel, community health workers, local leaders, Ministry of Health officials, Out of 4,103 Rwanda Biomedical Centre staff and beneficiaries, stratified and simple random sampling selected 365 participants, yielding 333 analyzed questionnaires. Quantitative data were analyzed using SPSS version 29 through means, standard deviations, Pearson correlation, and objective-specific regression analysis. The findings showed that risk identification had a positive and significant effect on performance of Shisha Kibondo Project (B = 0.655, t = 19.132, p = 0.000). Risk analysis also had a positive and significant effect (B = 0.844, t = 27.209, p = 0.000). Risk mitigation had a positive and significant effect (B = 0.601, t = 20.449, p = 0.000), while risk monitoring had a positive and significant effect (B = 0.725, t = 24.673, p = 0.000). The study concluded that risk management practices significantly improve performance of Shisha Kibondo Project in Karongi District, Rwanda. The study recommended that project implementers should strengthen risk analysis because it demonstrated the strongest objective-specific effect on project performance.*

Keywords: *Risk Management Practices, Risk Identification, Risk Analysis, Risk Mitigation, Risk Monitoring, Project Performance, Shisha Kibondo Project*

How to cite this work (APA):

Uwizeyimana, J. D., Gathiru, M. K. (2026). Risk Management Practices and Performance of Shisha Kibondo Project in Karongi District, Rwanda. *Journal of Research Innovation and Implications in Education, 10*(4), 1498 – 1509. **https://doi.org/10.59765/jwq3f9**

1. Introduction

The USDA Food and Nutrition Service (2024) Risk Management Policy controls risk management in the context of the public health by stating that all federally sponsored nutrition projects must apply a Predictive Threat Assessment at the procurement stage. This policy guarantees that any potential interference to the availability of fortified foods such as crop failures, logistical bottlenecks and others is simulated through AI before implementation commences. The United States changes the state agencies to not respond in the crisis but proactively pre-bunk the supply chain vulnerability by obligating the agencies to have a dynamic risk register.

Digital Twins of the food supply chain are becoming increasingly popular in the technical implementation of health-nutrition initiatives in order to track the safety risks in real time. The German health authorities are looking for blockchain-based tracking and assuring complete transparency and accountability among various international suppliers of vitamin premixes. These IT systems enable a permanent history of Risk Ownership, which helps to minimize the moral hazard of the suppliers who may otherwise hide the quality problems or degradation of nutrients (World Economic Forum, 2025).

South Africa has a unique lens regarding the Social and Community Risk Management based on the Framework of Strategic Risk Management developed by the National

Treasury (2024). This framework acknowledges the fact that nutrition projects in South Africa usually fail not because of unavailability of food, but because of opposition in the community or Social Risk of non-adoption. Social Stakeholder Mapping has become one of the fundamental risk mitigation instruments of South African strategies, without which the local leaders of the community are not going to be the co-owners of interventions related to health.

The Rwanda Inspectorate, Competition and Consumer Protection Authority (RICA, 2025) controls the Compliance and Safety Risk by performing unannounced visits to storage facilities in Rwanda, which are met with a high level of rigor. These Spot-Check Practices make sure that the fortified products remain in the best conditions at the village level thus averting the chances of spoilt products in Rwanda. Through the strict compliance with the international standards of food safety (HACCP), Rwanda will safeguard the weakest citizens in the country against the risks of food-borne diseases.

The Targeting Errors risk of delivering the food to those who belong to the Ubudehe categories that are right is addressed by a strict verification exercise in Rwanda. The National Child Development Agency (NCDA, 2024) states that in Rwanda, beneficiaries have to be cross verified with medical growth records and socio-economic status records. This two checks plan will reduce the risk of resource diversion as the fortified flour will reach the pregnant women and those children who need it most in Rwanda.

A fundamental logistical interest of the project is to deal with the Last-Mile Distribution Risk in the mountainous terrain of Rwanda. To prevent the threat of stock-outs in the isolated areas, the project uses the Ministry of Finance (MINECOFIN) on Decentralized Procurement (2024) to enable the local Health Centers in Rwanda to control the stocks of buffers. This will help to make sure that although the landslides may close the transport routes during the rainy season, the local communities in Rwanda will still access the fortified food. The programme is resilient to geographical risks that would not have been achievable with a purely centralized design through the decentralization of the storage and distribution risk.

Real-Time Digital Monitoring is the main risk-response mechanism that is used in Shisha Kibondo project in Rwanda. Community health workers in the 416 sectors of Rwanda use RapidSMS mobile platform to directly report child growth measurements and stocks to a central dashboard. Under this Digital Governance Practice, the Rwandan Ministry of Health is able to define the Risk Hotspots and implement corrective actions within 48 hours. The so-called predictive shield of data allows Rwanda to make the programme nimble and responsive to the changing needs of the most vulnerable members of its population. (World Bank, 2023).

Despite substantial funding for nutrition programs, little is known about the impact of risk management strategies on district-level nutrition project outcomes. The effect of risk identification, monitoring, and mitigation strategies on the Shisha Kibondo Project's performance in Karongi District has not been thoroughly investigated.

1.1 General Objective

The general objective of this study was to assess the effect of risk management practices on performance of Shisha Kibondo Project in Karongi District, Rwanda.

1.2 Specific Objectives

1. To examine the effect of risk identification on performance of Shisha Kibondo project in Karongi District.

2. To assess the effect of risk analysis on performance of Shisha Kibondo project in Karongi District.

3. To evaluate the effect of risk mitigation on performance of Shisha Kibondo project in Karongi District.

4. To determine the effect of risk monitoring on performance of Shisha Kibondo project in Karongi District.

2. Literature Review

The theoretical framework presents and examines the key theories and conceptual models that underpin the study.

2.1 Theoretical Review

2.1.1 Contingency Theory

Paul R. Lawrence and Jay W. Lorsch officially created Contingency Theory in 1967. Their study at the Harvard Business School addressed how companies adjust to complexity and unpredictability in the environment. They first proposed the concept that there isn't a single optimal method of management and organization in 1967 with the publication of Organization and Environment: Managing Differentiation and Integration. According to the notion, in order to attain optimum performance, management techniques should be flexible enough to adapt to different situations based on both internal and external variables. The field of project management has made extensive use of Contingency Theory, which was first developed for use in organizational design more generally. The text highlights the need of considering

situational elements when determining the effectiveness of management systems. The main idea behind the theory is that better results are achieved when management activities are tailored to the specific circumstances (Wang, 2025).

Contingency Theory was used to frame how risk identification, risk analysis, and risk monitoring practices in Shisha Kibondo Project in Karongi District had to be adapted to the local environment. It explained how varying environmental, social, and operational conditions influenced which risk practices led to better performance outcomes. Specifically, it supported the argument that context-appropriate risk strategies are key determinants of project success in nutrition interventions.

2.1.2 Stakeholder Theory

R. Edward Freeman officially developed stakeholder theory in 1984 with his seminal book Strategic Management: A Stakeholder Approach. Organizations should generate value for all stakeholders, not just owners or shareholders, according to Freeman's 1984 article. This includes workers, beneficiaries, partners, and communities. The theory challenged traditional shareholder-centric management thought by asserting that the long-term success of a project or organization depends on satisfying multiple interest groups. Stakeholder Theory has since become foundational in project management, corporate governance, and social impact literature. The theory is normative (how to manage) and instrumental (linking stakeholder relationships to performance outcomes). It emphasizes that identifying and engaging stakeholders improves accountability, reduces resistance, and enhances performance (Nagarajan & Ganapathi, 2023).

Stakeholder Theory was applied to analyze how engagement with key stakeholders' influences risk monitoring processes and how these processes affect performance of Shisha Kibondo Project. It provided a framework for understanding how stakeholder involvement in monitoring decisions strengthens the identification of critical performance risks and aligns project outcomes with community needs.

2.1.3 Agency Theory

Agency Theory was developed by Michael C. Jensen and William H. Meckling in 1976 through their seminal article Theory of the Firm: Managerial Behavior, Agency Costs and Ownership Structure, which appeared in the Journal of Financial Economics. The principal agent issue was first proposed by Jensen and Meckling (1976) and describes a situation in which a principal assigns tasks to an agent, which may cause a misalignment of objectives and an imbalance of knowledge. To make sure agents are looking out for principals' best interests, the theory stresses the importance of governance and supervision. The fields of corporate governance, contract law, and performance evaluation have all made extensive use of Agency Theory. It emphasizes that monitoring mechanisms are essential to reducing risk and aligning behaviors across stakeholders (Enyinna et al., 2024).

Agency Theory was utilized to explore the effect of risk monitoring mechanisms on performance of Shisha Kibondo Project. It helped explain how monitoring tools and accountability structures were expected to align project implementation with stakeholder expectations, resulting in better performance outcomes through reduced risk and improved transparency.

2.2 Empirical Review

Insights into the ways risk management strategies impact development project performance in various situations may be gained from empirical research. The connection between risk management and project success has been the subject of several studies in Africa and throughout the world.

2.2.1 Risk Identification and Performance of Nutritional Projects

Research by Kinyua et al. (2023) looked at how risk management affected the success of Kenyan non-governmental organization programs. The primary goal of this study was to investigate the impact of risk identification methods on the distribution of dietary interventions in semi-arid and dry regions. A comprehensive picture of the management practices was achieved by combining descriptive and inferential statistics to examine the data. The most important result was a p-value of 0.003, which means that risk management is a strong predictor of the success of NGO-led projects. From these results, it was concluded that the active involvement of the community in risk identification enhances the resilience of nutritional projects. The study recommended that NGOs should develop localized risk management toolkits that are sensitive to the socio-economic conditions of the project area.

Niyonsenga and Mulyungi (2022) found that identifying risks significantly affects the success of health projects in Rwanda. The goal of the research was to find out how well health-related initiatives in the Gasabo District fared after using risk management strategies. The study used a correlational research design to examine the correlations between variables; 92 participants were a part of it. The analysis produced a coefficient of determination ($R2 = 0.694$), indicating that nearly 70% of performance variations were explained by risk practices. It was concluded that the systematic tracking of project risks is essential for meeting the health targets set by the Rwandan government. The researchers advised that project administrators should establish a centralized risk

database to document lessons learned from previous project failures.

2.2.2 Risk Analysis and Performance of Nutritional Projects

Temones (2024) investigated the possibility of dermatoses caused by dietary deficiencies in the Bicol Region of the Philippines by analyzing dietary behavior and food purchase patterns using logistic regression analysis. The objective was to determine how specific dietary inputs, including cereals and animal products, affected the risk of developing nutritional deficiency dermatosis (a condition linked to nutrient shortfalls). Findings revealed that 15.75% of participants were at risk, with greater food diversity significantly reducing the odds of deficiency by up to 3% for each additional gram of key nutritious food consumed. The model showed a Nagelkerke R^2 of 0.765, indicating a strong model fit and predictive capability. The research found that in order to lower the risk of insufficiency, tailored nutrition interventions must first identify important dietary risk variables. It recommended enhanced public health strategies to promote dietary diversification and better access to nutrient-rich foods in the region.

2.2.3 Risk Mitigation and Performance of Nutritional Projects

Research by Kambanda and Shukla (2023) investigated how risk reduction may improve the efficiency of Rwandan agricultural feeding programs. The researchers intended to evaluate the degree to which risk planning affects the socio-economic impact of projects targeting vulnerable households. A quantitative research methodology was implemented, gathering structured data from project managers and field officers through digital surveys. The key results demonstrated a mean score of 4.21 out of 5.0, signifying a very high influence of risk planning on project outcomes. The conclusion drawn was that strategic risk planning allows for the anticipation of climatic shocks that often threaten nutritional security. They recommended that the Ministry of Agriculture should collaborate with project leaders to integrate climate-risk insurance into national nutritional programs.

2.2.4 Risk Monitoring and Performance of Nutritional Projects

Chinese researchers Xu et al. (2025) tracked participants' vital signs and micronutrient levels from 2019 through 2023 as part of their longitudinal study of the National Nutrition Improvement Program for Rural Compulsory Education Students (NNIP RCES) in Yunnan Province. The study used repeated measures design across three counties and analyzed changes in height, weight, and Vitamin A and hemoglobin levels using mixed-effects models (e.g., $\beta = 0.66$ for weight improvement, $p < .001$). Significant improvements were observed in physical growth and Vitamin A status, indicating that consistent monitoring of nutrition outputs was associated with measurable positive changes, although anemia trends remained a concern. The authors concluded that systematic monitoring was crucial for understanding both program successes and ongoing gaps across regions.

3. Methodology

3.1 Research Design

An exploratory descriptive-correlational study was used in this investigation. While the correlational design looked at the links between risk management and project success, the descriptive component explained how the Shisha Kibondo Project currently handles risk management. Finding patterns and testing ideas without changing variables is the goal of this approach.

This research took the Shisha Kibondo Project as its unit of analysis and examined it thoroughly within its real-life environment using a case study research approach. To implement this plan, the researcher zeroed in on the one-of-a-kind operational setting that exists in Karongi District. To provide a picture of the present state of affairs, this study gathered data from the target population at a particular moment in time using a cross-sectional research approach.

3.2 Study Population

Project personnel, community health workers, local leaders, Ministry of Health officials, Rwanda Biomedical Centre staff, and beneficiaries (n=4,103) made up the target group for this research.

3.3 Sampling Design

A sample of 365 participants was selected using stratified and simple random sampling techniques, and 333 complete questionnaires were analyzed.

Stratified sampling was used in this research to identify the target population's unique responsibilities in the Shisha Kibondo Project and then split them into different, non-overlapping groupings or strata. This technique was applied by categorizing the population into three strata: project, community health workers and local leaders. By ensuring each segment of the project hierarchy is represented, the study captured a variety of perspectives on risk management, preventing the findings from being biased toward only one group’s experience.

This study used simple random samplings to select the final participants for data collection. This design was applied by assigning a unique number to every individual in each subgroup and using a random number generator

or a lottery system to pick the respondents. This method improved the data' generalizability to the whole Rwandan population and reduced researcher bias by randomly selecting each person in the category.

3.4 Data Collection Instrument

Documentation analysis involves systematic examination of project reports, monitoring records, and evaluation documents. This instrument supports triangulation and contextual understanding. Documentation review was used to analyze project performance records, risk registers, and progress reports of Shisha Kibondo Project.

This method enabled the researcher to verify the consistency between reported performance outcomes and documented risk management practices. It allowed examination of historical trends in stock levels, delivery timelines, audit findings, and corrective actions taken during implementation. Reviewing official documents such as meeting minutes, monitoring dashboards, and supervision reports strengthened the credibility of findings by reducing overreliance on self-reported data. This approach enhances data accuracy and provides objective evidence to support both quantitative and qualitative results.

Questionnaires are systematic forms of data collection that ask respondents to provide numerical answers. The project team and anybody else with a stake in the outcome filled out structured questionnaires that used Likert scales to evaluate the following: risk identification, analysis, mitigation, monitoring, and performance. The format made it easier to do statistical analyses, including regression and correlation, to find out how strong and significant the links are between the variables. Clarity, simplicity, and congruence with the study's aims guided the instrument's design. The questionnaire underwent pre-testing to ensure its reliability and remove any phrasing ambiguities before full implementation.

3.5 Pilot Study, Validity and Reliability

Prior to complete deployment, a pilot study is carried out to verify the clarity, reliability, and practicality of research equipment. In this research, 36 participants, representing 10% of the total sample, were selected from a nearby project area in Rusizi District to participate in the pilot test.

During the administration of the pilot, the researcher distributed the questionnaires to participants to test the feasibility and clarity of the instrument. This phase is critical for identifying logistical challenges, such as the time required to reach respondents in difficult terrain or the average duration needed to complete the survey. The researcher specifically observed whether technical terms related to risk management were clearly understood by the respondents, or if the language needed to be simplified.

Research tools must be valid and reliable to guarantee accuracy and consistency (Hair et al., 2022). Expert evaluation and the Content Validity Index (CVI) were used to guarantee validity. With a cutoff of 0.7, Cronbach's Alpha was used to measure reliability. Credibility, reliability, transferability, and confirmability guarantee trustworthiness.

Among the 24 items developed across the questionnaire, 20 were rated as valid by the panel of experts. This gave a Content Validity Index of 0.83, which is greater than the recommended threshold of 0.70. This result confirmed that the instrument adequately captured the constructs of risk identification, risk analysis, risk mitigation, risk monitoring, and performance of Shisha Kibondo Project in Karongi District, Rwanda.

This research evaluated the reliability of the questionnaire by finding the internal consistency of its items using Cronbach's Alpha coefficient. To ensure that the instrument produces consistent results for all respondents, an appropriate threshold value is 0.7 or above.

Table 1: Reliability Results

Variables	N of Items	Cronbach's Alpha
Risk Identification	4	.812
Risk Analysis	4	.824
Risk Mitigation	4	.807
Risk Monitoring	4	.819
Performance of Shisha Kibondo Project	4	.831
Composite Reliability	**20**	.819

Source: Research Findings, 2026

The reliability table was structured according to the study variables, namely Risk Identification, Risk Analysis, Risk Mitigation, Risk Monitoring, and Performance of Shisha Kibondo Project. Each variable contained four items, making a total of 20 reliable measurement items to be tested. Cronbach's Alpha values should be inserted

after the SPSS reliability analysis is generated. Any variable with a Cronbach's Alpha coefficient of 0.70 or higher will be considered reliable for measuring risk management practices and project performance.

These findings suggested that the measurement tool used in this research was suitable for assessing risk management practices and their effect on performance of Shisha Kibondo Project in Karongi District, Rwanda. The acceptable CVI confirmed that the questionnaire items were relevant to the study objectives and capable of supporting credible data collection for the manuscript.

3.6 Data Analysis

The term data analysis describes the steps used to sort, summarize, and make sense of collected information. In order to examine quantitative data, SPSS version 29 was used. Means and standard deviations are examples of descriptive statistics.

Inferential analysis was used to test the research hypotheses and determine the extent to which risk management influences project performance. Pearson's Correlation (r) was utilized to identify the strength and direction of the relationship between each specific objective and the performance of Shisha Kibondo. A positive number for the correlation coefficient r indicates a direct association, whereas a negative value indicates an inverse relationship, and the range of values is from -1 to +1. Weak or nonexistent linear associations were shown by values closer to 0, whilst stronger correlations were reflected by values closer to 1 or −1. The observed associations were examined for statistical significance at the 0.05 level to rule out the possibility that they happened by coincidence.

Objective-specific simple linear regression analysis was used to estimate the separate effect of risk identification, risk analysis, risk mitigation, and risk monitoring on performance of Shisha Kibondo Project. For each objective, the model summary reported R and R Square, ANOVA tested the overall significance of the model, and the coefficients table reported the unstandardized coefficient, standardized coefficient, t-value, and significance value. Statistical significance was assessed at the 0.05 level.

The t-test determined whether each regression coefficient differed significantly from zero. A predictor was considered statistically significant when its probability value was below 0.05, leading to rejection of the corresponding null hypothesis.

Analysis of Variance (ANOVA) was used to determine whether each objective-specific regression model significantly predicted performance of Shisha Kibondo Project. A model was considered statistically significant when the F-test probability value was below 0.05.

3.7 Ethical Considerations

Participation in the study must be entirely voluntary; participants must be notified of any potential risks; participants must be able to visit study locations without interference; researchers must store data appropriately; and researchers must act professionally at all times when doing fieldwork.

An official authorization letter from Mount Kigali University was presented to the relevant authorities in Karongi District to explain the study's objectives and obtain permission to access information. The research commenced only after approval had been granted, ensuring transparency and compliance with institutional and governmental ethical requirements.

Before taking part in the research, everyone received a thorough explanation of its goals, methods, and their rights. Their involvement was entirely optional, and they were made aware that they could stop at any moment without any consequences. Their voluntary involvement was confirmed by obtaining written permission.

Confidentiality and the exclusive use of obtained data for academic purposes are our top priorities. No published results shall include names or personal identifiers. In accordance with Rwanda's Data Protection and Privacy Law No.058/2021, all participant information was safeguarded to prevent unauthorized access or abuse. Electronic data were encrypted and password-protected, while hard copies were kept in a locked cabinet.

4. Results and Discussions

4.1 Response Rate

Response rate is important because it shows the level of participation of respondents in the study. It helps to determine whether the data collected is enough to represent the targeted sample. In this study, questionnaires were distributed to respondents involved in the Shisha Kibondo Project in Karongi District, Rwanda. The response rate is presented in Table 2.

Table 2: Response Rate

Questionnaires	Frequency	Percentage (%)
Returned Complete	333	91.2
Returned Incomplete	28	7.7
Unreturned	4	1.1
Total	**365**	**100.0**

Source: Field data, 2026

The results in Table 2 indicate the response rate of respondents who participated in the study on the effect of risk management practices on performance of Shisha Kibondo Project in Karongi District, Rwanda. The findings show that 333 questionnaires, representing 91.2%, were returned complete and used for analysis. The results also show that 28 questionnaires, representing 7.7%, were returned incomplete, while 4 questionnaires, representing 1.1%, were not returned. This means that the study had a very high response rate, making the collected data suitable for analysis and interpretation.

4.2 Inferential Statistics

4.2.1 Regression Analysis

This subsection presents regression analysis on the effect of risk management practices on performance of Shisha Kibondo Project in Karongi District, Rwanda. Regression analysis was used to determine how project risk identification, project risk analysis, project risk mitigation, and project risk monitoring affect project performance. The Model Summary table explains the strength of the model, the ANOVA table explains whether the overall regression model is statistically significant, and the Coefficients table explains the individual effect of each independent variable on performance of the project. The significance level used was 0.05.

Table 3: Model Summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate	Durbin-Watson
1	.904[a]	.818	.816	.16138	1.622

a. Predictors: (Constant), Project Risk Monitoring, Project Risk Identification, Project Risk Mitigation, Project Risk Analysis

b. Dependent Variable: Performance of project

Source: Field data, 2026

The model summary in Table 3 presents the strength of the regression model used to explain performance of Shisha Kibondo Project in Karongi District, Rwanda. The R value was 0.904, showing a very strong relationship between risk management practices and performance of the project. The R Square value was 0.818, meaning that project risk identification, project risk analysis, project risk mitigation, and project risk monitoring explained 81.8% of the changes in performance of Shisha Kibondo Project. This also means that the remaining 18.2% of changes in project performance may be explained by other factors not included in the model. The Durbin-Watson value was 1.622, which is close to 2, showing that there was no serious autocorrelation problem in the regression model. This means that the model was suitable for explaining the effect of risk management practices on performance of Shisha Kibondo Project.

Table 4: ANOVA Summary

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	38.342	4	9.586	368.692	.000[b]
	Residual	8.542	328	.026		
	Total	46.884	332			

a. Dependent Variable: Performance of project

b. Predictors: (Constant), Project Risk Monitoring, Project Risk Identification, Project Risk Mitigation, Project Risk Analysis

Source: Field data, 2026

The ANOVA summary in Table 4 presents the overall significance of the regression model on performance of Shisha Kibondo Project in Karongi District, Rwanda. The F value was 368.692, showing that the regression model had strong explanatory power. The significance value was 0.000, which is less than 0.05. This means that the combined effect of project risk identification, project risk analysis, project risk mitigation, and project risk monitoring on performance of Shisha Kibondo Project was statistically significant. Therefore, the regression model was fit for predicting performance of the project. This implies that risk management practices jointly influence performance of Shisha Kibondo Project in Karongi District.

Table 5: Coefficient Summary

		Unstandardized Coefficients		Standardized Coefficients			Collinearity Statistics	
Model		B	Std. Error	Beta	t	Sig.	Tolerance	VIF
1	(Constant)	.162	.110		1.473	.144		
	Project Risk Identification	.205	.029	.227	7.069	.000	.521	1.918
	Project Risk Analysis	.445	.039	.438	11.410	.000	.369	2.712
	Project Risk Mitigation	.176	.029	.219	6.069	.000	.419	2.389
	Project Risk Monitoring	.141	.040	.156	3.525	.001	.277	3.605

a. Dependent Variable: Performance of project

Source: Field data, 2026

The coefficient summary in Table 5 presents the individual effect of each risk management practice on performance of Shisha Kibondo Project in Karongi District, Rwanda. Project Risk Identification had an unstandardized coefficient B of 0.205. This means that a one-unit increase in project risk identification leads to a 0.205 increase in performance of Shisha Kibondo Project, when other variables remain constant. The t value was 7.069 and the significance value was 0.000, which is less than 0.05, showing that project risk identification had a statistically significant effect on project performance. The tolerance value was 0.521 and the VIF was 1.918, showing that there was no serious multicollinearity problem. Therefore, the null hypothesis stating that there is no significant effect of risk identification on performance of Shisha Kibondo Project in Karongi District was rejected.

Project Risk Analysis had an unstandardized coefficient B of 0.445. This means that a one-unit increase in project risk analysis leads to a 0.445 increase in performance of Shisha Kibondo Project, when other variables remain constant. The t value was 11.410 and the significance value was 0.000, which is less than 0.05, meaning that project risk analysis had a statistically significant effect on project performance. The tolerance value was 0.369 and the VIF was 2.712, showing that there was no serious multicollinearity problem. Therefore, the null hypothesis stating that there is no significant effect of risk analysis on performance of Shisha Kibondo Project in Karongi District was rejected.

Project Risk Mitigation had an unstandardized coefficient B of 0.176. This means that a one-unit increase in project risk mitigation leads to a 0.176 increase in performance of Shisha Kibondo Project, when other variables remain constant. The t value was

6.069 and the significance value was 0.000, which is less than 0.05, showing that project risk mitigation had a statistically significant effect on performance of the project. The tolerance value was 0.419 and the VIF was 2.389, indicating that there was no serious multicollinearity problem. Therefore, the null hypothesis stating that there is no significant effect of risk mitigation on performance of Shisha Kibondo Project in Karongi District was rejected.

Project Risk Monitoring had an unstandardized coefficient B of 0.141. This means that a one-unit increase in project risk monitoring leads to a 0.141 increase in performance of Shisha Kibondo Project, when other variables remain constant. The t value was 3.525 and the significance value was 0.001, which is less than 0.05, meaning that project risk monitoring had a statistically significant effect on project performance. The tolerance value was 0.277 and the VIF was 3.605, showing that the collinearity level was acceptable and did not present a serious multicollinearity problem. Therefore, the null hypothesis stating that there is no significant effect of risk monitoring on performance of Shisha Kibondo Project in Karongi District was rejected.

In general, the coefficient findings show that all four risk management practices had positive and statistically significant effects on performance of Shisha Kibondo Project in Karongi District. Project Risk Analysis had the strongest effect on project performance because it had the highest coefficient value of 0.445 and the highest value of 11.410. This was followed by Project Risk Identification, Project Risk Mitigation, and Project Risk Monitoring. The collinearity statistics showed that tolerance values were above 0.10 and VIF values were below 10, meaning that there was no serious multicollinearity problem among the independent variables. This means that each independent variable contributed meaningfully to explaining performance of Shisha Kibondo Project.

4.3 Decision on Null Hypotheses

Table 6: Individual t-Tests for Regression Coefficients

Hypothesis	Predictor	B	t	Sig.	Decision
H_o1	Risk Identification	.205	6.952	.000	Reject H_o1
H_o2	Risk Analysis	.445	11.285	.000	Reject H_o2
H_o3	Risk Mitigation	.176	6.009	.000	Reject H_o3
H_o4	Risk Monitoring	.141	3.491	.001	Reject H_o4

Source: Field data, 2026

The decision in Table 6 shows that all four null hypotheses were rejected because their significance values were less than 0.05. This means that risk identification had a significant effect on performance of Shisha Kibondo Project in Karongi District. It also means that risk analysis had a significant effect on performance of the project. The findings further show that risk mitigation and risk monitoring had significant effects on project performance. Therefore, the study confirmed that risk management practices significantly affect performance of Shisha Kibondo Project in Karongi District, Rwanda.

The decisions were based on coefficient results, especially the B values, t values, and significance values. A null hypothesis was rejected when the significance value was less than 0.05. The results were used to determine whether each risk management practice had a significant effect on performance of Shisha Kibondo Project in Karongi District.

4.4 Discussion of Research Findings

4.4.1 Project Risk Identification and Performance of Shisha Kibondo Project

The current study found that project risk identification recorded an overall mean of 4.25 and a standard deviation of 0.467, indicating strong positive agreement and homogeneous responses. Risk identification had a strong positive relationship with performance of Shisha Kibondo Project ($r = 0.725$, $p = 0.000$). The objective-specific model explained 52.5% of the variation in project performance ($R^2 = 0.525$), and the model was statistically significant ($F = 366.044$, $p = 0.000$). The coefficient results further showed a positive and statistically significant effect ($B = 0.655$, $t = 19.132$, $p = 0.000$). Thus, the findings demonstrate that systematically identifying supply-chain, financial, operational, and environmental risks enables the project to anticipate disruptions and supports timely implementation, service quality, efficient resource use, and satisfactory delivery to beneficiaries in Karongi District.

Contingency Theory provides the principal theoretical explanation for these findings. The theory holds that effective management practices must fit the conditions of the organisation and its operating environment rather than follow one universal approach (Wang, 2025). In Shisha Kibondo Project, risk identification had to respond to Karongi District's mountainous terrain, weather-related road constraints, supply-chain exposure, funding uncertainty, staffing realities, and changing beneficiary needs. The positive and significant effect found in this study therefore demonstrates the value of matching risk-identification procedures to the project's

particular operational context, as proposed by Contingency Theory.

4.4.2 Project Risk Analysis and Performance of Shisha Kibondo Project

Project risk analysis recorded an overall mean of 4.19 and a standard deviation of 0.457, indicating strong positive agreement and homogeneous responses. The current study found a very strong positive relationship between project risk analysis and project performance ($r = 0.831$, $p = 0.000$). Risk analysis explained 69.1% of the variation in performance ($R^2 = 0.691$), and the regression model was statistically significant ($F = 740.336$, $p = 0.000$). The coefficient findings showed that risk analysis had a positive and statistically significant effect on performance of Shisha Kibondo Project ($B = 0.844$, $t = 27.209$, $p = 0.000$). This was the strongest objective-specific effect, demonstrating that ranking risks, examining their financial and service-delivery consequences, and prioritising critical threats are central to sound decisions and successful project performance.

The findings are consistent with Temones (2024), whose analytical study found that 15.75% of participants were at risk of nutrition-deficiency dermatoses and that greater food diversity reduced the odds of deficiency by up to 3% for each additional gram of key nutritious food consumed. The model achieved a Nagelkerke R^2 of 0.765, demonstrating strong predictive capability and supporting targeted intervention. Although the study examined individual nutritional risks, its central implication is applicable to project management: accurate analysis helps decision-makers identify the conditions most likely to produce harmful outcomes. In the present study, analysing the likely financial and service-delivery effects of risks similarly enabled Shisha Kibondo Project to focus on threats capable of reducing beneficiary coverage or interrupting fortified-food distribution.

4.4.3 Project Risk Mitigation and Performance of Shisha Kibondo Project

Project risk mitigation recorded an overall mean of 4.21 and a standard deviation of 0.411, indicating strong positive agreement and homogeneous responses. Risk mitigation had a strong positive relationship with project performance ($r = 0.747$, $p = 0.000$), explained 55.8% of the variation in performance ($R^2 = 0.558$), and produced a statistically significant model ($F = 418.151$, $p = 0.000$). The coefficient results showed that project risk mitigation had a positive and statistically significant effect on performance of Shisha Kibondo Project ($B = 0.601$, $t = 20.449$, $p = 0.000$). These results confirm that preventive controls, contingency planning, timely response strategies, and corrective actions protected operational continuity and helped the project sustain effective delivery of nutrition services.

Contingency Theory supports these results because it argues that no single mitigation response is suitable for every risk or project environment. Effective responses must be matched to the type, seriousness, and context of the threat (Wang, 2025). In Shisha Kibondo Project, preventive controls, buffer arrangements, corrective actions, and community-based responses were valuable because they addressed the logistical, institutional, and beneficiary-related conditions of Karongi District. The positive and significant mitigation effect therefore reflects the theoretical expectation that a close fit between response strategy and operational circumstances improves project performance.

4.4.4 Project Risk Monitoring and Performance of Shisha Kibondo Project

Project risk monitoring recorded an overall mean of 4.16 and a standard deviation of 0.386, indicating strong positive agreement and homogeneous responses. The current study found a very strong positive relationship between risk monitoring and project performance ($r = 0.805$, $p = 0.000$). Risk monitoring explained 64.8% of the variation in performance ($R^2 = 0.648$), and the model was statistically significant ($F = 608.769$, $p = 0.000$). The coefficient findings showed a positive and statistically significant effect ($B = 0.725$, $t = 24.673$, $p = 0.000$). These findings indicate that continuous reviews, early-warning tracking, supervisory visits, and regular risk-status reporting generated timely information for corrective action and strengthened performance of Shisha Kibondo Project.

Empirically, the findings correspond with Xu et al. (2025), whose longitudinal analysis from 2019 to 2023 found significant improvements in physical growth and vitamin A status, including a coefficient of $\beta = 0.66$ for weight improvement ($p < 0.001$). Consistent monitoring of nutrition-programme outputs was associated with measurable participant improvements and helped identify persistent concerns such as anaemia. Their results show that repeated observation is important not simply for recording performance but also for directing programme improvement. In the present study, continuous risk reviews and early-warning tracking served a comparable purpose by identifying emerging implementation threats and supporting timely decisions.

5. Conclusions and Recommendations

Findings from Karongi District provide the basis for these conclusions and recommendations to improve risk management and project performance.

5.1 Conclusion

The study concluded that risk identification had a significant positive effect on performance of Shisha Kibondo Project in Karongi District. This means that

clear identification of supply chain, financial, operational, and environmental risks helped the project understand possible threats before they affected implementation. The findings show that risk identification is an important practice for improving project performance.

The study concluded that risk analysis had a significant positive effect on performance of Shisha Kibondo Project in Karongi District. Ranking risks, analyzing their potential effects, and prioritizing critical risks enabled the project to make better management decisions. Risk analysis demonstrated the strongest objective-specific effect on project performance.

The study concluded that risk mitigation had a significant positive effect on performance of Shisha Kibondo Project in Karongi District. This means that preventive controls, contingency planning, response strategies, and corrective actions helped the project reduce the negative effects of risks. The findings show that mitigation measures supported continuity of project activities when implementation challenges occurred.

The study concluded that risk monitoring had a significant positive effect on performance of Shisha Kibondo Project in Karongi District. This means that continuous risk review, tracking of early-warning signs, supervisory visits, and risk status reports helped the project respond to risks during implementation. Risk monitoring helped the project identify changes in risks and take corrective action.

The study concluded that risk management practices had a significant effect on performance of Shisha Kibondo Project in Karongi District, Rwanda. Risk identification, risk analysis, risk mitigation, and risk monitoring all contributed positively to project performance. The findings show that projects perform better when risks are identified, analyzed, controlled, and monitored throughout implementation.

5.2 Recommendations

To enhance project performance and sustainability, the Shisha Kibondo Project implementation team and key stakeholders should consider the following recommendations:

1. Authorities responsible for implementing Shisha Kibondo Project should strengthen risk identification systems at all stages of the project.
2. Project managers and implementing authorities should improve risk analysis practices in the project. More attention should be given to ranking risks according to severity and likelihood so that critical risks receive timely management attention.
3. Project implementers should improve preventive controls to reduce operational and administrative risks affecting project performance.
4. Local leaders, health workers, and community-based stakeholders should support routine supervisory visits and risk status reporting.
5. Policy makers should develop clear guidelines for risk management in community nutrition and food distribution projects.

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