UNIVERSITY OF EDUCATION, WINNEBA

THE EFFECTS OF SUPPLY CHAIN DISRUPTION ON OPERATIONAL PERFORMANCE OF THE GHANA ARMED FORCES: THE MODERATING ROLE OF INFORMATION TECHNOLOGY

MICHAEL SOSU-KUMASSAH

2024

UNIVERSITY OF EDUCATION, WINNEBA

THE EFFECTS OF SUPPLY CHAIN DISRUPTION ON OPERATIONAL PERFORMANCE OF THE GHANA ARMED FORCES: THE MODERATING ROLE OF INFORMATION TECHNOLOGY

MICHAEL SOSU-KUMASSAH

(INDEX No 7231740017)

A Dissertation in the school of Business,
submitted to the School of Graduate Studies,
in partial fulfilment of
the requirement for the award of
Master of Business Administration
(Procurement and Supply Chain Management)
in the University of education, Winneba

OCTOBER, 2024

DECLARATION

By this writing of mine, I declare that, this work is the result of my singular effort. I have no knowledge of duplication of this piece of work anywhere. All the scholarly literatures that are cited in this work are duly referenced making the piece free from plagiarism.

Name: Michael Sosu-Kumassah

Index Number: 7231740017

Signature…….

Date…….

Supervisor's Certification

I hereby certify that the preparation and presentation of this project work were supervised under the guidance of the supervision of project work laid down by the University of Education, Winneba.

Name of Supervisor: Dr. Mawuko Dza

Signature…….

Date…….

ACKNOWLEDGEMENTS

Completing this dissertation has not only been an academic challenge but also a profound journey of personal and philosophical growth. I am immensely grateful to my supervisor, Dr Mawuko Dza, for encouraging me to explore complex ideas and to challenge conventional wisdom. His deep commitment to academic excellence guided me to navigate the effects of supply chain disruption coupled with the moderating role of information technology underpinnings of my research and deepened my analytical skills. My fellow students in the Department of Procurement and Supply Chain Management and colleagues in the logistics unit of the Ghana Armed Forces who also provided a supportive and intellectually stimulating community. Our discussions extended beyond the classroom, offering new insights and perspectives that were crucial to this dissertation.

I must also express my deepest appreciation to my family, who stepped in, not only with emotional reassurance but also accommodating when I needed to be out of home for lectures. Their unconditional love and sacrifices have been the foundation of my resilience and success. My gratitude and appreciation also go to the Ghana Armed Forces, School of Education, Teshie, for giving me the opportunity as part of the first batch of students to undertake the course in Procurement and Supply Chain Management. Also, special thanks to Mrs Linda Quagraine-Awoonor of the Department of Management Sciences, School of Business, of this prestigious University for her support, encouragement and guidance throughout the period of the course.

This dissertation also reflects not only my work, but also the collective support of everyone who has touched my life academically and personally. The journey has taught me the value of questioning and the importance of diverse perspectives in enriching my understanding of the effects of supply chain disruption on the operational performance

of the Ghana Armed Forces, the moderating role of information technology.

DEDICATION

This dissertation work is dedicated to my wife, Mirabel, who has been a constant source of support and encouragement during the course of this study. This work is also dedicated to my children Etornam, Seyram, Aku Sika and Nathaniel, who had to accommodate my absence from home. I also dedicate this work to all my colleagues in the Ghana Armed Forces who acknowledge supply chain management as an essential pillar in the conduct of successful military operations.

TABLE OF CONTENT

LIST OF TABLES

LIST FIGURES

ABBREVIATIONS

SCD	Supply Chain Disruption
IT	Information Technology
OP	Operational Performance
SEM	Structural Equation Model

ABSTRACT

In the fast-paced, constantly-changing modern world, gaining and maintaining logistics excellence demands more effort. The main objective of the study is to examine the moderating role of information technology in the relationship between supply chain disruption and operational performance. The quantitative data collected was analyzed using Structural Equation Modelling using SmartPLS. The findings of the study indicated that supply chain disruption negatively influences operational performance. Also, the findings of the study indicated information technology positively influences operational performance. In addition, the findings indicate that information technology moderates the relationship between supply chain disruption and operational performance. The study recommends that firms formulate policies that stress on a strengthening information technology since it has been found to have no impact on operational performance.

CHAPTER ONE

INTRODUCTION

1.0 Background of the proposed study

Supply chains are crucial components of organizational operations (Akole, 2021), serving as the backbone of efficient logistics and ensuring the timely flow of goods and services. This importance is magnified in military organizations, where operational success often hinges on the seamless functioning of supply chains (Coleman & Williams,2017). The Ghana Armed Forces (GAF), like other military entities, rely heavily on well-managed and resilient supply chains to support their mission-critical activities.

Disruptions to supply chains, whether brought on by pandemics, natural disasters, unstable political environments, or unforeseen changes in demand, have grown to be a major problem for businesses globally. Serious repercussions from these interruptions may include delays, higher expenses, and decreased operational effectiveness, all of which have an effect on the overall success of businesses. The complexity and interconnectedness of global supply chains make them more susceptible to disruptions, which highlights the need for efficient methods to lessen their consequences (Ivanov & Dolgui, 2021).

Lukasz et al. (2023) asserted despite their significance, supply chains are susceptible to disruptions, which can arise from various factors such as natural disasters, geopolitical tensions, or technological failures. These disruptions can have detrimental effects on operational performance, leading to delays, inefficiencies, and compromised mission objectives. Given the sensitive nature of military operations, any disruption in the supply chain can significantly impact the readiness and effectiveness of the GAF (Mohammed & Milisavljevic-Syed, 2023).

Information technology (IT) integration is a crucial topic that has come to light as a potential remedy to lessen the detrimental consequences of supply chain disruptions. IT has been demonstrated to strengthen supply chain networks' responsiveness, visibility, and communication, enabling businesses to react faster to unforeseen developments (Wamba et al., 2020). IT is becoming more and more recognized in both academic and business circles for its moderating role in boosting resilience during shocks.

The literature on supply chain resilience and IT integration is expanding, but there is still a lack of knowledge regarding the precise methods that IT uses to mitigate the effects of disruptions on operational performance. Although a number of studies have demonstrated how real-time data analytics, cloud computing, and enterprise resource planning (ERP) can improve supply chain responsiveness (Dubey et al., 2021), few have looked at the direct connection between IT integration and operational performance in the face of disruptions.

By investigating the function of IT as a moderator between supply chain interruptions and operational performance, the current study aims to close this gap. Specifically, this research intends to explore how the effective use of IT might buffer organizations from the unfavorable consequences of disruptions and boost their operational resilience. By presenting actual data on the significance of IT in disruption management and practical advice for practitioners looking to improve their supply chain capabilities, this study adds to the body of knowledge on information systems and supply chain management.

1.1 Problem Statement

Events like natural disasters, geopolitical tensions, or unanticipated demand spikes can cause supply chain disruptions, which have grown to represent a serious danger to an

organization's ability to operate globally. These interruptions frequently lead to delays, higher operating expenses, and worse customer satisfaction, which lowers a company's ability to compete (Ivanov & Dolgui, 2021). Global supply chains are more vulnerable to disruptions as they become more intricate and interconnected, thus it is important to have efficient systems in place to lessen the negative effects.

While studies by Xiong et al. (2020) and Mohammed & Milisavljevic-Syed (2023) have explored disruptions in military supply chains, none have specifically addressed the context of the Ghana Armed Forces. Additionally, while Cabrera et al. (2023) emphasized the importance of leveraging IT solutions to enhance supply chain resilience, there is limited research on how IT can specifically moderate the effects of disruptions for military organizations like the Ghana Armed Forces.

Even though a lot of businesses have created plans to strengthen the resilience of their supply chains, not enough is known about how information technology (IT) may help reduce the detrimental consequences of interruptions on business operations. Although IT has been shown to have the ability to increase responsiveness, improve communication, and increase supply chain visibility (Wamba et al., 2020), little is known about how IT specifically modifies the relationship between supply chain disruptions and operational performance outcomes.

There is little empirical data on whether and how IT can mitigate the effects of disruptions on important operational performance metrics like efficiency, agility, and cost management, despite the growing integration of digital technologies like big data analytics, cloud computing, and enterprise resource planning (ERP) systems into supply chain management (Dubey et al., 2021). Without a better grasp of IT's moderating role, organizations could find it difficult to take full use of technology's ability to guard

against disruptions.

By examining the moderating influence of IT in the relationship between supply chain interruptions and operational performance, this study aims to close this gap. The goal of the study is to investigate how IT might help businesses handle disruptions more effectively so that operations continue even in the face of outside shocks. Through the analysis of this relationship, the research will provide practitioners and academics alike new perspectives on how to use IT to enhance supply chain resilience.

1.3 Purpose of the Study

The purpose of the study is to better understand when information technology moderates the relationship between supply chain disruption and operational performance

1.4 Research Objectives

1. To analyse the relationship between supply chain disruption and operational performance.
2. To examine the relationship between information technology and operational performance.
3. To investigate the moderating role of information technology in the relationship between supply chain disruption and operational performance.

1.5 Research Questions

1. How does supply chain disruption influence the operational performance?
2. What is the relationship between information technology and operational performance?
3. To what extent does information technology moderate the relationship

between supply chain disruption and operational performance?

1.6 Scope of the study

The study explores the impact of supply chain disruptions on the Ghana Armed Forces (GAF)'s operational performance, focusing on the role of information technology (IT) in mitigating these effects. The research used a qualitative approach, interviewing and focus groups with military personnel to understand their experiences and perceptions of IT solutions. The study also explored how IT contributes to resilience and recovery within the supply chain, identifying strategies for enhancing IT integration into GAF's logistics practices. The findings offer valuable insights for military decision-makers and underscore the importance of tailored frameworks for optimizing supply chain resilience.

1.6.1 Research Methodology

This chapter presents the methodology that was used for the conducting the study. It examines the research philosophy, research design, study area, population, sample size and sampling technique, instrumentation, data collection procedure, data analysis procedure, ethical considerations and the timelines to complete the study. Convenience sampling technique will be used in sampling firms for the study. The target group were firms from Ghana. The data collection instrument was employed in this study is questionnaire which will have both closed ended and open-ended questions. Data gathering will take two months. Quantitative data approach was adopted. The quantitative data collected will be analyzed using statistical package for social sciences (SPSS latest version) and SmartPLS. The main reason for analyzing data was to treat the evidence factually and fairly in order to generate good analytical conclusions and to rule out alternative interpretations. This study will employ the quantitative approach

to research design. The first part employs a quantitative approach to conduct the investigation on how information sharing and quality service enhances supply chain performance among firms in the Ashanti Region of Ghana.

1.6.2 Delimitation/Scope of the Study

The scope of this study is focused on examining the moderating role of information technology in the relationship between supply chain disruption and the operational performance of Small and Medium-Sized Enterprises (SMEs) in sub-Saharan Africa. While the topic encompasses various aspects of supply chain disruption, information technology and operational performance, the study has specific delimitations.

The research will consider specific operational performance metrics such as cost efficiency, quality, delivery reliability, and responsiveness. Other operational performance aspects that fall outside the selected metrics may not be addressed in this study.

1.7 Significance of the Study

This research aims to contribute to the existing body of knowledge by providing insights into the moderating effect of supply chain social capital on the relationship between supply chain management and operational performance in SMEs. The findings will help SMEs and practitioners understand the significance of fostering relationships and collaboration within supply chains, particularly in enhancing operational performance. Additionally, the study may guide policymakers and business leaders in formulating strategies to leverage supply chain social capital for improved SME performance and overall economic development.

This study adds to the body of knowledge on supply chain management (SCM) by offering actual data regarding how SCM techniques affect small and medium-sized

businesses' (SMEs') operational performance. Since large organizations have been the focus of most previous research, this study adds to our understanding of SCM in various organizational contexts by highlighting the distinct dynamics and difficulties experienced by SMEs.

The study broadens the SCM domain's use of social capital theory. The study emphasizes the value of relational assets including trust, networks, and cooperation among supply chain partners by analyzing the moderating influence of social capital on the link between SCM practices and operational performance. By incorporating social capital theory into SCM, a more thorough framework for examining how social interactions affect operational outcomes is made available.

Finally, the study provides a theoretical framework for the creation of SCM tactics that take social capital into account as a crucial element. It implies that the advantages of supply chain management (SCM) approaches can be greatly amplified by building strong networks and relationships inside the chain, which will improve operational performance. This theoretical understanding lays the groundwork for future research into strategic interventions that use social capital to attain operational excellence.

1.8 Organization of the Study

The study is organized into five chapters. Chapter one provides an introduction to the study which comprises of the background to the study, problem statement, research objectives, research questions, justification of the study, research methodology, scope of the study, limitations of the study and organization of the study. Chapter two reviews the literature of related work in the research area. The review includes definition of

concepts and theory of the main components of the study. Empirical studies related to the research and the theoretical framework is reviewed. The conceptual framework of the study is presented including an explanation of the variables under study and hypothesis developed to test the relationship between the variables. Chapter three comprises of the research methodology and organizational profile. The chapter highlights the instruments used for data collection, the study population, sample size, sampling and sampling technique, research design, data collection procedure, ethical consideration and data analysis. Chapter four present results from the data collected, analysis and discussion of the data. Chapter five presents a summary of the research findings, conclusion and recommendations from the research findings to serve as a guide for future research.

CHAPTER TWO

LITERATURE REVIEW

2.0 Introduction

This chapter presents the review of related literature about the subject matter. The chapter includes a literature on supply chain management, supply chain disruption, information technology and operational performance. The purpose of these reviews was to assist the research understand the concepts of the topic under study.

2.1 Conceptual review

This section reviews the various concepts that have been employed in this study. The concepts include supply chain management, supply chain disruption, information technology and operational performance

2.1.1 Supply chain disruptions

Unplanned and unanticipated events that disrupt the normal flow of goods and materials within a supply chain" are referred to as supply chain disruptions, and they usually have negative effects including delays, higher costs, and lower service levels (Craighead et al., 2007).

"Infrequent and unexpected events that interrupt the flow of goods, information, or services, thereby impacting supply chain processes and performance" are what are referred to as supply chain disruptions (Hendricks & Singhal, 2005). Natural disasters and operational inefficiencies are just two examples of the internal and external variables that might cause these disruptions.

According to Blackhurst et al. (2011), "significant interruptions in the flow of products or services caused by unplanned or unexpected events, which result in negative impacts

on a firm's ability to meet customer demands" are referred to as supply chain disruptions. These incidents can be induced by several reasons, including supply shortages, transit delays, or infrastructural outages.

"The breakdown of a supply chain node or network, causing a deviation from the expected or planned supply chain flows, with consequences for overall performance, cost, and reliability" is the definition of a supply chain disruption (Ivanov & Dolgui, 2020).

"Any event that interrupts the normal operations of the supply chain, leading to negative consequences on supply chain performance, profitability, and customer satisfaction" is another way to define supply chain disruptions (Tang, 2006). These occurrences are frequently divided into internal risks, such as machine breakdowns, and external risks, such as natural disasters.

2.1.2 Information Technology

The use of computers, networking, and other physical devices, infrastructure, and processes to create, process, store, secure, and exchange all forms of electronic data" is what information technology (IT) is known as (Laudon & Laudon, 2020). Technology plays a key role in modern enterprises by facilitating data management, process automation, and communication.

"The hardware, software, and telecommunications systems that support an organization's information processing needs and decision-making processes" is the definition of information technology, or IT (Turban et al., 2017). IT provides tools for data processing and communication, which helps businesses increase productivity and competitiveness.

"All forms of technology used to create, store, exchange, and use information in its various forms including business data, conversations, still images, motion pictures, and multimedia presentations" are included in the category of information technology (IT) (Bourgeois, 2014). This definition emphasizes how diverse IT is, ranging from straightforward data storage to intricate digital communication networks.

According to O'Brien & Marakas (2011), information technology (IT) is "the technological resources that enable individuals and organizations to gather, store, process, and share information digitally". Computers, servers, networking hardware, and data systems that facilitate various corporate operations are all included in IT.

Information technology (IT) can be characterized as "a technological infrastructure that gives organizations a competitive edge through enhanced communication, productivity, and decision-making" (Ward & Peppard, 2016). This term underlines IT's role in producing value for organizations through increased information flow.

2.1.3 Operational performance (OP)

OP refers to the ability of a company in reducing management costs, order-time, lead-time, improving the effectiveness of using raw material and distribution capacity (Heizer et al., 2008). OP has an important meaning to firms, it helps to improve effectiveness of production activities and to create high-quality products (Kaynak, 2003), leading to increased revenue and profit for companies. Voss et al., (2012) explains that operational performance refers to aspects of an organizations process which can be quantified. It includes variables such production reliability and defect rates, cycle time, on time delivery, cost of quality and scrap reduction, productivity, and inventory management. Srinivasan et al. (2011) explained the concept of supply chain performance as the extent of performance of the processes included within the firm's

supply chain department. Some of the measures specifically used to determine the supply chain performance of a firm include supplier performance, customer satisfaction, stock costs, and number of on-time deliveries, product availability performance and lead time.

Performance measurement is defined as the process of quantifying the efficiency and effectiveness of a given process or function. (Gunasekaran & Kobu, 2007). Effectiveness is the level that customer's requirements are met and efficiency monitors usage of a firm's resources when providing a pre-specified level of customer satisfaction (Sheperd & Gunter, 2006). Hence, performance measurement is an important factor that improves supply chains' effectiveness and efficiency (Beamon, 1999). It is the responsibility of the decision-makers to develop metrics for evaluating performance.

Birech (2011) highlighted various performance metrics within operations area which include productivity measures, quality measures, invent y measures, lead-time measures, preventive maintenance measures, performance to schedule, and utilization; Specific measures which include cost of quality, variances, period expenses, safety measured on some common scale such as number of hours without an accident, profit contribution, measured in dollars or some common currency.

2.2 Empirical Review

Generally, supply chains and logistics are considered the backbone of any military operation (Coleman & Williams, 2017; Elizabeth., 2012). It is in light of this that there have been many studies relating the connection between supply chain disruption and operational performance of a military organization. One of such studies was conducted by Xiong et al., (2020). The authors were purposed to evaluate Military Supply Chain

Networks (MSCNs) disruptions, which is crucial for defense logistics decision-making on performances of the military.

In evaluating the performance of MSCNs against disruptions, Xion et al (2020) used simulation-based methodology within quantitative methodology to evaluate the operational effectiveness of Military Supply Chain Networks (MSCNs) and their adaptability to disturbances. Consequently, the authors investigated the dynamic interconnections among nodes in Military Supply Chain Networks (MSCNs), their influence on performance, and the correlation between disruptions and resilience. Additionally, the study investigated the correlation between disruption recovery indicators and the overall resilience of the network. Finally, the topological configuration of MSCNs, finding crucial entities that are vulnerable to interruptions and their influence on the overall functioning of the network was also explored by Xion et al (2020). Xion et al. (2020) found out that it is very important for any military organization to be constantly evaluating MSCN performance against disruptions. The author recommended understanding of how disruptions impact operational performance and stated that its essential for effective defense logistics decision-making.

The study by Xiong et al., (2020) provided insights into the impact of supply chain disruptions on the operational performance of the Ghana Armed Forces. It focused on understanding the resilience of Military Supply Chain Networks (MSCNs) and assessing their adaptability to disruptions. Xiong et al. (2020) highlighted the role of information technology in mitigating the effects of supply chain disruptions, suggesting that IT solutions can enhance the Ghana Armed force's ability to detect and respond effectively to disruptions. In application of the study by Xion et al., (2020 this study explored from respondent regarding how IT can be leveraged to limit disruptions in MSCN within the Ghana armed forces.

While Xion et al., (2020) focused on how disruptions within MSCNs impact the operations of military organizations, Mohammed & Milisavljevic-Syed, (2023) were focused on how to manage disruptions in Multi-State Supply Chain (MSC) within the Nigerian Military operating in conflict zone in order to boost operational performances. Mohammed & Milisavljevic-Syed, (2023) utilized a compromise Decision Support Problem (cDSP) framework and Decision Support in the Design of Engineered Systems (DSIDES) software to investigate potential remedies for disruptions in Military Supply Chains broadly under quantitative approach.

According to Mohammed & Milisavljevic-Syed, (2023), their objective of the study was to create a decision support model for effectively handling interruptions in the Nigerian Army Supply Chain in a zone with low levels of warfare. More so, the study was to aim to reduce the time it takes to complete tasks, prioritize meeting demands of military supplies, and optimize the use of military vehicles. To this end, a decision support model was built by Mohammed & Milisavljevic-Syed, (2023), to address disruptions in the Multi-State Supply Chain (MSC) within a military setting.

The model was based on the compromise Decision Support Problem (cDSP) and Decision Support in the Design of Engineered Systems (DSIDES). The model takes into account various objectives, including the reduction of lead time, the optimization of demand satisfaction, and the maximization of vehicle usage. It then identifies viable solutions that meet the restrictions of the system. What Mohammed & Milisavljevic-Syed, (2023) have been able to do, with regards to the topic of the study was that, they demonstrated how models can be built by application of systems engineering to boost supply chain activities within the military.

Mohammed & Milisavljevic-Syed (2023) were dealing with conflict zones in Nigeria,

considering the Nigerian Armed forces. The model they built, might have taken into considerations, the dynamic pertaining to the country firstly, that is Nigeria, and the regions of the conflict secondly. Even though most militaries have some common traits, such being bureaucratic and hierarchical, (Alvinius, A, 2013), there are organizational cultures that can be unique (Schein, 1990).

Impliedly, the Ghana armed forces, may display some similarities to that of the Nigeria Army. However, specific unique culture of the Ghana Armed Forces (GAF) may require that any model built to support its supply and logistical operation must recognize. In the realms of how IT can support the operations of GAF, therefore, specific cultures of GAF that can feed into IT systems to support supply and logistics are therefore key. In a nut shell, Mohammed & Milisavljevic-Syed (2023) have proven that models are important in supporting the supply chain of the Nigeria military's operational performance.

Nonetheless, Mohammed & Milisavljevic-Syed (2023) were derelict regarding how IT models can be leveraged, taking into considerations, unique features of GAF . Respondents therefore answered questions, about the specific organizational culture of GAF that needs to be exploited when building IT model in the support of GAF's supply chain management to boost its operational performances.

Using survey-based technique and combined with Structural Equation Modeling (SEM). Cabrera et al., (2023) examined the influence of risk, vulnerability, and adaptability on the resilience of defense sector organizations in Colombia, with a specific focus on the supply chain of the Colombian Air Force. Cabrera et al., (2023) outlined their purpose of the study was to provide Colombian government officials with comprehensive information regarding public policies and methods that can

enhance the resilience of defense sector organizations, specifically in response to disruptive occurrences such as the COVID 19 pandemic.

Cabrera et al., (2023)'s study revealed that risk management, vulnerability reduction, and adaptability significantly impact the resilience capacity of Colombian military sector entities during the coronavirus pandemic. It found that proactive risk identification and management can reduce vulnerabilities and improve the overall resilience of the supply chain. The study also found that reducing weaknesses in the supply chain can improve its ability to withstand and recover from disruptive events. The study of Cabrera et al., (2023) concluded that the lowering of vulnerability has a favorable impact on the capacity for resilience, particularly in the face of disruptive events such as the coronavirus outbreak. Consequently, the ability to adapt is essential in utilizing resilience to overcome interruptions.

Relating these findings of Cabrera et al., (2023) to the topic of study in question, it suggests that proactive risk management, vulnerability reduction, and adaptability are crucial factors in enhancing the resilience of military supply chains. By effectively managing risks, reducing vulnerabilities, and fostering adaptability, the Ghana Armed Forces can improve their ability to maintain operational performance even in the face of supply chain disruptions. Additionally, the findings emphasize the importance of leveraging information technology as a moderating factor to enhance the resilience of military supply chains, thereby ensuring continued operational effectiveness. In applying the study of Cabrera et al., (2023), respondents of the study provided answers to the question: how will IT be used to undertake proactive risk management, vulnerability reduction, and adaptability are crucial factors in enhancing the resilience of supply chains of GAF.

Unlike Cabrera et al., (2023), Mohammed & Milisavljevic-Syed (2023) and Xion et al., (2020) who investigated supply chain disruptions with military organizations in mind, Parast & Subramanian, (2021) were interested in how supply chain disruption moderates and impact organizational performance rather than military organization specifically. In order to examine the effects of supply chain disruption risk drivers on organizational and business performance outcomes, the researchers performed a cross-sectional survey on a sample of 315 Chinese firms.

The survey was formulated based on relevant scholarly sources and subsequently adapted to align with the conceptual framework of the study. A systematic stratified random sample procedure was employed to administer the survey, specifically targeting 135 firms located in Shanghai, Guangzhou, and Hangzhou. To check convergence validity and reliability, the data was evaluated using factor loadings, Average Variance Extracted (AVE), construct reliabilities, Cronbach's Alpha, AMOS 25.0.

The findings of the study of Parast & Subramanian, (2021) indicate that interruptions in supply and processes have a substantial impact on the performance results of organizations and firms. Supply disruptions, encompassing both external and internal operational disturbances, exert significant adverse impacts on the overall performance of supply chains. In conclusion, the authors asserted that, firms' performance can be impacted by demand disruptions, such as logistical inefficiencies or shifts in client demand.

Nevertheless, there is a lack of substantial correlation between environmental disruptions and the results of organizational performance, Parast & Subramanian, (2021) also found out. This study highlights the importance of implementing efficient ways to effectively manage interruptions in supply chains and processes. Furthermore,

it underscores the intricacy involved in effectively handling disturbances within the framework of a supply chain. The results provided valuable insights for firms seeking to enhance their resilience and minimize the adverse consequences of supply chain interruptions.

While Parast & Subramanian, (2021) were able to provide insight into how supply chain impact organizational performances, the researchers clamped all organizations into one without differences. Indeed, it is important to note that, the sensitivity of supply chains as regards different types of organizations are not the same. Supply chains, have been known to be the backbone of any military organization, especially in times of operations (Coleman& Williams, 2017). This level of sensitivity will not be the same as service provisioning organizations, for instance, an organization that provides cleaning services. To this extent, Parast & Subramanian, (2021) left a void, regarding how sensitive supply chains are in relation to the operations of military operations and how IT influences such sensitivity. This study aims to fill such a gap.

Synthesizing the work of the researchers, Xiong et al. (2020) studied the impact of supply chain disruptions on military organizations' operational effectiveness, emphasizing the need for continuous evaluation and resilience-building strategies. Mohammed & Milisavljevic-Syed (2023) focused on managing disruptions in Multi-State Supply Chains within the Nigerian Military, developing a decision support model based on compromise Decision Support Problem and Decision Support in the Design of Engineered Systems frameworks.

Cabrera et al. (2023) examined the influence of risk, vulnerability, and adaptability on the resilience of defense sector organizations in Colombia, highlighting the importance of leveraging IT solutions to enhance supply chain resilience. Parast & Subramanian

(2021) examined the effects of supply chain disruption risk drivers on Chinese firms, finding a lack of correlation between environmental disruptions and performance outcomes. These studies offer diverse perspectives on the complex relationship between supply chain disruptions and organizational performance outcomes, but also highlight areas for further research and refinement.

The synthesis of the work reveals several research gaps concerning the topic "The Effects of Supply Chain Disruption on Operational Performance of the Ghana Armed Forces: The Moderating Role of Information Technology. While Xiong et al. (2020) focused on the impact of supply chain disruptions on military organizations' operational effectiveness in general, Mohammed & Milisavljevic-Syed (2023) concentrated on managing disruptions in Multi-State Supply Chains within the Nigerian Military. Notably, there is a lack of specific research addressing the Ghana Armed Forces, leaving a gap in understanding how supply chain disruptions affect their operational performance uniquely.

Moreover, while Cabrera et al. (2023) emphasized the importance of leveraging information technology (IT) solutions to enhance supply chain resilience, none of the studies explored the moderating role of IT in mitigating the effects of disruptions specifically for military organizations like the Ghana Armed Forces. This highlights the need for research that examines how IT solutions can be effectively integrated into the supply chain management of the Ghana Armed Forces to enhance resilience and operational performance. Additionally, there is a gap in comparative analysis across different military organizations or industries, which could provide insights into the similarities and differences in the effects of disruptions on operational performance outcomes.

Lastly, while Mohammed & Milisavljevic-Syed (2023) developed a decision support model for managing disruptions within the Nigerian Military, there is a need for comprehensive frameworks that integrate risk management, vulnerability reduction, adaptability, and IT solutions tailored to the Ghana Armed Forces. Developing such frameworks would offer practical guidance for enhancing the resilience of the Ghana Armed Forces' supply chain and improving operational performance in the face of disruptions. Addressing these research gaps would contribute to a deeper understanding of how supply chain disruptions impact the Ghana Armed Forces and provide actionable insights for mitigating risks and enhancing resilience through effective information technology utilization.

All the researchers discussed in the synthesis employed a quantitative approach to investigate the relationship between supply disruptions and organizational performance, thereby leaving a gap in the exploration of qualitative aspects. Xiong et al. (2020) utilized a simulation-based methodology within a quantitative framework to evaluate Military Supply Chain Networks (MSCNs) disruptions. Mohammed & Milisavljevic-Syed (2023) applied a compromise Decision Support Problem (cDSP) framework and Decision Support in the Design of Engineered Systems (DSIDES) software to develop a decision support model for managing disruptions in Multi-State Supply Chains within the Nigerian Military.

Cabrera et al. (2023) employed survey-based techniques combined with Structural Equation Modeling (SEM) to examine the influence of risk, vulnerability, and adaptability on the resilience of defense sector organizations in Colombia. Parast & Subramanian (2021) conducted a cross-sectional survey on Chinese firms to investigate the effects of supply chain disruption risk drivers on organizational performance outcomes. The absence of a qualitative approach suggests a gap in understanding the

lived experiences regarding how information technology (IT) mediates the relationship between supply chain disruptions and organizational performance, particularly within the context of the operations of GAF. Therefore, filling this gap by incorporating qualitative methodologies could provide deeper insights into the human factors involved and contribute to a more comprehensive understanding of the dynamics between supply chain disruptions, IT utilization, and organizational performance.

2.3 Theoretical Review

This section reviews the theories that are used to explain the various relationships in the model

2.3.1 Contingency theory

The effectiveness of any plan or process depends on the unique conditions or "contingencies" that organization experiences, according to the contingency theory, which holds that there is no one-size-fits-all approach to organizational management. Contingency theory in supply chain management implies that a number of internal and external factors, including the firm's resources, the state of the environment, and technology capabilities, influence the relationship between supply network interruptions and operational success.

Contingency theory suggests that the impact of supply chain interruptions varies throughout organizations when it comes to the relationship between those disruptions and operational performance. Certain factors, such supply chain flexibility, modern technology, or solid supplier relationships, may make some firms more resilient to disruptions (Flynn et al., 2016). In contrast, others may experience more severe negative impacts because of rigid supply chains, resource limitations, or an inability to adapt quickly.

Environmental Uncertainty: Supply chain interruptions create uncertainty into the operational environment. Contingency theory states that in order to lessen the effects of disruptions, businesses operating in extremely uncertain situations must use more adaptable and responsive methods. Businesses that have made investments in supply chain agility and visibility, for instance, typically do better during interruptions (Merschmann & Thonemann, 2011). Thus, operational effectiveness amid disruptions depends on the firm's capacity to manage uncertainty.

Organizational Fit: To sustain operational success in the face of disruptions, a company must be able to match its internal resources and capabilities with the demands of the external environment. According to contingency theory, a company's performance will be less negatively impacted if its tactics and surroundings are more "fit" (Donaldson, 2001). For instance, firms that have integrated information technology (IT) into their supply chains may mitigate the impact of disruptions by improving communication, visibility, and responsiveness (Ivanov et al., 2019).

Strategic and Technological Flexibility: According to contingency theory, businesses that possess greater technological flexibility are also more resilient to shocks. Information technology (IT), for instance, can serve as a buffer, enabling businesses to quickly adjust to changing circumstances and preserve operational performance (Dubey et al., 2021). Firms that rely on real-time data, digital supply chain systems, and predictive analytics are more likely to handle disruptions effectively, leading to less impact on their operational performance.

Adaptation and Resilience: According to contingency theory, firms must continuously adapt to external threats like supply chain disruptions. Companies that can adjust their

processes, diversify their supply bases, and rethink their operational workflows are likely to experience enhanced performance even in the face of interruptions (Chopra & Sodhi, 2014).

According to contingency theory, external factors such as geopolitical instability, natural disasters, and market volatility are significant contributors to supply chain disruptions. These external factors vary across industries and geographic regions, meaning that firms must adopt context-specific strategies to mitigate the adverse impacts of disruptions on operational performance (Ivanov, 2020). For example, a firm operating in a highly volatile market might adopt more agile and flexible supply chain practices to respond swiftly to disruptions, thereby minimizing their impact on performance.

2.4 Conceptual framework and Hypothesis development

Having looked at the various theories underpinning this study, this section presents the procedures for the development of the conceptual model that seek to relate supply chain disruption to operational performance. The conceptual model also seeks to establish the moderating role of information technology on the effect of supply chain disruption on operational performance. The conceptual model of this study is presented in Figure 3.1.

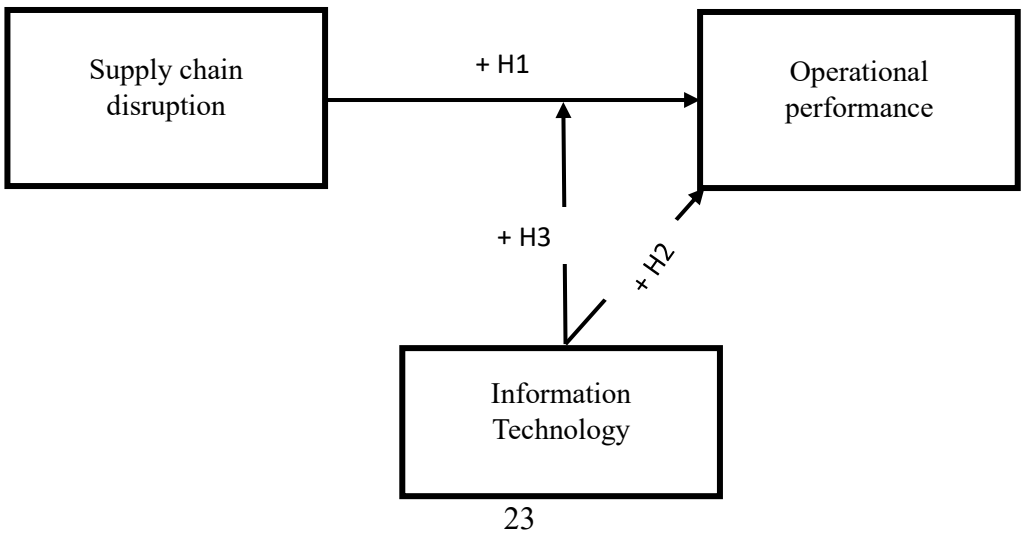

Figure 2.1: Conceptual model
Source: Author, 2024

2.4.1 Supply chain disruption and operational performance

Disruptions in the supply chain have a direct and substantial effect on operational performance, influencing important performance metrics like productivity, lead times, expenses, and client satisfaction. Events like natural disasters, transportation failures, shortages in supplies, or unstable geopolitical conditions can generate disruptions that stop materials, information, and items from moving freely along the supply chain. The ability of businesses to sustain seamless operations is put to the test by these disruptions, which ultimately affects the way they execute.

Because businesses may experience delays in getting raw materials or exporting products, disruptions frequently result in inefficiencies in production and delivery operations. Lower service levels, longer lead times, and greater production costs are the outcomes of this. Further undermining operational efficiency, businesses could also have to reallocate resources or use different tactics, such buying from more costly suppliers (Ivanov, 2021). The complexity and globalization of supply chains increase their susceptibility to disturbances, hence making it more difficult to sustain efficient operations.

The cost of expediting shipments, storing excess inventory, or even locating new suppliers is among the many operational costs that are greatly increased by supply chain disruptions (van Hoek, 2020). In addition, disruptions may force businesses to pay extra for the purpose of resolving production bottlenecks or reconfiguring supply chain networks, which can further erode profitability and competitive advantage.

The detrimental effect on customer satisfaction is one of the most prominent effects of

disruptions in the supply chain Customer discontent and decreased loyalty are caused by stockouts, late deliveries, and subpar products produced in a hurry. Companies' reputation and market share may suffer long-term consequences when disruptions keep them from fulfilling client expectations (Chowdhury et al., 2021).

Disruptions in the supply chain can lead to increased expenses, inefficiencies, and strained customer relations, all of which are serious threats to the performance of the operations. Advanced technology implementation, however, can assist businesses in lessening the damaging effects of these disruptions. Organizations must create strong plans using IT-driven tools in today's increasingly integrated global supply chains in order to reduce risks and guarantee business continuity. Based on the arguments, it is hypothesized that

H1: Supply chain disruption has a negative relationship with operational performance

2.4.2 Information technology and operational performance

In many different businesses, information technology (IT) is essential to improving operational effectiveness. Through process automation, improved data accuracy, and real-time communication, IT systems help firms increase overall productivity, streamline operations, and make better decisions. There is a complex relationship between IT and operational performance because IT gives supply chain processes the tools they need to be optimized, makes better use of resources, and encourages innovation.

The increased productivity and efficiency that technology brings about is one of the main ways that technology influences operational performance. Businesses can automate repetitive operations and lower the risk of human mistake by using advanced IT solutions like supply chain management (SCM) software, warehouse management

systems (WMS), and enterprise resource planning (ERP) systems. Increased productivity and lower operating costs are the results of automation's ability to expedite transaction processing, improve resource utilization, and streamline processes (Srinivasan & Swink, 2018).

Real-time data access is made possible by information technology, and this is crucial for making well-informed operational decisions. Large volumes of data from many sources can be captured, processed, and analyzed by IT systems, giving management fast insights into client demand, inventory levels, and production schedules. Organizations are better equipped to respond to changes in the business environment, modify production schedules appropriately, and prevent interruptions because to this real-time data (Chatterjee et al., 2021). Companies are therefore better able to sustain high levels of operational performance and optimize their supply networks.

By facilitating the smooth exchange of information, IT helps supply chain participants collaborate and coordinate more effectively. Cloud-based platforms, big data analytics, and blockchain technology are some examples of tools that businesses can use to monitor the movement of information and items along the supply chain. Increased visibility makes things more transparent, lowers the possibility of mistakes, and enables businesses to react fast to unforeseen circumstances (Dubey et al., 2020). Higher operational performance and enhanced supply chain resilience follow from this.

Innovation and process improvement are greatly aided by information technology. IT systems assist businesses in finding operational inefficiencies and creating new procedures that cut expenses, increase customer satisfaction, and minimize waste. Artificial intelligence (AI) and the Internet of Things (IoT) are two examples of technologies that might enhance operational outcomes by optimizing energy use, predicting equipment breakdowns, and improving product quality (Wamba et al.,

2020).

Information technology improves an organization's ability to respond quickly to changes in the business environment by giving them adaptable tools. IT systems facilitate the rapid reconfiguration of supply chain activities, production schedules, and resources in response to market instability or shifting consumer demands. In the face of uncertainty, this agility enables businesses to preserve their competitive edge and safeguard operational performance (Gölgeci et al., 2019). Based on the arguments, it is hypothesized that

H2: Information technology has a positive and siginificant relationship with operational performance

2.4.3 Moderating role of information technology on the relationship between supply chain disruption and operational performance.

Disruptions to the supply chain can have a serious negative effect on operational performance, influencing everything from lead times and inventory levels to total costs and customer satisfaction. However, by serving as a moderator in the link between disruptions and operational performance, information technology (IT) integration can greatly reduce these adverse consequences. In this capacity, IT helps businesses make better decisions, share data in real time, and improve supply chain visibility—all of which help them remain stable and flexible in the face of disruptions.

The enhancement of supply chain visibility is one of the most important ways that information technology helps to lessen the effects of supply chain disruptions. Real-time tracking of shipments, inventory levels, and manufacturing progress is made possible by IT systems including Internet of Things (IoT) devices, Enterprise Resource Planning (ERP), and Supply Chain Management (SCM) software. Businesses can now detect any interruptions more immediately and take preventative measures thanks to

this increased visibility. By doing this, businesses can minimize the detrimental effects on operational performance by shortening the time lag between the incidence of a disturbance and their response (Ivanov, 2021).

Data-driven decision-making is made easier by IT systems, and this is important while handling interruptions. By using big data and predictive analytics, IT helps businesses to foresee possible hazards and disruptions before they happen. Businesses can preserve operational continuity by using this predictive capability to create backup plans, reroute shipments, or spend resources more wisely. Furthermore, in spite of unforeseen circumstances, real-time data exchange throughout the supply chain guarantees that all parties can react to interruptions in concert, enhancing operational performance (Chowdhury et al., 2021).

IT makes supply networks more resilient by facilitating flexibility and accelerating recovery from interruptions. For instance, cloud-based platforms and blockchain technologies let organizations manage supply chain transactions and contracts more securely and transparently. Because of this openness, disruptions—like supplier delays or logistical snags—are guaranteed to be promptly identified and resolved. Furthermore, IT solutions enable businesses to dynamically reorganize their supply networks, increasing their agility and capacity to respond to unforeseen obstacles (Dubey et al., 2020).

In times of disruption, companies often incur higher operational costs, such as expedited delivery fees or the need to seek products from other vendors. Nonetheless, by enhancing supplier coordination, inventory control, and forecasting accuracy, IT may assist businesses in maximizing cost management. Artificial Intelligence (AI) and machine learning are examples of advanced IT systems that can forecast demand

changes and manage supply chain operations, minimizing the need for expensive interventions during interruptions (Tjahjono et al., 2021).

In the relationship between supply chain interruptions and operational performance, information technology is a key moderator. IT helps businesses better handle disturbances and sustain stable operations by boosting supply chain resilience, improving visibility, and improving decision-making. Modern IT system integration will be even more essential to preserving operational effectiveness as global supply chains grow more intricate and susceptible to disturbances. Based on the argument above, it is hypothesized that

H3: Information technology moderates the relationship between supply chain disruption and operational performance

CHAPTER THREE

METHODOLOGY

3.0 Introduction

This chapter presents the methodology for the study. It looks at the research purpose, research design and strategy, study's population, the sampling technique and sample sizes, data gathering instruments and the operationalization of constructs. In addition, it discusses measurement of variables, data collection procedures, data analysis, quality of the study, ethical considerations and the profile of the study area.

3.1 Research philosophy

The manner in which we think about research influences our research approach and our views on judgments in society suggest that we perceive some factors and events as more significant and relevant than others (Saunders et al., 2011). There are several research philosophies like the positivism, subjectivism, and pragmatism among other. However, this study adopts the pragmatism research philosophy.

According to Leavy (2017), pragmatism asserts that there is no allegiance to any set of rules instead rather suggest that any relevant tool can be crucial in different research context. The objective of this type of research philosophy is to reveal what works for a given research problem (Creswell, 2014). According to Creswell (2014), pragmatism concentrates on the findings of the research that is the actions or situations instead of antecedent conditions as in postpositivism. Therefore for the purposes of this study, which explored and tested an already existing theory, positivists research philosophy views will be espoused.

3.2 Research Purpose

According to Cavana et al. (2001), any type of research can be grouped based on its purpose (exploratory, explanatory and descriptive). The study is aimed at obtaining new thoughts into happenings in and around the world. This type of study is quite flexible and easily adaptable to changes. Descriptive study on the other hand, seeks to disclose an accurate profile of objects, persons, situations and events. Explanatory research seeks to study situations and problems by trying to establish a causal relationship between the variables which is being studied.

The purpose of this study is to investigate supply chain disruption and how it affects operational performance. Thus, establishing a relationship among supply chain disruption, information technology and operational performance, the research intends to address the issues of supply chain disruptions among firms in Ghana. The study is an explanatory research because it seeks to examine or explain whether or not if information technology influences the relationship between supply chain disruption and operational performance.

3.3 Research Design and Strategy

The type and nature of every study determine to a large extent the choice of design and the right strategy to be employed. Research design according to (Saunders et al, 2009) is a plan that determines the collection, measurement and how data would be analyzed. Several types of research strategies are in place for researchers. Some of the strategies include experiment, case study, action research, grounded theory, survey, archival and ethnography.

With reference to this current study, the researcher has chosen to employ the use of the survey strategy. The survey approach is normally associated with the deductive approach, it is commonly called and seen as a means that enables the collection of large

quantitative data. A data collection instrument for instance is a questionnaire that makes it possible to use either descriptive or inferential statistics or both in analyzing (Saunders et., 2009).

3.4 Population of the Study

Population is the whole group of people, elements or events of things that are of interest to the researcher (Cavana et., 2001). The study focuses on organisations in the Ashanti Region with the aim of empirically testing the theoretical framework that has been proposed. The proposed model is universal and therefore findings could be generalized.

Due to the kind of concepts which is being investigated, there will be the need to further narrow the population and make it more homogenous which will aid the researcher to get access to the relevant information or data required. This will help in addressing the objectives of the study due to the fact that the study concentrates on selected firms.

3.5 Sample Size and Sampling Technique

3.5.1 Sample Size

Saunders et al. (2009) posits that quality of every study is not only influenced by how appropriate the method and instrument is but also how suitable the strategy for sampling is. Every research is limited by some factors and this is a main challenge to the researcher as he/she is not able to study all the factors within the given target population. In such instances, the researcher is obliged to pass through a process which is systematic and this is called the sampling process with the aim of getting a representation of the entire population.

According to Singh (2006), there is no single acceptable rule for determining the sample size which is appropriate for a study. Several authors (e.g Pallant, 2007; Field, 2009;

Hair et al., 2014) have suggested that the appropriateness of sample size should be influenced by the statistical analysis or tools to be used in the study. The sample size for this study is 100 respondents.

3.5.2 Sampling Technique

In this study, the researcher used convenience sampling technique to obtain the sample that is representative of the population. Hence the researcher employed the use of convenient sampling technique. Convenience sampling aims at targeting a small sample of a population that has been specially chosen by the researcher. This is because it is easier to get the data and easily accessible (Trochim and Donnelly, 2008; Bhattacherjee, 2012). The researcher chose this technique because it is less expensive and fast compared with other sampling technique.

3.6 Research Method

This part is aimed at examining the various sources of data and the processes that were used in collecting the data.

3.6.1 Sources of Data

There are two kinds of data for every research which are primary data and secondary data. Primary data refers to the information that is collected by the researcher by means of systematic observation, interviews, results of questionnaires and case study compiled. Secondary data refers to that kind of data that has already been collected and accessible from other sources. Looking at the flaws that can characterize the usage of secondary source of data, the researcher used the primary source of data. Hence a questionnaire would be used. The questionnaire will be used to solicit responses from the research respondents to obtain in order to help address the research objectives.

3.6.2 Data Collection Technique

The only instrument that was used in collecting the data was through a well-structured questionnaire with measures adopted from an already existing literature.

The items in the instrument were grouped into two parts (Part A-B). Section A looked at the respondent's background information and information regarding the organisations in which the respondents were employed. The part B looked at the constructs in the theoretical framework of the study. This includes supply chain disruption and operational performance. The purpose was to help respondents to provide responses to the questions and also help the researcher. This will help the researcher to easily code the responses for the analysis.

3.6.3 Data Gathering Procedure

3.6.3.1 Preliminary Procedures

Despite the fact that the instruments were adapted for various constructs, the study has been validated in previous studies, it was therefore important for the researcher to review them in order that they serve as manifest variables for their appropriate constructs. To assist this, the researcher's supervisor had to probe the instrument that was to be used. Corrections were made in order to make the questionnaire ready for administration.

In like manner, the targeted respondents for the study includes some selected firms in Ghana. This is because such people are believed to have enough knowledge about the firm's internal and external relationships and processes. Therefore, an individual respondent was made to represent the firms.

3.6.3.2 The Field of Study

The researcher employed the use of two approaches in gathering the responses for the study. First of all, key firms who fall within the population and meet the criterion as a respondent were approached and questionnaire will be given to them.

In addition to the above, other responses were collected by personally going to the premises of the identified schools. Their consent will be sent and a letter of introduction from the department will be attached. Firms that accepted to participate in the study were given a maximum of two weeks to provide responses to the study. Out of 150 questionnaires, the researchers administered hundred and thirty within the study's time frame.

3.7 Data Analysis

This study employed quantitative data analysis techniques which is explained below.

3.7.1 Unit of Analysis

According to Cavana et al. (2001), several units of analysis exist and any of them can be used in a research work. They consist of individual, dyad (two-person interaction), group, organisations (organizational level) or cultures. The one to be used is dependent on the level of data gathered.

This study employed individual (organizational level) as its unit of analysis. Due to this, individuals who were made to answer the questionnaire were key persons who represented the views of their various firms.

3.7.2 DATA ANALYSIS PROCEDURE AND TECHNIQUES

In the quest to analyse the data gathered, the researcher used the procedures below

i. Generation of preliminary results (demographic information on the respondents and organization and addressing the study's objectives
ii. Validity and reliability testing of the data collection instrument
iii. Model estimation and evaluation of hypotheses

3.8 QUALITY OF THE STUDY

The quality of the current study was assessed on the following parameters; respondent's competency, knowledge level and truthfulness; reliability of the measures, validity of the scales used and method bias. The carrying out of these tests were necessitated by the need of the researcher to ensure that the data collected was suitable for the various analyses that were required to be used.

3.8.1 INFORMANTS' COMPETENCY, KNOWLEDGE LEVEL AND TRUTHFULNESS

This section looks at respondents' knowledge and comprehension on the issues being investigated. Furthermore, the level of their confidence in responding to the matters were analysed using the means, standard deviations to ensure accuracy as all firms have different experience about the concerns which are at hand. Refer to chapter four for more details.

3.8.2 VALIDITY AND RELIABILITY

Validity and reliability are two unique characteristics that every researcher must recognize in the process of designing, analyzing and judging the quality of a study or research especially with regards to quantitative studies. It is therefore necessary that every design adopted, data gathered and assessment techniques that are used are reliable and valid or else the study is considered futile. Conducting several tests (eg internal

consistency, discriminant validity, convergent validity etc), the researcher made sure that the data that has been collected was suitable for the intended study. See chapter 4 for more details.

3.9 ETHICAL CONSIDERATION

Ethical issues are of much significance in every research that is conducted and this study is not an exception.

In making the respondents to understand and sign the consent form to this study, an introductory letter was obtained from the head of department. Copies of the introductory letter were given to the heads of various firms selected for this study. That being said the respondents were briefed about the purpose of the study and the time needed to complete the questionnaire before they endorse the consent forms. The respondents were assured of confidentiality in the data collection. By these arrangements, the rights of the respondents were respected. At any given time, the respondents were allowed to opt out of the process if one wanted to do so. The participants that were interviewed were allowed to do so voluntarily and were not forced in answering questions.

Also, the researcher should not fill the questionnaire himself. The researcher did not also manipulate the data to suit the stated hypotheses and objectives. Uncompleted forms were not be filled by the researcher.

CHAPTER FOUR

DATA PRESENTATION, ANALYSIS AND DISCUSSION OF RESULT

4.1 Introduction

The aim of this work is to investigate the moderating effect of supply chain social capital in the relationship between supply chain management practices and operational performance. This chapter begins with a descriptive statistic of the data with the aim of revealing the scope and patterns of the issues that is being discussed. Furthermore, the chapter will also concentrate on the reliability and validity of the instruments that were used. Reliability and validity are very important because it helps to address the issues that concerns how robust the information gathered is and how accurate the measurement tools are. This chapter focuses on detailed analysis of the field data. The chapter presents the analysis of data using statistical techniques such as exploratory factor analysis, descriptive statistics, correlation and regression analysis.

4.1 Demographics characteristics of respondent

Most of the data was acquired using surveys. One hundred and ten (100) people completed the questionnaires and sent them back, making one hundred (120) total. 35% of the responders are women and 65% of men. This suggests that there was no discrimination based on gender.

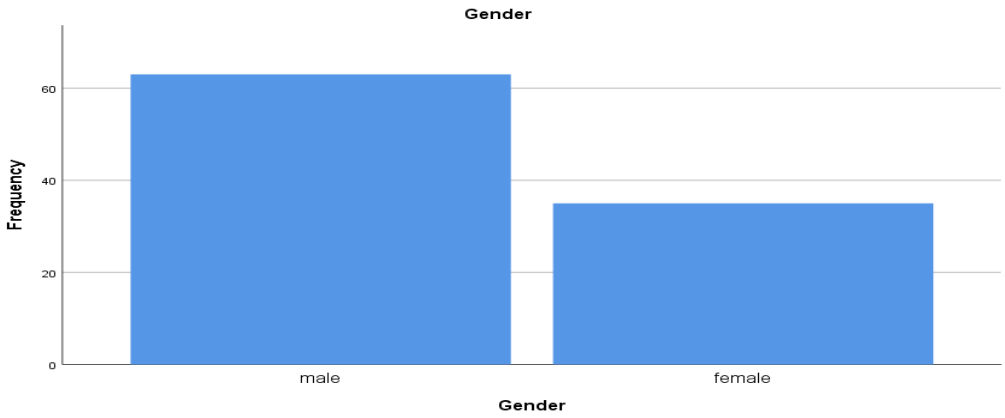

Figure 4.1

In terms of respondents' ages, 10% were under 23 years old, 20% were between 24 and 29 years old, 50% were between 30 and 35 years old, 12% were between 36 and 40 years old, and 4% were 41 years old and older. This indicates that the participants were of the appropriate age to reply to the inquiries.

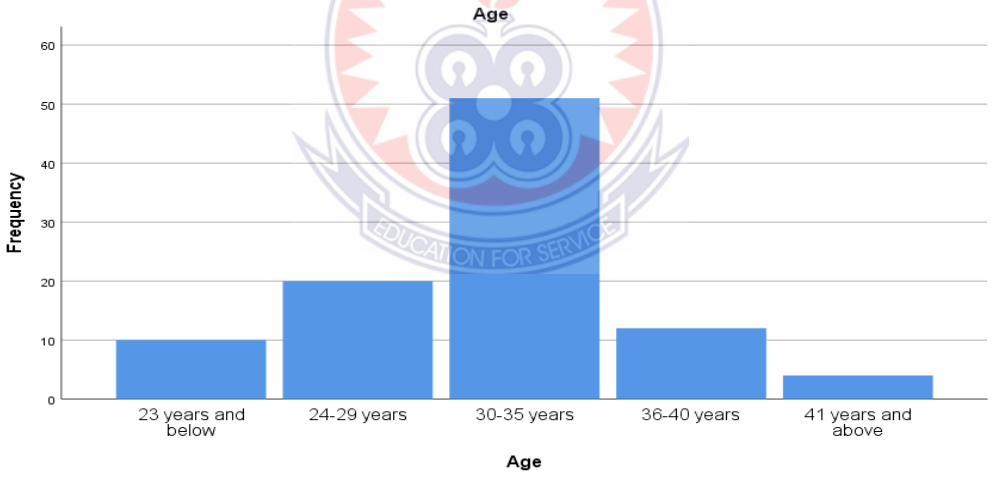

Figure 4.2

Regarding to the educational background of the respondents, 39% had bachelor's degree, 33% had master's degree and 3% PhD level. This indicates that respondents were well educated to respond to the questions.

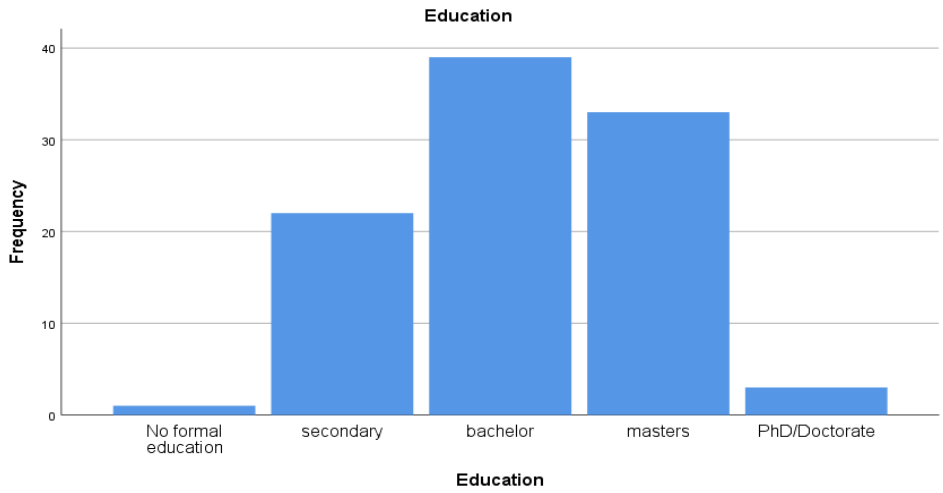

Figure 4.3

Moreover, with regard to the work experience of the respondents, 1% of them were less than one year, 21% 1-5years of work experience, 31% of them had 6-10 years of work experience, 12% of them had 11-15 years and above working experience. 29% of them had 16-20 years and above working experience. 6% of the respondents have worked for more than 21 years. This finding indicates that respondents had the industry experience to respond the questions.

Figure 4.4

Again, with regard to the number of employees in each firm, 10% of the firms have less than 6 employees, 17% have 6-9 employees, 29% had 10-29 employees, 5% had 30-50 employees and 39% had employees more than 50. This indicates that the organisations that were considered had the experience to respond to the questionnaire

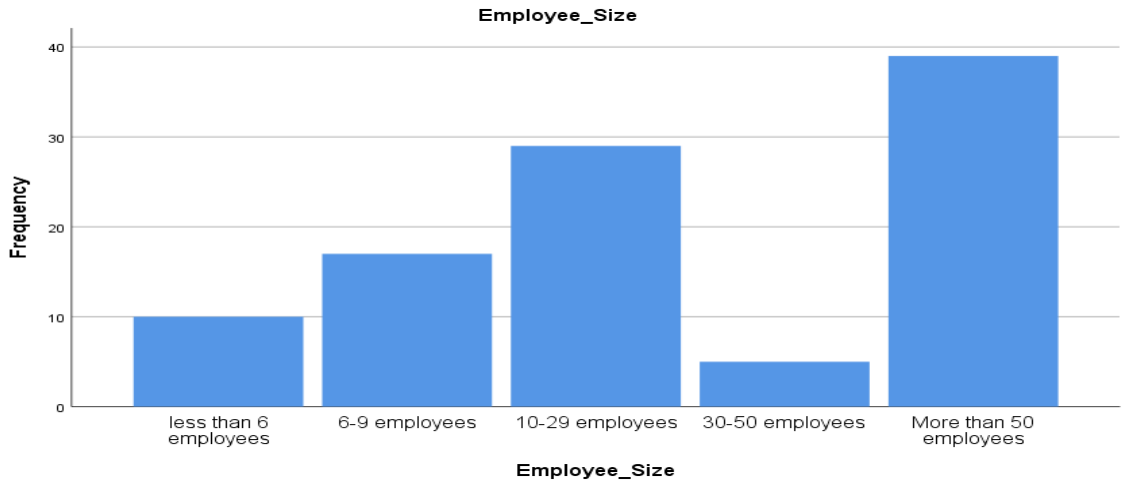

Figure 4.5

Based on their firms' ownership type, 53% are fully locally owned, 21% are foreign owned, 26% are jointly Ghanaian, and foreign owned. This indicates that there is fair selection of organisations based on the ownership type.

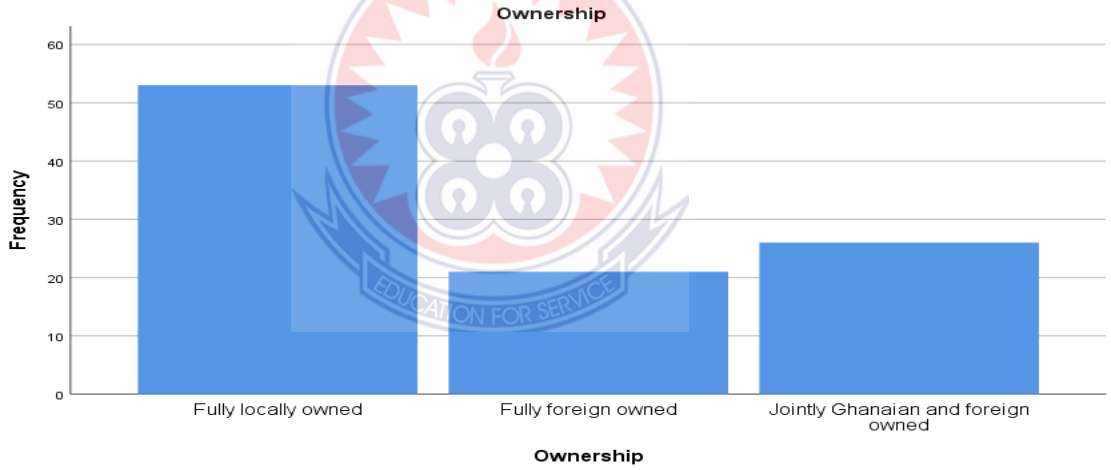

Figure 4.6

With regard to the positition of respondents, 45% of the respondents are procurement managers, 30% are logistics managers and 24% are at the warehouse officers. This indicates that the right respondents answered the questions.

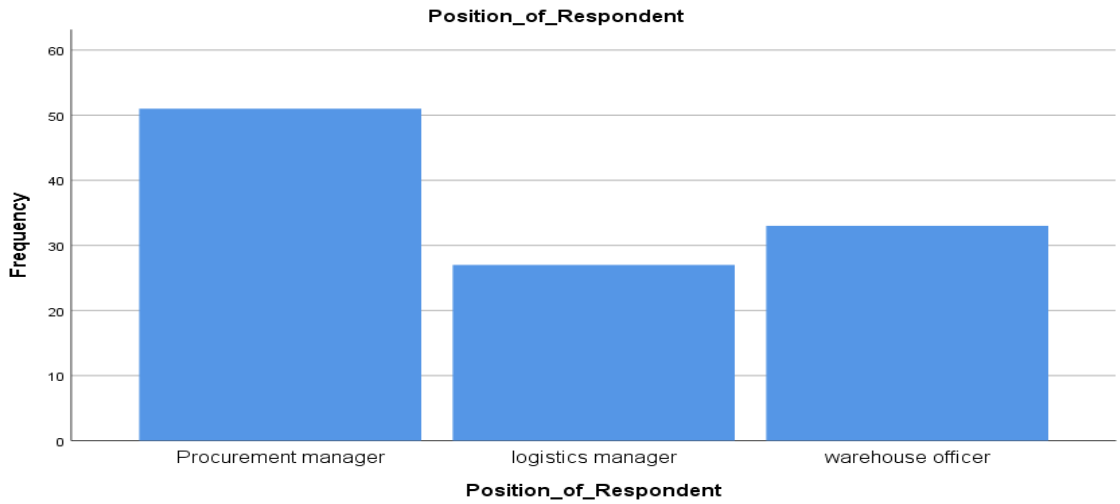

Figure 4.7

Table 4.1: Background Characteristics of respondents

	Frequency	Percent	Valid percent	Cumulative percent
Gender				
Male	63	63.0	64.3	64.3
Female	35	35.0	35.7	100.0
Total	**98**	**98.0**	**100.0**	
Age				
23 years and below	10	10.0	10.3	10.3
24-29 years	20	20.0	20.6	30.9
30-35 years	51	51.0	52.6	83.5
36-40 years	12	12.0	12.4	95.9
41 years and above	4	4.0	4.1	100.0
Total	97	97.0	100.0	
Educational background				
Bachelor's degree	39	39.0	39.8	63.3
Master's degree	33	33.0	33.7	96.9
Total	3	3.0	3.1	100.0
Work Experience	**98**	**98.0**	**100.0**	
Less than 1 year	21	21.0	21.0	22.0
1-5 years	31	31.0	31.0	53.0
6-10 years	12	12.0	12.0	65.0
11-15 years	29	29.0	29.0	94.0
Total	6	6.0	6.0	100.0
Number of Employees	**100**	**100.0**	**100.0**	
Less than 6 employees	10	10.0	10.0	10.0
6-9 employees	17	17.0	17.0	27.0
10-29 employees	29	29.0	29.0	56.0

30-50 employees	5	5.0	5.0	61.0
More than 50 employees	39	39.0	39.0	100.0
Total	100	100.0	100.0	

Ownership type				
Fully locally owned	52	52.0	52.0	52.0
Fully foreign owned	21	21.0	21.0	73.0
Jointly Ghanaian and foreign owned	26	26.0	26.0	99.0
Total	**111**	**100.0**	**100.0**	
Position_of_Respondent				
Procurement manager	45	45.0	45.5	31.7
logistics manager	30	30.0	30.3	78.3
warehouse officer	24	24.0	24.2	100
Total	99	99.0	100.0	

4.2 Measurement Model Results

The research model was analyzed through the PLS-SEM using SmartPLS version 4. The PLS-SEM analyses are presented firstly the results for the measurement model which is followed by a comprehensive structural model results. The model analysis was done by performing relevant tests to ensure they meet the appropriate thresholds.

The first step in assessing the reflective model involves examining the indicator loadings (Hair et al., 2018). The loadings are expected to be above 0.708 which is the recommended threshold as it explains that the construct explains more than 50 percent of the variance in the indicators which shows that it is acceptable for measuring reliability. Table 2 also indicates that all the items had loadings which is above the acceptable value 0.708. The study further examined the internal consistency of the constructs through the composite reliability and Cronbach's alpha. According to (Hair et al., 2019), the recommended threshold for the Cronbach's alpha and composite reliability is 0.7. From Table 2, all the constructs have a Cronbach's alpha and a composite reliability values which is greater than 0.7. Finally, Rho_A has emerged as

a very relevant measure of reliability for PLS-SEM and is considered as a consistent measure of reliability for the constructs (Dijkstra and Henseler, 2015). The acceptable threshold is a Rho_A value greater than 0.7. Once again, all the constructs exceeded the acceptable threshold as indicated in Table 2.

Convergent validity is said to have been achieved when the score of the items employed in measuring a construct is correlating with or are related to scores of other items that are supposed to measure the same construct (Hair et al., 2014). Convergent validity is determined by examining the psychometric properties of the constructs through the AVE. According to (Hair et al., 2018), the AVE should be equal or greater than 0.5. Table 2 also indicates that all the constructs have an AVE greater than 0.5, hence it meets the acceptable threshold.

Table 4.2: Psychometric Properties of Research Constructs

Construct	Items	Loadings	Cronbach alpha	Composite reliability	Rho_A	AVE
Supply chain disruption	SCD1		0.879	0.916	0.917	0.733
	SCD2					
	SCD3					
	SCD4					
Information Technology	IT1	0.885	0.865	0.888	0.907	0.708
	IT2	0.842				
	IT3	0.851				
	IT4	0.786				
Operational Performance	OP1	0.880	0.914	0.936	0.914	0.746
	OP2	0.875				
	OP3	0.798				
	OP4	0.926				
	OP5	0.833				

The study further examined the discriminant validity of the constructs. Discriminant validity examines the degree to which a particular measure correlates with the measure of constructs that are distinct from the construct the item is supposed to examine

(Barclay et al., 1995). Discriminant validity was examined using the Forneli-Larcker criterion and the heterotrait-monotrait ratio of correlations test. The Fornell-Larcker criterion depicts that discriminant validity is present when the square root of the AVE of a specific factor is greater than its correlation with all other factors in the model (Fornell and Larcker, 1981). The Fornell-Larcker criterion was used as the first method to test for discriminant validity. The Fornell-Larcker criterion which was originally proposed by Fornell and Larcker (1981) compares the square roots of the AVE values with the correlations among the latent variables. The rule of thumb is that, the square root of the AVE of each construct is supposed to be greater than its highest correlation with other constructs (Fornell and Larcker, 1981 & Hair et al., 2016). These results in Table 3 indicate that there is discriminant validity of the model.

Table 4.3: Fornell Larcker Criterion

Firm_Age	1.000				
OP	-0.016	0.864			
Ownership	0.059	0.178	1.000		
SCDP	0.022	0.831	0.114	0.856	
IT	0.001	0.858	0.259	0.757	0.842

Finally, the discriminant validity was examined using the HTMT test. HTMT is the average of the heteortrait-heteromethod correlations relative to the average of the monotrait-heteromethod correlations (Henseler et al., 2015). The thumb rule is that the HTMT values should be less than 1 with a value less than 0.85 ideal (Henseler et al., 2015). Table 4 indicates that the highest value is 0.81confirming that the model has the acceptable discriminant validity.

Table 4.4: HTMT results

	SCDP	**IT**	**OP**
SCDP	0.823		
IT	0.621	0.848	
OP	0.806	0.704	0.861

4.3 Items Cross loading

Akin to the conventional approach to testing discriminant validity, this study begins with an initial test of items cross-loading. The cross-loading is also referred to as the item level discriminant validity. Hair et al. (2016) recommend that when using the cross-loadings technique as a test of discriminant validity, the rule of thumb is that an indicator's outer loading must be greater than any of its cross-loading on other variables. On the contrary, the presence of cross-loadings that exceeds the indicator's outer loadings will present a problem discriminant validity. In such an instance the item in question is unable to distinguish itself as to whether it is part of its intended variable or another (Chin, 2010). On the table below, the columns present the latent variables and the rows represent the indicators. The results displayed on the table suggest that all the indicators loaded highly on their corresponding latent variable than against other variables which indicate that discriminant validity has been established.

Table 4.5: Item Loadings

Firm_Age	1.000					
OP1		0.880				
OP2		0.875				
OP3		0.798				
OP4		0.926				
OP5		0.833				
Ownership			1.000			
SCD1				0.923		
SCDP2				0.740		
SCDP3				0.839		
SCDP4				0.911		
IT1					0.885	
IT2					0.842	
IT3					0.851	
IT4					0.786	
IT x SCD						1.000

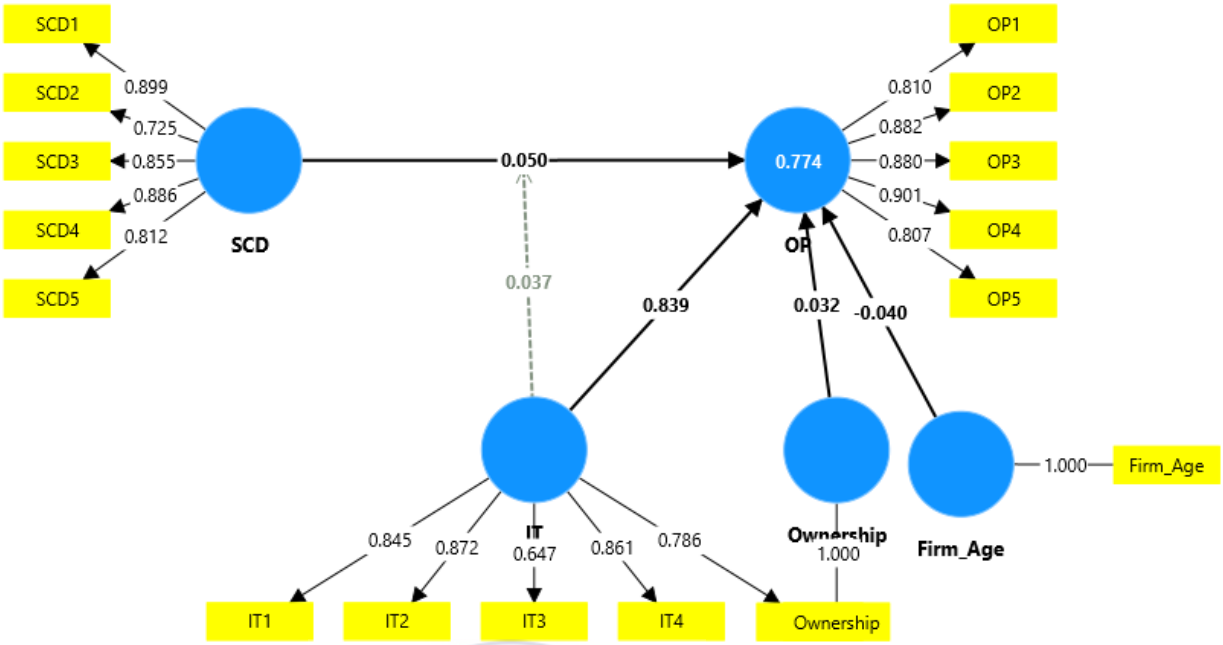

Figure 4.8: Measurement model results

4.4 Structural Model Results

After assessing the measurement model with regard to the validity and reliability of the various constructs, the structural model results were assessed. PLS indicates the magnitude and significance of the causal relationships that has been hypothesized as standard path coefficients. The parameter estimate of the hypothesized structural path should be significant statistically with the direction of the effect that has been hypothesized. A path is said to be significant statistically if its p-value is less than the 0.05 level of significance. Bootstrapping analysis in SmartPLS is used to examine the statistical significance of the loadings and the path coefficients (Ringle et al., 2015). Bootstrapping analysis is a non-parametric approach for estimating the precision of the PLS estimates, and generates t-values. The path coefficients and the t-values for the research model are shown in Figure 2 and summarized in Table 5. The path coefficients show the strength of the relationships between the constructs whilst the t-values

Study's hypothesis	Path coefficient	T-statistics	P-value	Decision
SCD → OP	0.050	1.523	0.050	Supported
IT → OP	0.582	4.021	0.000	Not Supported
Moderation effect of IT	0.469	1.298	0.080	Not Supported

indicates the significance of the path co-

efficient.

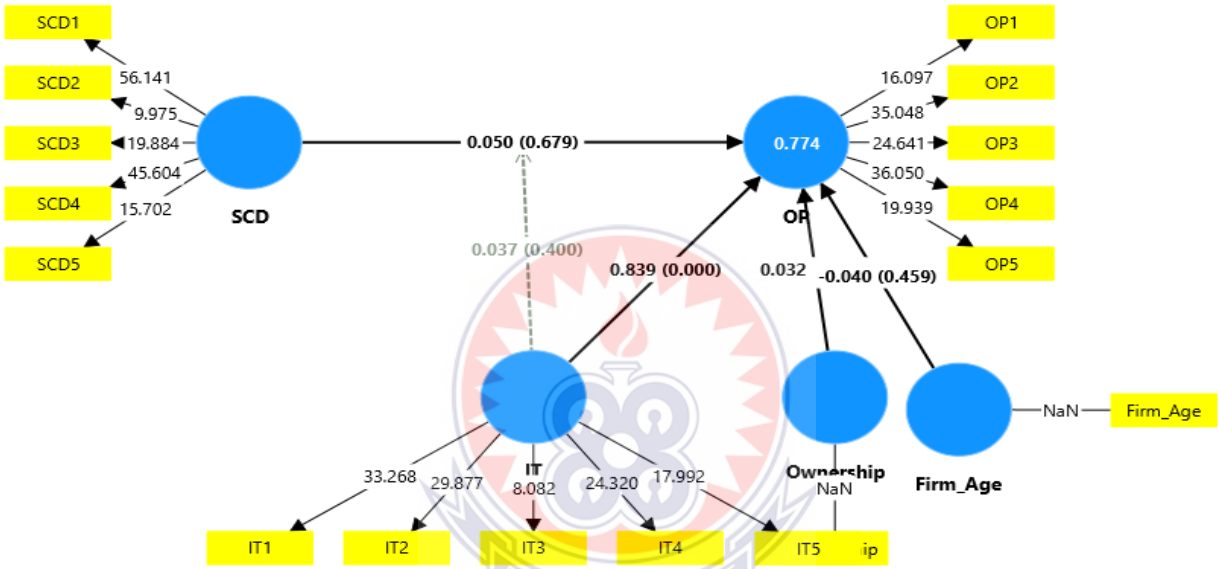

Figure 4.9: Structural model

Table 5: Results of Hypothesized Relationships

The results of the analysis revealed that all the hypotheses were supported. Supply chain disruption had a negative and significant effect on operational performance (β = -0.806, t = 1.927, p < 0.070) which indicates that higher supply chain disruption reduces operational performance. Information technology had a positive and significant effect on operational performance (β = 0.582, t = 4.021, p < 0.00) which also indicates that higher investment in IT results in a better operational performance. Finally, the findings

indicate that information technology does not moderate the relationship between supply chain disruption and operational performance. Supply chain disruption accounted for an R square of 0.504 meaning that 58% of the variations in operational performance was as a result of supply chain disruption. Also, information technology accounted for an R square 0.65 meaning that 65% of the variations in operational performance was as a results of information technology. With regard to the predictive relevance of the study, the blindfolding analysis was done as an additional assessment for the model fit. The predictive relevance indicates the adequacy of the model to predict the observed indicators of each latent construct (Hair et al., 2019). The blindfolding procedure in PLS was estimated using the Stone-Geisser Q^2 (cross-validated redundancy) to examine the predictive relevance. A Q^2 value exceeding zero indicates that a model has predictive relevance. With regard to this study, a Q^2 value of 0.323 was derived and the value is greater than zero and also depicting medium predictive relevance (Hair et al., 2019). The study further indicated that ownership type and firm performance do not have any effect of operational performance.

4.4 Discussion of results

This study assessed the moderating role of information technology in the relationship between supply chain disruption and operational performance among selected firms in the Ghana. A total of 100 firms were sampled for this work. The motivation for the study was on the premise that although some studies have been conducted looking at supply chain disruption and operational performance, very few have looked at when information technology moderates the relationship between supply chain disruption and operational performance especially among manufacturing firms.

4.4.1 The impact of Supply chain disruption on Operational performance

The finding that supply chain disruption and operational performance have a negative and significant link is consistent with the body of research on the subject. Unplanned and unanticipated occurrences that impede the flow of goods, services, and information throughout the supply chain and result in operational inefficiencies are referred to as supply chain disruptions. These interruptions frequently result in lost time, higher expenses, and decreased output, all of which impair operational success.

The capacity of a company to meet its operational objectives, such as cost effectiveness, timely delivery, quality, and flexibility, is referred to as operational performance. Disruptions in the supply chain can have multiple effects on these performance metrics: Disruptions frequently result in delays in the flow of goods, which can have a detrimental effect on customer satisfaction and result in a decline in sales. Tang (2006) asserts that disruptions in the supply chain can result in noticeably longer lead times, which can impair an organization's capacity to satisfy consumer demand and lower overall operational performance.

When businesses rush to find new suppliers, quicken shipment, or handle production halts, disruptions often result in higher operating expenses. Ivanov and Dolgui (2020) point out that disruptions result in unforeseen expenses for extra work and emergency shipping

Businesses may need to use different suppliers or modify their production plans during outages. Suppliers may not satisfy the customary requirements as a result, which could result in quality difficulties and further affect customer satisfaction and operational performance (Christopher & Peck, 2004).

Decreased Flexibility: A company's ability to adapt to shifts in supply or demand may be hampered by disruptions. According to Craighead et al. (2007), disruptions impair a company's capacity to react swiftly to changes in the market, which lowers operational performance in terms of adaptability and agility.

A few studies also look at how risk management techniques can lessen the damaging effects of supply chain disruptions. Chopra and Sodhi (2014), for instance, contend that companies can lessen the negative consequences of interruptions on operational performance by enhancing their risk mitigation and contingency planning frameworks. But in the event that these tactics are not implemented, the detrimental effects are severe and may last for a long time.

The body of research clearly supports the conclusion that supply chain interruptions have a negative and severe impact on operational performance. Disruptions can seriously impair a company's capacity to provide goods and services effectively. They can cause delays, higher expenses, poor quality, and a loss of flexibility, all of which have a detrimental effect on the company's overall operational performance. Subsequent research endeavors might center on how businesses can alleviate these adverse consequences by means of enhanced visibility, resilience, and technology integration.

4.4.2 The relationship between information technology and operational performance

Contrary to much of the current research, which frequently emphasizes the beneficial impact of IT in boosting operational efficiency, flexibility, and responsiveness, the findings indicating a negative and significant link between information technology (IT) and operational performance are surprising. But occasionally, certain contextual

factors—such as poor implementation, insufficient training, a mismatch between IT capabilities and organizational goals, or excessive IT maintenance costs—may be able to explain this unfavourable link.

The ability of an organization to accomplish its objectives in terms of cost, quality, flexibility, and speed of operations is referred to as operational performance. Most of the time, information technology is viewed as a major facilitator of better performance, increasing decision-making, process efficiency, and supply chain coordination. Nevertheless, certain implementation-related obstacles may contribute to the detrimental effects of IT on operational performance, as this study has shown.

According to research, the expenses of putting IT systems into place—especially large-scale enterprise resource planning (ERP) systems—can be unaffordable. The organization may see a decline in performance rather than an improvement if these systems are poorly integrated or improperly matched with its procedures (Esteves & Pastor, 2001). In some situations, technology could end up being more of a burden and cause inefficiencies instead of improving operational performance. Misalignment with Organizational Processes: In order for IT systems to be beneficial, Gunasekaran and Ngai (2004) contend that they must be properly matched with the operational procedures of a business. Performance can be adversely affected by misalignment, which occurs when technology is either too difficult for users or does not meet the needs of the company. This can lead to process slowdowns, operational delays, and interruptions.

When new IT solutions are adopted, there may be a significant learning curve for staff members, which can cause productivity dips while they become used to the new systems. According to Leonard-Barton (1988), operational inefficiencies can result

from reluctance to adopt new technology and inadequate training, which can limit the potential returns on IT investments. This explains why, during the transition phase of IT deployment, some firms see a detrimental impact on operational performance.

While IT can improve performance, Devaraj and Kohli's (2003) investigation of the connection between IT investments and operational success revealed that this relationship frequently hinges on how well these technologies are integrated into the business processes. Performance and IT may have a bad relationship if the integration is not good. According to Kwahk and Ahn (2010), the initial stages of ERP adoption are frequently characterized by lower operational performance, especially if users are not properly taught or if there is reluctance to implementing the new technology. This implies that the detrimental effect can be connected to the initial stages of IT adoption. The results of this study indicate that there is a significant and negative association between IT and operational performance, which implies that the context of implementation is important even though the majority of literature supports a positive relationship. This unfavourable association may be influenced by elements like low user uptake, high implementation costs, misalignment with business procedures, and an excessive reliance on technology. In order to fully realize the potential benefits of IT on operational performance, organizations must properly plan and manage the installation of IT, ensuring optimal alignment with business processes and providing adequate training and support.

4.4.3 Moderating role information technology in the relationship supply chain disruption and operational performance

Information technology (IT) may not have been able to lessen the detrimental effects of interruptions on operational results in the particular study environment, as seen by

the finding that IT does not moderate the association between supply chain disturbance and operational performance. Given the significant role that IT frequently plays in supply chain management, this conclusion is unexpected and raises a number of interpretations that could be made in light of the body of prior research.

The particular setting in which the investigation was carried out may offer one reason for this result. Depending on the sector, the area, or the kinds of disruptions encountered, IT may or may not be an effective moderator. For example, IT systems might not be strong enough to lessen the effects of disruption in areas with a lackluster IT infrastructure or less digitalized businesses. Various studies have demonstrated that the usefulness and deployment of IT are contingent upon various aspects, including personnel skill levels and organizational readiness (Dubey et al., 2019). In many situations, IT might not offer the desired operational advantages.

When deciding how best to use IT, supply chain disruptions must also be taken into consideration. IT systems might not be able to forecast or react quickly enough to lessen the effects of unpredictability or external events like political unrest or natural calamities (Ivanov et al., 2020). For instance, systems built for regular logistical management might not be able to withstand significant disruptions, which lessens the moderating influence of IT in these kinds of situations.

The compatibility of operational plans and IT systems may also be an issue. IT's ability to function as a buffer against disruptions is diminished if it is not properly integrated into supply chain management procedures. IT by itself does not always boost performance, as Li et al. (2015) discovered, unless it is properly integrated with a business's supply chain strategy and culture. IT investments might not provide the anticipated benefits in terms of resilience and responsiveness during interruptions if

they are not properly integrated.

The conclusion that supply chain disruption and operational performance are not moderated by IT emphasizes how crucial context, integration, and alignment are when utilizing IT systems. Although numerous studies have demonstrated that IT improves supply chain performance and resilience, this finding emphasizes that its efficacy is not always assured. Subsequent studies ought to investigate the ways in which organizational characteristics, kinds of disturbances, and the particular use of IT systems impact this correlation, along with the ways in which IT might be more effectively utilized to improve supply chain efficiency in turbulent settings.

CHAPTER FIVE

SUMMARY OF FINDINGS, CONCLUSION AND RECOMMENDATIONS

5.0 Introduction

This chapter is a summary of the research findings regarding the research objective and specific research question as a guide. The findings provided the basis for the recommendations and are also presented with the shortcomings of the study.

5.1 Summary of Findings

The purpose of this work is to examine the moderating effect of information technology in the relationship between supply chain disruption and operational performance. A total of 100 firms were sampled for the work. At the end of the study, the following findings were revealed and summarized based on the objectives of the research.

5.1.1 The impact of supply chain disruption on operational performance

It was found that statistically supply chain disruption has a negative impact (effect) on operational performance among selected firms. Supply chain disruption does not drive the ability of firms to improve operational performance.

5.1.2 The impact of information technology on operational performance

It was found that statistically information technology has a positive impact (effect) operational performance among selected firms. Hence, information technology drives the operational performance of firms.

5.1.4 The moderating effect of information technology on the relationship between supply chain disruption and operational performance

The findings of the study also revealed that information technology does not moderate

the relationship between supply chain disruption and operational performance. Hence it can be said that information technology does not influence the relationship between supply chain disruption and operational performance.

5.2 Conclusion

An empirical analysis of the moderating effect of information technology in the relationship between supply chain disruption and operational performance. A total of 100 firms were employed for this work. The work was aimed at filling three main gaps in literature; does supply chain disruption affect operational performance? Second, what is the effect of information technology on operational performance? Finally, does information technology moderate the relationship between supply chain disruption and operational performance?

The above questions have been carefully investigated and results have been obtained. Based on the study results, certain conclusions of significant management and theoretical implications can be inferred. Generally, it can be concluded that supply chain disruption and information technology generate some benefits in terms of operational performance. This is because supply chain disruption has great impact on the operational performance of firms. Also, the study indicates that information technology moderates the relationship between supply chain disruption and operational performance.

5.3 Managerial Implication

There are significant management implications to finding that information technology (IT) moderates the association between supply chain interruption and operational performance. It draws attention to how IT may help businesses enhance performance

and remain resilient in trying times by reducing the detrimental effects of disruptions on operational outcomes. The following are the main management implications:

IT has a strategic value that managers should understand in order to improve supply chain resilience and minimize interruptions. Enhancing operational performance can be achieved by investing in cutting-edge IT systems, such as Supply Chain Management (SCM), Enterprise Resource Planning (ERP), and real-time tracking technologies. These systems offer enhanced visibility, communication, and responsiveness in the event of disruptions. Businesses that put a high priority on IT investments are better able to absorb supply chain disruptions and bounce back more quickly.

In order to support supply chain operations, managers should set aside funds for the implementation or upgrade of IT infrastructure. These systems should be able to monitor, analyze, and communicate with all stakeholders in real time.

IT systems must be connected across the whole supply chain in order to effectively reap the benefits of IT in reducing supply chain disruptions. This entails linking distributors, logistics companies, and suppliers via a single IT platform that fosters communication and data exchange. Integration issues could make IT less beneficial and make disruptions worse.

In order to ensure that all parties involved in the supply chain can access real-time data, share information effectively, and react to disruptions cooperatively, managers should work toward end-to-end integration of IT systems.

Because information technology allows for real-time tracking and monitoring of items, inventory levels, and supplier performance, it significantly improves supply chain visibility. Managers can lessen the impact of possible problems, including delays or

bottlenecks, on operations by taking early measures to address them. This might be crucial in times of disruption when prompt decisions are required to change inventories, reroute shipments, or work with different suppliers.

IT can be used by managers to improve supply chain visibility. They should concentrate on deploying technologies like RFID, GPS tracking, and IoT-enabled devices to increase tracking capabilities throughout the supply chain.

IT technologies are essential, but how well employees use them determines how effective they are. Should one lack adequate training and a thorough comprehension of IT capabilities, the systems may not yield the desired performance gains. Supervisors are responsible for making sure staff members are properly trained to take use of IT services, particularly in times of interruption.

To increase staff proficiency with IT tools like data analytics platforms, SCM software, and ERP systems, invest in training programs. IT investments will result in improved operations thanks to well-trained personnel.

IT's moderating function in the relationship between operational performance and supply chain disruption highlights the strategic significance of IT in contemporary supply chain management. It is imperative that managers prioritize the integration of IT into all operations, enhance supply chain visibility, promote agility, and cultivate risk management competencies in order to make IT a fundamental component of their supply chain strategy. Employee training and IT system investments will guarantee that the business is prepared to manage supply chain disruptions and maintain operational performance.

5.4 Theoretical implications

The finding that information technology (IT) moderates the relationship between supply chain disruption and operational performance bears major theoretical implications, especially in the domains of supply chain management, operations management, and information systems. By emphasizing the role of IT as a moderating factor that can either amplify or reduce the impact of disruptions on performance, this research adds to the body of knowledge on theories and frameworks that already exist. The main theoretical implications are as follows:

According to contingency theory, there isn't a single organizational management strategy that works for all situations. Instead, the success of a given strategy or practice depends on the circumstances surrounding it. Contingency theory is supported and expanded upon by the discovery that IT moderates the relationship between supply chain disruption and operational performance. It implies that the degree of IT integration within the company affects how well supply chain interruptions are managed. Businesses can react to disruptions more quickly and effectively thanks to IT systems, which help them match their operational plans with the state of the environment.

This research lends credence to the notion that businesses should implement various tech solutions according to the unique requirements of their supply chain environments. Depending on the degree of IT adoption, disruptions may have a significant or negligible effect.

The firm's resource-based view (RBV) holds that valuable, rare, inimitable, and non-substitutable (VRIN) resources and competencies play a major role in determining the performance of an organization. Technology is frequently seen as a strategic asset that

can strengthen the competitive edge of a company. Because it emphasizes how IT resources assist businesses in managing supply chain risks and enhancing operational resilience, the conclusion that IT moderates the association between supply chain interruption and operational performance is consistent with the Resource-Based View (RBV). IT enables businesses to develop more robust dynamic capabilities, such as supply chain visibility, real-time data access, and improved decision-making in times of disruption.

This conclusion supports the RBV by highlighting the importance of IT as a crucial moderating component that enhances the firm's resilience to external shocks like supply chain interruptions, in addition to being viewed as a stand-alone resource. It expands the RBV's focus on tangible and intangible resources by placing importance on digital capabilities in minimizing external risks.

The ability of a company to integrate, develop, and reconfigure internal and external competences in response to quickly changing circumstances is the main focus of dynamic capabilities theory. The dynamic capabilities framework is supported by the function that IT plays in mitigating the relationship between supply chain interruption and operational performance. IT helps businesses respond to disturbances more quickly by enabling supply chain operations to be quickly adjusted and reconfigured. This is essential for preserving operational performance in times of crisis. IT solutions that offer predictive analytics or real-time data, for instance, enable businesses to immediately adjust their supply chain strategy in response to interruptions.

This result highlights the importance of IT as a critical enabler of flexibility and adaptability in the face of shocks, which validates the dynamic capabilities theory. Advanced IT capabilities enable businesses to dynamically modify their supply chain

plans, which is why IT is a crucial part of supply chain management's dynamic capabilities.

5.5 Limitations and Future Research Directions

The study has a number of limitations. The actual data collection was restricted to Ghana businesses, while it investigated when information technology moderates the relationship between supply chain disruption and operational performance. However, future studies by considering data from other country and regions should increase the scope of the study. The study revealed some fascinating results about supply chain disruption and operational performance among businesses in Ghana. However, some questions are left unanswered ed by this study. Future studies should explore other aspects of information sharing and supply chain disruption on operational performance. Also, future studies should consider the role that top management might play in the relationship between supply chain disruption, information technology and operational performance.

5.6 Recommendations

Based on the findings of the study, the following recommendations were made;

The study recommends that firms formulate policies that stress on a information technology since it has been found to have an impact on disruption as it will help in operational performance.

Firms must commit enough resources and capabilities to into enhancing information technology usage on the part of the suppliers; if they want to enhance their operational performance. Resource commitment is necessary for effective and efficient supply chain especially among service and manufacturing firms. It is also recommended that

as practically as possible, players and firms must make sure that the right type of mechanism is applied in the supply chain to disruptions from the suppliers and customers will affect their operational performance. This will ensure that there is widespread benefit within the chain.

REFERENCES

Blackhurst, J., Craighead, C. W., Elkins, D., & Handfield, R. B. (2011). An empirically derived framework of global supply chain resilience. *Journal of Business Logistics,* 26(1), 1-21.

Chopra, S., & Sodhi, M. S. (2014). Managing risk to avoid supply-chain breakdown. *MIT Sloan Management Review*, 46(1), 53-61

Chowdhury, P., Paul, S. K., Kaisar, S., & Moktadir, M. A. (2021). COVID-19 pandemic related supply chain studies: A systematic review. *Transportation Research Part E: Logistics and Transportation Review,* 148, 102271.

Craighead, C. W., Blackhurst, J., Rungtusanatham, M. J., & Handfield, R. B. (2007). The severity of supply chain disruptions: *Design characteristics and mitigation capabilities. Decision Sciences,* 38(1), 131-156.

Donaldson, L. (2001). *The Contingency Theory of Organizations*. Sage Publications.

Donaldson, L. (2001). *The Contingency Theory of Organizations*. Sage.

Dubey, R., Gunasekaran, A., Bryde, D. J., & Hazen, B. T. (2021). The effects of big data analytics on supply chain sustainability performance. *Resources, Conservation, and Recycling,* 168, 105439.

Dubey, R., Gunasekaran, A., Childe, S. J., Wamba, S. F., & Papadopoulos, T. (2020). The impact of big data on world-class sustainable manufacturing. *International Journal of Production Economics*, 229, 107775.

Flynn, B. B., Huo, B., & Zhao, X. (2016). The impact of supply chain integration on performance: A contingency and configuration approach. *Journal of Operations Management,* 28(1), 58-71.

Hendricks, K. B., & Singhal, V. R. (2005). An empirical analysis of the effect of supply chain disruptions on long-run stock price performance and equity risk of the firm. *Production and Operations Management,* 14(1), 35-52.

Hohenstein, N. O., Feisel, E., Hartmann, E., & Giunipero, L. (2015). Research on the phenomenon of supply chain resilience: A systematic review and paths for further investigation. *International Journal of Physical Distribution & Logistics Management,* 45(1/2), 90-117.

Ivanov, D., & Dolgui, A. (2020). A digital supply chain twin for managing the disruption risks and resilience in the era of Industry 4.0. *Production Planning & Control*, 32(9), 775-788.

Ivanov, D., & Dolgui, A. (2021). A digital supply chain twin for managing the disruption risks and resilience in the era of Industry 4.0. *Production Planning & Contro*l, 32(9), 775-788.

Ivanov, D., Dolgui, A., & Sokolov, B. (2019). The impact of digital technology and Industry 4.0 on the ripple effect and supply chain risk analytics. *International Journal of Production Research,* 57(3), 829-846.

Merschmann, U., & Thonemann, U. W. (2011). Supply chain flexibility, uncertainty, and firm performance: An empirical analysis of German manufacturing firms. *International Journal of Production Economics,* 130(1), 43-53.

Ponomarov, S. Y., & Holcomb, M. C. (2009). Understanding the concept of supply chain resilience. *The International Journal of Logistics Management,* 20(1), 124-143.

Tang, C. S. (2006). Perspectives in supply chain risk management. *International*

Journal of Production Economics, 103(2), 451-488.

Tjahjono, B., Esplugues, C., Ares, E., & Pelaez, G. (2021). What does Industry 4.0 mean to supply chain? *Procedia Manufacturing,* 13, 1175-1182.

van Hoek, R. (2020). Research opportunities for a more resilient post-COVID-19 supply chain—closing the gap between research findings and industry practice. *International Journal of Operations & Production Management*, 40(4), 341-355.

Wamba, S. F., Gunasekaran, A., Dubey, R., & Ngai, E. W. (2020). Big data analytics in operations and supply chain management. *Annals of Operations Research*, 270(1-2), 1-4.

APPENDIX

SURVEY QUESTIONNAIRE

I am a postgraduate student at University of Education, Winneba, Department of Procurement and supply chain management. This survey instrument has been designed to enable me carry out research on the topic: **THE EFFECTS OF SUPPLY CHAIN DISRUPTION ON OPERATIONAL PERFORMANCE OF THE GHANA ARMED FORCES: THE MODERATING ROLE OF INFORMATION TECHNOLOGY**

”. Any information provided will be used for academic purposes ONLY.

SECTION A: RESPONDENT’S BIOGRAPHY AND COMPANY PROFILE

When completing this questionnaire, please tick **[√]** in the applicable box or provide an answer as applicable.

1. Gender: [ ] Male [ ] Female

2. Age: [ ] 23 years and below [ ] 24–29 years [ ] 30–35 years
[ ] 36–40 years [ ] 41 years and above

3. Educational Background:
[ ] No formal education [ ] Basic/Primary [ ] Secondary
[ ] Bachelor’s Degree [ ] Master’s Degree [ ] Ph.D./Doctorate

4. Number of years the firm has been in operation:
[ ] Less than 1 year [ ] 1-5 years [ ] 6-10 years
[ ] 11-15 years [ ] 16-20 years [ ] 21 years & above

5. Number of employees in the firm:
[ ] Less than 6 employees [ ] 6-9 employees [ ] 10-29 employees
[ ] 30-50 employees [ ] More than 50 employees

6. Type of ownership:
[ ] Fully locally owned [ ] Fully foreign owned [ ] Jointly Ghanaian & foreign owned

7. Position of respondent
[ ] Procurement manager [ ] logistics manager [ ] warehouse officer

SECTION B: Digital innovation capabilities (Source: Miocevic & Crnjak-Karanovic, 2012)

Indicate the extent to which you agree or disagree with each statement by checking the appropriate number from 1 to 7, using the following scale:

1 = Strongly Disagree	***2 = Disagree***	***3 = Somewhat Disagree***
4 = Indifferent/Not Sure	***5 = Somewhat Agree***	***6 = Agree***
7 = Strongly Agree		

Item	**Statement**	**1**	**2**	**3**	**4**	**5**	**6**	**7**
Digital innovation capabilities								
SCD1	Our supply chain experiences frequent disruptions in inbound logistics.							
SCD2	There have been recurring disruptions in the supply of raw materials.							
SCD3	We often face delays or interruptions in the transportation of goods.							
SCD4	Disruptions in production processes have occurred regularly over the last year.							
SCD5	Our lead times have been significantly affected by supply chain disruptions.							
	SOURCE:							
Information technology								
IT1	Our company has access to up-to-date IT systems to support business processes.							
IT2	The IT infrastructure in our organization is readily available for employees to use.							
IT3	Our organization has reliable access to the latest software applications for business operations.							
IT4	The IT systems we use support all key functions of our supply chain operations.							
IT5	The functionality of our IT systems meets the needs of all departments in our organization.							

SECTION C: Firm performance

Indicate the extent to which you agree or disagree with each statement by checking the appropriate number from 1 to 7 using the following scale:

1 = Strongly Disagree	***2 = Disagree***	***3 = Somewhat Disagree***
4 = Indifferent/Not Sure	***5 = Somewhat Agree***	***6 = Agree***
7 = Strongly Agree		

Item	**Statement**	**1**	**2**	**3**	**4**	**5**	**6**	**7**
OP1	Our firm has cut down operating costs							
OP2	Our firm has enhanced the company's overall competitive position							
OP3	Our firm has increased product sales growth rate							
OP4	Our firm has increased its market share of products							

Thank you for participating in the survey