The Impact of Supply Chain Risks and Supply Chain Risk Management Strategies on Enterprise Performance in Ghana

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Abstract

Enterprises are constantly experiencing higher levels of supply chain disruptions in their operations due to the expansion of industries' business networks. It becomes very necessary for enterprises to continually assess risks in their business operations. To mitigate the adverse consequences of such potential supply chain risks on the performance of enterprises, it becomes imperative for Ghanaian enterprises to implement adequate supply chain risk management strategies. The purpose of this paper is to outline potential risks in the supply chain network of Ghanaian enterprises and investigate the impact of these potential risks and supply chain risk management (SCRM) strategies on enterprise performance. Data for the study was collected from 210 enterprises in Ghana and analyzed by modeling the constructs of supply chain risks, supply chain risk management (SCRM) strategies and enterprise performance and also measuring the complex relationships among the constructs using a structural approach. The structural model result shows that, enterprises with distinct organizational structures dedicated to supply chain risk management with the purpose of mitigating supply chain risks tend to perform better than their competitors. The results also indicated a negative association between supply chain risks and the performance of Ghanaian enterprises. This research provides direction for managers to adopt and develop adequate enterprise supply chain risk register and supply chain risk management (SCRM) strategies to mitigate the consequences of supply chain risks in their planned business operations.

Keywords

Supply Chain Risk, Organizational Performance, Supply Chain Risk Management, Structural Equation Modeling, Enterprise, Ghana

1. Introduction

A supply chain is made up of a firm or group of firms whose business activities and processes are associated with the movement of raw materials, products, services, information and capital from their source to the final consumer (Butilca et al., 2011). Although supply chains differ significantly in size and nature, their ground laying principles are applicable in all business enterprises regardless of the size (Basu, 2011). The Council of Supply Chain Management Professionals (2009) asserts that Supply Chain Management (SCM) refers to the planning, management and coordination of all business-related activities among supply chain members to improve operating efficiency. Supply chain management (SCM) can then be seen as the active management and effective coordination of supply chain activities to leverage strategic positioning by increasing customer value and achieving a competitive advantage. Supply chain management exists to overcome the gap among different participants or stakeholders within a supply chain until the ultimate consumer (Waters, 2011). Chopra & Sodhi (2004) contended that, most enterprises implement strategic plans to protect their planned business operations against frequent low-impact risks in their supply chain; many however, ignore the consequences of high-impact and low-probability risks. Effective supply chain management requires proper coordination and collaboration of all supply chain members to leverage strategic positioning and improve operational efficiency.

It is clear in the 21st Century that, manufacturing firms cannot compete successfully in the extended world market without an effective and operational supply chain network. Globalization has become more intense in the past years and supply chains have become more diffused and extended in nature exposing major links within the supply chain network to risk (Kirilmaz & Erol, 2017). As more companies and industries expand their business process to meet the increasing demands of customers and competition in the market, managers are frequently pressured to improve the efficiency and effectiveness of their supply chains, making transportation of materials within and outside the organization cheaper and faster, reducing the inventory cost and use of just-in-time (JIT) deliveries or lean inventories. Hauser (2003) suggested that enterprises should place a high priority on developing adequate supply chain management strategies to improve financial performance and to achieve competitive advantage considering today's increasingly complex environment of business.

Supply Chain disruptions are becoming more prevalent in Ghanaian enterprises due to the complex and nested nature of supply chain networks. Supply Chain in Ghana cut across all sectors of the economy and as enterprises are beginning to realize the significance of adequate supply chain risk management (SCRM) process in their operations, about 83% of enterprises still experience some forms of disruption in their operations. The frequent disruptions in the supply chain of businesses emanate from the complex nature of supply chain networks (Wagner & Neshat, 2012). The unstable economy and lack of ideas in

mitigating supply chain disruptions are the strategic difficulties for most enterprise managers in Ghana (Sodhi et al., 2012). Most Ghanaian enterprises find it difficult to cope with external business partners due to supply chain uncertainties and the global complexity of supply chain networks (Simangunsong et al., 2012). Over the past years, Ghanaian enterprises have extended their business operations to countries with more efficient and effective supply chain networks like the US, China and the UK (Dey, 2016).

Wright & Datskovska (2012) revealed the impact that modification in the business scope and process have on operations and supply chains management. They argue that, while globalization might have enhanced operational efficiency, local concentrated risks become globally nested in nature consisting of several dimensions of risks in the supply chain network.

Unexpected outcomes and the economic difficulties related to the dynamic nature of business, volatile demand, market uncertainty and varying levels of trust among members of supply chain network indicate that enterprises face constant supply chain risks.

As many enterprises are considering and targeting performance enhancement possibilities in their supply chain network (Fabbe-Costes & Jahre, 2008; Sari, 2008), there is a need to identify risks and devise strategic measures to mitigate or eliminate such unexpected consequences in the supply chain. Giannakis & Papadopoulos (2016) suggested the need for enterprises to have advanced and sustainable approaches in mitigating supply chain risks. Jahre (2017) recommended a framework that enterprises can use to mitigate supply chain risks in their planned business operations by developing adequate and effective humanitarian supply chain strategies.

This paper seeks to identify risks in the supply chain network of enterprises in Ghana. More specifically, this paper attempts to 1) identify and validate key Supply chain risks in Ghanaian enterprises, 2) outline effective supply chain risk management (SCRM) strategies to mitigate the identified risks, and 3) investigate the impact of supply chain risks and supply chain risk management (SCRM) strategies on performance of Ghanaian enterprises.

This research paper is structured as follows. The dynamics of supply chain risks, supply chain risk management strategies and organizational performance are presented in Section 2 while the methodology and its application to the context under study are described in Section 3. The research results from the data analysis and the justification of the research implication are discussed in Section 4. Some conclusions and recommendations end the paper.

2. Literature Review on Supply Chain Risks

The likelihood of an undesired outcome to occur is referred to as "risk" (Rowe, 1977). The most common terms extensively used in literature to describe the nature of risk are "possibility" and "undesired". Rescher (1983) defined risk as an unpredictable event with possible undesired outcomes. The Supply Chain

Risk Leadership Council (2011), defined "supply chain risk" as the probability and consequences of events at any stage in the end-to-end supply chain network starting from sources of raw materials to end use of customers, and then defined "Supply-Chain Risk Management (SCRM)" as the effective coordination and management of all business activities to regulate an enterprise's end-to-end supply chain network placing higher priorities on supply chain risks. The March, 2011 Tohoku earthquake and subsequent tsunami in Japan indicates how a single disruption can interrupt important global supply chain drivers such as supply, manufacturing, distribution and communication (Lee & Pierson, 2011). The global economic implication of this disaster was estimated to cost US$139 billion (Arto et al., 2015). In critical cases, a single disruption at a particular location can severely distort the plan operations of enterprises and sometimes, extreme consequences of the disruption may cause the business to fold out of operations. A common scenario that caused huge losses to business is the case of Ericsson. This disaster led to an estimated loss of US$400 million to Ericsson (Norrman & Jansson, 2004). The most recent disruption in the global supply chain network is the outbreak of the corona virus (COVID-19) in China. China's manufacturing sector is expected to have a nearly 2% reduction in production due to the virus outbreak resulting in a significant impact on all sectors of production such as the automobile industry, electronics industry, pharmaceutical industry, etc. The European Union automobile industry is predicted to see a drastic reduction in automobile and parts export from china due to the outbreak estimating to cost about US$2.5 billion. Global pharmaceutical industries are also expected to experience a huge loss in the production of antibiotics and painkillers because China produces nearly 40% of the major ingredients of these drugs. According to the US Institute for Supply Management (ISM, 2020) about 95% of companies are predicted to experience various forms of supply chain disruptions due to the COVID-19 outbreak. Toyota's production was disrupted in 2011 after an earthquake, a tsunami and a nuclear crisis that occurred in Japan, resulting in an estimated loss of US$72 million daily in profits (Autonews 2011). Consequently, this disruption has led to a 77% fall in Toyota's net income for the first quarter of 2011 (Canis, 2011).

Risk in the supply chain comprises of all events that might disrupt the movement of goods and services in an enterprise (Waters, 2011). Sodhi et al. (2012) after a thorough supply chain literature review indicate that most researchers in the field consider supply chain risk management (SCRM) a subset of supply chain management (SCM), which involves developing adequate strategies to mitigate disruption and supply-demand stochastic with additional focus on risks and strategies dealing with uncertain disruptions and supply-demand volatility.

Risks sometimes provide positive results but in general, it is associated with undesired outcomes. Risk can be described as a potential variation in expected outcomes; this variation can either be a desired outcome or undesired outcome (Williams et al., 1998). This idea of risks is shown by many researchers in the supply chain risk management field who concur to the knowledge that supply

chain risks are generally associated with the probability of loss, damage and un-desired outcomes (Wagner & Bode, 2008).

For the purpose of this research, we concur with the many researchers in the field of supply chain risk management such as Wagner & Bode (2008) and establish that supply chain risks are associated with only undesired outcomes.

Generally, a possible collection of pairs of likelihood (L) and Outcomes (O) can be termed as Risk. Mathematically; Risks in an enterprise can be described as a function of likelihood (L) and Outcomes (O), that is;

$$\text{Risk} = \left\{ \left(L_1 O_1 \right), \left(L_2 O_2 \right), \left(L_3 O_3 \right), \cdots, \left(L_n O_n \right) \right\}$$

L_i = probability of occurrence of risk.

O_i = potential losses of risk.

Ayyub (2003) established that the arrangement sequence of likelihood and outcome pairs is known as a "risk profile". The international organization for standardization (ISO, 2002) explained two of the important constituents of risk as; losses experienced along with its related amount and the probability of occurrence. These and several other definitions of risks provided by researchers in the field of supply chain risk management are consistent with literature that implies two constituent of risk:

1) Potential losses (what will be the impact of the consequences of the losses and what losses will result if the risk occurs) (Harland et al., 2003; Manuj & Mentzer, 2008; Mitchell, 1995); and

2) Probability of the occurrence (the likelihood of the event occurring).

There are many ways of identifying and classifying risks within the business environment. Juttner et al. (2003) documented that risk can be classified based on sources of risks: 1) environmental risk sources, 2) network risk sources and 3) organizational risk resources. Chopra & Sodhi (2004) opined that risks can be classified on the basis of supply-related risks, demand-related risks and contextual risks. According to Tang & Tomlin (2008), supply chain risk can be categorized into supply risk, process risks and demand risks. Manuj & Mentzer (2008) categorized supply chain risks based on 1) supply, 2) operational, 3) demand, 4) security, 5) macro, 6) policy, 7) competitive, and 8) resource risks. Oke & Gopalakrishnan (2009) opined that supply chain risks can be classified by considering low-impact high-rate of occurrence and high-impact low-rate of occurrence risks in three significant areas: 1) supply, 2) demand, and 3) miscellaneous risks in the retail sector. According to Rao & Goldsby (2009), supply chain risks can also be categorized as: 1) framework risk, 2) problem-specific risk, and 3) decision making risk. Risks may also be identified by examining extremely important uncertainties in scenario planning (Garvin & Levesque, 2006).

What follows is a classification of supply chain risks, concentrating on the identification of risk categories in the entire supply chain network of enterprises in Ghana. We also sought empirical evidence on the impact of supply chain risks and supply chain risk management strategies on organizational performance in Ghanaian enterprises through a review of the literature.

Vikulov & Butrin (2014) suggested a classification of supply chain risks by considering risks in specific points in the supply chain network. These risks are identified at major links within the entire supply chain network of enterprises and then categorized. These researchers categorized supply chain risk based on 1) suppliers, 2) transport, 3) warehousing and 4) production.

For the purpose of this study, we adapt the supply chain risks classification proposed by Vikulov & Butrin (2014) as shown in Table 1.

2.1. Supply Chain Risk Management Strategies

Supply Chain Risk Management (SCRM) attempts to mitigate the disruptions in supply chains via a well-structured and organized approach by identifying potential supply chain risks along several links or nodes within the supply chain network of an enterprise. The strategies are implemented to mitigate the adverse consequences of supply chain vulnerability. Wagner & Bode (2008) opined that coping with supply chain risks requires adequate and effective supply chain risk management strategies. Table 2 shows the indicators and measurement items of supply chain risk management strategies.

2.2. Indicators of Organizational Performance

Organizational performance can be measured by considering how enterprises leverage their strategic positioning in achieving both its market-oriented and financial goals. Organizational performance constitutes the actual output of an organization as compared to its expected output. According to Richard et al. (2009) performance of organizations can be measured based on three unique aspects of firm outcomes 1) based on financial performance (profits, return on assets, return on investment, etc.), 2) based on product market performance

Table 1. Supply chain risks.

Risk Category	Risk Composition	Indicator Variable
	Delivery Schedule	X1
Risks Associated with Suppliers	Poor quality	X2
	Prices	X3
	Non-delivery/Non-delivery	X4
Risks Associated with Transport	Damage of goods in transit	X5
	Loss of goods in transit	X6
Risks Associated with Warehousing	Damage of goods during storage	X7
	Changes in taxes and other cost of warehousing	X8
	Quality problems	X9
Risks Associated with Production	Overproduction	X10
	Disruptions due to equipment failure	X11
	Disruptions due to procurement failure	X12

Source: Adaptation from Vikulov & Butrin (2014: p. 45).

Table 2. Indicators of supply chain risk management (SCRM) strategies.

Indicators	Measurement Items	Variable Indicator
Supplier Collaboration	Collaboration with suppliers to develop transparent supply chains and an open sharing of information	SCRM1
Continuity or Contingency Plan	Business continuity or contingency plans addressing several supply chain risks	SCRM2
Product Innovation or Differentiation	Product differentiation for reducing demand side risks	SCRM3
Dedicated SCRM Structure	A distinct organization structure dedicated to SCRM	SCRM4
Insurance	Insurance against supply chain risks or disruptions	SCRM5

Source: Adaptation from Khan & Burnes (2017).

(sales, market share, etc.) and 3) based on shareholder return (total shareholder return, economic value added, etc.). Many researchers (such as Cao & Zhang, 2011; Vickery, Calantone, & Droge, 1999; Stock, Greis, & Kasarda, 2000) indicated that organizational performance can be measured using both financial and market indicators including market share, return on investment (ROI), the growth of market share, growth of return on investments (ROI), the profit margin on sales, and overall competitive advantage. Based on the above literature, four measurement indicators were adapted to measure organizational performance in Ghanaian enterprises. Table 3 shows the indicators and measurement items of Organizational performance.

3. Research Methodology

The research commenced with the identification of potential risks in an enterprise's supply chain, indicators of supply chain risk management strategies and organizational performance based on literature review. The process resulted in establishment of 12 major risks that affect the supply chain of enterprises in Ghana. These risks were further grouped into 4 risk categories. The next step was developing a structural equation model to analyze the impact of these potential supply chain risks and supply chain risk management strategies on the performance of Ghanaian enterprises.

3.1. Conceptual Framework

Existing supply chain risk management literature indicates that supply chain disruptions can lead to loss of both short term sales and long term market share, implying that enterprises that are exposed to supply chain disruptions can anticipate having lower performance compared to firms who do not have a greater level of exposure to disruptions. The research work of Wagner & Bode (2008); Wagner & Neshat (2012) documented the negative impact of supply chain risks on the performance of enterprises. Following these researchers, we formulate our first hypothesis as:

Table 3. Indicators of organizational performance.

Dimension	Measurement Items	Variable Indicator
Profit	Average profit over the last three years	OP1
Cost	Average cost over the last three years	OP2
Return on Investment (ROI)	Average ROI over the last three years	OP3
Sales	Increase in Sales over the last three years	OP4

Source: Adaptation from Cao & Zhang (2011).

Hypothesis 1: Supply chain risks are negatively associated with the performance of enterprises.

Supply Chain Risk Management (SCRM) attempts to mitigate supply chain disruptions via a well-structured and organized approach by identifying and analyzing the risk of failure nodes within the entire supply chain network of an enterprise. Therefore, enterprises can start mitigating the consequences of risks in the supply chain by prioritizing and developing adequate supply chain risk management strategies. According to Wagner & Bode (2008), effective communication of enterprise priorities and measures put in place to mitigate risks in the entire Supply chain network of enterprises is essential in achieving organizational performances considering the present unstable business market. Li Suhong et al. (2006) reported that enterprises that place a higher priority on the practices of higher levels of supply chain management (SCRM & ERM) can expect to have an improvement in organizational performance and enhanced competitive advantage. Kamalahmadi & Parast (2017) also documented that enterprise that invests in developing capabilities to mitigate supply chain risks tend to enjoy positive benefits including better performance. Thus we formulate our second hypothesis as:

Hypothesis 2: Supply chain risk management (SCRM) strategies impact positively on enterprise performance.

Therefore to analyze the relationship between supply chain risks, SCRM strategies and enterprise performance, we propose the conceptual framework presented in Figure 1.

3.2. Why Structural Equation Modeling

Structural Equation Modeling (SEM) is a series of statistical estimations that allows modeling of complex associations between one or more exogenous variables and one or more endogenous variables in a model. Our choice for structural equation modeling (SEM) was by the premise that, SEM is the most dominant research methodology widely used in supply chain research (Kumar & Nambirajan, 2013). The SEM approach has spread widely as a result of the development of unique statistical packages such as LISREL and AMOS. Joreskog & Sorbom (1999) and Arbuckle & Worthke (1999) found that the accessibility of these statistical packages has encouraged a widespread application in various contexts. Statistical estimation involving the SEM approach permits the modeling
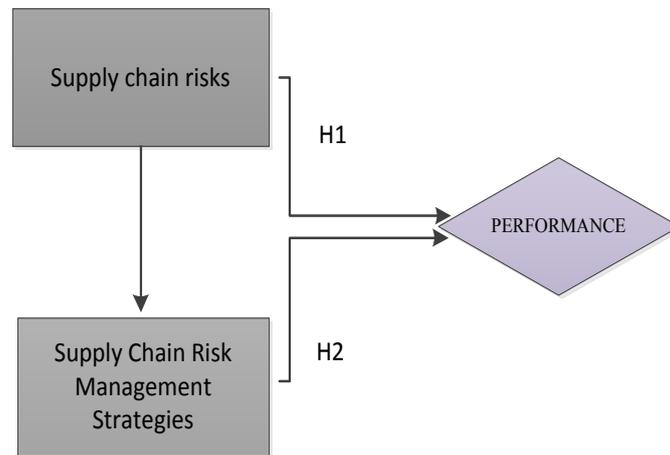
Figure 1. Conceptual model.

of an event by considering both the unobserved "latent" constructs and the observed "manifest" constructs that describe the process.

3.3. Data Collection

A survey-based questionnaire was used for the data collection. The questionnaire was close-ended in 3 sections. Section 1 requires respondents (enterprises) to assess the impact of risks on their supply chain. Section 2 requires respondents to assess the various SCRM strategies in their enterprise and Section 3 requires respondents to assess the performance of their enterprise over a period of time. 210 valid questionnaires were usable after distributing 250 questionnaires. The questionnaire used in this study is adapted from (Cao & Zhang, 2011; Vikulov & Butrin, 2014; Khan & Burnes, 2007). Data was analyzed using IBM SPSS 25.0 and IBM AMOSS 24.0 software. The estimated effective recovery rate of questionnaires was 84%.

3.4. Sample Size

A theoretical rule of thumb about the connection between sample size and complex models which is supported by empirical researches was documented by Jackson (2003) as the **N:q** rule. This rule is suitable when the statistical estimation method employed is the maximum likelihood (ML), which is by far the most prevalent method used in SEM.

Jackson (2003) suggested that, researchers should consider the minimum sample size as a ratio of cases (N) to the required estimated number parameters in the model (q). According to Kline (2011) a minimum sample size of 200 cases is required in studies where SEM is used; that said, a sample size of 200 cases may not be enough to achieve model fit when analyzing a complex model. Muthén & Satorra (1995) suggested that a minimum sample size of 150 cases is required for a non-complex confirmatory factor analysis (CFA) model with normally distributed continuous factors without missing data cases to achieve a power of 0.81 to statistically reject the hypothesis that the factor correlation is

zero. For the purpose of our study, we use a sample size of 210 cases which is consistent with Jackson's (2003) opinion.

3.5. Evaluation of Structural Model

Evaluation and specification of the structural model was based on empirical results from literature review, informed judgment and combination of theories used in previous supply chain management researches. Variables that were used for the evaluation of the structural model are illustrated in Table 4.

Table 4. Variables in the structural model.

Latent variable	Manifest variable	How to measure
Supply Chain Risks (SCR)	X1-Delivery schedule	
	X2-Prices	
	X3-Non-delivery/Short delivery	To assess the impact of these
	X4-Poor quality	Potential supply chain risks on
	X5-Damage of goods in transit	Performance of Ghanaian
	X6-Loss of goods in transit	enterprises-responses were made
	X7-Damage of goods during storage	on a 6-point scale
	X8-Changes in taxes and other costs of warehousing	(1-Very low impact, to 6-Very high impact)
	X9-Quality problems	
	X10-Over production	
	X11-Disruptions due to equipment failures	
	X12-Disruptions due to procurement failures	
Supply Chain Risk Management strategies (SCRM)	SCRM1-Our firm collaborates with suppliers to develop transparent supply chains and open sharing of information	
	SCRM2-Our firm has a business continuity or contingency plan addressing several supply chain risks	To assess how Ghanaian enterprises implement supply chain
	SCRM3-Our firm use product differentiation for reducing demand side risks	management strategies-responses were made on a 6-point scale
	SCRM4-Our firm has a distinct organization structure dedicated to supply chain risk management	(1-Extremely disagree, to 6-Extremely agree)
	SCRM5-Our firm has insurance against supply chain risks	
Organizational Performance (OP)	OP1-Average profits over the last three years	To assess the performance of
	OP2-Average costs over the last three years	Ghanaian enterprises-responses
	OP3-Average ROI over the last three years	were made on a 6-point scale
	OP4-Increase in sale over the last three years	(1-Extremely worse, to 6-Extremely better)

3.6. Results and Analysis

The structural model analysis consists of statistical estimation using maximum likelihood (ML) approach since the data for the analysis was multivariate normally distributed. The evaluation of model fit is to confirm the theoretical model by means of fitting parameters. To evaluate the model fit indices, AMOS 24.0 software was used to calculate the model parameters and the required indices obtained. Review of previous researches (by Hu & Bentler, 1995; Burnham & Anderson, 2002; Hoyle & Panter, 1995; Steiger, 2007; Wen et al., 2004) established that the general criteria for judging the fitting indices are as follows: 1) When $\chi^2/df < 3$, it indicates a good model. 2) When CFI > 0.95, it means the model is a good fit, and when CFI > 0.90, it indicates an acceptable model fit. 3) TLI > 0.90 indicates an acceptable fit. 4) SRMR and RMSEA < 0.05, it indicates a satisfactory model fit and when SRMR and RMSEA < 0.08, it indicates an acceptable model-data fit. 5) Both GFI and AGFI are mandated to be greater than 0.85.

After the analysis, it was found that a satisfactory model fit was achieved and the goodness-of-fit indices of the structural model satisfied all the required measurement criteria as shown in Table 5.

To examine the construct validity of the structural model, Bagozzi and Yi's (1998) composite reliability index and Fornell and Larcker's (1981) average variance extracted variance were used. The three reliability measure criteria to consider for convergent validity are: 1) standardize factor loadings are required to be statistical significance at 0.3 (Angsuchoti et al., 2008); 2) A minimum value of 0.6 is required to achieve composite reliability (CR) of the constructs, and 3) A minimum value of 0.5 is required for average variance extracted (AVE) (Diamantopoulos & Siguaw, 2000). Convergent validity of constructs used to develop the structural model was achieved as shown in Table 6.

Critical Ratio (CR) greater than 1.96 (CR > 1.96) indicates statistical significance for the estimated path parameter at $\alpha = 0.05$ level or better.

4. Discussion and Research Implications

The result from the data analysis indicates the acceptance of all our proposed hypotheses. It was established that the variable supply chain risk (SCR) has a significant negative relationship with organizational performance. As supply chain risks are becoming more prevalent in Ghana, enterprises planned operations are disrupted which affects the overall performance of enterprises. This result is consistent with previous research work by Wagner & Bode (2008), Wagner & Neshat (2012) who reported a negative association between supply chain risks and organizational performance. Consequently hypothesis **H1** is accepted.

Table 5. Fitting indices of structural model.

Fit Index	CMIN	DF	CMIN/DF	CFI	GFI	AGFI	RMSEA	TLI	SRMR
Fitting Indices	1313.673	191	1.642	0.933	0.921	0.851	0.055	0.926	0.0578

Table 6. Results of structural model.

Latent Variable	Item	Standardized Factor Loading	Standard Error (SE)	Critical Ratio	Average Variance Extracted (AVE)	Composite Reliability (CR)	Cronbach's Alpha Coefficient
OP	OP1	0.849	0.059	16.163			
	OP2	0.871	0.054	16.931	0.733	0.912	0.916
	OP3	0.835	0.060	15.691			
	OP4	0.870	-	-			
SCRM	SCRM1	0.766	-	-			
	SCRM2	0.714	0.084	11.418			
	SCRM3	0.642	0.084	9.938	0.512	0.850	0.848
	SCRM4	0.816	0.084	13.775			
	SCRM5	0.700	-	-			
SCR	X1	0.890	-	-			
	X2	0.544	0.137	7.592			
	X3	0.700	0.146	6.639			
	X4	0.891	-	-			
	X5	0.583	0.141	8.201			
	X6	0.585	0.146	8.224	0.533	0.924	0.832
	X7	0.881	-	-			
	X8	0.640	0.155	9.113			
	X9	0.798	-	-			
	X10	0.608	0.139	8.591			
	X11	0.539	0.139	7.514			
	X12	0.782	-	-			

For **H2**, the results supported that supply chain risk management (SCRM) strategies impact positively on organizational performance. This is probably because organizations that place a higher priority on developing and implementing adequate supply chain risk management strategies are able to mitigate the adverse consequences of risks in their supply chain network. This result is consistent with the research work of Li Suhong et al. (2006) who found that, placing a higher priority on developing and implementing supply chain management (SCM) practices can lead to enhanced operational efficiency and improve competitive advantage. Table 7 shows the results for the path coefficient and hypothesis testing.

5. Conclusion

Existing research on supply chain indicates the relevance of developing and implementing adequate supply chain risk management strategies for enhancing

Table 7. Path coefficient and hypothesis testing.

Hypothesis	Relationship	Standard factor loadings	*P*-Value	Supported
H1	SCR → OP	−0.122	0.021	Yes
H2	SCRM → OP	0.839	***	Yes

***$P < 0.001$.

organizational performance. This paper seeks to add to the already extended literature on supply chain risk management by providing new data and empirical knowledge about the impact of supply chain risks and supply chain risk management strategies on organizational performance in Ghanaian enterprises. Results suggest that enterprises in Ghana must develop distinct organizational structures dedicated to supply chain risk management to mitigate the consequences of supply chain disruption and enhance performance.

Finally, managers of enterprises should use the guidelines provided in this research in identifying and designing company risk register as well as supply chain risk management strategies to cope with recurrent supply chain risks.

Regardless of its limitations, this research paper offers valuable managerial knowledge on the measures required for achieving a risk-free supply chain network and paves the way for future research in the field such as extending the number of variables used in the analysis.

6. Recommendation for Company

1) Enterprises can use the constructs or variables used in the structural model formulated in this paper as a measure for developing a proper enterprise risk register. These variables are empirically proved to be closely related to supply chain risk management, which indicates that they are reliable measures for developing adequate organizational risk register. Organizations that developed an adequate risk register would be able to identify the immediate supply chain threats around their business operations and promptly devise strategies to mitigate such risks before they cause catastrophic losses over time. Organizations that developed their risk register would be able to identify the immediate supply chain risks around their business operations and as such will be able to mitigate such risk before they cause catastrophic losses.

2) Enterprises should occasionally monitor and review their risk register and supply chain risk strategies to timely identify and mitigate new supply chain risks in the course of business operation. As organizations expand their business operations, their supply chains are more exposed to new supply chain risks and as such new strategies need to be implemented quickly to mitigate the effect on organization planned operations.

Conflicts of Interest

The authors declare no conflicts of interest regarding the publication of this paper.

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