

Role of Supply Chain Risk Management Practices on Performance of Private Companies in Rwanda: A Case of Sulfo Rwanda Industries

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Abstract: In this study, we examine the role of supply chain risk management practices on performance of private companies in Rwanda. Despite Sulfo Rwanda's numerous attempts to enhance its supply chain risk management practices, its performance level occasionally remains woefully low. The following were the four specific objectives of the study: to assess the role of supply chain risk identification on the performance of Sulfo Rwanda Industries, to analyze the role of supply chain risk assessment on the performance of Sulfo Rwanda Industries, to examine the role of supply chain risk mitigation and strategy on the performance of Sulfo Rwanda Industries, as well as to determine the role of supply chain monitoring and reviewing on the performance of Sulfo Rwanda Industries. The study is guided by the supply network theory as well as resource-based view. Data was collected from 234 employees of Sulfo Rwanda Industries and they were all chosen by using the census sampling technique. Questionnaires, interview guides, and documentation were used as tools for data collection. The data was analyzed using both descriptive and inferential statistics by presenting the findings of respondents. Findings indicated that all four variables have positive coefficients, meaning they all contribute to better company performance. Supply chain risk assessment and mitigation and strategies share the highest impact, both with a coefficient of .611. This means that for every unit improvement in these areas, performance is predicted to rise by 0.611 units. Risk identification follows with a coefficient of .417, while monitoring and review has the smallest individual impact at .222. To determine if these results are statistically reliable, we examine the Sig. (P-value) column. All four variables are considered statistically significant because their Sig. values are below the common 0.05 threshold. Risk assessment is the most highly significant at .002, followed by risk identification at .004 and mitigation at .007. Even monitoring and review, which has the lowest coefficient, is still significant with a P-value of .048. From the above findings, the study concluded that supply chain risk management strategies are essential for the operational success and sustainability of private manufacturing firms in Rwanda, including Sulfo Rwanda Industries. It recommended that Sulfo Rwanda Industries implement a formal risk assessment process with a clear scoring system to reduce production delays and supplier disruptions.

Keywords: Supply Chain, Risk Management Practices, Performance, Private Companies, Sulfo Rwanda Industries.

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I. INTRODUCTION

A private company's performance is improved by supply chain risk management practices (SCRM), which increases resilience, safeguards profits, and improves reputation (Okoye, et al. 2024). In order to maintain business continuity and avoid expensive delays and emergency costs, SCRM proactively detects and mitigates possible disruptions, such as supplier breakdowns, natural disasters, or cyberattacks. By maintaining constant operations, cutting expenses, and raising customer happiness, this resilience immediately contributes to improved financial outcomes, allowing the business to stay competitive and experience more steady, long-term growth (Koerber & Schiele, 2022). Businesses faced unexpected

risks, including labor disputes and natural disasters, as global supply chains grew. Significant events like the 2011 earthquake and the COVID-19 pandemic exposed these weaknesses, prompting the use of advanced risk scoring tools critical for resilience and transparency, necessary for survival and competitiveness (Holloway, 2024).

At the international perspective, supply chain risk management practices have grown increasingly intricate and intertwined as international trade has increased and businesses now source commodities from several nations (Baldwin & Freeman, 2022). Because of this globalization, disruptions in one area whether brought on by pandemics, natural catastrophes, unstable political systems, or logistical issues can have an impact on producers, consumers, or

entire industries in other places. In response, businesses, governments, and researchers have created two crucial tools: supply chain risk, which shows the locations of all suppliers, materials, transportation, and manufacturing steps, including top and sub-tiers, and risk scoring, which assesses the likelihood of disruptions and the severity of their effects (Mubarik, et al. 2023). In a world where supply chain interruptions are more common and expensive, these aid in risk management and mitigation, resilience building, and business continuity.

In United States of America, the late 20th century's growing reliance on outsourcing and global trade was what really brought attention to the need for increased visibility in supply chain management (Sanders, 2025), even though early efforts concentrated on internal economies and lean manufacturing concepts pioneered by firms like Toyota. Hurricane Katrina and the September 11th attacks were two major interruptions that forced businesses and the government to think about risks other than cost and speed (Hillson, 2022). The COVID-19 pandemic, on the other hand, was a massive wake-up call that revealed serious weaknesses and single points of failure in international supply networks. Sophisticated supply chain risk-scoring systems were consequently quickly and widely adopted in a variety of industries, including technology and manufacturing (Ben Bouheni, et al. 2025).

The evolution of supply chain risk management practices in Germany has involved a shift from an emphasis on industrial quality and efficiency to a far more comprehensive consideration of social and environmental responsibility (Medina-Serrano, et al. 2021). Supply chain visibility is crucial for efficiency optimization since "just-in-time" and lean production have long been valued in Germany's well-known engineering and manufacturing sectors, especially in the automobile sector (Nagel, 2023). Germany also responded by passing the historic Supply Chain Due Diligence Act in 2023, which requires businesses to actively identify, evaluate, and reduce environmental and human rights risks in both their direct operations and their extensive supply chains. The law mandates German companies to incorporate sustainability and ethical considerations into their supply chain mapping, risk scoring, and operational risk management, making it a legal and moral requirement (Ventura, 2021).

At regional perspective, Africa's supply chains are extremely susceptible to shocks from around the world because of their fragmentation, inadequate infrastructure, and heavy reliance on imports (Andriantomanga, et al. 2023). The COVID-19 pandemic highlighted the need for increased resilience and self-reliance, leading to a shift from linear supply chain models to complex, risk-aware frameworks, influenced by the African Continental Free Trade Area and e-commerce growth (Seif & Jafari, 2025). With the goal of establishing a single, continent-wide market, this historic agreement is encouraging regional supply chain integration while driving governments and companies to spend money on scoring tools to detect and

reduce risks associated with cross-border trade, logistics, and regulatory disparities.

In South Africa, private enterprises' profitability is increasingly determined by how well they manage supply chain risk (SCRM) in the face of unstable energy, port congestion, and infrastructure breakdowns. According to Holloway (2024), companies that successfully apply SCRM strategies particularly risk identification and mitigation have much more operational resilience and financial stability than those that use informal techniques (Tshitumulo et al., 2025). For example, many small and medium enterprises (SMEs) suffer from high mortality rates because of a lack of agile risk practices and limited technological integration, whereas larger South African firms frequently use redundancy and high-diversification strategies to maintain performance during disruptions (Okoumba, 2025; Takawira & Poole, 2024). Additionally, it has been discovered that integrating technological capabilities can mitigate the detrimental effects of financial risks and logistics, enabling forward-thinking businesses to sustain profitability and customer satisfaction in spite of regional obstacles like "construction mafias" and failing transportation networks.

In Nigeria, supply chain risk management practices (SCRM) mitigates the severe effects of infrastructure shortfalls, foreign exchange volatility, and internal security concerns, making it a crucial performance factor for private enterprises. Proactive SCRM practices like supplier diversification, buffer stock maintenance, and the use of digital technologies like ERP systems greatly improve both operational efficiency and financial stability, according to empirical data from Nigeria's oil and gas industry and small-to-medium enterprises (SMEs) (Asikhia, 2022; Babatunde, 2025). Additionally, companies that put a high priority on supply chain resilience through technological integration and agility are better able to withstand macroeconomic shocks, preserving a competitive edge and protecting their brand name from disruptions (Agorzie *et al.*, 2025).

In Ghana, supply chain risk management practices are crucial factors in determining performance for private businesses, especially the small and medium-sized businesses (SMEs) that control the majority of the country's economy. According to research, supply chain risks like delivery delays, unreliable suppliers, and financial volatility have a major detrimental effect on business performance. However, these risks can be effectively mitigated to improve operational and financial results by implementing proactive SCRM strategies (Ganiyu et al., 2020). Additionally, businesses that have organizational structures specifically designed for risk management typically outperform their rivals by retaining greater levels of adaptability and resilience in the face of disturbances (Hamidu *et al.*, 2023).

At national level perspective, Rwanda's private companies are increasingly recognizing the importance of supply chain risk management practices (SCRM) due to challenges like landlocked and globalization. Inappropriate practices, such as risk identification and mitigation, negatively impact performance. Systemic issues like high

freight transport costs and shortages of skilled staff highlight the need for robust SCRM strategies (Bolivia & Andersen, 2024). Rwanda's ranking in the World Bank's Logistics Performance Index has improved under the administration, although sector-specific problems including operational costs and skilled personnel still exist (Wizemann & Simon, 2025). Private companies are shifting from simple logistics management to strategic supply chain mapping to identify opportunities and weaknesses, particularly in new markets, to create robust, transparent, and effective supply chains for sustained growth.

At Sulfo Rwanda Industries, supply chain risk management are tools used to handle logistical challenges and reduce risks in an industry that is expanding quickly (Gamariel & Noella, 2021). By identifying suppliers, transportation routes, and storage locations, this lets the business concentrate efforts on significant weaknesses like unstable suppliers or manufacturing components that are hard to replace. This can be a crucial manufacturing component that is challenging to replace or a sole-source supplier in a politically unstable area. In a competitive and interconnected global and regional economy, Sulfo's profitability and reputation are ultimately protected by this proactive approach, which guarantees that the company can secure its market position, preserve operational continuity, and establish resilience.

➤ *Problem Statement*

Supply chain risk management practices enhances resilience, profitability, and competitive advantage in private enterprises by reducing disruptions, ensuring business continuity, preventing production shutdowns, and protecting revenue streams (Boonlua, et al. 2023). It also improves operational efficiency, compliance, vendor collaboration, and strategic decisions, promoting market stability and financial health (George, et al. 2024). Even though Sulfo Rwanda has made multiple efforts to improve its supply chain risk management practices through supply chain risk assessment, identification, mitigation, and strategies, as well as monitoring and review, the company's performance level occasionally remains appallingly low and insufficient.

According to Sulfo Rwanda Industries reports, in 2022, product sales rate decreased by 2.9% compared to 2021, when they had decreased by 3.5%, primarily due to the high competition in the beauty industry across East African countries, where it was evident that soaps like Tembo and oils like Claire were not sold as much as expected. In 2023, Sulfo Rwanda Industries also faced an increase in operational costs of 9.3%, mainly due to external factors, including the increase in transport costs for raw materials used in some of the products manufactured in the factory. Furthermore, Sulfo Rwanda Industries' net profit margin varied from 20.2% in 2020 and also went down to 19.1% in 2021; furthermore, it also continuously reduced from 11% in 2022; up to 9.3% % in 2023. Also, 12.6% in 2020 to 9.6% in 2023, this was further continuously reduced from 4.4% in 2022 to 0.5% in 2023 (Sulfo Rwanda Industries Annually Report, 2024).

Supply Chain Risk Management practices (SCRM) and company performance are linked, according to recent research, but there is still a big knowledge gap regarding the mediating impact of digital transformation and human-centric aspects (Alkhatib, 2022; Takawira & Poore, 2024). Numerous studies (cited by Helmold, et al, 2022; Qiao, R., & Zhao, L. 2023) show that although SCRM practices generally improve operational and financial outcomes, little is known about the precise mechanisms by which Industry 4.0 technologies like blockchain, artificial intelligence, and big data analytics moderate this relationship, especially when it comes to emerging economies (Perdikas et al., 2025; Fallahieh et al., 2025).

Additionally, Saes, et al. (2023) revealed that supply chains as engineered systems, ignoring the "social-ecological" component in which corporate culture and human behavior may increase or decrease risks, creating a gap in integrated performance models. The absence of cross-sectoral and long-term empirical data following global shocks is another significant gap. The long-term "time-to-recover" (TTR) and "time-to-survive" (TTS) indicators required to demonstrate sustained financial resilience are not captured by the cross-sectional data used in the majority of recent research (Ivalua, 2025). There is a "missing link" in how risk identification and mitigation techniques translate into particular green or sustainable performance metrics over time, despite the fact that these techniques contribute to resilience, according to researchers. In highly volatile, conflict-prone, or specialized industries like healthcare and cattle (Fadare, 2023), future study is necessary to standardize reporting procedures and examine the synergistic effects of SCRM combined with supply chain agility and resilience.

From the above, much of the research's project on supply chain risk management practices is inconclusive, and the conclusions vary. However, the main problems of these studies are that the criteria role of supply chain risk management practices on performance of private companies are not full detailed, the research period is also very short, and most of these studies were conducted within two or three years, and the sample size is also very limited. Therefore, the current study is needed, but considering the shortcomings of the previous studies, it focuses on analyzing the role of supply chain risk management practices on performance of private companies in Rwanda, Sulfo Rwanda Industries as a case study.

➤ *Specific Objectives*

- *To examine the role of supply chain risk identification on the performance of Sulfo Rwanda Industries.*
- *To analyze the role of supply chain risk assessment on the performance of Sulfo Rwanda Industries.*
- *To assess the role of supply chain risk mitigation and strategies on the performance of Sulfo Rwanda Industries.*
- *To determine the role of supply chain risk monitoring and review on the performance of Sulfo Rwanda Industries.*

➤ Research Questions

- *What is the role of supply chain risk identification on the performance of Sulfo Rwanda Industries?*
- *What is the role of supply chain risk assessment on the performance of Sulfo Rwanda Industries?*
- *What is the role of supply chain risk mitigation and strategies on the performance of Sulfo Rwanda Industries?*
- *What is the role of supply chain risk monitoring and review on the performance of Sulfo Rwanda Industries?*

II. LITERATURE REVIEW

➤ Conceptual Framework

The performance of private businesses is significantly impacted by two essential elements of contemporary supply chain management: supply chain risk management practices (Richert & Dudek, 2023). The foundation of their relationship's conceptual framework is the idea that company cannot manage something that you cannot see or measure well. The first step in identifying potential vulnerabilities is for a corporation to map out the whole supply network. This gives them the transparency they need. A strategic and data-driven approach to threat mitigation is made possible by this visibility, which subsequently makes it possible to evaluate these vulnerabilities systematically through risk scoring (Wickramasinghe, 2023). By using an integrated approach, a business can shift from a reactive to a proactive stance, improving its capacity to function in a complicated and uncertain global marketplace.

The cornerstone of a company's risk management plan is supply chain mapping and scoring (Wang, et al. 2022). Theoretically, it transforms a business's first-tier suppliers into a multi-tiered, intricate network rather than a straightforward, linear picture (Christopher & Peck, 2024). The movement of materials, data, and cash is captured in this intricate representation, which also highlights bottlenecks, dependencies, and single points of failure that are frequently obscured from view. This is especially important for a private company because it does not have the vast resources of a big public company, which leaves it more susceptible to unanticipated shocks (Hynes, et al. 2020). The map serves as a "diagnosing tool" for the supply chain, indicating geographical concentrations of suppliers that could be impacted by a single event, like a natural disaster or geopolitical instability, and exposing the complex relationships between different partners, including sub-suppliers and logistics providers.

The integration of scoring in supply chain risk management practices reveals its conceptual value, enhancing efficiency and resilience. This direct relationship significantly influences the success of private enterprises. According to Trkman and McCormack (2021), a corporation can reduce the length and severity of a crisis by anticipating

and addressing high-risk areas in advance. A resilient supply chain is one that can bounce back swiftly from disturbances. Improved operational performance is the result, as indicated by indicators like accurate order fulfillment, on-time delivery, and reduced logistical expenses (Abdul Rahman, et al. 2023).

Through proactive supply chain risk management practices, these businesses can guarantee a steady and dependable supply of goods to their clients, which immediately increases client happiness and brand loyalty (Sebata, 2024). A business can stand out from its rivals by avoiding expensive disruptions, keeping to production schedules, and fulfilling commitments. A major factor in the company's long-term viability and financial stability is this enhanced performance (Samborska, et al. 2023). The strategic foresight and data-driven management framework integrates supply chain risk management practices with organizational success. Risk scoring prioritizes key risks, while mapping enhances visibility of supplies.

➤ Conceptual Framework

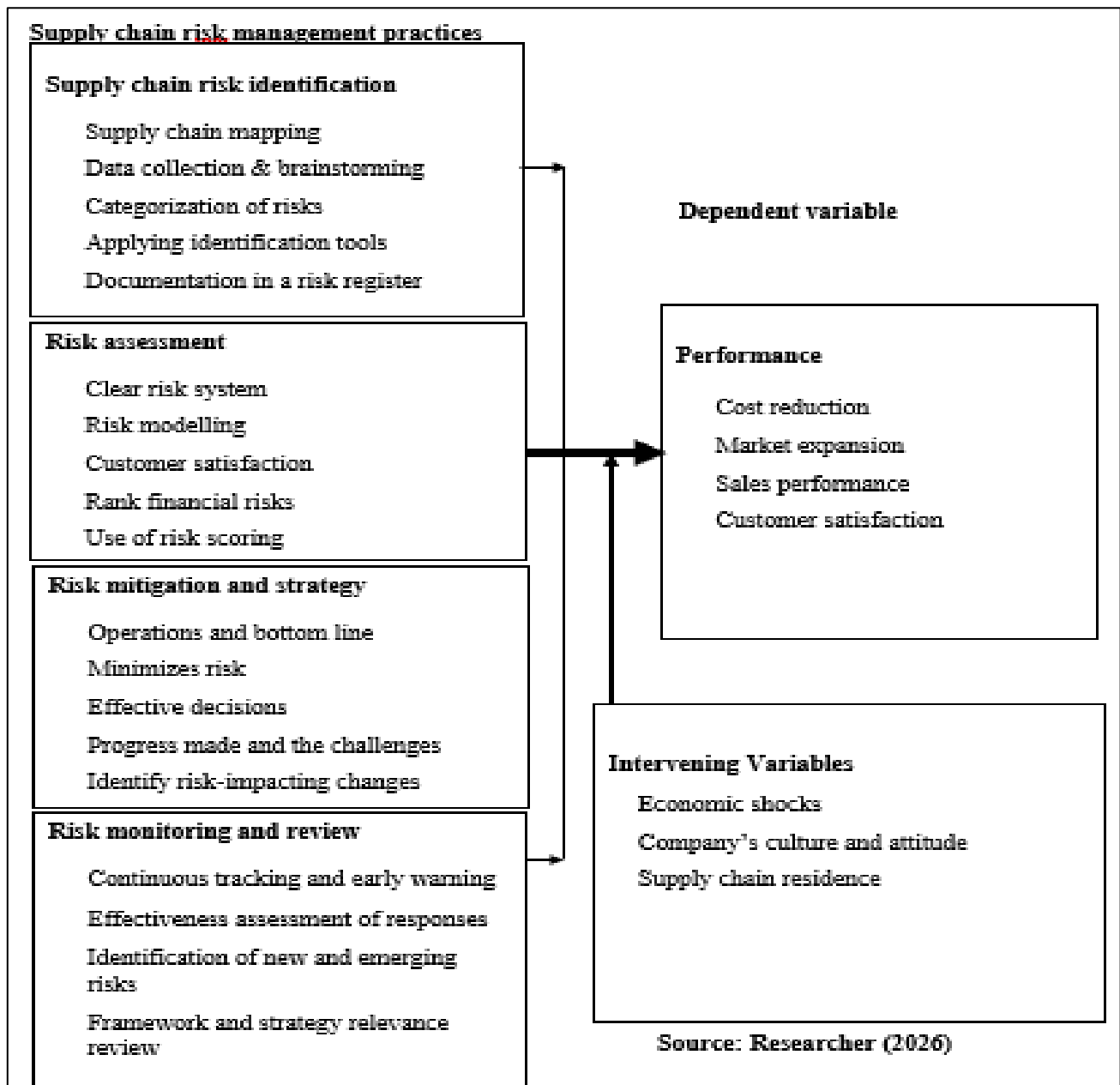


Fig 1 Conceptual Framework
Source: Researcher (2026)

➤ Theoretical Review

This section discussed supply chain resilience theory, network theory as well as resource-based view theory.

➤ Supply Chain Resilience Theory

Supply Chain Resilience Theory wasn't introduced by a single person, but it gained significant traction and was formalized as a core concept in the early 2000s (Mulopulos, 2023), largely popularized by researchers like Martin Christopher and Helen Peck in their 2004 paper, "Building the Resilient Supply Chain." The theory emerged from a growing recognition that traditional, lean-focused supply chains were highly vulnerable to disruptions (Limon, 2023). It borrows concepts from other fields like ecology and engineering to define a system's ability to "bounce back" from a disturbance.

Therefore, Sulfo Rwanda's performance is linked to supply chain risk resilience theory, which acts as a "shock absorber" that enables the business to sustain consistent production and profitability in the face of external disruptions. This theory holds that Sulfo Rwanda Industries' performance is not only determined by its daily efficiency but also by its adaptive capacity, or its ability to anticipate, respond to, and recover from unexpected events like the 2020 global lockdowns or raw material shortages. For a manufacturer like Sulfo can avoid expensive "performance drops," like factory shutdowns or empty retail shelves. Finally, Sulfo can safeguard its market share and maintain financial stability by implementing resilience measures, demonstrating that the more robust the company's capacity to "bounce back," the more stable its entire business performance is during turbulent times.

➤ *Supply Network Theory*

Supply Network Theory was primarily introduced in the late 1990s and early 2000s, with researchers such as Thomas Y. Choi and Kevin Dooley (2001) being key figures. They shifted the academic and managerial perspective from a linear "supply chain" to a more realistic, interconnected "supply network." This new view was a response to the growing complexity of global sourcing and manufacturing, where a single company's product often depended on a vast web of suppliers, sub-suppliers, and logistics partners rather than a simple, sequential chain.

Supply Network Theory views a supply chain as a complex, multi-tiered network of nodes and links (Gruchmann, 2022). The nodes are the companies and facilities (e.g., suppliers, manufacturers, distribution centers), while the links represent the flow of materials, information, and funds between them. This perspective is vital because it reveals hidden vulnerabilities and interdependencies that a traditional linear view miss. For example, it can expose that a company's two seemingly independent first-tier suppliers both rely on the same distant, second-tier component manufacturer, creating a single point of failure. By mapping and analyzing the network, companies gain the visibility needed to proactively manage risks, improve collaboration, and enhance their overall agility and resilience.

For this study, Sulfo Rwanda Industries use heavily on supply network theory. Generally, this perspective helps manage manufacturers, distributors, suppliers, and customers by identifying risks, reducing costs, and building resilience. Furthermore, a well-designed supply network gives Sulfo Rwanda Industries as a private firm a competitive edge by increasing customer satisfaction, creating solid, cooperative partnerships, and quickly responding to market demands.

➤ *Resource Based View*

The theory derives primarily from Penrose's 1959 research, in which she identified untouched organizational assets as a key driver of growth (Ogutu et al. 2023). Penrose recognized that internal management resources were both a driver and a constraint on a company's expansion. Based on the managerial strategy literature, a firm's RBV describes, explains, and predicts how a firm can achieve sustainable competitive advantage by acquiring and controlling its "unique" resources and capabilities (Bharadwaj, 2020; Barratt & Oke, 2017). These unique resources and capabilities that give firms a competitive advantage is valuable, rare, difficult to copy, irreplaceable, and unevenly distributed among firms within an industry (Barney, 1991; Bharadwaj, 2000). They found that each organization has its own unique resource elements, skills, and capabilities that represent specific characteristics of the organization and its resources.

Sulfo Rwanda Industries benefits from the Resource-Based View (RBV), which concentrates on their distinct internal capabilities and gives them a competitive edge. This method also stresses the significance of obtaining and

utilizing strategic resources that are rare, valuable, unique, and non-replaceable, such as intangible or tangible assets. Last but not least, the theory promotes a more robust market position since success is linked to the organization's core competencies rather than ephemeral market trends.

➤ *Empirical Review*

Below section explained an empirical review per objective.

➤ *Role of Supply Chain Risk Identification on the Performance of Private Companies*

Nshokeyinka and Akumuntu (2024) investigated how supply chain risk management affected private companies' performance from 2017 to 2022. MTN Rwanda's performance as a private company is hindered by inadequate supply chain risk management. A study aimed to determine the impact of supply chain risk identification, measurement, assessment, mitigation, reporting, and monitoring. A study based on a review of literature and 171 respondents indicates that effective implementation of supply chain risk management can enhance MTN Rwanda's performance. A correct application may reduce performance by 0.769%, whereas frequent use can boost performance by 42.3%. Additionally, consistent application correlates with a 23.1% performance increase. The study suggests that a global supply chain risk management strategy can improve productivity, reduce costs, and increase customer satisfaction. The researcher advises MTN Rwanda to develop ongoing risk management frameworks and policies.

In order to create a tool that is helpful for risk assessment throughout the supply chain (SC) in accordance with the process-based SC approach, Ríos et al. (2019) set out to provide a technique that detects and prioritizes the operational risk elements in a SC. The paper uses a scenario analysis to identify and rank twenty risk factors using the supply chain operational reference model (SCOR). The methodology, based on a standard model, facilitates collaborative study and identifies the most influential risk elements in a supply chain. The study's primary contributions include the measurement of influence levels and risk identification using SCOR model KPIs.

➤ *Role of Supply Chain Risk Assessment on the Performance of Private Companies*

Niyigena (2022) studied the impact of risk management on the success of Rwandan pharmaceutical investment firms. The research aimed to identify the risks these companies face, evaluate their financial success, and establish the relationship between risk management and industry performance. Data was collected from a pharmaceutical company in Rwanda using a survey, and analyzed via SPSS. Findings indicated that companies are subject to various risks linked to the local environment, facility standards, and distribution-dependent business structures, which lead to increased potential dangers, product spoilage, reduced demand, and resultant financial losses.

In order to create and evaluate blockchain's potential to improve supply chain resilience during periods of

elevated risk and uncertainty, Etemadi et al. (2021) outline the landscape of scientific literature enhanced by an author's keyword analysis. Systematic literature network analysis (SLNA), a dynamic quantitative bibliometric technique, is used in this review to extract and examine the papers. A systematic literature review (SLR) and bibliometric network analysis (BNA) are the two techniques that make up the process. In order to control and anticipate disruption risks and increase the supply chain's resilience and robustness, this study makes a significant contribution to the literature on the application of blockchain as a crucial component of cyber supply chain risk management (CSR). The potential of blockchain for privacy and security issues, smart contract security, counterfeiting monitoring, and traceability database systems to guarantee food safety and security are only a few of the study topics that are clarified by this systematic review.

➤ *Role of Supply Chain Risk Mitigation and Strategy on Performance of Private Companies*

The extent to which vulnerability mitigation techniques (VMSs) impact firm performance was examined by Ali et al. (2023). The authors tested their proposed model and hypotheses in AMOS after recruiting 355 textile SME entrepreneurs through a survey method. The results show that all VMSs considerably reduce SCR, which in turn raises FP. Additionally, in the context of textile SMEs, the study highlights supply chain financing (SCF), a new VMS. Lastly, the results assist SME officials in reducing SCR by appropriately integrating VMSs into the day-to-day activities of the company. Due to its ability to maximize working capital and reduce default risk, SCF is highly recommended for SMEs.

• *Role of Supply Chain Risk Monitoring and Review on Performance of Private Companies*

A literature review on risk management analysis was carried out by Sumirat et al. (2023) utilizing ISO 31000: 2018, a relatively recent idea in risk management that replaces the same standard but from 2009. After that, the

model will be integrated with supply chain business processes to help each business process reduce risk. The supply chain business process was employed in the study's model to set the stage for risk analysis, which was followed by risk identification, analysis, and evaluation with the integrated processes of record-keeping, reporting, reviewing, and monitoring. Design risk, land price risk, legal land status risk, political risk, contractual risk, market risk, business risk, material price risk, operational risk, legal risk in handover, and asset impairment risk are among the important risks that need to be reduced, according to the study. The model has suggested a number of novel approaches to risk mitigation, including the use of Monte Carlo simulation's value at risk (VaR) to quantify market, business, and operational risk; the development of digitalization for communication processes; and the recording, reporting, reviewing, and monitoring of information. Because banks have access to data from digitization that takes into account the assurances of the public and private sectors, it is also advised that suppliers and subcontractors use supply chain finance.

III. METHODOLOGY

➤ *Research Design*

The research question, the purpose of the research, and the existing literature greatly influence the research design (Creswell, 2020). Therefore, this study used the mixed research design (both quantitative and qualitative research design) as a research method that explores why something occurs when limited information is available on how supply chain risk management practices affects the performance of private companies in Rwanda.

➤ *Target Population*

Population of the study was 234 employees of Sulfo Industries working within different areas, including project management, operations, Finance & Accounting, Logistic and purchasing management, procurement and administration, etc.

Table 1 Target Population.

No	Departments/ Units	Target Population
1	Production and Manufacturing	64
2	Operations	26
3	Sales and Marketing	9
4	Finance/Accounting	27
5	Quality Control/Assurance	4
6	Logistics and Distribution	23
7	Engineering/Research & Development	19
8	IT (Information Technology)	12
9	Warehouse/Inventory Management	8
10	Human Resources	7
11	Maintenance and Facilities	15
12	Legal	2
13	Health and Safety (HSE)	11
14	Inspections	7
15	Total	234

➤ *Sample Size and Technique*

From the above table, 234 employees are currently working in Sulfo Rwanda Industries, especially in procurement management, supply chain management, sales and operations, etc. Generally, they all have full knowledge regarding the role of supply chain risk management practices on performance of private companies in Rwanda; therefore, the researcher used all of them because the study population of this study was less than 300 people (Strain et al., 2023), i.e., the census method was also used.

➤ *Data collection Instruments*

In this segment, the investigator used questionnaires, interview guides, and papers as data accumulating tools.

➤ *Questionnaire:*

contained by closed-ended questions that limit the answers and opinions of the respondents by using pre-selected options. The questionnaire was also chosen by the research because it the most efficient way of gathering information needed from these respondents. There are divided into four parts: the first part is related to the respondent's information. The second section also contained by five closed-ended questions addressed to respondents based on the role of comprehensive supply chain mapping on the performance of Sulfo Rwanda Industries. The third section contained by five closed-ended questions addressed to respondents based on the role of supply chain risk identification on the performance of Sulfo Rwanda Industries, the fourth section was also used by examining the role of supply chain risk assessment on the performance of Sulfo Rwanda Industries. Finally, fifth section focused on the role of supply chain risk monitoring and review on the performance of Sulfo Rwanda Industries.

➤ *Interview Guide:*

An interview guide is a set of questions that the interviewer wants to cover during the interview (Boyce and Neale, 2018). Therefore, an interview guide was prepared and also addressed to three (3) employees working in Sulfo Rwanda Industries including procurement specialists, operations specialist, chief finance, and budgeting officers in order to gain a better understanding on the role of supply chain risk identification on the performance of Sulfo Rwanda Industries, the role of supply chain risk assessment on the performance of Sulfo Rwanda Industries; the role of supply chain risk mitigation and strategy on the performance of Sulfo Rwanda Industries as well as to determine the role of supply chain risk monitoring and review on the performance of Sulfo Rwanda Industries.

➤ *Data Analysis*

Data analysis is the procedure of scrutinizing, sweeping, remodeling, and modeling data with the goal of

identifying useful information and conclusions and supporting decision-making (Kothari, 2021). Therefore, in this study the entered data was analyzed using both the descriptive and inferential statistics to generate frequency distribution, percentages, mean, standard deviation, and correlation. Therefore, the researcher also interpreted the results in light of the research objectives. In addition, in order to analyze the extent of performance of Sulfo Rwanda Industries, the researcher used further a multiple linear regression model, assuming that there is a linear relationship between the dependent variable Y (performance of Sulfo Rwanda Industries) $Y = \alpha + \beta X + \varepsilon$ and the independent variable X (supply chain risk management practices), where the error term ε contains missing factors. The formula for multiple linear regression that was used is:

$$Y = \beta_0 + \beta_1 X_1 + \beta_2 X_2 + \beta_3 X_3 + \beta_4 X_4 + \varepsilon_t$$

Where:

Y	: Performance of Sulfo Rwanda Industries
X ₁	: Supply chain risk identification
X ₂	: Supply chain risk assessment
X ₃	: Supply chain risk mitigation and strategy
X ₄	: Supply chain risk monitoring and review
β ₀	: Intercept
β ₁ , β ₂ , β ₃ , β ₄	: Slopes
ε	: Residual (error term)

Multiple linear regressions follow the same conditions as the simple linear model.

IV. FINDINGS AND DISCUSSION

This chapter consists of the practical part of the study. It first presents the data, the analysis of field findings (from the respondents) in relation to the specific objectives of the research. The analysis of the data was done according to the objectives of the study the "Role of supply chain risk management practices on performance of private companies in Rwanda, a case of Sulfo Rwanda Industries". The data to be analyzed were gathered using questionnaires and analyzed and interpreted according to the objectives of the study. This is the reason why the researcher uses percentages, tables, and frequencies as ways of analysing, interpreting, and presenting results.

➤ *Demographic Characteristics of Respondents*

This section gave more details about the respondent's profile who participated in the study in terms of their age, gender, educational level, occupation, and time working within an organization.

Table 2 Age of Respondents

		Frequency	Percent
Valid	Between 21-30	67	28.6
	Between 31-40	81	34.6
	Between 41-50	52	22.3
	51 years and above	34	14.5

	Total	234	100.0
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Table 2 indicates that 67 respondents representing by 28.6% have the age group between 21-30, majority of 81 respondents representing by 34.6% have the age group between 31-40 years, 52 respondents representing by 22.3%

have the age group between 41-50 years and finally 34 respondents representing by 14.5% have the age group between 51 years and above.

Table 3 Gender of Respondents

		Frequency	Percent
	Male	143	61.1
	Female	91	38.9
	Total	234	100.0

Table 3 reveals that the majority of 143 respondents (61.1%) were male, while the remaining 91 respondents (38.9%) were females. Therefore, both females and males

participated in this study, and the data presented above imply that more male respondents are enrolled in Sulfo Rwanda Industries than their female counterparts.

Table 4 Educational Level of Respondents

		Frequency	Percent
Valid	Master's degree	13	5.6
	Bachelor's degree	47	20.1
	Diploma	75	32.0
	Secondary level	99	42.3
	Total	234	100.0

The table 4 revealed that majority of 99 (42.3%) respondents hold a secondary level, second category of 13(5.6%) respondents hold a master's degree; moreover 75 (32%) respondents hold a diploma; and finally, majority of 99 (42.3%) respondents hold a secondary certificate. Therefore, the majority of employees of Sulfo Rwanda

Industries are highly educated and qualified, and this gives them the competence to understand the research instrument and to execute very well their duties and responsibilities and assure the researcher of receiving great and relevant information.

Table 5 Years of Experience

		Frequency	Percent
Valid	Less than 1 year	59	25.2
	1 to 5 years	72	30.8
	5 to 10 years	56	23.9
	10 years and above	47	20.1
	Total	234	100.0

Table 5 indicated 25.2% of respondents are belonging to the year's group less than 1 year, majority of 30.8% of respondents are belonging to the year's group between 1 to 5years, the second category of 23.9% of respondents are belonging to the year's group of 5 – 10 years, and lastly other 20.1% of respondents are belonging to the year's group of 10 years and above; therefore through the human development policies by Sulfo Rwanda Industries takes higher engagement levels that improve institution's culture and increase productivity, ultimately creating a positive impact on the organization's efficiency and effectiveness.

➤ Findings Presentation Per Objectives

By using appropriate data analysis, interpretation, and presentation techniques, researchers can generate meaningful insights, understand research results, and effectively communicate research results.

• Role of Supply Chain Risk Identification on the Performance of Sulfo Rwanda Industries

Supply chain risk identification refers as an act of identifying and cataloging possible occurrences that could impede the flow of goods and services to a business, such as natural disasters, supplier failures, or transportation delays.

Table 6 Descriptive Statistics on Supply Chain Risk Identification

Statements	N	Mean	Std. Deviation
When financial risks are identified, Sulfo Rwanda Industries' profitability increases in a quantifiable way.	234	4.18	.423
Categorization of supply chain risks into distinct groups enabled Sulfo Rwanda Industries to reduce the frequency of production delays	234	4.56	.478
A clear process for identifying and categorizing risks improve Sulfo Rwanda Industries' ability to maintain a consistent on-time delivery rate for its products	234	5.00	.000
Sulfo Rwanda Industries' reputation and customer satisfaction improved as a direct result of proactively identifying and mitigating supply chain risks	234	4.50	.488
Sulfo Rwanda Industries' financial reports show a decrease in unexpected costs and a more stable cash flow after implementing a formal supply chain risk identification and categorization framework	234	4.29	.486
Valid N (list-wise)	234		

Table 6 indicates that “Categorization of supply chain risks into distinct groups enabled Sulfo Rwanda Industries to reduce the frequency of production delays” responded at very highest mean and the responses were homogeneous (mean= 4.56, SD= .478), and item 3 indicates that “A clear process for identifying and categorizing risks improve Sulfo Rwanda Industries' ability to maintain a consistent on-time delivery rate for its products” responded at very highest mean and the responses were homogeneous (mean= 5.00, SD=0.000), moreover item 4 indicates that “Sulfo Rwanda Industries' reputation and customer satisfaction improved as a direct result of proactively identifying and mitigating supply chain risks” responded at very highest mean and the responses were homogeneous (mean= 4.50, SD=0.488) finally item 1 indicates that “When financial risks are identified, Sulfo Rwanda Industries' profitability increases in a quantifiable way” responded at highest mean and the responses were homogeneous (mean= 4.18, SD= .423). Therefore, identifying supply chain risks is the first line of defense in manufacturing against interruptions that could cause production lines to stall. Manufacturers can transition from a reactive firefighting mindset to a strategic one by proactively identifying concerns like shortages of raw materials, supplier bankruptcies, or geopolitical unrest.

Ivanov's (2020) research highlights that early detection of these hazards enables businesses to develop "resilience," guaranteeing that the manufacturing doesn't just shut down

in the event of an interruption. It is the crucial process of identifying the "weak links" before they give way under duress. Unidentified risks frequently have a serious and quantifiable effect on a company's performance. Failure to anticipate an approaching interruption can lead to increased operational costs, missing delivery dates, and a tarnished brand reputation (Paul, et al. 2019). Advanced risk identification and sustained profitability are directly correlated, according to Chowdhury et al. (2023); businesses that are unable to recognize risks have greater volatility in their financial results. The speed at which a business recognizes a risk directly affects its capacity to safeguard its profitability and market share in the current environment of 2026, when global networks are more intertwined than ever.

• Role of Supply Chain Risk Assessment on the Performance of Sulfo Rwanda Industries

The methodical process of locating, examining, and assessing possible risks that could interfere with a business's operations is known as supply chain risk assessment. It entails examining each link in the chain, from suppliers of raw materials to transportation networks, in order to assess the probability of an issue arising and the degree of its consequences.

➤ Descriptive Statistics for Supply Chain Risk Assessment

Table 7 Descriptive Statistics for Supply Chain Risk Assessment

Statements	N	Mean	Std. Deviation
A formal supply chain risk assessment process with a clear scoring system enabled Sulfo Rwanda Industries to reduce the frequency of production halts caused by supplier disruptions	234	4.85	.376
Use of a risk scoring model for suppliers directly correlate with a quantifiable decrease in raw material costs at Sulfo Rwanda Industries	234	5.00	.000
Sulfo Rwanda Industries' customer satisfaction, as measured by on-time delivery metrics, improved since they began using risk scoring to prioritize supplier management efforts	234	4.69	.480
After putting in place a system to evaluate and rank financial risks in its supply chain, Sulfo Rwanda Industries' financial performance improved.	234	4.77	.439
Sulfo Rwanda Industries was able to maintain a steadier supply of goods through the use of risk scoring for a diverse supplier base.	234	5.00	.000
Valid N (list-wise)	234		

Table 7 indicates that “After putting in place a system to evaluate and rank financial risks in its supply chain, Sulfo Rwanda Industries' financial performance improved” responded at very highest mean and the responses were homogeneous (mean= 4.77, SD=0.439), and item 2 indicates that “Use of a risk scoring model for suppliers directly correlate with a quantifiable decrease in raw material costs at Sulfo Rwanda Industries” responded at very highest mean and the responses were homogeneous (mean= 5.00, SD=0.000), moreover item 1 reveals that “A formal supply chain risk assessment process with a clear scoring system enabled Sulfo Rwanda Industries to reduce the frequency of production halts caused by supplier disruptions” responded at very highest mean and the responses were homogeneous (mean= 4.85, SD=0.376); furthermore item 5 indicates that “Sulfo Rwanda Industries was able to maintain a steadier supply of goods through the use of risk scoring for a diverse supplier base” responded at very highest mean and the responses were homogeneous (mean= 5.00, SD=0.000). Therefore, in manufacturing, supply chain risk assessment is a methodical analysis of possible risks that could impede the manufacture and delivery of goods, such as cyberattacks, shortages of raw materials, and geopolitical instability.

Due to manufacturers' growing reliance on worldwide networks that are susceptible to even small external shocks, this procedure has changed from a periodic check to a continuous, data-driven necessity in the post-pandemic era (Barnes Dennig, 2025). Businesses can go beyond

straightforward cost-cutting to create a robust architecture that foresees disruptions before they happen by measuring "time to recover" and "time to survive" for each node in the supply chain (AuditBoard, 2024). According to Ivalua (2026), manufacturers who implement proactive risk management programs can save disruption-related expenses by roughly 50% when compared to those who use reactive tactics (SR Analytics, 2026). By eliminating stockouts and guaranteeing on-time delivery, effective assessment protects a business's brand and upholds client trust in a turbulent market. In the end, strong risk management reduces emergency procurement costs and guards against "extinction-level" financial losses brought on by unanticipated events, which correlates with increased profitability and an average first-year return on investment of 12:1 for enterprise-level implementations (Secureframe, 2026).

• *Role of Supply Chain Risk Mitigation and Strategy on the Performance of Sulfo Rwanda Industries*

Supply chain risk mitigation is the collection of proactive tactics and measures a manufacturing organization takes to limit the chance or impact of potential disruptions, such as material shortages, price spikes, or logistics failures.

➤ *Descriptive Statistics for Supply Chain Risk Mitigation and Strategy*

Table 8 Descriptive Statistics for Supply Chain Risk Mitigation and Strategy

Statements	N	Mean	Std. Deviation
Risk monitoring allows Sulfo Rwanda Industries to know the types of risks that affect their operations and bottom line	234	3.85	.376
Sulfo Rwanda Industries minimizes risk by identifying it and ensuring there are defenses sufficient to prevent it	234	5.00	.000
Good risk monitoring and control processes provide information that assists Sulfo Rwanda Industries with making effective decisions in advance of the risk's occurring	234	2.92	.577
Supply chain risk reporting and monitoring helps to inform Sulfo Rwanda Industries' stakeholders of the progress made and the challenges faced	234	4.76	.420
Risk reporting and monitoring helps to identify risk-impacting changes to organizational information systems and the environments in which those systems operate	234	5.00	.000
Valid N (list-wise)	234		

Table 8 indicates that “Supply chain risk reporting and monitoring helps to inform Sulfo Rwanda Industries' stakeholders of the progress made and the challenges faced” responded at very highest mean and the responses were homogeneous (mean= 4.76, SD = .420), and item 2 indicates that “Sulfo Rwanda Industries minimizes risk by identifying it and ensuring there are defenses sufficient to prevent it” responded at very highest mean and the responses were homogeneous (mean= 5.00, SD = .000), moreover item 5 reveals that “Risk reporting and monitoring helps to identify risk-impacting changes to organizational information systems and the environments in which those systems operate” responded at very highest mean and the responses were homogeneous (mean= 5.00, SD = .000); additionally item 3 indicates that “Good risk monitoring and control processes provide information that assists Sulfo Rwanda

Industries with making effective decisions in advance of the risk's occurring” responded at low mean and the responses were heterogeneous (mean= 2.92, SD = .577). Therefore, a proactive safeguard against disruptions such as material shortages, logistical bottlenecks, or geopolitical changes is provided via supply chain risk mitigation and strategy. Businesses make sure that manufacturing lines continue to operate even in the event of a network failure by putting methods like buffer stocks and supplier diversification (multi-sourcing) into practice (Hajarath & Vummadi, 2024). This strategic strategy is no longer optional; as recent global events have shown, the ability to anticipate and react to risks is what separates resilient organizations from those that suffer entire operational shutdowns (Ivanov, 20234). By safeguarding profit margins and client loyalty, these tactics have a direct effect on a business's performance. Effective

risk mitigation helps businesses avoid the high expenses of emergency shipment and stock-outs, which drive customers to rival businesses (Byberg & Nylander, 2023). Additionally, sophisticated digital tracking, also known as supply chain visibility, increases operational effectiveness, which boosts long-term financial stability and gives businesses a greater competitive advantage in erratic markets (Chowdhury et al., 2023).

➤ *Role of Supply Chain Risk Monitoring and Review on the Performance of Sulfo Rwanda Industries*

The ongoing process of tracking possible disruptions like shortages of raw materials, equipment malfunctions, or

supplier delays and routinely assessing the effectiveness of your backup plans is known as supply chain risk monitoring and review. This continuous monitoring is essential because it makes a business proactive rather than reactive, enabling managers to see "red flags" before they result in expensive manufacturing shutdowns.

➤ *Descriptive Statistics for Chain Risk Monitoring and Review*

Table 9 Descriptive Statistics for Chain Risk Monitoring and Review

Statements	N	Mean	Std. Deviation
Sulfo Rwanda Industries is always continuously track key risk indicators, such as a supplier's financial health, on-time delivery performance	234	4.87	.424
Sulfo Rwanda Industries requires evaluating the performance of implemented risk response plans to determine if the mitigation or contingency measures are working as intended	234	3.82	.393
Sulfo Rwanda Industries is regularly scanning the internal and external environment to identify new or emerging risks	234	4.94	.443
Sulfo Rwanda Industries' strategies remain relevant and aligned with the organization's current risk appetite, business objectives	234	4.71	.370
Sulfo Rwanda Industries always ensure risk controls remain effective, detect new and emerging threats	234	4.88	.332
Valid N (list-wise)	234		

Table 9 indicates that "After putting in place a system to evaluate and rank financial risks in its supply chain, Sulfo Rwanda Industries' financial performance improved" responded at very highest mean and the responses were homogeneous (mean= 4.77, SD=0.439), and item 2 indicates that "Use of a risk scoring model for suppliers directly correlate with a quantifiable decrease in raw material costs at Sulfo Rwanda Industries" responded at very highest mean and the responses were homogeneous (mean= 5.00, SD=0.000), moreover item 1 reveals that "A formal supply chain risk assessment process with a clear scoring system enabled Sulfo Rwanda Industries to reduce the frequency of production halts caused by supplier disruptions" responded at very highest mean and the responses were homogeneous (mean= 4.85, SD=0.376); furthermore item 5 indicates that "Sulfo Rwanda Industries was able to maintain a steadier supply of goods through the use of risk scoring for a diverse supplier base" responded at very highest mean and the responses were homogeneous (mean= 5.00, SD=0.000). Therefore, in manufacturing, supply chain risk assessment is a methodical analysis of possible risks that could impede the manufacture and delivery of goods, such as cyberattacks, shortages of raw materials, and geopolitical instability.

Due to manufacturers' growing reliance on worldwide networks that are susceptible to even small external shocks, this procedure has changed from a periodic check to a continuous, data-driven necessity in the post-pandemic era (Barnes Dennig, 2025). Businesses can go beyond straightforward cost-cutting to create a robust architecture that foresees disruptions before they happen by measuring "time to recover" and "time to survive" for each node in the supply chain (AuditBoard, 2024). According to Ivalua (2026), manufacturers who implement proactive risk management programs can save disruption-related expenses by roughly 50% when compared to those who use reactive tactics (SR Analytics, 2026). By eliminating stockouts and guaranteeing on-time delivery, effective assessment protects a business's brand and upholds client trust in a turbulent market. In the end, strong risk management reduces emergency procurement costs and guards against "extinction-level" financial losses brought on by unanticipated events, which correlates with increased profitability and an average first-year return on investment of 12:1 for enterprise-level implementations (Secureframe, 2026).

➤ *Descriptive Statistics for Performance of Sulfo Rwanda Industries*

Table 10 Descriptive Statistics for Performance of Sulfo Rwanda Industries

Statements	N	Mean	Std. Deviation
Sulfo Rwanda Industries has a good sales revenue during five years ago	234	4.82	.393
Sulfo Rwanda Industries reduces waste and increases productivity all the time	234	4.96	.426
Sulfo Rwanda Industries has built strong core operations across Africa and abroad	234	4.67	.488
Sulfo Rwanda Industries provides high quality cosmetics products and ensures good after sales	234	4.76	.333

service			
Sulfo Rwanda Industries exhibited higher yields and better field results	234	4.80	.414
Valid N (list-wise)	234		

Source: Primary data (2023)

Table 10 indicates that “Sulfo Rwanda Industries reduces waste and increases productivity all the time” responded at very highest mean and the responses were homogeneous (mean= 4.96, SD= .426), and item 3 indicates that “ Sulfo Rwanda Industries has built strong core operations across Africa and abroad” responded at very highest mean and the responses were homogeneous (mean= 4.67, SD= .488), furthermore item 4 indicates that “ Sulfo Rwanda Industries provides high quality solar energy and ensures good after sales service” responded at highest mean and responses were also homogeneous (mean=4.76, SD= .333). Therefore, Rwanda's overall industrial development, with the manufacturing sector predicting growth rates as high as 17–18% in late 2024 and 2025, is gradually supporting Sulfo's success. By continuing its commitment to

ISO Quality Management Systems and growing its export reach within the East African region, Sulfo has secured its position as a market leader. According to recent sources, the company has profited greatly from the Made in Rwanda effort and rising domestic demand for soaps and chemical goods, which resulted in a 25% rise in production volume in 2025. This continuous expansion, supported by upgraded plant machinery and streamlined cash flow management, provides a good and stable performance prognosis for the balance of 2026 (MINICOM, 2025; NISR, 2025).

➤ Inferential Statistics

Inferential statistics helps to propose explanations for situations or phenomena.

Table 11 Tests of Normality

Kolmogorov-Smirnov ^a	Shapiro-Wilk					
	Statistic	df	Sig.	Statistic	df	Sig.
CoK's project performance	.366	156	.000	.638	156	.000
Lilliefors Significance Correction						

The above results show that both the Kolmogorov-Smirnova and Shapiro-Wilk statistics are between -1.96 and +1.96. These results indicate that there is no significant

difference from normality since their values are within the range; therefore, it is concluded that the study variables satisfy the threshold of normal distribution.

Table 12 Correlational Matrix

		Performance of Sulfo Rwanda Industries	Supply chain risk identification	Supply chain risk assessment	Supply chain risk mitigation and strategies	Supply chain risk monitoring and review
Performance of Sulfo Rwanda Industries	Pearson Correlation	1				
	Sig. (2-tailed)					
	N	234				
Supply chain risk identification	Pearson Correlation	.868**	1			
	Sig. (2-tailed)	.000				
	N	234	234			
Supply chain risk assessment	Pearson Correlation	.669**	.580**	1		
	Sig. (2-tailed)	.001	.006			
	N	234	234	234		
Supply chain risk mitigation and strategies	Pearson Correlation	.461*	.400	-.073	1	
	Sig. (2-tailed)	.035	.072	.755		
	N	234	234	234	234	
Supply chain risk monitoring and review	Pearson Correlation	.149	.091	-.132	-.091	1
	Sig. (2-tailed)	.004	.094	.167	.148	
	N	234	234	234	234	234
**. Correlation is significant at the 0.01 level (2-tailed).						
*. Correlation is significant at the 0.05 level (2-tailed).						

According to the Pearson correlation coefficient theory, Table 4.7 shows that Supply chain risk identification shows the strongest relationship with the Performance of Sulfo Rwanda Industries, featuring a high Pearson

Correlation coefficient of .868 and a highly significant P-value of .000. This suggests that as identification efforts increase, performance levels tend to rise very closely in tandem. Risk assessment also shows a strong positive

correlation of .669, which is statistically significant ($P = .001$). These results indicate that the initial stages of the risk management cycle spotting and evaluating threats are currently the most influential drivers of performance in this dataset. Moreover, other factors also show meaningful connections to performance, though they are less intense than identification. Supply chain risk assessment has a strong positive correlation of .669 ($P = .001$), while mitigation and strategies show a moderate positive

correlation of .461 ($P = .035$). Interestingly, monitoring and review has the weakest relationship with a coefficient of .149, but in the second table, its P-Value is .004. This means that while the link is small, it is still statistically significant. Overall, the data suggests that while all these risk management steps contribute to Sulfo's performance, the initial phase of identifying risks has the most dramatic impact.

Table 13 Model Summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.938 ^a	.880	.850	.156
a. Predictors: (Constant), Supply chain risk monitoring and review, Supply chain risk mitigation and strategies, Supply chain risk assessment, Supply chain risk identification				

From Table 13 above, the R Square value of .880 indicates that 88% of the variance in the company's performance can be explained by the combined influence of risk identification, assessment, mitigation, and monitoring. The Pearson Correlation table further reveals that Supply chain risk identification has the strongest individual impact, with a very high positive correlation of .868 that is

statistically significant ($P = .000$). While other factors like risk assessment ($r = .669$) and mitigation ($r = .461$) also show significant positive relationships, the overall model suggests that the company's performance is highly dependent on how effectively these four risk management stages are integrated.

Table 14 ANOVAb

Model	Sum of Squares	Df	Mean Square	F	Sig.
1					
Regression	2.849	4	.712	29.306	.000 ^b
Residual	.389	229	.024		
Total	3.238	233			
a. Dependent Variable: Performance of Sulfo Rwanda Industries					
b. Predictors: (Constant), Supply chain risk monitoring and review, Supply chain risk mitigation and strategies, Supply chain risk assessment, Supply chain risk identification					

Table 14 shows that regression model is a highly significant predictor of the performance of Sulfo Rwanda Industries. With a Regression Sum of Squares of 2.849 compared to a Residual Sum of Squares of .389, the model captures a substantial portion of the total variation in performance. The F-statistic of 29.306 measures the ratio of explained variance (Mean Square of .712) to unexplained

variance (Mean Square of .024), and since the Sig. value is .000, it falls well below the standard 0.05 threshold. This statistical significance confirms that the combination of supply chain risk identification, assessment, mitigation, and monitoring has a reliable and non-random impact on the company's overall performance.

Table 15 Co-efficients

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	-.889	.296		-3.000	.008
	Supply chain risk identification	.417	.123	.452	3.381	.004
	Supply chain risk assessment	.611	.164	.457	3.719	.002
	Supply chain risk mitigation and strategies	.611	.198	.331	3.088	.007
	Supply chain risk monitoring and review	.222	.104	.198	2.138	.048
a. Dependent Variable: Performance of Sulfo Rwanda Industries						

From the above regression equation, Unstandardized B coefficients to see how much the performance of Sulfo Rwanda Industries changes for every one-unit increase in a risk management practice. Generally, all four variables have positive coefficients, meaning they all contribute to better company performance. Supply chain risk assessment and mitigation and strategies share the highest impact, both with a coefficient of .611. This means that for every unit

improvement in these areas, performance is predicted to rise by 0.611 units. Risk identification follows with a coefficient of .417, while monitoring and review has the smallest individual impact at .222. To determine if these results are statistically reliable, we examine the Sig. (P-value) column. All four variables are considered statistically significant because their Sig. values are below the common 0.05 threshold. Risk assessment is the most highly significant at

.002, followed by risk identification at .004 and mitigation at .007. Even monitoring and review, which has the lowest coefficient, is still significant with a P-value of .048. This

confirms that the positive relationship between these supply chain practices and Sulfo's performance is likely a real effect rather than a result of random chance.

Table 16 Summary of Hypotheses Testing Results

	P-value	Decision
H ₀₁ : There is no significant role of supply chain risk identification on the performance of Sulfo Rwanda Industries.	.004	Rejected
H ₀₂ : There is no significant role of supply chain risk assessment on the performance of Sulfo Rwanda Industries.	.002	Rejected
H ₀₃ : There is no significant role of supply chain risk mitigation and strategies on the performance of Sulfo Rwanda Industries.	.007	Rejected
H ₀₄ : There is no significant role of supply chain risk monitoring and review on the performance of Sulfo Rwanda Industries.	.048	Rejected

The results of the hypotheses testing in Table 16 provide significant about the role of supply chain risk management practices on performance of private companies in Rwanda. Each null hypothesis (H₀₁, H₀₂, H₀₃ and H₀₄) has been rejected ($p < 0.05$), indicating strong evidence against the idea that these supply chain risk management practices have no significant role on performance of Sulfo Rwanda Industries. Specifically, supply chain risk identification, supply chain risk assessment, supply chain risk mitigation and strategies, as well as supply chain risk monitoring and review all demonstrate a significant role on the performance of Sulfo Rwanda Industries. As stated by Sin & Md (2025), supply chain risk management (SCRM) procedures are critical for manufacturing enterprises to preserve operational continuity and competitive advantage in an increasingly turbulent global market. Organizations can considerably reduce the adverse effects of uncoordinated elements and external disruptions by putting into practice strategic frameworks that prioritize stakeholder collaboration, information sharing, and formal contractual processes (Makarevic, 2022). Additionally, a company's capacity to recognize, evaluate, and track risks in real-time is improved by integrating digital transformation with advanced analytics like big data and blockchain, which raises organizational responsiveness and resilience overall (Kromes et al., 2024; Saad et al., 2022).

V. CONCLUSIONS & RECOMMENDATIONS

➤ Conclusions

From the above findings, the study concluded that supply chain risk management strategies serve as a crucial engine for the operational success and long-term sustainability of private manufacturing enterprises in Rwanda, such as Sulfo Rwanda Industries. According to the data, a proactive strategy that includes methodical risk identification, evaluation, and mitigation greatly stabilizes production cycles and lowers the possibility of expensive disruptions. For a diverse manufacturer like Sulfo, which handles a wide spectrum of consumer items from soaps to plastic products, these procedures are not only defensive measures but strategic strategies that promote resource efficiency and financial health. Additionally, it has been demonstrated that integrating risk monitoring with more comprehensive project management and inventory control

systems enhances important performance metrics like return on assets and total sales revenue. Businesses can maintain steady supply levels even in the face of external market volatility by early detection of possible weaknesses in raw material procurement and logistics.

Strong risk management creates a "resilience advantage" that enables companies to stay competitive and responsive to customer demands in the Rwandan context, where manufacturing enterprises frequently encounter logistical difficulties and varying demand. Finally, Sulfo Industries indicates that the most effective supply chain risk management strategy is one that is firmly integrated in the organizational culture rather than handled as an isolated activity. The complete application of sophisticated risk instruments may occasionally be hampered by budgetary limitations and a lack of financing, but there is no denying the statistical relationship between risk management and business performance. In order to move from reactive crisis management to proactive strategic growth, private enterprises in Rwanda must make ongoing investments in risk analysis, stakeholder collaboration, and contemporary reporting systems.

➤ Recommendations

- *In order to have a good formal supply chain risk assessment process with a clear scoring system, Sulfo Rwanda Industries needs to adopt a formal risk assessment with clear scoring to minimize production halts and supplier disruptions.*
- *To determine the types of risks that affect their operations and bottom line, Sulfo should automate risk tracking to proactively protect profitability and streamline decision-making.*
- *For having good risk monitoring and control processes, Sulfo Rwanda Industries needs to establish proactive tracking systems to identify and mitigate potential issues before they impact operations.*

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