Supplier Optimization Strategy, Risk Strategy and Enterprise Supply Chain Performance of SMEs: A Study in Bamenda City

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Research Article

Abstract

Purpose: *Small and Medium Enterprises (SMEs) in Bamenda City are integral to the region's economic development, contributing significantly to employment, innovation, and economic growth. Supply chain management involves the coordination and optimization of activities related to sourcing, production, and delivery of products and services. The main objective of this study was to investigate the effects of supplier optimization strategy and risk strategy on the enterprise supply chain performance of SMES in Bamenda City.*

Methods: *Data for this study was obtained with the help of a structured questionnaire. By combining both designs, the study can first describe the existing situation or relationships (descriptive), and then explore or test potential causes and effects (causal). The partial least square regression model was used to analyze the paper.*

Results: *Results from partial least squares structural equation models (PLS-SEM) revealed a positive insignificant effect of supplier optimization strategy on supply chain performance. Risk strategy was also found to exert a positive effect on supply chain performance everything being equal.*

Implications: *Although supplier optimization has a positive impact on supply chain performance, the effect is insignificant. This suggests that while the strategy is directionally sound, it may need to be enhanced or refined. Also, given the positive significant effect of the risk strategy on supply chain performance, organizations should continue to focus on and invest in risk management.*

Keywords: Bamenda, Enterprise supply chain, PLS-SEM, Risk strategy, Supplier optimization strategy

1. Introduction

Procurement management strategy entails taking measures that eliminate or remove procurement risk or reduce them to what is an acceptable level including changes in behaviors, procedures, and control (Emily, 2015). Globally, businesses must strategize at all levels to ensure that all their goals and objectives that were clearly stated are achieved within the specified time along their supply chains. Procurement strategies require efforts beyond what most enterprises are doing and to pinpoint success metrics, practices, and solutions (Olsha, 2010). Most businesses have witnessed or have undergone significant changes in their supply chains during the past decade and are still turbulent or experiencing difficulties.

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In the developed world, SMEs often benefit from advanced supply chain infrastructures and access to a broad range of suppliers. However, despite these advantages, certain challenges persist. SMEs in developed economies typically utilize sophisticated supplier optimization strategies, often leveraging advanced technologies and data analytics to select and manage suppliers (Christopher & Holweg, 2017). These strategies are designed to optimize cost, quality, and delivery times, which are crucial for maintaining competitiveness in highly developed markets. However, the over-reliance on global suppliers due to cost efficiencies can introduce significant risks, especially in the face of global disruptions, such as geopolitical tensions or pandemics (Handfield et *al.,* 2020).

Despite the advanced supplier optimization strategies, another problem is that SMEs in developed economies may focus excessively on cost minimization, sometimes at the expense of flexibility and resilience (Simchi-Levi et *al.,* 2014). This focus can lead to overly lean supply chains, which, while efficient under normal circumstances, may lack the necessary buffers to absorb shocks. The drive for efficiency can also lead to supplier selection based on cost alone, potentially compromising on aspects like quality or reliability that are critical for long-term performance.

Unlike their counterparts in developed countries, SMEs in these regions often operate in environments characterized by weaker infrastructure, limited access to technology, and less stable economic conditions (Cheng & Zhang, 2021). These conditions complicate efforts to optimize supply chains and manage risks effectively. One significant observation is that SMEs in developing economies frequently rely on local suppliers who may lack the capability to meet global standards in terms of quality, consistency, and reliability (Nair et *al.,* 2015). This reliance on underdeveloped local supply chains can result in frequent disruptions, as suppliers may struggle with issues like poor infrastructure, limited access to finance, and inadequate production capacities. Moreover, the lack of diversification in supplier networks increases vulnerability, as SMEs often depend on a small number of suppliers for critical inputs.

The business environment is increasingly becoming volatile, uncertain, complex and ambiguous because of globalization, increased competition; random consumer tastes changes and environmental factors. Most competitive profit and non-profit making enterprises and supply chains have been shifting from the traditional way of sourcing and equally adapting to competitive, resilient and sustainable procurement (Makudza, *et al*, 2023).

SMEs often rely heavily on a limited number of suppliers due to cost constraints and lack of access to a broader supplier network (Nguyen et *al.,* 2019). This dependence on a few key suppliers increases their vulnerability to supply chain disruptions. If a major supplier encounters operational issues, it can result in significant delays, increased costs, or even complete production stoppages. Despite this awareness, many SMEs in Bamenda lack formalized risk management strategies, which results in a reactive rather than proactive approach to managing supply chain risks (Ambe & Badenhorst-Weiss, 2011). This reactive approach often leaves SMEs unprepared for unforeseen disruptions, leading to higher operational risks and more severe consequences when disruptions do occur.

Stiff competition has been faced by small and medium size enterprises within the city as globalization and advancement in technology is on the rise at a geometric rate. The world has been termed a global village as nearly all what is produce elsewhere are consumed in any part of the world within the shortest possible time. This is because of improvement in transport modes and means. As wants and needs keeps on changing, business units along the various supply chains turn to acquire equipment and skills, making them more resilient (Gesimba, 2012).

Business processes are endangered due to increase vulnerabilities because of risk along the stages of or processes of enhancing supply chain performance. suppliers in performing their logistics at times fails in their action as the strive in ensuring their objectives and goals are well achieved (Suhong *et al*., 2016).

Supply chains of some small and medium size enterprise have been expose to high risk to an extend that sustainability becomes a problem. Constant fluctuation in the prices of goods and services makes it difficult for supply chain actors to plan on the various logistics aspect. Negotiating on prices of goods and services

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becomes cumbersome as uncertainties prevails among supply chain entities (Elahi, 2010). Ineffective supply chain performance, decreases enterprises' revenue, cut down market share, inflate enterprise cost, tarnishes company's credibility with investors and other stakeholders, increases budget and threatens production up to 60%, increase on inventory holding cost, thereby driving up cost of capital (Ruud and Bosmand, 2006).

Additionally, SMEs tend to focus on immediate cost savings rather than long-term supply chain performance improvements (Tachizawa & Wong, 2014). This short-term focus undermines the development of a resilient supply chain, making SMEs more susceptible to market fluctuations and external shocks. Their emphasis on cost savings also extends to supplier selection, where price is often prioritized over other critical factors like reliability, quality, or delivery time (Chen & Paulraj, 2004). This can compromise the overall performance and reliability of the supply chain, leading to inferior product quality and delays, which ultimately affect customer satisfaction and the SME's reputation. The limited adoption of advanced supply chain technologies further exacerbates these issues (Bagchi et *al.*, 2018). Without the tools to effectively optimize their supply chains, SMEs face inefficiencies and are less able to compete in the market. This lack of technological capability not only limits their operational efficiency but also puts them at a competitive disadvantage, as they struggle to respond to market changes and optimize their operations effectively.

Smith (2012) indicated that enterprises should seek procurement management practices from strategic point of view so as to achieve competitive advantage and overall enterprise supply chain performance. Thus, there is need to verify if small and medium size enterprises within Bamenda city are aware of procurement strategies and how they relate with enterprises supply chains. To this end, this study seeks to investigate the effect of procurement strategies on enterprise supply chain performance in Bamenda Municipalities scenario. Specifically, to assess the relationship between supplier optimization strategy and enterprise supply chain performance of SMEs in Bamenda city and examine the relationship between risk strategy and enterprise supply chain performance of SMEs in Bamenda city.

The structure of the paper is as follows. After the introduction in Section 1, section 2 constitutes related literature, section 3 reports the methodology used in the study, section 4 proceeds with presentation of results and discourse and section 5 highlights the conclusion and policy implications.

2. Literature Review

This section presents both theoretical and empirical literature related to the study.

2.1. Theoretical Considerations

2.2.1 The Stakeholders Theory

Stakeholders' theory was brought forth by Freeman (1984) and later developed by Hoffman and Linehan (2019). Freeman (1984) developed the theory to illustrate the relationship between internal and external stakeholders. It proposes that internal and external stakeholders have to create harmonious coordination of its operations failure to which would jeopardize enterprise supply performance. There is a need to incorporate intrinsic and extrinsic interest amongst stakeholders of small and medium size enterprise within Bamenda city. Bamenda city has several stakeholders such as suppliers, government, employees, customers, shareholders, farmers, individuals, and commercial users. All these stakeholders be they internal or external affect the supply chain performance of small and medium size enterprises in Bamenda City. Almost all companies within their supply chain are for the fact that their customers are satisfied, cost minimized, profit improved and sustainability guaranteed.

According to the theory, all the views of these stakeholders should be taken into consideration at the level of product design, process design, production layout, procurement planning and customer services to ensure

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a uniform direction of achieving supply chain performance. A very common way of differentiating the different kinds of stakeholders is to consider groups of people who have classifiable relationships with the organization and supply chains. Freedman (1984) means that there is a clear relationship between definitions of what stakeholders are and identification of who are the stakeholders. The main groups of stakeholders are: customers, employees, local communities, suppliers and distributors, shareholders, media and government authorities. Suppliers of different raw materials need to be evaluated in terms of risk of quantity, time delivery, prices, quality, and cost, and develop them to meet up with the standard from customers and that of the government. The media on it such as websites, WhatsApp, internet, and other electronic medias must be taken in to consideration during planning as proposed by Freedman (1984) and Hoffman and Linehan 2(019).

Certain assumptions were later developed by Hoffman and Linehan (2019) to help explain the theory for better understanding and application by other studies. This theory has been applied to the study of procurement strategies and enterprise supply chain performance of small and medium size enterprises. Some of the key assumptions of this theory are:

According to the stakeholder theory, all the actors of a given supply chain must have updated information for them to make decisions affecting the success of the enterprise. On the contrary, most of the suppliers that are performing fail to perform with time due to the constant changes in the business environment making it difficult to update other stakeholders. With this, enterprises must keep in mind that there is risk that must be identified and suppliers communicated and optimized.

The theory assumes that all the actors related to any supply chain are trying their best. According to the theory, we should not capitalize on the poor performance of the supplier, retailer, or manufacturer, rather the enterprise encourages them and tells them of how best they could do. The theory therefore, emphasizes on knowing the standard and result of all the stakeholders in each supply chain.

The theory assumes proper analysis of the various stakeholders involved in the supply chain. According to the theory, absolute information is needed to take a decision. This entails continuous search of information from all the stakeholders along the supply chain before making a decision.

The strength of this theory is its ability to point out all the actors affecting the enterprise supply chain such as: suppliers of raw materials, producers, internal customers, retailers, and end customers. The theory equally met provisions on how participatory decision making can be adopted to influence programmable and non-programmable decision making. The small and medium size enterprises do not operate in space. This shows that SMEs have different customers, different suppliers, retailers, and producers that have different wants and needs. This automatically shows that planning must take in to consideration their views. This holistic approach is crucial to enhancing the performance of the supply chain. SMEs within the Bamenda City have to consolidate the interest of heterogeneous stakeholders and devise measures on how to share scarce resources especially their suppliers. Stakeholders such as employees and suppliers are important players in the procurement process and their involvement enhances enterprise performance. Enterprise and supply chain performance is a process that calls for ease of identification of needs and development of strategies to optimize its distribution. In essence, taking care of all stakeholders ensures that the agricultural sector's respective objectives are achieved.

The major criticism of this theory is the inability to balance the needs of heterogeneous stakeholders due to overriding interests and nature of operational guidelines. Also, the theory assumes, that an enterprise must have full or complete information before making a decision. This assumption is flawed due to the dynamic nature of the environment and the impossibility of obtaining all information within a specific business sector. Therefore, supply chains can only have optimal information for decision making and not all as proposed by Hoffman and Linehan (2019).

Stakeholder theory is relevant for explaining the relationships between procurement strategies and enterprises supply chain performances. Supplier relationships have been found to have a very big significant influence on the performance of supply chain of small and medium size enterprises. Supplier relation is

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about identifying the risk or the weaknesses of the entire stakeholders and taking precautions. Collaboration entails sharing vision and risk among stakeholders. The theory helps explain how supply chains can perform well if the views of the stakeholders are taken into consideration. There is need to adopt supplier optimization and negotiation strategies and supply risk strategies that are geared towards monitoring and evaluating procurement resources in SMEs in Bamenda city. All stakeholders need to clarify their approaches to contractual and negotiation implementation. This minimizes conflict and amplify communication of expected needs in the course of project implementation. Also, there is need for procurement department in SMEs corporations to have in place internal control mechanisms which optimizes allocation of resources and ultimately benefit all stakeholders.

2.2.2. The Resource Based View Theory

Resources based view theory (RBV) was brought forth by Peteraf and Barney (1991). The theory supports the need for organization to understand their resource capabilities and the constraints they are exposed to as they strive to gain competitive advantage. Although an organization ought to strategically optimize resources gathering strategies, there is no surety of optimal benefits due to pilferage of its capabilities (Wolf, 2013).

To achieve performance sustainability, there is a need for organization to accumulate rare, non-substitutable and non-imitable resources despite operating in highly volatile and competitive environments (Finney et al., 2004). According to Hitesh (2020) an organization possesses internal tangible and intangible resources. Tangible resources according to the theory are: buildings, machines, and equipment, while intangible resources are: intellectual property rights, and a company's good will. The resource-based view theory was further modified by Hitesh (2020) by developing assumptions on which other studies could be based.

Companies that are unable to distinguish themselves from their competitors are unable to improve their supply chain performance in terms of having well train employees, machines, intellectual property right and enterprise good will. Supply chain entities do focus on their core business making them unique in their performance. Supplier optimization therefore sets into acknowledge the fact that external supplier's views must be taken in to consideration for supply chain performance be optimise in terms of quality, profit, customer satisfaction, time delivery and fill rate (Hitesh 2020).

RBV assumes that resource heterogeneity may persist over time because the resources used to implement firms' strategies are not perfectly mobile across firms; that is, some of the resources cannot be traded in factor markets and are difficult to accumulate and imitate. Resource heterogeneity (or uniqueness) is considered a necessary condition for a resource bundle to contribute to a competitive advantage and supply chain performance. The RBV is concerned with the connection between internal resources, strategy, and the performance of the enterprise and supply chains. It focuses on encouraging sustained competitive advantage through the development of human capital rather than simply aligning human resources with current strategic goals (Wolf, 2013).

From its conception and evolution, the resource-based view theory has faced significant criticism over time, as noted by Hitesh (2020). The argument that resources internal to an organization can result in competitive advantage is a shift from earlier suggestions of strategy, which focused on the external environment and such factors as customers, industry, and competitors. The ability of an organization to manage its resources would maximize the value addition from both internally and externally generated resources (Hooley & Greenley, 2005). Additionally, the theory lacked clarity regarding the specific resources involved. The theory did not specify which of the various resources, be they tangible or intangible, could greatly affect the performance of an enterprise and its supply chains. Furthermore, its major drawback is its organization's ability to respond optimally to dynamic organizational operating environments.

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The theory has the advantage of aiding an organization in identification of its unique resources and creation of competitive environment (Lopez, 2005; Helfat & Peteraf, 2003). Further, it provides value additive criterion to be adopted whenever an organization seeks to discover blue ocean market through creation of value additive products and services. The relevance of RBV is anchored on ability of it an enterprise to plan its internal resources and allocate them optimally to gain supply chain performance. Procurement strategies of small and medium size enterprises should be guided by budgetary guidelines, procurement method adopted and adherence to procurement approvals. Proper procurement strategies on resources minimizes pilferage of resources and maximize enterprise and supply chain performance.

2.2 **Empirical Review**

Hassana and Cross (2020) conducted a study to investigate the effect of supplier optimization on the operational performance of manufacturing firms in Nigeria, with a specific focus on Dangote Sugar Refinery (DSR). The researchers collected primary data through a well-structured questionnaire, and the data was analyzed using the Statistical Product and Service Solution (SPSS). Methodologically, descriptive survey research design of the quantitative approach was employed. The study had a population size of 15026 from entire top middle and lower-level management staff of the Dangote Sugar Refinery (DSR) Plc. in Apapa, Lagos, Bompai in Kano and Nkpor-Onitsha in Anambra and sample size of 390. It was found-out that supplier technical support has statistically significant effect on competitive advantage at Dangote Sugar Refinery Plc., early supplier involvement has statistically significant effect on cost efficiency at Dangote Sugar Refinery Plc., supplier audit has statistically significant effect on operational efficiency at Dangote Sugar Refinery Plc. and supplier certification has statistically significant effect on customer service delivery at Dangote Sugar Refinery Plc.

In a similar light, research aimed at assessing the impact of strategic procurement on public organization performance using Arusha City Council (ACC) as a case study was conducted (Mwitango,2019). The study had three specific objectives; the first was to examine the influence of strategic procurement on procurement execution, the second was to assess the influence of supplier base on organization performance, and the third objective was to examine the influence of supplier selection on organization performance. The researcher applied a case study research design, and samples were selected by using purposive sampling techniques, where by questionnaire were used as primary data collection method and documentary review and internet source were used as secondary data collection method. A sample of 79 respondents was purposively selected from different department and section at Arusha city council. The analyzed data was then presented in tables and figures for interpretation. Factor analysis and multiple regression analysis were employed for data reduction and assessing relationship between independent and dependent variables. The study realized relationship between the procurement execution, strategic supplier base (supplier development), and strategic supplier selection on public organization performance.

Wang and Cheng (2019) investigated the role of supplier relationship management (SRM) in enhancing operational performance in the electronics manufacturing industry in China. The study specifically looked at how SRM practices, such as collaboration, communication, and long-term partnerships, impact supply chain resilience and efficiency. Descriptive research design using a mixed-method approach. The study used a combination of quantitative data collected through questionnaires and qualitative data obtained from in-depth interviews with supply chain managers. A sample of 150 electronics manufacturing firms was selected using stratified random sampling to ensure representation from different segments of the industry. Quantitative data were analyzed using regression analysis, while qualitative data were subjected to thematic analysis. The study found that strong collaboration and effective communication between firms and their suppliers significantly enhance operational performance by reducing lead times and improving product quality. Establishing long-term partnerships with key suppliers was shown to enhance supply chain resilience, enabling firms to better handle disruptions and maintain operational continuity.

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Kaplan and Haenlein (2021) conducted a study on the impact of digital transformation on supplier optimization and its subsequent effect on operational performance in the European consumer goods sector. The study aimed to understand how digital tools and platforms used in supplier management could lead to improved operational outcomes. Longitudinal study tracking digital transformation efforts over five years. Data were collected from company records, interviews with supply chain executives, and digital platform usage analytics. The study focused on 20 large consumer goods companies that had actively implemented digital transformation strategies in supplier management. Time-series analysis was conducted to examine changes in operational performance metrics before and after digital transformation. The use of digital platforms for supplier management significantly improved operational performance by enhancing data visibility, reducing errors, and facilitating better decision-making. Tools that allowed for real-time collaboration and communication with suppliers helped reduce lead times and improve supply chain flexibility.

Nguyen and Nguyen (2022) explored the impact of digital supplier management tools on operational performance in the electronics industry in Vietnam. The study aimed to assess how digitalization in supplier management affects factors like cost reduction, speed of operations, and product quality. Quantitative research design using a survey methodology. Data were collected through online surveys distributed to supply chain managers in electronics firms. A total of 100 electronics firms were selected using random sampling techniques. Data were analyzed using multiple regression analysis to evaluate the impact of digital tools on operational performance. The adoption of digital tools, such as automated procurement systems and digital communication platforms, was found to significantly improve operational performance. These tools helped reduce procurement costs, increase the speed of order processing, and enhance product quality by improving supplier coordination and communication. Digitalization in supplier management led to better cost efficiency and higher product quality by minimizing errors and delays in the procurement process.

Karim and Arif (2018) conducted a study to investigate the impact of strategic supplier partnerships on supply chain performance in the textile industry of Bangladesh. The study aimed to explore how long-term relationships with suppliers affect operational metrics such as lead time, cost efficiency, and product quality. The study employed a descriptive research design. Data were collected through structured questionnaires distributed to supply chain managers in the textile industry. A sample of 200 managers was selected using stratified random sampling to ensure representation from different levels of management. Structural Equation Modeling (SEM) was used to analyze the relationships between strategic supplier partnerships and supply chain performance. The study found that strategic supplier partnerships positively influence supply chain performance by reducing lead times, lowering costs, and enhancing product quality. The findings suggest that firms with strong supplier partnerships can better coordinate their supply chains, leading to more efficient and effective operations. Trust and open communication between firms and suppliers were identified as critical factors in fostering successful strategic partnerships. These elements helped mitigate risks and enabled smoother coordination across the supply chain.

Nyangechang (2017), conducted a related study, with a population size of 147 employees of the kisii Bottlers Limited. The study had as samples size as 44 employees of the same institute. Quantitatively, the research employed structured questionnaire to collect data that were administered and later collected by the researcher. Nyangechang (2017), concluded that procurement risk strategy strongly influences enterprise supply chain performance. At the level of conceptual framework, the study did not include vital variable that could explain performance such as risk identification, mitigation, and evaluation. Also, the study had as unit of analysis as employee of Bottlers Limited in Kisii which makes it difficult for other researchers and policy makers to generalize the result to a larger population. Had it been the sample of 44 employees were from different companies and from procurement department, the result somehow would have been of good grounds to explain the performance of the supply chain. Again, the study as other in the line of

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procurement risk did not include control variables such as age, gender, education, enterprise size and longevity of service.

Zhu et al. (2020) aimed to examine how risk management strategies affect supply chain performance in the context of manufacturing firms in China. The study sought to explore the influence of risk identification, risk assessment, and risk mitigation strategies on supply chain performance. Data were gathered from 250 manufacturing firms in China using a structured questionnaire. The study used a stratified random sampling technique to ensure diversity across different manufacturing sectors. Statistical analysis was performed using structural equation modeling (SEM) to evaluate the relationships between risk management strategies and supply chain performance. Effective risk identification and assessment were found to significantly improve supply chain performance by reducing disruptions and improving responsiveness. Risk mitigation strategies were also crucial, as they helped in enhancing the resilience of the supply chain and maintaining performance during adverse conditions.

From the examination of the written and published information on procurement strategies and enterprise supply chain performance, the research recognizes that there is a call for a study to be carried out in this field in Cameroon precisely in Bamenda City the capital of Northwest Region. Literature obtainable signify that studies available are mostly done on developed countries and not focusing more developing states such as in Africa (Sobhani et al., 2014; Hassan, 2012; Sobhani et al., 2014). Past studies such as Mokogi et al. (2015), Sobhani et al. (2014), and Oyuke and Shale (2014) have tended to study on procurement strategies. In addition, such studies done on the effect of e-procurement, supplier optimization, negotiation and procurement risk strategy on enterprise supply chain performance have been done in with inadequate supply chain performance measurement indicators. The area of e-procurement, supplier optimization, negotiation and procurement decision synchronization has been neglected in these past studies which this study seeks to address. Moreover, most studies failed to include control variable such as age, sex, education, longevity and type of enterprise that plays a lot on the performance of an enterprise through the F-test.

3. **Methodology**

The study was conducted in Bamenda City, the capital of the Northwest Region of Cameroon. Given that the population of Bamenda I, II and III were all unknown and projected, a convenient sample was used for the study. The study had as dependent variable enterprise supply chain performance which is a latent variable captured by supply chain cycle time, perfect order rate and demand satisfaction rate. The study made use of both descriptive and causal research designs (Cooper & Schindler, 2013). By combining both designs, the study can first describe the existing situation or relationships (descriptive), and then explore or test potential causes and effects (causal). Data for this study was gotten with the help of a structured questionnaire (the research instrument was based a likerk scale for respondents to tick the most appropriate that explains their state), trough stratified random sampling (the population was divided into three; Bamenda I, II and III), and analysed using both descriptive and inferential statistic. Structural equation modelling (SEM) is a technique used to analyse complex relationships between observed and latent variables (Wong, 2013). The variables used in the study included supplier optimization strategy (measured using enterprise visits, suppliers are advised, trained, clarity on organization's goals , professional qualifications skills, Coach of suppliers, encourage or motivation of suppliers), risk strategy (measured using identification of risk, supplier risk assessment, supplier control and monitoring, supplier risk mitigation) and enterprise supply chain performance (measured using cash-to-cash cycle time, supply chain cycle time, demand satisfaction rate, perfect order rate, on-time-delivery).

To investigate the influence of supplier optimization strategy on enterprise supply chain performance in SMEs in Bamenda city. The model chosen for this objective was formalized in a set of structural equations making up a conventional model of organizational performance dependent on internal recruitment factors. SEM is helpful in estimating relationships among multiple variables at the same time, especially when these variables themselves are latent, but are explained by several indicators.

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Following Wong (2013) and Hair and Alamer (2022), let X_i represent the latent constructs considered in this objective, namely, SME supply chain performance and supplier optimization strategy. The first step in the SEM approach is to regress each latent variable on its indicators, as in equation 5.

$$X_i = \alpha_1 x_1 + \alpha_2 x_2 + \cdots + \alpha_P x_P + \varepsilon \ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots 1$$

Where $\alpha_1, \alpha_2, \ldots \alpha_p$ are the factor loadings that represent the strength of the association between the latent construct and its observed indicators, and ε on its part represents the error term which accounts for omitted variables, data measurement errors, and model misspecification bias.

The structural equation which represents the relationship between supply chain performance and supplier optimization strategy can be stated as in equation 6 as follows:

$$Performance = \lambda_0 + \lambda_1 Optimisation + \sum_{k=2}^{K} \lambda_k X_k + \omega \ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots 2$$

Here, $Performace$ represents the dependent latent variable (supply chain performance); Optimization represents supplier optimization strategy and X_k represents other hypothesized independent variables that can also affect supply chain performance such as the size of the enterprise, its longevity in business, and the average educational level of its workers; $\lambda_0, \lambda_1, \ldots, \lambda_k$ are the structural coefficients to be estimated. They represent the strength of the relationship between the independent and the dependent variables, while ω represents the error term. The model was estimated using SMARTPLS 4.

To investigate the effect of SME risk strategy on enterprise supply chain performance of SMEs in Bamenda City. To realize this objective, this study employed the structural equation modeling (SEM) technique since both risk strategy and enterprise supply chain performance are latent constructs. To formalize this approach, we follow Wong (2013) and Hair and Alamer (2022) and suppose that Y_i represents the latent constructs of supply chain performance and risk strategy, where Y_1 stands for supply chain performance and Y_2 stands for risk strategy, with each having its own set of indicators. The first step in the SEM approach consists of regressing each latent variable on its set of indicators, as in equation 9, and obtaining the path coefficients (ω_i).

$$Y_i = \omega_{1i} z_{1i} + \omega_{2i} z_{2i} + \cdots + \omega_{Pi} z_{Pi} + \xi_i \ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots 3$$

where $\omega_{1i}, \omega_{2i}, \ldots \omega_{pi}$ are the factor loadings which represent the strength of the association between each construct Y_i and its indicators and z_i represent the vector of indicators for each construct. ξ_i is the error term for each regression which accounts for omitted variable bias, data measurement errors as well and model misspecification bias. The structural equation that represents the relationship between supply chain performance and enterprise risk strategy is expressed in equation 10:

$$Performance_i = m_0 + m_1 Risk_i + \sum_{r=2}^{R} m_r Z_r + \psi \ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots 4$$

where $Performance_{\square}$ is the dependent latent variable (supply chain performance of enterprise i); $Risk_i$ represents the risk strategy or firm i and Z_r represents other variables that can also affect supply chain performance such as the longevity of the enterprise in the line of business as well as the average educational level of its workers; $m_0, m_1, \ldots, m_k$ are the structural coefficients of the measurement model; while ψ on its part is the random disturbance term. The model was estimated using SMARTPLS 4.

4. Results and Discussion

This section is the empirical section of the study which deals with a presentation of results and discussion of findings. Specifically, we start by describing the sample and then discuss the findings following the objectives set out at the beginning of this study.

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Table 1. Summary statistics of enterprise supply chain performance

Variables	Obs	Mean	Std. Dev.	Min	Max	Skew.	Kurt.
Performance	125	20.296	4.434	9	25	-1.19	3.458

Source: Computed by the researcher using Stata 15.

Enterprise supply chain performance was thus captured as a composite index. This score ranged from 9 to 25, where higher values indicate higher levels of enterprise supply chain performance.

4.1. Supplier Optimization Strategy and Enterprise Supply Chain Performance

The second objective of this study was to examine the influence of supplier optimization strategy on enterprise supply chain performance. A partial least squares structural equation modeling analysis (PLS-SEM) was conducted to test this relationship since the variables of interest (supplier optimization and supply chain performance) are unobservable and difficult to measure. Unlike the covariance-based SEM (also called CB-SEM), the PLS-SEM is a variance-based approach that is useful in explorative studies and soft modeling of this nature.

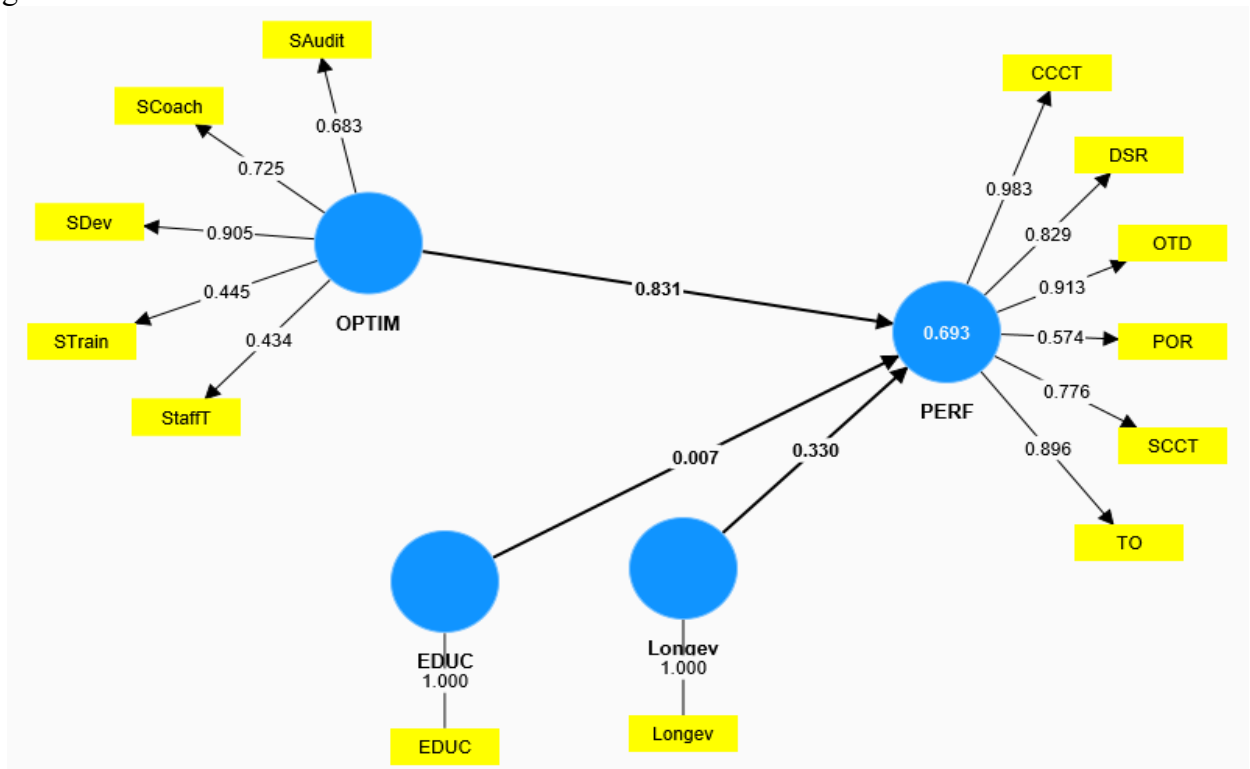

Fig. 1. PLS-SEM results of the influence of supplier optimization strategy on enterprise supply chain performance

The results of the PLS-SEM are displayed in Figure 1. The figure displays both the path coefficients and the outer loadings. To understand this result, we shall interpret step by step.

Path coefficients of the supplier optimization - performance model.

Table 2. Path coefficients of the supplier optimization - performance model

Paths	Path coefficients
EDUC -> PERF	0.007
Longev -> PERF	0.330
OPTIM -> PERF	0.831

The path coefficient is a measure of the strength of the association between the latent variables. A path coefficient of 0 indicates no relationship while a path coefficient of 1 indicates a perfect relationship. The path coefficient between supplier optimization strategy (OPTIM) and supply chain performance (PERF) is

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0.83 implying a very strong positive relationship between supplier optimization and supply chain performance.

More specifically, if supplier optimization changes by 1 standard deviation, then supply chain performance changes by 0.83 standard deviations, all things equal. Educational qualification of workers and the longevity of the business do not explain variations in supply chain performance as much as supplier optimization strategies, since their path coefficients are also positive but smaller.

An outer loading measures the strength of the relationship between an indicator and its latent variable. An outer loading of 0 indicates no relationship while an outer loading of 1 indicates a perfect relationship. The results are displayed in Table 3.

Table 3. Outer loadings of the supplier optimization - performance model

	Outer loadings
CCCT <- PERF	0.983
DSR <- PERF	0.829
OTD <- PERF	0.913
POR <- PERF	0.574
SCCT <- PERF	0.776
TO <- PERF	0.896
EDUC <- EDUC	1.000
Longev <- Longev	1.000
SAudit <- OPTIM	0.683
SCoach <- OPTIM	0.725
SDev <- OPTIM	0.905
STrain <- OPTIM	0.445
StaffT <- OPTIM	0.434

The results show that the indicators of supply chain performance (CCCT, DSR, OTD, SCCT, and TO) are extremely good indicators. This is because the outer loadings of these indicators are all very close to 1, implying a near-perfect relationship between these indicators and supply chain performance. Longevity and education each load perfectly unto themselves. Only POR (perfect order rate) has a factor loading that is less than 0.7. However, not all indicators of supplier optimization are good indicators. This is because some of the indicators are small in absolute value. The best indicator of supplier optimization is supplier development (SDev) with an outer loading of 0.91.

Table 4. Quality indicators of the supplier optimization - performance model

	R-square	R-square adjusted		
PERF	0.693	0.685		
	f-square			
EDUC -> PERF	0.000			
Longev -> PERF	0.084			
OPTIM -> PERF	2.052			
	Cronbach's alpha	Composite reliability (rho_a)	Composite reliability (rho_c)	Average variance extracted (AVE)
OPTIM	0.776	0.835	0.784	0.440
PERF	0.935	0.947	0.933	0.703

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The criteria that help to ascertain the goodness or quality of the supplier optimization–performance model include the R-squared, the f-squared, the different reliability measures, and the average variance extracted as well as the heterotrait-monotrait and collinearity ratios. R-square measures the amount of variance in the dependent variable that is explained by the independent variables.

The R-square value is 0.693, implying that the included covariates explain 69.3% of the variations in enterprise supply chain performance. The f-square statistic or effect size (Cohen, 1998) measures the change in R-square when an exogenous variable is removed from the model. It is small if it is less than 0.02, medium if it lies between 0.02 and 0.15, and large if it is greater than 0.35. Supplier optimization thus has the greatest effect size on supply chain performance whereas education has a very insignificant effect.Cronbach's alpha is a measure of the internal consistency of a scale, considered to be good if it is greater than 0.7. The results show that the indicators of both supplier optimization and supply chain performance are good or reliable since their Cronbach alpha values are 0.776 and 0.935, respectively, which is greater than 0.7. The composite reliability (rho_a) is also a measure of internal consistency that takes into account the number of indicators used in constructing the scale. It is good if it is greater than 0.7. The composite reliability (rho_c) statistic on its part is a measure of internal consistency that considers the number of indicators in the scale and the average variance extracted (AVE). It is good if it is greater than 0.7. Both constructs have a good composite reliability score.

Average variance extracted (abbreviated AVE) is a measure of validity, and shows how much variance in the indicators is explained by the latent variables. A value greater than 0.5 is considered to be a good measure of validity. Overall, indicators of performance (AVE = 0.703) are more valid than those of supplier optimization (AVE = 0.44).

Table 5. Collinearity ratios of supplier optimization

Paths	VIF
EDUC -> PERF	1.108
Longev -> PERF	1.022
OPTIM -> PERF	1.094

The variance inflation factors (VIF) measure the degree of collinearity among the variables. A VIF score of 1 indicates the absence of any linear association (no multicollinearity) while a value of about 10 indicates an extremely strong and disturbing linear association between the variables. The VIF ratios reported show that some variables in the outer model are weakly correlated but the variables in the inner model do not suffer from any multicollinearity among the variables.

The finding that supplier optimization strategy positively affects enterprise supply chain performance is consistent with prior expectations and with previous studies. This leads us to reject the second hypothesis formulated in this study and to conclude that there exists a positive and statistically significant effect of supplier optimization strategy on enterprise supply chain performance. This finding corroborates that of Adedokun et al, (2017) who found that supplier development has a significant influence on the enterprise performance of manufacturing organizations in terms of reduction of production cost, improving quality of product, speed to the market, and operational flexibility. Hassana and Cross (2020) made a similar finding that supplier technical support has a statistically significant effect on competitive advantage at Dangote Sugar Refinery in Nigeria.

4.2 Risk Strategy and Enterprise Supply Chain Performance

The fourth objective of this study was to investigate the effect of SME risk strategy on enterprise supply chain performance. A partial least squares structural equation modeling (PLS-SEM) analysis was conducted to test this relationship since risk strategy and supply chain performance are both latent variables. Additional regressors include the education level of workers at the enterprise (recoded as 0 if primary and 1 if post-primary) and the longevity of the enterprise (recoded as 0 if below 5 years and 1 if above 5 years). The

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results of the PLS-SEM estimation are displayed in Figure 4.6. The figure displays both the path coefficients and the outer loadings.

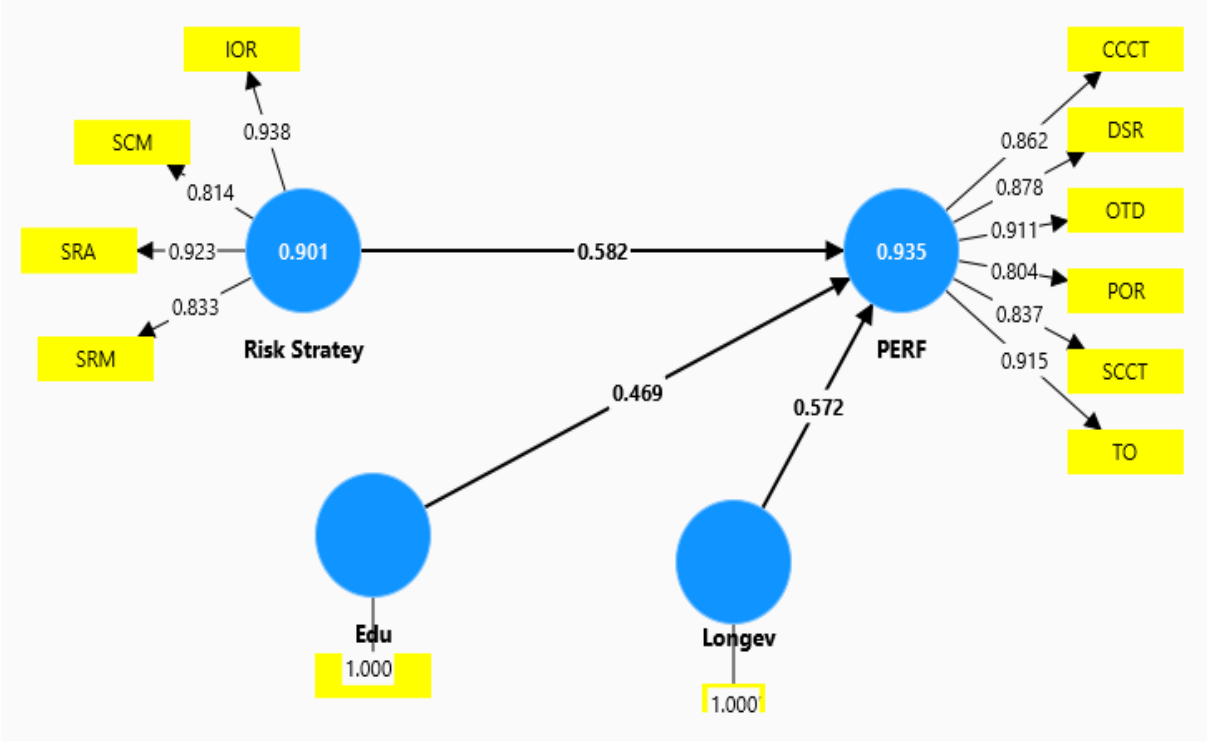

Fig. 2. PLS-SEM results of the effect of risk strategy on supply chain performance

4.3. Path coefficients of the risk strategy - performance model

Path coefficients measure the strength of the association between the latent variables. If a path coefficient is 0, it implies that no relationship exists between the variables, but if the path coefficient is 1, it implies that a perfect relationship exists between the variables.

Table 6. Path Coefficients of the risk strategy - performance model

Paths	Path coefficients
Edu -> PERF	0.469
Longev -> PERF	0.572
Risk Strategy -> PERF	0.582

Table 6 summarizes the path coefficients of the inner model which show the strength of the relationship between supply chain performance and risk strategy, longevity in business and average educational level of workers. The path coefficient between risk strategy and supply chain performance (Risk Strategy -> PERF) is 0.582, which implies a moderate positive relationship between risk strategy and supply chain performance. Precisely, if the risk strategy score changes by 1 standard deviation, then supply chain performance score changes by 0.58 standard deviations, all other things held constant.

The longevity of the enterprise is also an important determinant of its supply chain performance since the path coefficient is 0.572. This means the supply chain performance score of older enterprises (those above 5 years of existence) enterprises is 0.57 standard deviations higher than that of young enterprises (below 5 years of existence). The supply chain performance of the enterprise is also positively (though weakly) correlated with the average educational level of its workers.

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Table 7 reports the results of the outer model, specifically, the outer loadings while Table 7 reports the outer weights. The outer loadings measure the strength of the relationship between the indicators and their latent variables meanwhile the outer weights are coefficients that represent the relative importance of each indicator in the formative measurement model.

Table 7. Outer Loadings of the risk strategy - performance model

	Outer loadings
CCCT <- PERF	0.862
DSR <- PERF	0.878
OTD <- PERF	0.911
POR <- PERF	0.804
SCCT <- PERF	0.837
TO <- PERF	0.915
IOR <- Risk Strategy	0.938
SCM <- Risk Strategy	0.814
SRA <- Risk Strategy	0.923
SRM <- Risk Strategy	0.833
Edu <- Edu	1.000
Longev <- Longev	1.000

The results show that the indicators for the latent variables (supply chain performance and risk strategy) are extremely good. This can be inferred from the fact that the effects of these indicators on their respective constructs are all greater than 0.8 or very close to 1. The strongest indicators of supply chain performance are inventory turnover (TO, loading = 0.915) and on-time delivery (OTD, loading = 0.911). On the other hand, the strongest indicators of risk strategy are identification of risk (IOR, loading = 0.938) and supplier risk assessment (SRA, loading = 0.923). Education and longevity have loadings equal to 1 because they are their perfect predictors.

4.4. Quality criteria of the risk strategy - performance model

The criteria used to judge the goodness or quality of the risk strategy–performance model include the R-squared, the f-squared, the different reliability measures, and the average variance extracted as well as the heterotrait-monotrait and collinearity ratios.

Table 8. Quality indicators of the negotiation - performance model

	R-square	R-square adjusted		
PERF	0.355	0.339		
Paths	f-square			
Edu -> PERF	0.026			
Longev -> PERF	0.111			
Risk Strategy -> PERF	0.459			
	Cronbach's alpha	Composite reliability (rho_a)	Composite reliability (rho_c)	Average variance extracted (AVE)
PERF	0.935	0.948	0.948	0.755
Risk Strategy	0.901	0.928	0.931	0.772

The included independent variables explain 36% of the variations in the independent variable. This can be seen from the R-square value of 0.355 in Table 8. The f-square statistic or effect size (Cohen, 1998) measures the change in R-square when an exogenous variable is removed from the model. It is small if it is less than 0.02, medium if it lies between 0.02 and 0.15, and large if it is greater than 0.35. Risk strategy thus

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has a large effect size on supply chain performance since the f-square statistic is 0.459 which is greater than 0.35.
Cronbach's alpha is a popular measure of the internal consistency of a scale and is considered to be good if it is greater than 0.7. The results in Table 8 show that the indicators of all the latent constructs (supply chain performance and risk strategy) are good since the alpha values of all constructs are greater than 0.7. This implies the existence of internal consistency of the various scales. The composite reliability (rho_c) is a measure of internal consistency that takes into account the number of indicators in the scale and the average variance extracted (AVE) while the composite reliability (rho_a) measures internal consistency by taking into account only the number of indicators used in constructing the scale.
They are good if they are greater than 0.7. The results in Table 8 show that there is evidence of the internal consistency or composite reliability of the scales.
Average variance explained (AVE) is a measure of validity and shows how much variance in the indicators is explained by the latent variables. A value greater than 0.5 is considered to be a good measure of validity. Overall, the indicators of all the constructs are extremely good since the AVE values of the constructs are all greater than 0.5.

Table 9. Collinearity ratios of risk strategy

Paths	VIF
Edu -> PERF	1.051
Longev -> PERF	1.115
Risk Strategy -> PERF	1.141

The variance inflation factors (VIF) on their part measure the degree of collinearity among the variables in the model. A VIF score of 1 indicates the absence of any linear association (no multicollinearity) while a value of about 10 indicates an extremely strong and disturbing linear association between the variables. The VIF ratios reported in Table 9 reveal that the variables in the outer model are not correlated among themselves since their VIFs are well below 10.
The findings corroborate the findings of Brown et al. (2021) found that effective risk mitigation strategies, such as diversification and contingency planning, significantly enhanced supply chain resilience and operational efficiency. Companies with strong risk management practices demonstrated better performance in terms of reduced disruptions and improved operational metrics. Karim and Arif (2018) suggested that firms with strong supplier partnerships can better coordinate their supply chains, leading to more efficient and effective operations. Trust and open communication between firms and suppliers were identified as critical factors in fostering successful strategic partnerships. These elements helped mitigate risks and enabled smoother coordination across the supply chain. Zhu *et al*. (2020) found to significantly improve supply chain performance by reducing disruptions and improving responsiveness. Risk mitigation strategies were also crucial, as they helped in enhancing the resilience of the supply chain and maintaining performance during adverse conditions.

5. Conclusion and Policy Implications

The main objective of this study was to analyze the effects of procurement strategies on enterprise supply chain performance in Bamenda municipalities. Specifically, it investigates the influence of supplier optimization strategy on enterprise supply chain performance of SMEs in Bamenda City and analyzes the effect of SME risk strategy on enterprise supply chain performance. The results showed that the training and development of suppliers by the enterprise is key to its supplier optimization strategy. Training and developing the SME's suppliers was found to be strongly associated with improved supply chain performance. The results showed that goal setting in such a way that the SME clearly spells out its goals to

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its suppliers, and having a strong negotiation team that adopts the negotiation style of not moving first are strong indicators of an excellent negotiation strategy. This permits the enterprise to have a well-performing supply chain.

This study therefore recommends that SMEs willing to boost their supply chain performance should train and develop a strong negotiation team and that they should always clearly spell out their goals and expectations and refuse to accept offers below their standards. They may also consider hiring well-qualified workers with good experience in negotiation and procurement strategies. The extra cost would be negligible compared to the potential rewards of having a well-trained and well-equipped negotiation team.

6. Limitations and Direction for Future Studies

This study was limited only to Bamenda. So future studies could be carried out on the relationship between the different procurement strategies and enterprise supply chain performance in other cities or at national and regional levels such as in the CEMAC zone or in sub-Saharan Africa. Also, a similar study might be conducted while taking other factors into consideration such as the area of residence of the enterprise (which could be rural, semi-urban, or urban), the leadership style of the enterprise in question, and other control factors that may bias the results if left unaccounted for

Authors' Contribution: Jude Bonglav Nsawir came up with the idea and made the tools for collecting the data. Urie Eleazar Jumbo wrote the introductory paragraphs and did the literature review. Elizabeth Ankiambom Chiatii and Jude Bonglav Nsawir worked on the methodology, data collection, and analysis. Urie Eleazar Jumbo did the first review of the draft manuscript, and Elizabeth Ankiambom Chiatii did the second review. Jude Bonglav Nsawir did the final review and submitted the manuscript for consideration.

Conflict of Interest: The authors declare no conflict of interest.

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APPENDIX 1
Research Questionnaire

Section A: Respondent information

1. How many workers does your enterprise employ? _____.
2. For how many years has your enterprise existed?
   Below 1 year [ ] 1-3years [ ] 3-5years [ ] 5-10years [ ] above 10years [ ]
3. What is the average educational level of most workers in your enterprise?
   Primary education [ ] Secondary education [ ] Tertiary education [ ]
4. What type of goods/services does your enterprise deal in? _____

Section B: E-procurement Strategy and Enterprise Supply Chain Performance

E-Procurement Strategy	SD	D	N	A	SA
Your enterprise communicates and does business through the internet (WhatsApp, Facebook, Instagram, and Twitter...)					
Reliable E-procurement software has been adopted among suppliers.					
E-tendering has eased paperwork between supply chain entities.					
E-ordering has saved review time among the enterprise supply chain entities.					
E-procurement has reduced lead time along the supply chain.					
E-procurement is interlinked with payment portals of other supply chain members.					
E-information has reduced defects and cost from suppliers of goods/material					
There is coherent procurement information courtesy of E-procurement.					
E-design helps to know the type of supplier relationships for the various suppliers.					

Section C: Negotiation strategy and Enterprise supply chain Performance

Negotiation strategy	SD	D	N	A	SA
Our goals and expectations well spell out and documented					
We have created a strong negotiation team with skilled staff from all department.					
We have orientated our negotiation team on the bargaining style of not starting first.					
We have created a supplier cooperation platform.					
We have created harmonious service delivery amongst stakeholders.					
We have created mutual understanding among stakeholders.					
We have eliminated surprises and disruptions during service delivery.					
We have enhanced the supplier's compliance with procurement procedures					
We have created incentives for ongoing procurement performance improvement.					
We have reduced misunderstandings among stakeholders.					
We adhere to procurement guiding principles					
We have developed contract management plans.					

Section D: Enterprise Supply Chain Performance

Item	SD	D	N	A	SA
Our inventory turnover has improved the performance of the enterprise and supply chain					
There has been an improvement between the payment being made to suppliers and being received from customers (**cash-to-cash cycle time**) as a result of procurement strategies.					
There has been a drastic decrease in time taken to produce pack and deliver when there is stock out **(supply chain cycle time)**					
Customers have been satisfied because of stock availability and without backorders **(Demand Satisfaction rate**) We incur low maintenance and repair costs.					
Orders delivered to customers have been of error-free or breakage or delivery documents (**Perfect Order Rate**)					
Orders delivered to customers have been delivering on time without delay as specified by the customer (**On-Time-Delivery**)					

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