KWAME NKRUMAH UNIVERSITY OF SCIENCE AND TECHNOLOGY

INSTITUTE OF DISTANCE LEARNING

EXAMINING THE EFFECT OF SUPPLY CHAIN INTEGRATION ON SUPPLY CHAIN PERFORMANCE IN THE OIL AND GAS INDUSTRY IN GHANA: EVIDENCE FROM SERVICE LEVELS KITS DELIVERY OF SCHLUMBERGER GOS GHANA

BY

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DECLARATION

I declare that this submission is my own work towards the Master of Science (Logistics and Supply Chain Management Option) Degree and to that, to the best of my knowledge, it contains no material previously published by another person or material which has been accepted for the award of any other degree of the University. Except where due acknowledgement has been made

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DEDICATION

I dedicate this thesis to my wife and children throughout this MSc programme.

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I give God all the glory for the strength and will power afforded me to successfully complete this study. A couple of individuals helped in making the completion of this study possible and I am forever grateful, and I dedicate this study to all of them. I cannot be grateful enough to my supervisor Dr. Samuel Bruce Rockson for the time, patience, guidance, constructive criticisms, suggestions, and encouragement that went a long way to help in the completion of my work, God bless you forever sir. I am very thankful to all participants of the study for their time and the assistance given in the collection of the data to aid the completion of my work successfully. I also dedicate this work to my family for all the support financially and to my colleagues and friends for their invaluable input in one way or the other.

God bless you all immensely.

ABSTRACT

A study that seeks to examine effect of supply chain integration (SCI) on supply chain performance is one that cannot be overemphasized. This necessitated this study to examine the effect of supply chain integration on supply chain performance of service levels kits delivery of Schlumberger Gos Ghana. This was done by selecting sample of respondents who were actors among firms along the supply chain of Schlumberger GOS Ghana of which a response rate of 74.5% was achieved using appropriate methodological approaches. The study revealed that for the firms in Ghana to benefit from supply chain integration, there is the need for absolute supplier integration. That is, those who are at the helm of affairs among firms should develop measures for building strong relationships with their suppliers and providing them with necessary support that is necessary for such collaborating and engagement. Also, the study found out that though internal integration is vital to all stages of supply chain integration, it does not necessarily contribute much to supply chain performance. Finally, the study revealed that when there is supplier quality management, it could yield performance but this relationship was not statistically significant in this study. This means that for Ghana to have higher supply chain performance in the firms along the supply chain of Schlumberger GOS Ghana, there is the need for effective supply chain integration. Supply chain integration is a vital component of ensuring an effective supply chain network. The advantage of supply chain integration can be achieved through efficient relationship among various supply chain activities, with a linkage based on the effective construction and utilization of various supply chain activities for an integrated supply chain. And this is mostly applicable among firms in Ghana.

The entire work has been proofread and necessary grammatical and typographical errors are corrected. Also, all issues identified in the book have been resolved.

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CHAPTER ONE

INTRODUCTION

1.1 Background of the Study

During the past decade, supply chain management (SCM) and information technology management have attracted much attention from both practitioners and researchers. As information technology evolves, firms tend to become more integrated. Therefore, integrating effective supply chain practice with effective information sharing becomes critical for improving supply chain performance (Zhou and Benton, 2007). Partnering between firms is an increasingly common way for firms to find and maintain competitive advantage. This could be occurred through extensive social, economic, service, and technical ties over time (Mentzer et al., 2000).

According to Hakansson and Persson (2004), at least three different trends in developments of logistics solutions can be identified within industry during past years. First, increased integration of logistics activities across firm boundaries aimed at reducing costs which revealed the need for closer coordination and cooperation with suppliers and customers. The second trend characterizing emerging supply system is the increased specialization of individual companies. Outsourcing of traditional activities including logistics activities is an example of such trend. Finally, the third trend concerns change and innovation. Importance of response to market changing demands has forced companies to be more agile, responsive, and intelligent.

Companies have relentlessly restructured and reengineered to increase organizational effectiveness and satisfy key customers. Lack of the resources and competencies needed to achieve competitive success has led firm managers to look beyond their companies' organizational boundaries to evaluate how the resources of suppliers and customers can be used to create exceptional value. Efforts to align objectives and integrate resources across company

boundaries to deliver greater value are known as supply chain management initiatives (Fawcett and Magnan, 2002).

For this reason, supply chain integration (SCI) has been transformed into a very useful practice because it promotes joint planning, value creation, and the development of cross-firm problem-solving processes (Cao and Zhang, 2011; Wong et al., 2011; Wu et al., 2010). Hence, during the past decade different scholars have been emphasizing on the strategic significance of close integrative associations between supply chain partners (Bernon et al., 2013; Childerhouse and Towill, 2011; Palomero and Chalmeta, 2014; Zhao et al., 2011). For instance, Frohlich and Westbrook (2002) argued that firms that link their suppliers and customers in decisively integrated networks could turn into the most competitive and valued companies in the industry. Several authors empirically agree that SCI improves performance (e.g. Das et al., 2006; Flynn et al., 2010). In some cases, investigation on this issue reported a negative relationship between SCI and performance (Rosenzweig et al., 2003; Vickery et al., 2003). Nevertheless, the majority of existing studies in this area have reported a positive association between SCI and performance.

Furthermore, some studies on SCI have focused on developing definitions and dimensions of SCI (Flynn et al., 2010). While some authors have viewed SCI as a single construct (e.g. Sezen, 2008; Shub and Stonebraker, 2009), few researchers have examined the effects of internal, customer, and supplier integration on performance outcomes (Flynn et al., 2010; Koufteros et al., 2005; Wong et al., 2011). Additionally, a small number of studies have employed the same SCI dimensions and variables for specific region, country or industry (Alfalla-Luque et al., 2013). However, Flynn et al. (2010) argued that most of such empirical research overlook the role of internal integration, and emphasize supplier and customer integration.

In Africa and Ghana specifically, there is limited studies on supply chain integration and firm performance. As such, there is a research gap as far as this area and context is concerned. Thus, it is essential to conduct a study to ascertain the extent of supply chain integration among Ghanaian organisations and its effect on their supply chain performance in terms of time, cost, quality and delivery. It is against this backdrop that this study is being conducted.

1.2 Problem of the Study

A study that seeks to examine the effect of supply chain integration (SCI) on supply chain performance is one that cannot be overemphasized. There have been several extant studies that have analysed the relationship between supply chain integration and supply chain performance and showed positive results (Tarifa-Fernandes and Burgos-Jimenez, 2017; Leuschner et al., 2013). However, there has been other studies that have showed different result culminating in no consensus in the relationship between SCI and performance (Huo, 2012; Vickery et al., 2012). Nonetheless, the SCI construct has also been measured using different approaches (unidimensional, multidimensional construct, and even as a set of practices). Also, studies that analyse that SCI as a construct views the construct from internal integration point of view or external integration (Huo et al., 2014; Droge et al., 2004). Furthermore, some studies suggest the existence of moderating effects of the SCI measures (Wiengarten et al., 2014; Danese and Romano, 2013, 2011; Flynn et al., 2010). This implies that the SCI literature do not have a consensus in the measurement, relationships and effect.

The conventional wisdom in most supply chain management literature is that "the more integration, the better the performance of the supply chain" (Bagchi et al., 2005). SCM concept is defined as "integration of business processes" (Cooper et al., 1997). Lee et al. (2000) argues that a truly integrated supply chain does more than reduce costs. It also creates value for the company, its supply chain partners and its shareholders. The ideal situation is that the entire process across the supply chain is designed, managed and coordinated as a unit. This is also in

accordance with other papers from 2000 onwards discussing supply chain integration and performance (Stock et al., 2000; cited by Fabbe-Costes and Jahre, 2007; Frohlich and Westbrook, 2001).

However, not everybody agrees that integration and close collaboration are the best solution in every case. Bask and Juga (2001) believe that we need to re-evaluate the dominant view of integrated supply chain management and propose that polarization of strategies in supply chains can lead to separation and give rise to semi-integration rather than full integration. For some companies, tight integration is the answer. For others, intensive integration might be the goal in selected areas of SCM, such as quality management and performance measurement, while in other areas it can be beneficial to strive for limited integration.

According to the authors (Bask and Juga, 2001), the pressures in contemporary SCM seem to be towards the opposite direction: disintegration, divergence and differentiation. Degree of supply network dynamics and focal firm's influence has also proposed to classify supply chains with different levels of integration (Harland et al., 2001). Correspondingly, Bagchi and Skjoett-Larsen (2002) suggest a contingency approach to supply chain integration, arguing that elements such as dominance versus balanced power in the supply chain, the maturity of the industry, the degree of competition in the industry, and the nature of the products may specify the desired level of integration in a supply chain.

Kim (2013) argued that most studies on supply chain integration addressed the direct relationship between SCI and performance with reference to studies conducted from 2000 to 2016, whereas Mackelprang et al. (2014) also found out than more than half of studies that looks at the relationship between SCI and performance are subject to unknown moderating effects. Thus, performance measurements related to SCI might vary widely. The question to ask then is, to what extent does supply chain integration has impact on firm's supply chain

performance? As such, this study sought to fill this gap by identifying supply chain integration practices that influence supply chain practices performance. The study seeks to make theoretical and practical contributions.

1.3 Objectives of the Study

The general objective of the study is to assess the effect of supply chain integration and supply chain performance: evidence from service levels kits delivery of Schlumberger Gos Ghana. However, the specific objectives are as follows;

1. To determine the effect of supplier integration on a firm's supply chain performance.
2. To assess the influence of internal integration on a firm's supply chain performance.
3. To determine the effect of customer integration on a firm's supply chain performance.

1.4 Research Questions

1. What is the effect of supplier integration on a firm's supply chain performance?
2. What is the effect of effect of internal integration on a firm's supply chain performance?
3. What is the effect of customer integration on a firm's supply chain performance?

1.5 Significance of the Study

Theoretically, this study contributes to the field of literatures on supply chain performance and supply chain integration. The study provides a further literature on the relationship between supply chain integration and supply chain performance especially within Ghanaian firms. Although many researchers have proven the existence of relationship between supply chain integration and supply chain performance (Cao and Zhang, 2011; Wong et al., 2011; Wu et al., 2010; Bernon et al., 2013; Childerhouse and Towill, 2011; Palomero and Chalmeta, 2014; Zhao

et al., 2011), the study will help confirm the proposed relationship are valid and true in all contexts including Ghana, a developing country.

On the other hand, through the findings of this study, it will help serve as a guideline to the organization, whether proper planning and implementation of the supply chain integration dimensions will definitely lead to the improvement of supply chain performance.

On a broader aspect, the findings from this study might be useful to other competitor companies in the country and other developing countries since the study suggests how supply chain performance can be achieved through the management of supply chain integration. The study would also be relevant to academia and other areas as it would expand the frontiers of learning and research in this area and assist as standpoint for other researchers who may be interested in conducting further studies in this area in future especially in Sub Saharan Africa.

1.6 Methodology

Due to the nature of this study, it employs a quantitative approach. An integration of analytical framework with the use of primary data was collected. Primary data was collected through administering of questionnaires and secondary data through books, journals and the review of existing literature. The content of the questionnaire was designed in accordance with the objectives. This was used to gather responses from top management, staff and customers of firms in Ghana. The study would employ regression model where bank profitability would be the explanatory variable been predicted by contribution of various sectors and make meaningful analysis of data collected to draw conclusions and give recommendations for manager and decision makers to take a cue from.

1.7 Scope of the Study

The study is written within the supply chain management context and focused on supply chain integration. The study looks at whether the dimensions of supply chain integration positively relate to supply chain performance of firms. The dimensions of SCI identified for this study are supplier integration, internal integration and customer integration as per the studies of Xu et al. (2014) and Zhao et al. (2013). Supply chain performance is measured in 4 dimensions namely cost performance, efficiency performance, quality performance and flexibility performance. The geographical scope of the study is service levels kits delivery of Schlumberger Gos Ghana. The unit of analysis is firm-level represented by top management members in the supply chain of Schlumberger Gos Ghana.

1.8 Limitations of the Study

Almost every field research encounters some challenges, this study was no exception. The research design was constrained by limited access to objective verifiable quantitative data, in part due to commercial confidentiality on the part of some players. Apart from the challenge of bearing huge financial costs and limited time frame for the completion of the study, the researcher had to interpret the questions in the survey instrument to some respondents due to their lack of proficiency in reading which limited wider data coverage. Additionally, there were some cases of data loss in the responses and some questionnaires were never returned. As a result, data collected had to be checked and re-tested through all other means possible to improve on its validity and reliability. Notwithstanding, the statistical results of these tests were very good, rendering such errors negligible.

1.9 Organization of the Thesis

The study would be organized into five Chapters. Chapter One provides the introduction of the study which comprise the background of the study, problem statement, objectives of the study, research questions, significance of the study, overview of methodology, scope of the study, significance of the study and organization of the study. Chapter Two provides both theoretical and empirical review of existing literature in the area of supply chain integration and supply chain performance and also in line with the objectives of the study.

Chapter Three gives details on the methods and methodological approaches that were used to conduct the study. This comprises the research design, population and sample of the study, sources of data, data collection techniques, data analysis as well as ethical consideration and research quality indicators. Chapter four provides the presentation of the data gathered from the field, the analysis and discussions in line with the objectives of the study. Chapter Five finally provides the summary of findings, conclusions and recommendations of the study for managers and decision makers to consider for adoption and implementation.

CHAPTER TWO

LITERATURE REVIEW

2.1 Introduction

This Chapter reviews extant scholarly works on the subject-matter regarding supply chain integration and supply chain performance. There are three dimensions of SCI namely supplier integration, internal integration and customer integration and these are all reviewed accordingly. The literature reviewed provides information about previous studies on the topic and helps to compare the findings of this research with existing ones. Major literature reviewed includes the concept of supply chain network, supply chain management, supply chain integration, supply chain performance and the theoretical framework for the study.

2.2 Conceptual Review

2.2.1 Definitions and Overview of Supply Chain

Supply chain is considered as a system that includes group of activities, processes and sub-processes such as procurement, operations, transportation, warehousing. It aims to provide the products and/or services either to consumer or customer starting with purchasing materials and equipment then transforming it to semi-finished products that will be reprocessed again to produce the final products.

Supply chain management is concerned with the planning and managing the flow of materials, products and services among and between these processes. The ultimate goals of managing supply chain is to provide the products at the agreed delivery time, suitable quality, and competitive price to the customers, and that is reflected by the customer's satisfaction and the overall organizational performance.

The concept of supply chain has been evolved over time. Chopra and Meindl (2007) said that supply chain consists of all parties involved directly or indirectly in fulfilling customer demand,

it includes all functions involved in receiving and fulfilling a customer's requests. These functions include manufacturers and suppliers, warehouses, transporters, retailers, and final customers. Chopra and Meindl (2007) added that the objective of every supply chain is to maximize the overall value created. Wheelen and Hunger (2011) stated that "Supply chain management is the forming of networks for sourcing raw materials, manufacturing products or creating services, storing and distributing the goods, and delivering them to customers and consumers". Then they added that the concept of supply chain is used first to reduce costs, and then to improve customer service and get new products to market faster than others. Finally, Mentzer et al. (2001) indicated that supply chain links a firm with its customers, suppliers and other members of the supply chain system, including logistics and warehousing companies. The goal of SCM is for members in the organisations to integrate, work together, and build a partnership with each other to increase the competitive advantage of the supply chain as a whole.

In summary, the concept of supply chain management was recently introduced which covers all activities carried out by organizations to collaborate with suppliers and customers to satisfy customers' needs, requirements and preferences.

2.2.2 Definitions and Overview of Supply Chain Integration

There are slight variations in the way supplier integration is defined in previous literature. It has been described as a "process of acquiring and sharing operational, technical, and financial information and related knowledge" (Swink et al., 2007) a "state of synergy accomplished through a variety of integration practices among the supplier, purchasing and manufacturing constituents of an organization," (Das et al., 2006) and as "the degree to which a firm exchanges information and develops partnerships with its suppliers" (Danese, 2013). From the literature it can be concluded that the integration taking place can concern the exchange of materials, information and knowledge in different ways.

Due to the intense of global competition, the organizations create cooperative and mutually beneficial relationship among supply chain partners (Wisner and Tan, 2000). Bowersox et al. (1999) and Frohlish and Westbrook (2001), pointed out that organizations or companies need to implement supply chain integration to meet the new challenges of the global competitive environment. Many studies propose different supply chain definitions. Rosenzweig et al. (2002), Pagell (2004), and Han & Omta (2007) defined integration of supply chain as a process of collaboration in which companies work together in a cooperative manner to arrive at mutually acceptable outcomes. Zhao et al. (2008) described supply chain integration as "the degree to which an organization strategically collaborates with its supply chain partners and manages intra- and inter-organization processes to achieve effective and efficient flows of products, services, information, money and decisions, with the objective of providing maximum value to its customers". Krajewski et al. (2013) defined supply chain integration as "the effective coordination of supply chain processes through the seamless flow of information up and down the supply chain". Supply chain integration can be defined as the process through which all parties who involved with supply chain; supplier, organizations and customers, are working independently and dependently in a harmony way to achieve a unite objectives such as providing maximum customer value, lowering overall cost. Bagachi et al. (2005), Fabbe-Costes and Jahre (2007) said that supply chain integration is a key to the success of companies and supply chains.

In this study, supply chain integration defined as the process of collaboration within supply chain players that manage inter and intra- organization activities to achieve effective and efficient flow of products, services and information to provide a maximum value to the customer in right place at suitable price and high speed. Supply chain integration was measured by: supplier, internal, and customer integration.

2.2.3 Supply Chain Integration Elements

Supply chain management can be classified into three macro processes (stages) to better understanding of supply chain integration (Chopra and Meindl, 2007):

a. Customer relationship management: all processes and activities those focus on downstream interaction between the organization and customer.

b. Internal supply chain management: all processes and activities that focus on internal operations within organization.

c. Supplier relationship management: processes that focus on upstream interaction between organization and supplier.

At the start, the organizations were focusing on what they were able to do to manage the business and achieve their goals which were represented by the profitability and customer satisfaction, so the main focus was on managing internal processes between the departments which was effective at that time. Later, the concept of organizational performance was coupled with supply chain performance, so the organizations that plan to continue, compete, survive, and being superior over the other competitors started to adopt this concept and tried to expand the scope of managing the relationship with the other supply chain parties (suppliers and customers).

Even an effective supply chain management could not be able to achieve its objectives and being effective unless it maintained internal (interdepartmental) and external coordination and collaboration, thereby the importance of supply chain integration has emerged between and among these processes and activities. In addition, supply chain must be designed in a way that ensure all processes, activities, roles, and stages are aligned to support the supply chain

strategy. Basic Enterprise Resource Planning (ERP) is one of various software systems that used to make the integration between the three processes (stages).

Monk and Wagner (2013) defined ERP as "systems that can help a company integrate its operations by serving as a company-wide computing environment that include delivering consistent data across all business function". Evolution and development in information technology allowed ERP to evolve and being flexible to match the between all supply chain parties. ERP link different applications into single application that integrates the data and business processes such as integrating the following operational functions: marketing and sales, accounting, human resources, purchasing, and logistics.

Many researches and academic papers have been written about supply chain management and its elements. Some were investigated supply chain integration. Others were studied supply chain performance, while others were discussed mediating factors that affect supply chain integration or performance and/ or both of them. Finally, some studies have addressed both elements together (supply chain integration and performance).

Zhang and Huo (2013) focused on dependence and trust and its impact on external integration (supplier and customer). Frohlich and Westbrook (2001) studied the arcs of integration (supplier and customer). Van der Vaart and van Donk (2008) analyzed integration from different perspectives: attitudes, pattern, and practices. Zhao et al. (2011) emphasized on internal integration, and concluded that internal integration is the source of both customer and supplier integration through relationship commitment to customer and relationship commitment to supplier.

Rosenzweig et al. (2002) explored supply chain integration intensity on competitive capabilities and business performance. In addition, they studied the mediating effect of competitive capabilities between supply chain integration and business performance. Alam et

al. (2014) studied the mediating effect of logistics integration on supply chain performance. The results showed that logistic integration has very significant direct effect on supply chain performance.

Lockamy and McCormack (2004) explored the linkage between supply chain operations reference planning practices (plan, source, make, and delivery) to supply chain performance. Zelbst et al. (2010) investigated supply chain performance through the impact of supply chain linkages. In addition, they assessed the relationships of the linkages with supply chain performance. Vaidya and Hudnurkar (2012) explored multiple criteria for supply chain performance. These criteria include: cost, customer service, productivity, asset-management, quality, time, innovativeness, flexibility/adaptability, supplier profile, marketing measures and ability to collaborate. Cirtita et al. (2012) explained one- dimensional structure; supply chain operations reference that consists of: flexibility, costs, delivery reliability, asset management efficiency, and responsiveness.

Huo (2012) examined the impact of supply chain integration with its elements (Supplier, Internal and customer integration) on three types of company performance (supplier-related, customer-related and financial performance). Huo (2012) concluded that internal integration improves external integration, and both integrations directly and indirectly enhance company performance. Xu et al. (2015) explored intra-organizational resources (Top management support and Information technology) and inter-organizational capabilities (Supplier and Customer integration) and its effect on competitive advantage (Performance). They found that inter- organizational resources were vital enablers of supply chain integration. In addition, both supplier and customer integration have significant effect on business performance. Zhao et al. (2013) investigated the impact of supply chain risk (supply delivery, and demand delivery risk)

on supply chain integration (supplier, internal, and customer integration) and company performance (schedule attainment, competitive performance, and customer satisfaction).

From above, it shows clearly the importance of the relationships between and among supply chain activities, processes, and personnel who perform specific tasks to add value for overall supply chain partners. Accordingly, and based on previous studies regarding to the importance of all supply chain elements, this study was intended to investigate all the supply chain variables: Supplier, Internal, and Customer integration variables.

2.2.3.1 Supplier Integration

Suppliers are considering the main and the only source for inputs that are needed by the organizational operations, so they have an essential role in the continuation of manufacturing products and /or services in order to meet customer requirements. In the modern era, giant manufacturing organizations tend to build strong relationship and partnership with their suppliers to manage the fluctuation in customer demands and reducing the cycle and delivery time. More over the suppliers now are more involved in designing the products and operations to facilitate the manufacturing process and being close to the customer.

From the literature review, Stank et al. (2001), defined supplier integration as "the degree to which a firm can partner with its key supplier members". Some authors use the term downstream integration to express supplier integration. Scannell et al. (2000) have focused on upstream integration, analyzing the integration with suppliers. Flynn et al. (2010), also comment on supplier integration as it involves core competencies related to coordination with critical suppliers.

Accordingly, current study defined supplier integration as the process of cooperation between supplier and organization that facilitate sharing of information, knowledge, materials and experiences. It was measured by specific items that reflect the nature of relationship,

partnership, and other relevant issues between supplier and Pharmaceutical Manufacturing Organization.

2.2.3.2 Internal Integration

Internal integration is the centre of gravity for both suppliers and customers and it's considered the linchpin that maintains the stability and continuity for all supply chain parties, so the organization could not make neither supplier nor customer integration without internal integration. Building the proper supply chain strategy depends heavily on the existence of clear and shared goals, which originally derived from the adoption of all departments of the organizational mission, vision, and objectives. In the presence of such consensus, each department is considering two types of customers. The first customer is the main customer that the organization plans to provide with the final product or service, and the second customer is the department or the employee where depending on the other output to continue achieving their tasks and thus achieving the overall organizational objectives.

Many researchers were defining internal integration. Among them, Flynn et al. (2010) defined internal integration as "the degree to which a manufacturer structures its own strategies, practices and processes into synchronized, collaborative processes to fulfil its customers' requirements and efficiently interact with suppliers". Zhao et al. (2011) said that “the internal integration stresses organizational structure, procedures, and practices, so it must be collaborative and synchronized to fulfil customer requirements”.

In this study, internal integration defined as the process of maintaining cross-functional cooperation and collaboration within the organization that intends to achieve organizational strategic goals. It was measured by a group of items that identified the nature of relationship, coordination and collaboration among organizational departments.

2.2.3.3 Customer Integration

Customers are considering the source of life for organizations whatever they provide either product or service and it's considered the fresh air that is needed by the organization to grow and being able to survive in the presence of the strong and tough competitions. Customer needs and requirements are always transformed, so what was considered essential in the past perhaps it becomes complementary in the near future. Accordingly, the organizations should monitor the external environment such as political, economic, social, technological, and legal changes Moreover it should behave proactively but not reactively to be superior over competitors in satisfying customer needs.

Managing the relationship with customer is considered a vital element in supply chain. Customer integration was discussed and defined by different researchers' perspectives. Flynn et al. (2010), added that customer integration involves core competencies derived from coordination with critical customers. Kulp et al. (2004) have studied the integration with buyers.

Van der Vaart and Van Donk (2008) analyzed supply chain integration from different perspectives: attitudes, pattern, and practices. While other authors have studied integration with customers and suppliers such as Salvador et al. (2001); Frohlich and Westbrook (2001); and Narasimhan and Kim (2002). Rosenzweig et al. (2002) examined supply chain integration as a single dimensional construct, while Droge et al. (2004); Koufteros et al. (2005); Flynn et al. (2010) and Zhao et al. (2011) considered a broader perspective for supply chain integration as internal integration and external integration. Huo (2012) said that both supplier integration and customer integration can be classified as external integration.

In current study, customer integration defined as the process of building and maintaining a strong relationship and partnership with the customers. It includes sharing the knowledge,

experiences, products, services, and suggestions with customers. It was measured by selected items that explore the relationship and partnership and related issues.

The current research addresses the supply chain integration which includes supplier integration, internal integration and customer integration.

2.2.4 Supply Chain Performance

Academicians and researchers have investigated supply chain performance from many different perspectives. Wang and Kafouros (2009) developed supply chain performance measures based on efficiency. Gimenez et al. (2011) studied profits, delivery speed and transportation costs as a performance measure. Vanichchinchai (2014) investigated firm's supply performance that composed of flexibility, cost, relationship and responsiveness.

Frohlich and Westbrook (2001) and Yu et al. (2001) stated that eliminating non-added value activities, decreasing variance of orders and speeding product flows affect organizations performance. Hult et al. (2002) mentioned that IT and process innovation can contribute significantly to supply chain performance. Shah (2009) said that organizations must recognize the nature of trade-offs between customer services and costs. The organizations attempt to gain competitive advantages by aligning supply chain processes and decisions with its business strategy. Shah (2009) stated that supply chain strategy should ensure that supply chain provides a superior value to the end user in an efficient manner. Zelbst et al. (2009) emphasized that organization success depends heavily on the success of supply chain in which the organization participates as a partner. Wheelen and Hunger (2012) reviewed Porter's competitive strategies (lower cost, focus and differentiation) and argued that business strategy focuses on improving the competitive position of a business unit's, products and/or services within specific industry or market segment. Wheelen and Hunger (2012) indicated that supplier network resources have

a significant impact on firm's performance. Alam et al. (2014) concluded that logistic integration has mediating effect on supply chain performance.

Bowersox et al. (2000) and Croxton et al. (2001) said that the use of external linkage performance metrics leads to the creation of end- customer value through integrating activities and communication with other member firms along the supply chain. Harrison and New (2002) pointed out the importance of supply chain performance metrics as a standard framework to assess supply chain performances which include internal and external firm links. Vaidya and Hudnurkar (2012) presented the criteria of performance evaluation through cost, customer service, productivity, asset measurement, quality, time, innovativeness, price, flexibility / adaptability, ability to collaborate, supplier profile, and marketing measures.

This study is considered the supply chain performance as a group of standards and benchmarks that are adopted and used by the organizations to achieve competitive advantage, customer satisfaction, and maximum level of profitability. In this study supply chain supply chain performance was measured by the following dimensions: Flexibility, Time (Speed), Quality, and Cost because they are considered the most common dimensions that were investigated between previous studies.

2.3 Theoretical Review

The literature on supply chain management is based on various theories and models, which make it difficult to determine the best theory or model suitable for study of SCM and implementation. Although the field of SCM has been growing fast, there is still a lack of academic literature regarding methodologies to guide and support SCM evaluation and implementation (Akkermanset al., 2004; Croxton et al., 2001; Lambert et al. 1998a). The literature on SCM inclines to change between description, prescription and trend identification (Storey et al., 2006).

Two main theories guide the research on the effect of e-procurement on organisational performance in Ghana. Resource-Based View (RBV) theory and the Transaction Cost Economics (TCE) are the two theories that underpin the study.

2.3.1 Resource-Based View (RBV) Theory

A resource-based view (RBV) is the cornerstone of this analysis and this section will concentrate on evaluating and addressing its relevance, as all research elements are built on this theory. From this theory logistics capacity was developed; however, as it is such an important concept for this study.

RBV's definition, according to Strategic Management, is 'a strategic idea of management that each firm is unique and processes resources and capabilities that provide the basis for its competitive advantage' (Mohamed et al., 2014). One of the important contributions to this study of resource-based theory is that it presumes that each firm has a unique bundle of resources and capabilities that form the source of competitive advantage for the firms (Mohamed et al., 2014). Each organization has unique skills, individuals, resources and capabilities: in other words, each is distinct. Every international logistics firm, too, is unique. Every practical theoretical framework must therefore be tailored to a particular company so as to effectively and efficiently solve specific problems.

Initially, a resource-based approach focuses on the businesses' internal resources and capabilities. It contrasts with the industrial or organizational view that the sector in which a company chooses to compete has a greater impact on performance than the firm's internal resources. This view considers that the success of a firm is highly affected by its external environment (Mohamed et al., 2014), in other words, it relates to external resources and capabilities.

Resources are essential inputs to produce the final product or service, and are the basis for the productivity of a business. Capacity refers to the ability of a company to distribute capital, typically in conjunction, using organizational processes, to achieve a desired ending. They are processes based on knowledge, tangible or intangible, which are firm-specific and evolved over time through complex interactions.

According to the RBV theory, company unique features contribute to organisational performance (Abadi and Cordon, 2012). Since many resources are firm-specific and not completely elastic or imitable, firms are increasingly heterogeneous as to their resource base. Sustained heterogeneity of firm capital, therefore, is a potential source of organisational performance (Das and Teng, 2000).

In the current state of strategy research, there are two diametrically opposed ideas that explain why some firms perform better than others, resulting in higher firm value. The resource-based view (RBV) and the market-based view (MBV) are two of them.

According to Barney (1991), a key proponent of the resource-based view (RBV), the company's resource-based perspective (RBV) is centered on the firm's resources and competences to illuminate organisational performance. According to this perspective, organizations with competitive advantage are one-of-a-kind and have important firm-specific resources that competitors cannot duplicate. Physical, human, and organizational capital resources are divided into three categories in the resource-based view (RBV). These assets are used by businesses to improve their performance.

The market-based view (MBV), on the other hand, focuses on the markets in which the firm competes, approaching the problem from the outside. This focuses primarily on the state of finished items on the market as a guarantee of future earnings and improved business performance in the interim (Tallman, 1991). Competitive advantage, according to this

viewpoint, is based on competition limits arising from market structure. The competitiveness of the firm's external product marketplaces generates its value. As a result, the firm's market power reflects its performance. Monopoly, entry restrictions, and negotiating power are all ways to gain market power (Grant, 1991).

As a result, the higher the firm's performance, the bigger its market power (Makhija, 2003). The drivers of company success are, however, centered on the resource-based view for the purposes of this study.

For this study, supply chain integration would be possible if the firms have the resources and capabilities available especially with the supply chain partners. This implies that to ensure the relationship between supply chain integration and supply chain performance, there is the need for effective selection and combination of firm’s resources and capabilities. This makes the resource-based view (RBV) theory an underpinning theory for this study.

2.3.2 Transaction Cost Economic (TCE) Theory

The transaction cost economics (TCE) refers directly to the issue of why businesses are formed and how they are hierarchically regulated and organized. A transaction is characterized as the transition from an upstream to a downstream manufacturing process of a pre-product or semi-produced product or service (Bremen et al., 2010).

TCE is looking at the efficient distinction between companies and markets. The TCE represents that economizing transaction costs is essential to organizational analysis, and saving is achieved by assigning transactions in a selective manner to governance structures. The TCE claims that transaction costs are the key concern when a company chooses between internal development and business acquisition (Hyuk, 2014). TCE defines the firm as an administrative instrument that promotes productivity and encourages trade between economic actors (Leiblein, 2003).

Originally, transaction cost economic (TCE) theory addresses these questions: Why do firms exist? What are the most effective strategies for maximizing profits? What should firms make? And what should firms buy? The main theoretical argument of this theory is concerned with the conditions under which certain characteristics of the transaction or the object of the transaction would lead to its internal hybrid, or external governance (Coase, 2009). It has two important fundamental behavioural assumptions bounded rationality and opportunism (Nderitu and Ngugi, 2014). What are these two assumptions talking about? Bounded rationality refers to the fact that people have rationality, but limited.

Therefore, it is only possible for both parties in a transaction to sign an incomplete contract (William, 2008). Opportunism refers to that people cunningly behave opportunistically at the expense of others. The danger of opportunism is assumed to be less likely within a firm than in market coordination since it can be prevented within a firm by means of the authority principal hierarchy as well as outside the firm, such as customers, suppliers, or shareholders (Muma et al. 2014).

The basic argument is that the principal transfers decision rights to the agent. To make sure that the agent behaves as expected, the principal sets incentives. The sole existence of firms is to make profit and therefore a firm that embrace sustainable supply chain is better placed over its competition. For example, if tea factories are able to effectively run the sustainability programme they are able to enhance performance of the firm in the industry making it profitable. Previous research by scholars in this field for example Sannes (2008), was able to bring out the cost of doing business was affected by how well the firm was able to give to the society and what it was able to take as its raw materials. The more sustainable practices it embraced the more positive synergy it attracts thus good performance which eventually brings profitability (Muma et al., 2014).

According to Xu and Xia (2008), humans were “limitedly rational” at the same time, humans were not just greedy, however, they would not hesitate to hurt others as long as it might help themselves. This innate instinct for humans is called opportunism. The opportunists, if it is possible to increase their income, will try to breach any alerts, will send out skewed information deliberately to confuse other people and will make the information vague. Adopting steps to hold back opportunistic actions in this kind of situation is economically important to economies and will add new costs.

Since the main aim of firms is to maximise profit and ensure shareholder wealth maximization, supply chain performance could be achieved if supply chain integration is effective. As such, the transaction cost economic (TCE) theory therefore becomes a relevant theory that underpins this study. This is because the purpose of the firm is to increase supply chain performance, and it is necessary to adopt supply chain integration. Therefore, the extent to which e supply chain integration influence supply chain performance can be influenced by the TCE in terms of how the relationship is structured and organised to maximize wealth.

2.4 Empirical Review

Many researchers investigated the relationship between supply chain integration and organizational performance from different aspects, while few researchers investigated the effect of supply chain integration on supply chain performance in the pharmaceutical industry. The following section, due to limited space will tackle only selected previous researches:

Rosenzweig et al. (2002) in their study titled “The influence of an integration strategy on competitive capabilities and business performance: An exploratory study of consumer products manufacturers”, aimed at examining the intensity of supply chain integration on business performance. The study surveyed 1997 from targeted population that consisted of manufacturers in the top quartile of sales revenues in 35 countries. The unit of analysis was

broad industrial sectors such as automotive, consumer products, pharmaceuticals, chemicals, high tech, and aerospace. Descriptive statistics, correlation and hierarchical regression analysis were used. It found that supply chain integration intensity leads directly to improved business performance.

Cheng et al. (2004) in their study titled “An empirical study of supply chain performance in transport logistics”, purpose to evaluate the three transport logistics industry sectors, sea, air, and third-party logistics services. A cross-sectional survey (questionnaire) was administered and completed by 924 firms in the transport logistics industry in Hong Kong. Mean, standard deviation, Cronbach's alpha, reliability, validity, ANOVA tests were applied. The result showed that there were significant in supply chain performance between firms in the three sectors.

Saeed et al. (2005) in their study titled “Examining the Impact of Interorganizational Systems on Process Efficiency and Sourcing Leverage in Buyer–Supplier Dyads", aimed at understanding the linkages between interorganizational systems, buyer-supplier relationship, and manufacturing performance. Research methodology was based on survey to collect the data. It was found that the external integration enhanced the manufacturing firms' process efficiency.

Peterson (2005) in his study titled “Supplier integration into new product development: coordinating product, process and supply chain design", purposed to examine the role of supplier involvement in new product development. Data was collected using a questionnaire. Multiple regression analysis was applied to find the relationships between research elements. It was found that supplier involvement has a positive impact in new product development and made significant improvements in financial returns as well.

Kim (2006) in his study titled "The effect of supply chain integration on the alignment between corporate competitive capability and supply chain operational capability", designed to identify the shape of interactive relationship between supply chain operational capability and corporate competitive capability, and identify the role of supply chain integration on these interactive capabilities. Data were collected through questionnaire of 623 respondents (from Korea and Japan). Confirmatory factor analyses and regression analysis were conducted. It found that the effect of interaction between operational capability and corporate competitive capability on performance improvements became insignificant related to the substitute role of supply chain integration.

Koufteros et al. (2007 in their study titled "Black-box" and "gray- box" supplier integration in product development: Antecedents, consequences and the moderating role of firm size", purposed to investigate the antecedent and consequences of supplier integration in product activities. Research methodology was built based on social network perspective using 157 firms as a sample. It was found that antecedents, supply base rationalization, supplier selection, and embeddedness with supplier had positive impact on supplier integration.

Al-Lamy and Al-Amery (2008) in their study titled "The possibility of implementing supply chain integration indicators: An analytical study at the production of shoes in Bagdad", aimed to apply the measurements of supply chain variables performance. The researcher used the quantitative manner to analyze the results. It founded that different conditions were affected the supply chain and the importance of upward and downward integration to build long-term relationship with partners and customers.

Zelbst et al. (2009) in their study titled "Impact of supply chain linkages on supply chain performance", aimed at examining the impact of supply chain linkages on supply chain performance. A total of 145 manufacturing and services sector managers were surveyed. The

measurement scales were assessed for reliability and validity and further assessed within a measurement model context. Study hypotheses were then tested using a multiple regression approach. It found that power, benefits, and risk reduction linkages were positively and significantly impact supply chain performance. Power identified as the dominant linkage for manufacturers, and risk reduction as the most important within the services sector.

Forslund and Jonsson, (2009) in their study titled "Obstacles to supply chain integration of the performance management process in buyer-supplier dyads: The buyers' perspective", aimed at explaining to what degree supplier relationship obstacles and operational tool obstacles hinder supply chain integration of the performance management process. Hypothetic-deductive study, where the results were based on a survey to 257 purchasing managers in nine manufacturing industries in Sweden. Mean, standard deviation, and reliability coefficients of scales tests were applied. It found that supplier relationship obstacles (lack of trust, different goals and priorities and lack of parallel communication structure) significantly hindered performance management process integration.

Al-Shaar (2010) in his study titled "The Impact of Supply Chain Integration through the Supply Chain Response on Supply chain performance in Large and Medium Sized Jordanian Industrial Companies: A Field Study", aimed at exploring the impact of supply chain integration on supply chain performance through mediator (supply chain response). The researcher used the questionnaire, 141 questionnaires were collected. Structural equation modelling was used to test the hypothesis and the study model. It found that supply chain integration (Internal, strategic, and external integration) was affecting the supply chain performance.

Gimenez, (2011) in his study titled "Supply chain integration and performance: the moderating effect of supply complexity", aimed at investigating the effectiveness of supply chain integration in different contexts. A survey-based research design was developed to measure

different dimensions or aspects of supply chain integration and supply complexity. Data were collected from manufacturers in The Netherlands and Spain from different industries such as Manufacture of pulp, manufacture of chemicals, manufacture of radio and television, manufacture of medical instruments, manufacture of motor vehicles, and manufactures of machinery and computers.145 completed and valid questionnaires were collected (80 from Netherland and 65 questionnaires from Spain). Factor analysis, regression analysis was performed. It found that supply chain integration increased performance if supply complexity was high, while a very limited or no influence of supply chain integration can be detected in case of low supply complexity. The results also showed that in high supply complexity environments the use of structured communication means to achieve supply chain integration had a negative effect on cost performance.

Huo (2012) in his study titled “The impact of supply chain integration on company performance: an organizational capability perspective", purpose to examine the impact of three types of supply chain integration (internal, supplier, and customer integration) on three types of company’s performance from the perspective of organizational capability (supplier-oriented performance, customer-oriented performance, and financial performance). Data were collected from 617 companies in China. Reliability, validity, and structural equation modelling method were performed. It found that internal integration improves external integration and that internal and external integration directly and indirectly enhance company’s performance.

Zhang and Huo (2012) in their study titled “The impact of dependence and trust on supply chain integration”, aimed at investigating the joint influence of dependence and trust in supply chain relationships on supply chain integration and financial performance. Structural equation modelling based on empirical data collected from 617 manufacturers in China such as arts and crafts, building materials, chemicals and electrical, food and beverage, jewellery,

pharmaceutical and medical, publishing and printing, and other industries. Reliability, validity, and structural equation modelling method were used. It found that trust with

Customers/suppliers significantly influence supply chain integration. Both supplier integration and customer integration significantly improved financial performance.

Hamad (2013) in his study titled the impact of supply chain integration on organizational performance and the role of environmental turbulence: An empirical study on food industry firms in Jordan", purposed to investigate the impact of supply chain integration on organizational performance on the food industry firms in Jordan. Casual descriptive analytical method was used. Questionnaire was administered and the actual collected and used in analysis were 326 respondents for all food industry firms. Mean, standard deviation, t-test, simple regression and path analysis tests were applied. It was found that there was a significant impact of supply chain integration on organizational performance and environmental turbulence.

Parast and Spillan (2013) in their study titled Logistics and supply chain process integration as a source of competitive advantage: An empirical analysis", aimed at investigating the effectiveness of logistics and supply chain integration on firm competitiveness in manufacturing firms. Structural equation modelling was used to determine the effect of two sets of logistics and supply chain integration practices (logistics/supply chain information integration and logistics/supply chain process integration) along with logistics outsourcing decision practices (logistics investment decisions and private warehousing decisions) on firm competitiveness. 782 questionnaires were collected from US and 361 usable questionnaires were collected from China. A comparison of Means, standard deviations, and reliability coefficients were performed. The results indicated that logistics/supply chain strategy was the main driver of logistics and supply chain integration and logistics decisions. Furthermore, the

findings suggested that logistics/ supply chain process integration was the most significant predictor of firm's competitive position.

Han et al. (2013) in their study titled "The impact of supply chain integration on firm performance in the pork processing industry in China", aimed at investigating the effects of supply chain integration on firm performance in pork supply chains in China. The study followed by a causal research approach and survey methodology to collect data from 229 pork processors. It suggested that internal integration and buyer- supplier relationship coordination are significantly related to firm performance in both relationships. Information technology integration not significantly related to both upstream and downstream relationships. Logistics integration significantly contributes to pork processors' performance in relationships with downstream customers.

From the literature review above, it seems that it is a worth-full to study the relationship between supply chain integration and supply chain performance which affect organizations' overall performance. Ghanaian organizations are not exceptional; therefore, this research was dedicated to explore the impact of supply chain integration on supply chain performance at Ghanaian business sector with emphasis on the Western region.

Table 2.1: Summary of Empirical Review

Author(s)/Year	Main Purpose	Theory(ies) Used	Methodology	Findings
Rosenzweig et al. (2002)	The study aimed at examining the intensity of supply chain integration on business performance	RBV	Survey Descriptive statistics, correlation and hierarchical regression analysis were used	It found that supply chain integration intensity leads directly to improved business performance
Cheng et al. (2004)	To evaluate the three transport logistics industry sectors, sea, air, and third-party logistics services	RBV	cross-sectional survey Mean, standard deviation, Cronbach's alpha, reliability, validity, ANOVA tests	The result showed that there were significant in supply chain performance between firms in the three sectors.
Saeed et al. (2005)	understanding the linkages between interorganizational systems, buyer-supplier relationship, and manufacturing performance	RBV	Research methodology was based on survey to collect the data.	It was found that the external integration enhanced the manufacturing firms' process efficiency.
Peterson (2005)	to examine the role of supplier involvement in new product development.	RBV	Survey Multiple regression analysis	It was found that supplier involvement has a positive impact in new product development and made significant improvements in financial returns as well
Kim (2006)	to identify the shape of interactive relationship between supply chain operational capability and corporate competitive capability, and identify the role of supply chain integration on these interactive capabilities	RBV	Survey Confirmatory factor analyses, and regression analysis	It found that the effect of interaction between operational capability and corporate competitive capability on performance improvements became insignificant related to the substitute role of supply chain integration
Koufteros et al. (2007)	to investigate the antecedent and consequences of supplier integration in product activities	Social network theory	Survey regression	It was found that antecedents, supply base rationalization, supplier selection, and embeddedness with supplier had positive impact on supplier integration

Al-Lamy and Al-Amery (2008)	to apply the measurements of supply chain variables performance	RBV	Quantitative survey	It founded that different conditions were affected the supply chain and the importance of upward and downward integration to build long-term relationship with partners and customers
Zelbst et al. (2009)	examining the impact of supply chain linkages on supply chain performance	RBV	Survey of 145 manufacturing firms multiple regression approach	It found that power, benefits, and risk reduction linkages were positively and significantly impact supply chain performance. Power identified as the dominant linkage for manufacturers, and risk reduction as the most important within the services sector
Forslund and Jonsson (2009)	explaining to what degree supplier relationship obstacles and operational tool obstacles hinder supply chain integration of the performance management process	RBV	Hypothetic-deductive study, where the results were based on a survey to 257 purchasing managers in nine manufacturing industries in Sweden	It found that supplier relationship obstacles (lack of trust, different goals and priorities and lack of parallel communication structure) significantly hindered performance management process integration
Al-Shaar (2010)	exploring the impact of supply chain integration on supply chain performance through mediator (supply chain response)	RBV	Survey of 141 firms Structural equation modeling	It found that supply chain integration (Internal, strategic, and external integration) was affecting the supply chain performance.
Gimenez (2011)	investigating the effectiveness of supply chain integration in different contexts	RBV	survey-based research design Data were collected from 145 manufacturers in The Netherlands Factor analysis, regression analysis was performed	It found that supply chain integration increased performance if supply complexity was high, while a very limited or no influence of supply chain integration can be detected in case of low supply complexity. The results also showed that in high supply complexity environments the use of structured communication means to achieve supply chain integration had a negative effect on cost performance

Huo (2012)	examine the impact of three types of supply chain integration (internal, supplier, and customer integration) on three types of company's performance from the perspective of organizational capability (supplier-oriented performance, customer-oriented performance, and financial performance)	RBV	Survey of 617 companies in China Structural equation modelling	It found that internal integration improves external integration and that internal and external integration directly and indirectly enhance company's performance.
Zhang and Huo (2012)	investigating the joint influence of dependence and trust in supply chain relationships on supply chain integration and financial performance	RBV	Survey of 617 companies in China Structural equation modelling	It found that trust with customers/suppliers significantly influence supply chain integration. Both supplier integration and customer integration significantly improved financial performance
Hamad (2013)	to investigate the impact of supply chain integration on organizational performance on the food industry firms in Jordan	RBV	Survey of 326 respondents for all food industry firms Mean, standard deviation, t-test, simple regression and path analysis tests were applied	It was found that there was a significant impact of supply chain integration on organizational performance and environmental turbulence.
Parast and Spillan (2013)	investigating the effectiveness of logistics and supply chain integration on firm competitiveness in manufacturing firms	RBV	A comparison of Means, standard deviations, and reliability coefficients were performed. Structural equation modelling	The results indicated that logistics/supply chain strategy was the main driver of logistics and supply chain integration and logistics decisions. Furthermore, the findings suggested that logistics/ supply chain process integration was the most significant predictor of firm's competitive position

Han et al. (2013)	investigating the effects of supply chain integration on firm performance in pork supply chains in China	RBV	causal research approach and survey methodology	It suggested that internal integration and buyer-supplier relationship coordination are significantly related to firm performance in both relationships. Information technology integration not significantly related to both upstream and downstream relationships. Logistics integration significantly contributes to pork processors' performance in relationships with downstream customers

2.5 Conceptual Framework

In the literature reviews, it was shown that there is a strong relationship between supply chain integration and performance. Some studies claimed that there is strong relationships between supplier and customer integration and organizational performance, other studies comment the presence of relationship between upstream and downstream interactions and supply chain performance, another group of studies assured the inevitability of relationship between supplier, internal, and customer integration with the overall organizational performance.

Almost all studies concluded that the supply chain integration is considered as vital process that affects supply chain performance, consequently the organizations' overall business performance.

Scannell et al. (2000) concluded that supply chain practices were positively associated with aggregation measures of cost and flexibility. Salvador et al. (2001); Frohlich and Westbrook (2001); and Vickery et al. (2003) found a positive and direct relationship between information technology integration and supply chain integration. Chen and Paulraj, (2004) said that: internal integration of different departments within a firm should act as integrated process. Kulp et al. (2004); Gimenez and Ventura, (2005); and Fynes et al. (2005) showed the importance of downstream integration. Bagchi et al. (2005) stated that supply chain integration affects supply chain performance, and the degree of integration influences cost and efficiency. Swink et al. (2007) and Flynn et al. (2010) pointed out that external integration emphasizes the importance of cooperation and collaboration with suppliers and customers.

Frohlich and Westbrook (2001); Swink et al. (2007); Van der Vaart and Van Donk, (2008); and Zhao et al. (2011) have been suggested that supplier integration and

customer integration play different roles in performance improvement and capability development. Xiao et al. (2010) found a significant role of both relationship commitment and trust in improving cooperation performance and supply chain performance. Flynn et al. (2010) found that internal integration and customer integration were more strongly related to performance improvement than supplier integration. Gimenez et al. (2011) found that a positive effect of integration on performance in terms of profits, delivery speed, and transportation cost. Alam et al. (2014) mentioned that due to integration supplier get closer to their customers and may involve customers in shaping and fabricating the products or service in a way to satisfy customers' demands.

The current study was considered supplier integration, internal integration, and customer integration as independent variables, while supply chain performance elements (cost, quality, time, and flexibility) as dependent variable. More specifically, the purpose of the current

study is to investigate the impact of supply chain integration on supply chain performance at Jordanian pharmaceutical manufacturing organizations.

Whatever the classification used in any research or literature, the aim was to understand, measure and manage the supply chain integration. In most researches, the supply chain integration was divided into three components: Supplier, internal and customer integration (Flynn et al., 2010).

The conceptual framework of this study discusses the interrelationships among the variables that are deemed to be integral to the dynamics of the situation being investigated. The major features of the framework include clear explanations of the variables relevant to the study, a discussion on how the variables are related to one another (this is done for the important relationships that are theorized to exist among

these variables) and a schematic diagram of the framework presented to aid readers to see and easily comprehend the theorized relationships.

SCI has been receiving substantial consideration as a vital strategy in generating flows of data and material, and leveraging core competencies (Narasimhan et al., 2010; Swink et al., 2007). Different authors have highlighted the potential benefits of SCI, facilitated through efficient internal operations and solid supply chain networks (Allred et al., 2011; Flynn et al., 2010; Huo, 2012; Koufteros et al., 2010; Olhager and Prajogo, 2012; Saeed et al., 2005; Wong et al., 2011b; Zhao et al., 2011). For instance, Narasimhan and Kim (2002) were the first to operationalize SCI as both internal and external integration. The authors provided key definitions and measurement of SCI, and extended Frohlich and Westbrook (2001) concept of SCI (only external integration). Therefore, starting from this research, several authors developed their frameworks on SCI (Flynn et al., 2010; Kim, 2006; Zailani and Rajagopal,

2005). A number of authors offered empirical evidences in relation to the different impact SCI has on performance. These include activities such as, developing reactions to complex and uncertain business environments (e.g. Frohlich and Westbrook, 2002), and also pooling resources and capabilities across supply chain members (Frohlich and Westbrook, 2001; Narasimhan and Kim, 2002; Swink et al., 2007). However, unclear definitions and understandings of SCI (Fabbe-Costes and Jahre, 2008; Pagell, 2004) and the developing conceptualizations have resulted in mixed outcomes concerning the relationship between SCI and supply chain performance (Das et al., 2006; Devaraj et al., 2007; Germain and Iyer, 2006). While several authors empirically agree that SCI improves supply chain performance (Das et al., 2006; Flynn et al., 2010; Frohlich & Westbrook, 2001; Koufteros et al., 2007a; Lee et al., 2007; Petersen et al., 2005; Swink

et al., 2007), others do not report such relationship (Chen et al., 2007; Cousins and Menguc, 2006; Sezen, 2008). Additionally, in some cases investigation authors have reported a negative relationship (e.g. Narasimhan et al., 2010; Rosenzweig et al., 2003; Swink et al., 2007; Vickery et al., 2003). Although a number of studies have highlighted the importance of SCI and its advantages, through the systematic review it has been identified that inadequacies still exist.

For example, Van der Vaart and Van Donk (2008) ignored the role of internal integration, and focused on the external factors of integration. Similarly, Lee et al. (2007) also investigated external integration (customer and supplier) as the main source of innovative concepts, and disregarded the impact of the company's ability to internally integrate. The authors argued that companies must create and effectively maintain routines for sharing data and information with their customers and suppliers, if they want to be competitive. In a separate systematic review Fabbe-Costes and Jahre (2008) presented definitions and measurement items of SCI. They argued that ambiguous definitions and measures in relation to SCI resulted in inconsistent research outcomes. Alfalla-Luque et al. (2013) stated that a lack of uniformity could be seen in the measures utilized to assess SCI. They suggested a framework, which includes measurements for resource sharing and coordination, in both inter and intra organizational relationships. Although it was argued that higher level of SCI positively affects the performance of the focal firm (e.g. Liu et al., 2013; Bagchi et al., 2005; Prajogo et al., 2012; Zhao et al., 2013), the outcome of such topic was not so clear in other cases (Gimenez and Ventura, 2005; Sahin and Robinson, 2005; Swink et al., 2007). Alfalla-Luque et al. (2013) concluded that both internal and external integration should receive the same level of importance. Additionally, Basnet (2013) noted that internal integration was mostly affected by the level of coordination, communication, and affective relationship between

different links in the SC. The authors argued that although collaboration and communication have been widely examined in external integration, its role and affective relationship in internal integration remains unexplored.

Additionally, Williams et al. (2013) proposed that, although supply chain visibility was enhanced by merging information and data with external supply chain partners, however not all data sharing was beneficial in real practice. Based on such perspective, it could be argued that the data processing abilities required to enhance SC, must be initially built through internal integration (cross-functional units). Accordingly, Huo (2012) argued that examining the mediating influence of internal integration on both customer and supplier integration could be used to clarify the discrepancy in the SCI findings. Moreover, Wong et al. (2013) investigated the direct and interaction effects of internal and external integration on product innovation. The authors examined this through "complementary integration" which develops enough external integration to support and encourage internal integration and consequently meet the demands of new product development, and also "balanced integration" which achieves similar degrees of internal and external integration. The results of this study indicated that complementary integration was positively associated with product innovation; however, the same relationship was insignificant for balanced integration. This further highlight the role of internal integration in achieving successful SCI, and also the impact of internal integration (e.g. cross-functional knowledge sharing) on the ability of companies to benefit from external integration. It is argued that most research has focused on external integration, and that a few have considered the impact of internal integration. Furthermore, those studies which have included internal integration in their study generally, do not break down external integration to customer and supplier integration. Therefore, based on evidence from a number of reviewed studies, this research proposes

that internal and customer, supplier integration is complementary and must be examined together (in separate constructs) in order to completely appreciate the impact of each dimensions of SCI on performance and provide a more robust conceptualization of SCI as a whole.

Another reason for the discrepancies in the relationship amongst SCI dimensions and supply chain performance is that, different methodological approaches have been adopted. For example, authors have been using mathematical simulations, case studies, and literature reviews (see Fabbe-Costes and Jahre, 2008; Pagell, 2004). Similarly, different degrees of measurement, such as financial, or multiple measures, and sample sizes (e.g. from 38 to 980), have been used to examine SCI (Chen et al., 2007; Flynn et al., 2010; Handfield et al., 2009). Many recent studies have been using structural equation modeling (SEM) as their analysis technique (e.g., Cao and Zhang, 2011; Koufteros et al., 2010) whereas correlation or regression analysis has also been commonly utilized (e.g. Das et al., 2006; Olhager and Prajogo, 2012). In some studies, data was obtained from multiple sources like CEOs, directors, or managers (e.g. Devaraj et al., 2007; Flynn et al., 2010; Koufteros et al., 2005; Sanders, 2008) while in others only one respondent was targeted (e.g., Danese and Romano, 2012; He and Lai, 2012). This research argues that such discrepancies amongst SCI studies have resulted in unclear and in some cases confusing association between SCI dimensions and supply chain performance. Therefore, by reviewing articles with different mixtures of methodologies (e.g. survey, case study, and meta-analysis) this study hopes to shed some clarity (i.e. revealing qualitative and quantitative perspectives) on the mixed research findings.

Following these are appropriate hypotheses to test the relationships that are theorized and the logic/concepts that underpin each. A subtle operational definition for supply chain integration is also proposed to arrive at the set objectives and conclusions that are relevant to the case under study. Figure 2.1 below shows the theoretical framework of the study:

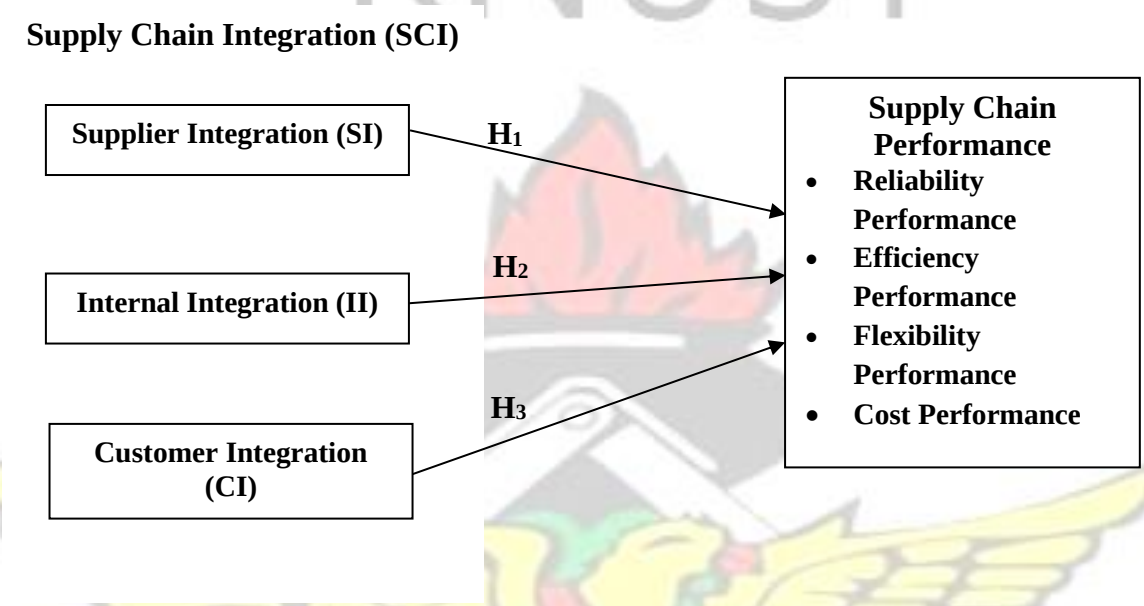

Figure 2.1: Conceptual Framework of the Study

Source: Author's Construct, 2022

2.8.1 Supplier Integration and Supply Chain Performance

Supplier integration refers to the practices amongst companies and their suppliers, that enables the efficient transfer of knowledge and resources, required for generating mutual benefits (Childerhouse and Towill, 2011; Danese and Romano, 2011; Danese, 2013; Das et al., 2006; Droge et al., 2012; Huo, 2012; Leuschner et al., 2013; Lockström et al., 2010; Narasimhan et al., 2010; Petersen et al., 2005; Swink et al., 2007; Vereecke and Muylle, 2006). In simpler terms, supplier integration involves closer collaboration and coordination with key suppliers in order to achieve, mutual benefits such as a reduction of inventory, and supplier lead-time (Thun, 2010). This entails long-term interactions

with suppliers, enhancing the process of joint problem identification and real-time process/product solutions (Flynn et al., 2010). Some have argued that supplier integration is the most common type of SCI (Fawcett and Magnan, 2002). Therefore, as much as internal integration is vital to an organization success, in the post-industrial era organizations can no longer rely on themselves for continual development (i.e. globalized business processes). For example, Petersen et al. (2005) argued that in uncertain and turbulent business environments, companies required higher level of accuracy on real-time information, in order to leverage supplier network (resources) and improve customer satisfaction.

Furthermore, successful supplier integration necessitates cooperative rather than adversarial attitude. Boon-itt and Wong (2011) suggested joint efforts in developing products, exchanging technology, mutual problem-solving initiatives, and design supports, as important features cooperative attitudes. Thus, it is vital for a focal company to communicate effectively with its major suppliers, and to frequently upgrade data gathered in the intentional integration processes. This should happen since the focal company may have outdated data that do not expose new or ongoing problems in the real business environment (Das et al., 2006; Handfield et al., 2009; Narasimhan et al., 2010). As argued earlier supplier integration is obtained through data sharing, and collaborations amongst companies and their suppliers (Ragatz et al., 2002). When this occurs, there is more of a chance to facilitate regular deliveries in smaller sizes, utilize more than one source of supply, assess substitute supply sources in relation to quality and delivery instead of cost, and create long-term relationships with suppliers to enhance performance (Handfield et al., 2009). Such mutual and timely exchanging of operational and market data, enables the focal firm to better predict and respond to alterations in customer demands (Zailani and Rajagopal, 2005). A supplier cooperates with the foal

company as either a seller offering equipment parts/components or as a strategic collaborator sharing expertise and know-hows (data and information) (Bernon et al., 2013). Accordingly, from the point of view of the company acting as the seller, a supplier is basically included in the focal company's purchasing procedure and has the one and only obligation to produce the goods (Koufteros et al., 2010). Thus, it is essential for the focal company to pay close attention in selecting an appropriate supplier, checking delivered goods, and controlling related procedures. In a separate study Koufteros et al. (2007a) named such type of integration as the black box approach. It has also been referred to in literature as the supplier product integration. Some authors argue that the supplier is mostly considered as the main provider of the goods, and they affect the focal company in terms of process/product quality, cost, and flexibility (Kim, 2009; Koufteros et al., 2007a; Prajogo et al., 2012).

By viewing all the three important SCI dimensions in one research framework, this study hopes to remove some of the ambiguity in the relationship between supplier integration and supply chain performance. Based on this the first hypothesis is posited as follows;

H1: Supplier integration has a positive and significant effect on supply chain performance.

2.8.2 Internal Integration and Supply Chain Performance

Internal integration is defined as the company practices of combining and developing internal information/resources for the purpose of generating know-hows and knowledge beyond borders of single department/function, in order to support external integration activities, and ultimately achieve goal alignment and improved performance (Alfalla-Luque et al., 2013; Fabbe-Costes and Jahre, 2007; Huo, 2012; Koufteros et al., 2010; Leuschner et al., 2013; Sanders, 2007; Zailani and Rajagopal, 2005; Zhao et al., 2011,

Zhao et al., 2013). In simpler terms, it is the degree a firm set its structural strategies and practices into mutual, joined, and synchronized activities, in order to meet customer demands and effectively cooperate with suppliers (Boon-itt and Wong, 2011; Zhao et al., 2011). Therefore, internal integration is the chain of activities or functions within a firm that results in goods delivered to customers. Integration of such functions involves the holistic performance of organizational processes across departmental boundaries, and thus integrating from materials management to production, sales, and distribution is vital to meet customer needs at lower cost (Basnet, 2013; Morash and Clinton, 1998). Numerous researchers have argued that internal integration encourages greater intra-firm collaboration and coordination between different functions. This is achieved mainly sharing through higher integration of data/information system sharing and cross-functional collaboration (Schoenherr and Swink, 2012; Williams et al., 2013). For example, Pagell (2004) stressed that internal integration enables better usage of each of the individual function/department's competencies. The author concluded that internal integration enables firms to better explain functional interdependencies. Thus, better functional coordination and cross-functional teams; enable staff to manage disagreements and conflicts arising across individual functions (Vickery et al., 2003).

Additionally, in a number of studies it was found that idea/knowledge sharing and value creation using internal integration had a positive effect on the degree of external cooperation and organizational competitive performance (Allred et al., 2011; Childerhouse and Towill, 2011; Droge et al., 2004; Flynn et al., 2010; Gimenez and Ventura, 2005; Koufteros et al., 2005; Prajogo and Olhager, 2012; Wong and Boon-itt, 2011; Zhao et al., 2011). However, in other studies results were mixed (Devaraj et al., 2007; Flynn et al., 2010; Germain and Iyer, 2006).

Since the objective of this research is to examine the relationship (direct) amongst SCI, and supply chain performance, this study classifies all three SCI dimensions (internal, supplier and customer) under the same conceptual framework. Based on this, the second hypothesis is formulated as follows;

H2: Internal integration has a positive and significant effect on supply chain performance.

2.8.3 Customer Integration and Supply Chain Performance

Customer integration could be defined as the organizational practices of identifying, understanding, and utilizing customer requirements with the objective of producing customer-defined goods/products and increasing customer satisfaction (Boon-itt and Wong, 2011; Childerhouse and Towill, 2011; Droge et al., 2012; Flynn et al., 2010; Huo, 2012; Kannan and Tan, 2010; Lai et al., 2014; Lau et al., 2010; Schoenherr and Swink, 2012; Wong et al., 2011b). In other words, it is the mutual participation of customers with the focal company, strategically distributing data, information and know-how about their demands and performance levels (e.g. such as quality, delivery time, and cost) (Devaraj et al., 2007; Fabbe-Costes and Jahre, 2007; Koufteros et al., 2010; Zhao et al., 2011). Customer integration is therefore an important feature in better understanding the requirements of key customers, and the logical counterpart of supplier integration (Thun, 2010). It does so by enabling focal company to penetrate deep into the customer firm, in order to understand the customer's product, culture, market, and organization, in order to efficiently react to customer needs (Boon-itt and Wong, 2011). Authors such as Frohlich and Westbrook (2001), Kim (2006), Rosenzweig et al. (2003), and Vickery et al. (2003) have also conceptualized customer integration as a part of the external (vertical) connection of the firm.

By taking a marketing perspective customer could be viewed as decision-makers who attain potential purchasing power and assess the features of the products (Boon-itt and Wong, 2011). Customer integration hugely depends on sharing data, know-how and information between the focal company and the customer (He et al., 2014). Therefore, the lack of information sharing from both ends of the supply chain could result in tremendous inefficiencies in relation to customer service (Lee et al., 2007). Customers typically provide their insight and judgment on a product through surveys or in person (to selling company), however the focal company offers operational data to customers, such as schedules of their production, level of inventory, and sales forecast (Danese and Romano, 2013; Lau et al., 2010; Moyano-Fuentes et al., 2012). Accordingly, customer-driven companies are in more regular contacts with their customers, in order to inspire customers to get involved in the product development stages and also to create feedback tools (Koufteros et al., 2010; Swink et al., 2007; Zhao et al., 2011). Such companies typically embrace a variety of information technology tools to exchange data with their customers. Subsequently, these customer-driven companies will be capable of implementing collaborative initiatives such as automatic replenishment programs including vendor managed inventory, efficient consumer response, quick response used to capture the exact customer demand, and comprehend the changes in customer needs (see Daugherty et al., 1999). Based on this, the last hypothesis and sub-hypothesis are formulated as follows;

H3: Customer integration has a positive and significant effect on supply chain performance.

CHAPTER THREE

RESEARCH METHODOLOGY

3.1 Introduction

This Chapter presents the detailed methodological approaches that were followed to conduct this study. This chapter focused on the processes and activities for undertaking this research. It accounts for the methodology for the data collection and its final outcome as this research document. This includes the research design, population of the study, sample size and sampling techniques, sources of data, data collection techniques, data analysis and ethical consideration.

3.2 Research Design

Research design is the plan and structure of investigation so conceived as to obtain answers to research questions. Burns and Grove (1993) define quantitative research as a formal, objective, systematic process to describe and test relationships and examine cause and effect interactions among variables.

Research design is the blue print for conducting a research. It serves as the road map by which the research will be conducted and outlines the method for data collection, measurement and the analysis of data. The research design is the structure from which the work plan will flow, and is dependent on the purpose of the research. It could be quantitative in nature or qualitative. Quantitative studies focus on collecting and analysing numerical data whereas a qualitative study is based on other characteristics and attributes that are non-numeric. For this study, a quantitative approach was followed.

There are three main types of research including descriptive research, explanatory and exploratory research. This study adopts a descriptive research design. Descriptive research is used to obtain information regarding the current status of the phenomena and

describes what exists with respect to variables in a situation. Good descriptive research work can challenge accepted assumptions about the way things are, and tends to provoke further explanatory studies into the phenomena.

A descriptive survey was selected because it provides an accurate portrayal or account of the characteristics, for example behavior, opinions, abilities, beliefs, and knowledge of a particular individual, situation or group. The motive behind the choice of this approach is based on the fact that the study required multiple sources of evidence. A case study research offers researchers the opportunity to have an in-depth understanding of a problem or situation under study. Another reason is that; the researcher does not have control over the issues to be investigated.

3.3 Population of the Study

In research the term population is the total number of all units of the phenomenon to be investigated that exists in the area of investigation. It refers to the targeted group which would provide information for analyzes in the research. The population for this study was made up of all key top management along the supply chain of Schlumberger GOS Ghana. The study population was divided into management staff, senior staff, junior staff and customers who are directly, involved in the supply chain management processes of Schlumberger GOS Ghana.

3.4 Sample Size

An entire sample size of two hundred (200) was originally provided for, for use of the study. The constituents of available respondents in the sample size included procurement and logistics professionals or those who perform logistics-related activities along the supply chain of Schlumberger GOS Ghana.

3.4.1 Sampling Techniques

Since it was impracticable to collect data from the entire population due to budget and time constraints, a sample was targeted. The researcher used purposive technique and

the convenience method for the study. The purposive technique was used to select management and senior management respondents which the researcher assumes that, they have in-depth knowledge of the supply chain management process. Finally, the convenience sampling method was also used to select respondents who were willing and able to participate in the study. These two methods were used to access the data needed to achieve the objectives of the research.

3.5 Data Collection Method

Two main sources of data collection procedure were used in the study. Data was gathered from both primary and secondary sources. A combination of both primary and secondary sources of data provides a wide range of reliable data and helped to build the accuracy and reliability of the conclusions and the recommendations that were made. All the selected customers and employees, who were present on data collection days, were given out their questionnaires to fill themselves, with the investigator available to explain any unclear understanding of a question.

3.5.1 Primary Data

This is the type of data that was collected by the researcher purposely for the research at hand. The primary sources of data for this study were obtained from information gathered directly from employees (management and workers) of selected firms through the questionnaires which were administered in person or by phone

3.5.2 Secondary Data

Secondary data is collected by organizations for other purposes other than for the study that was underway. It provides already made data and as such saves time and money spent on collecting data, plus the benefit of un-obstructive access to data. Secondary data for the study was drawn from journals, books and internet sources.

3.5.3 Data Collection Tools

As part of the research activities, the researcher made use of telephone interviews but questionnaires were the instruments main data collection tool used. Separate standard questionnaires were developed for the employees (management and workers). The items used to measure the various constructs in the questionnaire to represent supply chain integration were adopted from the studies of Zhao et al. (2013), Xu et al. (2014) and Zhang and Huo (2012). Also, items used to measure supply chain performance were adopted from the studies of Zhang and Huo (2012). The data collected from the questionnaires and interviews were analyzed and based on the analysis, the researchers then came out with their findings.

3.6 Data Analysis

The data that were collected and gathered were analyzed using simple statistics such as a frequency distribution table. Tables, charts and figures were generated with the aid of Statistical Package for Social Sciences (SPSS) and Microsoft Excel software.

With regard to the SPSS software, all the responses to the close-ended questions were fed into the SPSS software for data processing and analysis. The system then presented the analyzed data (output) in the form of frequency tables and figures. The above approach was adopted because of its suitability in appropriately explaining the findings in order to enable the researchers come out with very concrete and relevant observations, recommendations and conclusions. Correlation was used to identify the relationship between various performance variables. The data were also presented on tables. From these, appropriate conclusions and recommendations were made from the findings of the research.

3.7 Data Validity and Reliability

Data validity is the correctness and reasonableness of data. The data requirement for the above tasks was obtained from both primary and secondary data. The researcher developed the sample frame from the survey. This was to ensure that the approach adopted was reliable, valid and consistent. Later particular attention was given to data entry process to ensure correctness of the data process. Validity is the correctness and reasonableness of data. Data validity errors are common so special attention was given to data entry procedure.

CHAPTER FOUR

DATA PRESENTATION, ANALYSIS AND DISCUSSIONS

4.1 Introduction

This chapter presents the findings and analysis of data gathered from the filed study. Thus, it presents responses on the study of examining the influence of supply chain integration on supply chain performance using firms along the supply chain of Schlumberger GOS Ghana. Data were gathered from the field by administering questionnaires to top procurement and supply chain professionals of the firms. Out of the 200 questionnaires that were administered, 149 were received. This represents 74.5% response rate. Analysis was made on only valid responses from the field study. The presentations and discussions of findings were done in line with the structure of the questionnaire and followed the objectives of the study.

4.2 Demographic Information of Respondents

With reference to Table 4.1, the study revealed that 58.4% (n=87) of the participants of the study who are employees of the selected firms along the supply chain of Schlumberger GOS Ghana were males with the remaining 41.6% (n=62) were females. Majority (55.7%) of the respondents aged between 21 – 30 years. This was followed by the next 35.6%and 6% who were within the ages of 31 – 40 years and 41 – 50 years respectively. On the educational ladder, majority (38.3%) were HND holders whereas the next 31.5% were SHS graduates with a 26.8% being First Degree holders. With the work experience of the respondents at the selected firms, it was realized that most of them (34.2%have been with their respective firms from 1 – 5 years whereas about 33.6% had been there for working from 6 – 10 years and 18.8% had been working at their respective firms for about 10 – 15 years. This is as shown in Table 4.1 below;

Table 4.1: Demographic breakdown of respondents

Variable	Categories	Freq.	%
Gender of Respondents	Male	87	58.4%
	Female	62	41.6%
	Total	**149**	**100.0%**
Educational Level of Respondents	Secondary	47	31.5%
	HND	57	38.3%
	Degree	40	26.8%
	Masters	2	1.3%
	Other	3	2.0%
	Total	**149**	**100.0%**
Age of Respondents	Less than 20 years	4	2.7%
	21-30 years	83	55.7%
	31-40 years	53	35.6%
	41-50 years	9	6.0%
	Total	**149**	**100.0%**
Occupation of Respondents	Public Work	110	73.8%
	Private Work	26	17.4%
	Own-business	6	4.0%
	Retired	1	0.7%
	Other	6	4.0%
	Total	**149**	**100.0%**
Number of Years of Experience of Respondents	Less than 1 year	13	8.7%
	1-5 years	51	34.2%
	6-10 years	50	33.6%
	10-15 years	28	18.8%
	Above 15 years	7	4.7%
	Total	**149**	**100.0%**

Source: Field Work, 2019

It could be seen from Table 4.1 that the demographic information of the respondents has a direct linkage with employee knowledge and perception of supply chain integration at their respective firms. Given the adequately long years of service of the employees and their educational level, it is believed that the responses provided in relation to the subject of the study is a true representation of the issues being looked into.

The relationship between the demographic information and the objectives of the study are duly discussed below in the following subsections.

4.3 Extent of Supply Chain Integration (SCI) among Ghanaian firms along the supply chain of Schlumberger GOS Ghana

The first of objective of the study was to examine the extent of supply chain integration (SCI) among Ghanaian firms along the supply chain of Schlumberger GOS Ghana. The study examined extent of the three dimensions of supply chain integration within firms along the supply chain of Schlumberger GOS Ghana. A 5-point scale was employed, measuring "1=strongly disagree" through to "3=neither agree nor disagree" to "5=strongly agree". The dimensions of the supply chain integration were supplier integration, internal integration and customer integration. Items to measure these items were adapted from the studies of Zhao et al. (2013), Xu et al. (2014) and Zhang and Huo (2012).

4.31 Supplier Integration

In all, 10 adapted items were employed in measuring Supplier integration. The results obtained from this evaluation are shown in Tables 4.2 below;

Table 4.2: Supplier integration as a dimension of Supply chain integration

Measuring Items	Min	Max	Mean	Std. Dev
1. Our company shares information with suppliers through our electronic network.	1	5	3.76	1.228
2. Our company is working to build partnership with our suppliers	1	5	3.91	1.074
3. Our company is working with our suppliers through clear contracts (regarding the quantities, specifications, costs, and delivery)	1	5	3.96	1.071
4. Suppliers are committed to our required specifications	1	5	4.03	.830
5. Suppliers contribute in our product design	1	5	3.95	1.002
6. Our company is holding regular meetings with our suppliers to review the business issues.	1	5	3.74	1.117
7. There are joint activities between our company and our suppliers (Training program, joint celebrations, exchange of experience)	1	5	3.69	1.191
8. Our company and our suppliers are connected with an electronic system to control the inventory	1	5	3.66	1.345
9. Our company and our suppliers are discussing the significant changes that affect the continuity of our relationship.	1	5	3.72	1.145
10. There are common awareness programs are hold between our company and our suppliers to develop our business.	1	5	3.70	1.154
Overall Average	**1.30**	**4.90**	**3.81**	**.804**

Source: Fieldwork, 2023

Given a mid-point value of 3.00, which indicates "neutral" in a respondent's perception on the issues being evaluated, the results produced in Table 4.2 concerning the supplier integration as a dimension of supply chain integration, the findings revealed that indicate that a staff of firms along the supply chain of Schlumberger GOS Ghana, agrees that supplier integration is a dimension of supply chain integration (given overall mean score =3.81). For the 10 items measuring "supplier integration", the highest mean score was obtained on the fourth item: "*Suppliers are committed to our required specifications"* (M=4.03; SD=0.830) while the least mean score was obtained on the sixth item: "*Our company and our suppliers are connected with an electronic system to control the inventory"* (M=3.66; SD=1.345).

This is in line with literature that a good relationship between the buyer and its supplier, based on mutual trust, joint problem solving, and fulfilment of pre-specified promises, helps in avoiding complex and lengthy contracts, that are costly to write and difficult to monitor and enforce (Fynes et al., 2004, 2005).

4.3.2 Internal Integration

The second objective of the study was to examine the effect internal integration on supply chain performance. The study assessed the impact of internal integration as a dimension by focusing on perceptions of players of firms along the supply chain of Schlumberger GOS Ghana in Ghana. A 5-point scale was employed, measuring "1=strongly disagree" through to "3=neither agree nor disagree" to "5=strongly agree". In all, 10 adapted items were employed in measuring "internal integration". The results obtained from this evaluation are shown in Tables 4.3 below;

Table 4.3: Internal integration as a dimension of Supply chain integration

Measuring Items	Min	Max	Mean	Std. Dev
1. Our company is constantly striving to unify our culture with stakeholders (mission and vision)	1	5	3.93	.949
2. Our company involves different department during our preparation of strategic plan	2	5	4.17	.844
3. Our company uses materials requirement planning (MRP) system (to harmonize forecasting, procurement, production, and sales)	1	5	3.79	1.120
4. There is an internal network for the exchange of information between our employees	1	5	4.01	1.059
5. Our company holds training program to increase our employees' competencies	1	5	4.21	.925
6. Our company is keen to hold regular meetings with departments' managers to coordinate our work	1	5	4.14	.910
7. Our company holds extensive meetings to increase homogeneity (oneness) among employees	1	5	3.99	.904
8. Our company allow our employees to participate in solving our problems and internal conflicts and settlement	1	5	3.90	1.005
9. Our company departments share in our development of production processes	1	5	3.84	1.031
10. There are multiple teams working with each other interactively	1	5	4.05	1.035
Overall Average	**1.90**	**5.00**	**4.00**	**.66**

Source: Fieldwork, 2023

Given a mid-point value of 3.00, which indicates "neutral" in a respondent's perception on the issues being evaluated, the results produced in table 4.3 concerning the internal integration as a dimension of supply chain integration, the findings revealed that indicate that a staff of firms along the supply chain of Schlumberger GOS Ghana, to some extent, agrees that internal integration is a dimension of supply chain integration (given overall mean score =4.00). For the 10 items measuring "internal integration", the highest mean score was obtained on the second item: "*Our company involves different department*

during our preparation of strategic plan" (M=4.17; SD=0.844) while the least mean score was obtained on the third item: "*Our company uses materials requirement planning (MRP) system (to harmonize forecasting, procurement, production, and sales"* (M=3.79; SD=1.120) implying disagreement.

This is in line with literature that buyers expected their suppliers to take suit of these developments and also adopt this improved approach (Tangus et al., 2015). Internal integration seeks to provide a regular and continuous feedback of the supplier's performance as qualified by the buyer's organization, jointly with any client's complaints.

4.3.3 Customer integration

The third objective of the study was to examine the effect customer integration on supply chain performance. The study assessed the influence of customer integration as a dimension by focusing on perceptions of staff of firms along the supply chain of Schlumberger GOS Ghana. A 5-point scale was employed, measuring "1=strongly disagree" through to "3=neither agree nor disagree" to "5=strongly agree". In all, 10 adapted items were employed in measuring "supplier quality management". The results obtained from this evaluation are shown in Tables 4.4 below;

Table 4.4: Customer integration as a dimension of Supply chain integration

Measuring Items	Min	Max	Mean	Std. Dev
1. Customer's satisfaction is central goal that our company pursued to achieve	1	5	4.26	.934
2. Our company seeks to build partnership with customers	1	5	4.07	.875
3. There is specialized customer service department in our company	1	5	3.91	1.061
4. Our company has a fast system to receive orders from our customers	1	5	3.97	.993
5. Our company reserves the full databases about their customers	1	5	3.97	1.059
6. Our company set up scientific seminar for its customers	1	5	3.64	1.187
7. Company customers are encouraged to provide feedback	1	5	3.93	1.086
8. Our company deals with the complaints and observations of our customers properly	1	5	4.01	.955
9. Our company engages its customers in the preparation of marketing programs	1	5	3.74	1.147
10. Our company engages its customers in the design of our company's products	1	5	3.83	1.184
Overall Average	**1.40**	**5.00**	**3.93**	**.690**

Source: Fieldwork, 2023

Given a mid-point value of 3.00, which indicates "neutral" in a respondent's perception on the issues being evaluated, the results produced in Table 4.4 concerning customer integration suppliers as a dimension of supply chain integration, the findings revealed that indicate that a staff of firms along the supply chain of Schlumberger GOS Ghana, agrees that customer integration is a dimension of supply chain integration (given overall mean score =3.93). For the 10 items measuring "supplier quality management", the highest mean score was obtained on the first item: "*Customer's satisfaction is central goal that our company pursued to achieve"* (M=4.55; SD=0.610) while the least mean score was obtained on the 6th item: "*Our company set up scientific seminar for its customers"* (M=3.64; SD=1.187).

This is in line with literature that the supply chain is all connected, when an organization is able to deliver certain value to customers efficiently which in turn translates to creation of value for the firm itself (Lambert, 2008). Performance is also measured by the extent to which value is created for the shareholders of the organization (Field & Meile, 2008).

4.4 Supply Chain Performance

The third objective of the study was examining the level of supply chain performance among Ghanaian firms along the supply chain of Schlumberger GOS Ghana. The items to measure supply chain performance were adopted from literature (Zhang and Huo (2012). However, there were four dimensions of supply chain performance namely reliability performance, efficiency performance, flexibility performance and cost performance.

A 5-point scale was employed, measuring "1=strongly disagree" through to "5=neither agree nor disagree" to "5=strongly agree. The results obtained from this evaluation are shown in Tables 4.5 below;

Table 4.5: Reliability Performance

Measuring Items	Min	Max	Mean	Std. Dev
SPREL1: Our firm offers products that are highly reliable	1	5	3.91	.888
SPREL2: Our firm offers high quality products to our customers	1	5	3.95	.971
SPREL3: Our firm and supply chain partners have helped each other to improve product quality	1	5	3.91	1.037
SPREL4: Our firm with supply chain partners increases the rate at which we fulfill customer orders	1	5	3.95	.974
SPREL5: Our firm with supply chain partners increases our inventory turns	1	5	4.01	.873
Overall Average	**1.67**	**5.00**	**3.91**	**.715**

Source: Fieldwork, 2023

Given a mid-point value of 3.00, which indicates "neutral" in a respondent's perception on the issues being evaluated, the results produced in Table 4.5 concerning the indicators of reliability performance, reveal that a staff of firms along the supply chain of Schlumberger GOS Ghana, to agrees that there is high level of reliability supply chain

performance (given overall mean score =3.91). For the 5 items measuring "Flexibility performance", the highest mean score was obtained on the fifth item: "*Our firm with supply chain partners increases our inventory turns"* (M=4.01; SD=0.873) while the least mean score was obtained on the third item: "*Our firm and supply chain partners have helped each other to improve product quality"* (M=3.91; SD=1.037).

Table 4.6: Efficiency Performance

Measuring Items	Min	Max	Mean	Std. Dev
SPEFF1: Our firm with supply chain partners reduces inbound and outbound cost of transport	1	5	4.24	.860
SPEFF2: Our firm with supply chain partners reduces warehousing and inventory holding costs	2	45	4.35	.479
SPEFF3: Our firm with supply chain partners meets on-time delivery requirements for all product	1	5	4.05	.850
SPEFF4: Our firm with supply chain partners reach agreed costs per unit as compared with industry	1	5	3.77	1.008
Overall Average	**2.00**	**11.00**	**4.06**	**.825**

Source: Fieldwork, 2023

Given a mid-point value of 3.00, which indicates "neutral" in a respondent's perception on the issues being evaluated, the results produced in Table 4.6 concerning the indicators of efficiency performance, reveal that a staff of firms along the supply chain of Schlumberger GOS Ghana, to agrees that there is high level of efficiency supply chain performance (given overall mean score =4.06). For the 4 items measuring "Efficiency performance", the highest mean score was obtained on the second item: "*Our firm with supply chain partners reduces warehousing and inventory holding costs"* (M=4.35; SD=0.479) while the least mean score was obtained on the fourth item: "*Our firm with supply chain partners reach agreed costs per unit as compared with industry"* (M=3.77; SD=1.008).

Table 4.7: Flexibility Performance

Measuring Items	Min	Max	Mean	Std. Dev
SPFLX1: Our firm with supply chain partners offers a variety of products and services efficiently	1	5	4.07	.859
SPFLX2: Our firm with supply chain partners offers customized products and services with different features.	1	5	3.99	.900
SPFLX3: Our firm with supply chain partners meets different customer volume requirements efficiently	1	5	4.00	.944
SPFLX4: Our firm with supply chain partners has short customer response time as comparison to industry	1	5	3.99	.870
SPFLX5: Our firm with supply chain partners responds to and accommodates demand variations	1	7	3.95	1.150
Overall Average	**1.67**	**5.00**	**3.99**	**.701**

Source: Fieldwork, 2023

Given a mid-point value of 3.00, which indicates "neutral" in a respondent's perception on the issues being evaluated, the results produced in Table 4.7 concerning the indicators of flexibility performance, reveal that a staff of firms along the supply chain of Schlumberger GOS Ghana, to agrees that there is high level flexibility supply chain performance (given overall mean score =3.99). For the 5 items measuring "flexibility performance", the highest mean score was obtained on the first item: "*Our firm with supply chain partners offers a variety of products and services efficiently"* (M=4.07; SD=0.859) while the least mean score was obtained on the last item: "*: Our firm with supply chain partners responds to and accommodates demand variations"* (M=3.95; SD=1.150).

Table 4.8: Cost Performance

Measuring Items	Min	Max	Mean	Std. Dev
SPCP1: decrease of cost for purchased materials.	1	8	4.19	.913
SPCP2: consideration of the purchasing price when making financial decisions.	1	5	4.06	.953
SPCP3: consideration of the cost of managing the purchasing process in all purchases	1	5	3.54	1.255
Overall Average	**2.17**	**5.00**	**3.93**	**.630**

Source: Fieldwork, 2023

Given a mid-point value of 3.00, which indicates "neutral" in a respondent's perception on the issues being evaluated, the results produced in Table 4.7 concerning the indicators of cost performance, reveal that a staff of firms along the supply chain of Schlumberger GOS Ghana, to agrees that there is high level of cost supply chain performance (given overall mean score =3.93). For the 3 items measuring "cost performance", the highest mean score was obtained on the first item: "*decrease of cost for purchased materials"* (M=4.19; SD=0.913) while the least mean score was obtained on the last item: "*consideration of the cost of managing the purchasing process in all purchases"* (M=3.54; SD=1.1255).

Table 4.9: Overall Supply chain performance

Measuring Items	Min	Max	Mean	Std. Dev
1. Reliability Performance	1.67	5.00	3.91	.715
2. Efficiency Performance	2.00	11.00	4.06	.825
3. Flexibility Performance	1.67	5.00	3.99	.701
4. Cost Performance	2.17	5.00	3.93	.630
Overall Average	**2.54**	**5.67**	**3.97**	**.592**

Source: Fieldwork, 2023

Given a mid-point value of 3.00, which indicates "neutral" in a respondent's perception on the issues being evaluated, the results produced in Table 4.9 concerning the indicators of supply chain performance, reveal that a staff of firms along the supply chain of

Schlumberger GOS Ghana, to agrees that there is high level of supply chain performance (given overall mean score =3.97). For the 4 items measuring "Supply chain performance", the highest mean score was obtained on the second item: "*Efficiency performance"* (M=4.06; SD=0.825) while the least mean score was obtained on the first item: "*flexibility performance"* (M=3.91; SD=0.715).

4.5 The Effect of Supply Chain Integration on Supply chain performance

It was necessary to test the reliability and validity of the items used to measure the constructs. First, reliability test using Cronbach's Alpha was conducted and the results are displayed in Table 4.10.

Table 4.10: Reliability Test Using Cronbach's Alpha

Variable	Number of Items	Cronbach's Alpha
1. Supplier Integration	10	0.894
2. Internal Integration	10	0.868
3. Customer Integration	10	0.859
4. Reliability Performance	6	0.819
5. Efficiency Performance	6	0.835
6. Cost Performance	6	0.888

Source: Fieldwork, 2023

From the reliability test, it could be seen that almost all variables passed the Cronbach's Alpha test with a minimum threshold of 0.70 alpha values except efficiency performance and cost performance measures. This implies, that, only reliability performance, flexibility performance and cost performance passed as supply chain performance and used for subsequent analysis.

4.5.1 Exploratory Factor Analysis

Even though most of the constructs passed the initial reliability test using Cronbach Alpha, it was necessary to determine if the individual items that measured their respective constructs had a strong internal consistency and there were no problematic items. As such exploratory factor analysis was performed to explore the relationships among the constructs and the dimensionality among them thereof (Pallant, 2007). This analysis was also performed using SPSS. Using Principal Component Analysis and Varimax with Kaiser Normalization for rotation, three factors were fixed to extract. The Kasier-Meyer-Oklin (KMO) value was 0.804, which far exceeded the minimum recommended value of 0.6, with Bartlett's Test of Spherity been statistically significant, supporting the factorability of the correlation matrix (Pallant, 2007).

With the three components produced, they had Eigen value exceeding 1 explaining 37.84%, 9.14%, 5.57%, 5.06%, 4.42%, and 3.7% respectively of the variance. Given a minimum of 0.50, some of the items on their respective components were retained whereas problematic items were dropped. For Supplier Integration, items remaining includes 1-3, 6-10, whereas for internal integration, items remaining include 2-4, 7, 9-10 and for Customer integration, items remaining include 1, 3-8. All items for reliability performance and flexibility performance remained whereas items 1 – 3 remained for cost performance. The remaining items per construct were thus composited and used for the model run analysis.

In establishing the influence of supply chain integration on supply chain performance, correlation and regression analysis were employed.

Three main antecedents were considered: Supplier integration (S), Internal integration (I) and Customer integration (C); while the dependent variable was Supply chain performance (P).

The regression estimates were given as:

$RP = b_0 + \beta_1 S + \beta_2 I + \beta_3 C + \varepsilon$ …….. Model 1

$RP = b_0 + \beta_1 S + \beta_2 I + \beta_3 C + \varepsilon$ …….. Model 2

$CP = b_0 + \beta_1 S + \beta_2 I + \beta_3 C + \varepsilon$ …….. Model 3

Where, $b_0 = constant\ of\ proportionality$

β_1 = Coefficient of supplier integration as an independent variable
β_2 = Coefficient of internal integration as an independent variable
β_3 = Coefficient of customer integration as an independent variable

$\varepsilon = error\ term$

S = supplier integration
I = internal integration
C = customer integration

RP = Flexibility performance
RP = Quality Performance
CP = Cost Performance

Table 4.11: Correlations of Variables and Descriptive Statistics

Variables	1	2	3	4	5	6
1. Supplier integration	1					
2. Internal integration	.549**	1				
3. Customer integration	.637**	.801**	1			
4. Reliability Performance	.469**	.709**	.621**	1		
5. Flexibility Performance	.469**	.691**	.640**	.727**	1	
6. Cost Performance	.464**	.494**	.519**	.511**	.554**	1
Mean	**3.78**	**3.91**	**3.95**	**3.91**	**3.99**	**4.07**
Standard Deviation	**0.938**	**0.773**	**0.709**	**0.715**	**0.701**	**0.69**

Note:
** Correlation is significant at the 0.01 level (1-tailed).

Source: Fieldwork, 2023

The correlation results shown in Table 4.11 above generally revealed that staff of firms along the supply chain of Schlumberger GOS Ghana partly attributes their supply chain performance to their supply chain integration practices. Also, supplier integration, internal integration and customer integration among suppliers are antecedents of supply

chain integration as their associations were positive and significant at 0.01 or 0.05. However, the relationships were quite strong as all of the coefficients (r) are more than 0.5.

4.5.2 Model Assessment

The model estimation process began with creating composite variables, interaction term, and then examining relevant assumptions underlying the method of estimation employed in the study. Arithmetic mean was used to create the composite variables. Same was done with the supply chain performance variable.

The researcher used ordinary least square regression analysis to estimate the study's model. The main outcome variable was supply chain performance and the main predictor variables were supplier integration, internal integration among suppliers and supply chain integration.

In the model, all paths in the theoretical framework were estimated. That is, the paths from supplier integration (S), internal integration (I) and customer integration (C) to supply chain performance (P).

Table 4.12: Ordinary Least Square Regression Estimates

Variables:	Standard Estimates		
	Reliability Performance	**Flexibility Performance**	**Cost Performance**
	Model 1	**Model 2**	**Model 3**
Hypothesized			
Direct Effect			
Supplier integration (S)	-.379(-.911)	.020(.102)	.441(.667)
Internal integration (I)	.844(2.742)*	-.341(-2.370)	-.816(-.743)
Customer integration (C)	-.271(-.555)	-.218(-.956)	.913(.764)
FIT INDICES			
χ^2 (df)	47.478(3)	66.665(3)	22.372(3)
χ^2/df	15.826	22.22	7.46
F-Statistics	39.960	257.312	11.022
R^2	**.628**	**0.916**	**0.318**

Notes:

1. t-values are in the parenthesis
2. *Hypothesized paths evaluated at 5% significance level (1-tailed test)

Source: Fieldwork, 2023

The R-square of **0.628** for flexibility performance implies that about 62.8% changes in reliability performance among selected firms along the supply chain of Schlumberger GOS Ghana can be explained by supply chain integration. However, for flexibility performance, the R-square of **0.916** implies that 91.6% changes in flexibility performance among selected firms along the supply chain of Schlumberger GOS Ghana can be explained by supply chain integration. This implies that supply chain integration contributes massively to supply chain performance among firms along the supply chain of Schlumberger GOS Ghana in Ghana. Finally, the R-square of **0.318** for cost performance implies that about 31.8% changes in cost performance among selected

firms along the supply chain of Schlumberger GOS Ghana can be explained by supply chain integration.

4.5.3 Hypothesis Testing and Findings

From the research model, three hypotheses were developed. The first hypothesis was posited that supplier integration significantly and positively lead to supply chain performance. From reviewed literature, it was found out that supplier integration improves supply chain performance as supply chain integration is also tied to performance through the competitive advantage it can create (O'Brien, 2014).

From the standardized estimates of Model 1, this hypothesis was not supported because as the path from S to RP was negative (β = -.379; t=-.911), and it was not statistically significant at 5%. Similarly, the path from C to RP was also negative (β = -.271; t=-.555). However, the path from I to RP was partially supported as it was positive and statistically significant (β =.844; t=2.742) but it was statistically not significant at 5%. The study revealed that supplier integration and customer integration have a negative influence on reliability performance but internal integration only had a positive and significant effect on reliability performance.

From model 2, it was realized that only supplier integration had a positive effect on quality performance though not statistically significant at $p<0.5$. Both internal (β =-.341; t=-2.370) and customer integration (β =-.-.218; t=-.956) had negative effect on flexibility performance but only internal integration was statistically significant at 5%. From the results of the findings in Model 2, none of them supported earlier findings that supply chain integration leads to flexibility performance. Purchasing and supplies management ought to also be receptive to the likelihood of taking up internal integration seriously to contribute to their performance (Chan et al., 2012; Krause et al., 2007)

Finally, from model 3, it was realized that none of the dimensions of supply chain integration had a positive effect on cost performance and all were statistically insignificant at p<0.5. As such, the direct effect of supply chain integration on cost performance was not supported in this study.

Table 4.13: Summary of Results

	Hypothesis	β	T-Value	Remarks
H1	Supplier integration has a positive and significant effect on supply chain performance.	-.379 .020 .44	-.911 .102 .667	Not supported Not supported Not supported
H2	Internal integration has a positive and significant effect on supply chain performance.	.844 -.341 -.816	2.742 -2.370 -.743	Supported Not supported Not supported
H3	Customer integration has a positive and significant effect on supply chain performance.	-.271 -.218 .913	-.555 -.956 .764	Not supported Not supported Not supported

Source: Fieldwork, 2023

4.6 Discussion of Results and Implications

This study sought to investigate the effect of supply chain integration on supply chain performance. There was review of extant literature to come out with the antecedents and outcomes of supply chain integration, which are supplier integration, internal integration and customer integration whereas the dependent variable was supply chain performance which was measured by four indicators. These were modelled into a framework and hypothesized paths were tested empirically.

The first hypothesis postulates that that supplier integration significantly and positively lead to supply chain performance. From the standardized estimates of Model 1 and 2, this hypothesis was not supported because as the path was negative (β = -.379; t=-.911) and insignificant for Model 1 and positive but insignificant for Model 2 (β =.020; t=.102) and it was statistically significant at 5%. This presupposes that for the organisations in Ghana to benefit from supply chain performance, there is the need for absolute supplier integration. That is, those who are at the helm of affairs among firms should develop

measures for building supplier integrations and also provide them with necessary support that is necessary for such partnering and engagement. This finding collaborates previous studies that supplier integration improves performance. For instance, supplier integration involves closer collaboration and coordination with key suppliers in order to achieve, mutual benefits such as a reduction of inventory, and supplier lead-time (Thun, 2010). This entails long-term interactions with suppliers, enhancing the process of joint problem identification and real-time process/product solutions (Flynn et al., 2010). Some have argued that supplier integration is the most common type of SCI (Fawcett and Magnan, 2002). Therefore, as much as internal integration is vital to an organization success, in the post-industrial era organizations can no longer rely on themselves for continual development (i.e. globalized business processes).

Similarly, the second hypothesis asserts that internal integration significantly and positively influence supply chain performance. There was partially supported in Model 1 as internal integration had a positive and significant effect on reliability performance (β=.844; t=.742). Unfortunately, Model 2 did not find support for this hypothesis as there was a negative statistically insignificant relationship between internal integration and flexibility performance (β=-.341; t=-2.370). This implies that internal integration though important, may not necessarily lead to improved supply chain performance but just flexibility performance. Supply chains have grown physically longer (e.g. geographical dispersion) and have become far more complex (e.g. increased reliance on outsourcing, increased number of critical embedded technologies, additional product design complexity). There has been the urge to adopt lean mentality to drive out waste and excess inventory which would eventually yield increased inter-firm dependency and with it, help to reduce business risk from supply chain disruptions (Alfalla-Luque et al., 2013; Fabbe-Costes and Jahre, 2007; Huo, 2012; Koufteros et al., 2010; Leuschner et

al., 2013; Sanders, 2007; Zailani and Rajagopal, 2005; Zhao et al., 2011, Zhao et al., 2013). Therefore, there is the need for effective supply chain integration to help the various players in the firms along the supply chain of Schlumberger GOS Ghana supply chain to overcome challenges in their operations so as to improve on their efficiency and supply chain performance.

CHAPTER FIVE

SUMMARY OF FINDINGS, CONCLUSIONS AND RECOMMENDATIONS

5.1 Introduction

This chapter presents the summary of findings in the previous chapter. It also presents the conclusion of the study and recommendations in relation to the findings of the study. Using a purposive and convenience sampling techniques, one hundred and forty-nine (149) responses were gathered from staffs of firms along the supply chain of

Schlumberger GOS Ghana from the 200 questionnaires administered. This represents 74.5% response rate. Analysis was made on only valid responses from the field study.

5.2 Summary of Findings

The summary of the study's findings is presented in line with the research objectives as follows:

5.2.1 Supplier integration and Supply chain performance

As part of the first of objective of the study was to determine the effect of supplier integration on a firm's supply chain performance. Concerning the supplier integration as a dimension of supply chain integration, the findings revealed that supplier integration is a dimension of supply chain integration (given overall mean score =3.81). This is in line with literature that a good partnership quality between the buyer and its supplier, based on mutual trust, joint problem solving, and fulfillment of pre-specified promises, helps in avoiding complex and lengthy contracts, that are costly to write and difficult to monitor and enforce (Fynes et al., 2004, 2005).

5.2.2 Internal integration and Supply chain performance

The second objective of the study was to assess the influence of internal integration on a firm's supply chain performance. Concerning the internal integration as a dimension of supply chain integration, the findings revealed that internal integration is a dimension of supply chain integration (given overall mean score =4.00). This is in line with literature that when the internal supply chain is all connected, then an organization is able to deliver certain value to customers efficiently which in turn translates to creation of value for the firm itself (Lambert, 2008).

5.2.3 Customer integration and Supply chain performance

The third objective of the study was to determine the effect of customer integration on a firm's supply chain performance. The study examined customer integration as a

dimension of supply chain integration among firms in Ghana. Concerning customer integration suppliers as a dimension of supply chain integration, the findings revealed that customer integration is a dimension of supply chain integration (given overall mean score =3.93).

5.3 Conclusion

This study sought to investigate the extent of supply chain integration (SCI) among Ghanaian firms along the supply chain of Schlumberger GOS Ghana, examine the effect of internal integration on supplier integration and customer integration among Ghanaian firms along the supply chain of Schlumberger GOS Ghana, examine the level of supply chain performance among Ghanaian firms along the supply chain of Schlumberger GOS Ghana and establish the effect of supply chain integration and supply chain performance among Ghanaian firms along the supply chain of Schlumberger GOS Ghana. This was done by selecting sample of respondents who were actors among firms along the supply chain of Schlumberger GOS Ghana of which a response rate of 74.5% was achieved using appropriate methodological approaches. The study revealed that for the firms in Ghana to benefit from supply chain integration, there is the need for absolute supplier integration. That is, those who are at the helm of affairs among firms should develop measures for building strong relationships with their suppliers and providing them with necessary support that is necessary for such collaborating and engagement.

Also, the study found out that though internal integration is vital to all stages of supply chain integration, it does not necessarily contribute much to supply chain performance. Finally, the study revealed that when there is supplier quality management, it could yield performance but this relationship was not statistically significant in this study.

This means that for Ghana to have higher supply chain performance in the firms along the supply chain of Schlumberger GOS Ghana, there is the need for effective supply chain integration. Supply chain integration is a vital component of ensuring an effective supply chain network. The advantage of supply chain integration can be achieved through efficient relationship among various supply chain activities, with a linkage based on the effective construction and utilization of various supply chain activities for an integrated supply chain. And this is mostly applicable among firms in Ghana.

5.4 Recommendations of the Study

By investigating the direct impact of SCI-supply chain performance, the following recommendations are made for practitioners:

It was found out that a key driver of supply chain integration is supplier integration. One key component which builds integration is information sharing. Therefore, it is recommended that all supply chain partners should do their best to share vital information concerning quality of products, delivery schedules, tools of trade, etc. for effective operations and better supply chain integration.

It was also found out that supplier integration has a positive effect on supply chain performance. It is recommended that the supply chain partners collaborate in coming out with appropriate actions and remedies so as to ameliorate problems that confront them.

It was realized that internal integration goes a long way to ensure an effective supply chain integration. It was revealed from the findings that some challenges confronting implementation of supply chain integration include delay in payment of work done and administrative bureaucracies as well as poor supplier training and development. Therefore, it is recommended that top management show more commitment by indulging in facilitating payment promptly and improve upon internal integration efforts

in order to yield effective operations and better supply chain integration. Building trust among supply chain partners is a very important factor which can contribute to customer integration as well as supplier integration. Therefore, trust should be built among suppliers by probably committing them into signing bonding contracts that will make them trustworthy to ensure effective operations and better supply chain integration.

Nevertheless, this research understands that from a practical point of view, it may be a difficult and daunting task for firms in Ghana to restructure and reform their SCI endeavours to impact on their supply chain performance. But with focus and tenacity, firms could adopt supply chain strategies that would make their supply chains agile and responsive to all external pressures to improve their overall supply chain performance in the long run.

5.4.1 Suggestions for Future Studies

Although the dimensions of supply chain integration considered in this research were based on the literature reviewed only supplier integration has a significant and positive effect on one dimension of supply chain performance. However, there is no doubt that other supply chain integration (SCI) practices may have a significant impact on supply chain performance. It is therefore recommended for future research to replicate this study in different setting to determine if similar findings would be achieved or otherwise in order to make informed recommendations for theory and practice.

Other variables can considered as either moderators or mediators in the research model to account for most of the failed direct relationships between supply chain integration and supply chain performance in future studies. The scope of the study can be extended to cover firms along the supply chain of Schlumberger GOS Ghana across all regions in

Ghana to have a holistic picture of supply chain integration among firms along the supply chain of Schlumberger GOS Ghana in Ghana.

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APPENDIX

SURVEY QUESTIONNAIRE

I am a graduate student of Kwame Nkrumah University of Science and Technology. As part of the requirements for the award of Master of Philosophy in Logistics and Supply Chain Management, I am undertaking a research work on the topic: "***assessing the effect of supply chain integration and supply chain performance".*** This work is purely for academic purposes and the data collected and the results will not be used in any way to jeopardize the interest of your unit and your business as a whole. I guarantee your anonymity and complete confidentiality.

Please tick/circle an answer that suits your choice.

PART A BACKGROUND INFORMATION

1. Sex: Male ☐ Female ☐

2. What is your highest level of education?
   ☐ JHS/Middle School ☐ Secondary ☐ HND ☐ Degree Masters

   ☐ Other, please specify: …….

3. Please indicate your age bracket.
   ☐ Less than 20 years ☐ 21 – 30 years ☐ 31 – 40 years ☐ 41 – 50 years
   ☐ 51 years and above
   ☐ Other, please specify: …….

4. How many years have your worked with your company/institution in Ghana?
   ☐ Less than 1 year ☐ 1 – 5 years ☐ 6 – 10 years ☐ 11 – 15 years
   ☐ Above 15 years

PART B SUPPLIER INTEGRATION

5. **Please to what extent do you agree with the following as reality on ground with regards to your institution on supplier integration?** *Please circle the number that best represents your opinion.*

Strongly Disagree	Disagree	Indifferent	Agree	Strongly Agree
1	2	3	4	5

PRACTICES	RESPONSE				
1. Our company shares information with suppliers through our electronic network.	1	2	3	4	5
2. Our company is working to build partnership with our suppliers	1	2	3	4	5
3. Our company is working with our suppliers through clear contracts (regarding the quantities, specifications, costs, and delivery)	1	2	3	4	5
4. Suppliers are committed to our required specifications	1	2	3	4	5
5. Suppliers contribute in our product design	1	2	3	4	5
6. Our company is holding regular meetings with our suppliers to review the business issues.	1	2	3	4	5
7. There are joint activities between our company and our suppliers (Training program, joint celebrations, exchange of experience)	1	2	3	4	5
8. Our company and our suppliers are connected with an electronic system to control the inventory	1	2	3	4	5
9. Our company and our suppliers are discussing the significant changes that affect the continuity of our relationship.	1	2	3	4	5
10. There are common awareness programs are hold between our company and our suppliers to develop our business.	1	2	3	4	5

PART C INTERNAL INTEGRATION

6. **Please to what extent do you agree with the following as reality on ground with regards to your institution on internal integration?** *Please circle the number that best represents your opinion.*

Strongly Disagree	Disagree	Indifferent	Agree	Strongly Agree
1	2	3	4	5

Measures	RESPONSE				
1. Our company is constantly striving to unify our culture with stakeholders (mission and vision)	1	2	3	4	5
2. Our company involves different department during our preparation of strategic plan	1	2	3	4	5
3. Our company uses materials requirement planning (MRP) system (to harmonize forecasting, procurement, production, and sales)	1	2	3	4	5
4. There is an internal network for the exchange of information between our employees	1	2	3	4	5

5. Our company holds training program to increase our employees' competencies	1	2	3	4	5
6. Our company is keen to hold regular meetings with departments' managers to coordinate our work	1	2	3	4	5
7. Our company holds extensive meetings to increase homogeneity (oneness) among employees	1	2	3	4	5
8. Our company allow our employees to participate in solving our problems and internal conflicts and settlement	1	2	3	4	5
9. Our company departments share in our development of production processes	1	2	3	4	5
10. There are multiple teams working with each other interactively	1	2	3	4	5

PART D CUSTOMER INTEGRATION

7. **Please to what extent do you agree with the following as reality on ground with regards to your institution on customer integration?** *Please circle the number that best represents your opinion.*

Strongly Disagree	**Disagree**	**Indifferent**	**Agree**	**Strongly Agree**
1	**2**	**3**	**4**	**5**

Measures	**RESPONSE**				
1. Customer's satisfaction is central goal that our company pursued to achieve	1	2	3	4	5
2. Our company seeks to build partnership with customers	1	2	3	4	5
3. There is specialized customer service department in our company	1	2	3	4	5
4. Our company has a fast system to receive orders from our customers	1	2	3	4	5
5. Our company reserves the full databases about their customers	1	2	3	4	5
6. Our company set up scientific seminar for its customers	1	2	3	4	5
7. Company customers are encouraged to provide feedback	1	2	3	4	5
8. Our company deals with the complaints and observations of our customers properly	1	2	3	4	5
9. Our company engages its customers in the preparation of marketing programs	1	2	3	4	5
10. Our company engages its customers in the design of our company's products	1	2	3	4	5

PART E: SUPPLY CHAIN PERFORMANCE

8. **Indicate your agreement to the following as indicators of supply chain performance in your organization.** *You can circle the appropriate number that follows.*

Strongly Disagree	**Disagree**	**Indifferent**	**Agree**	**Strongly Agree**
1	**2**	**3**	**4**	**5**

Reliability Performance	**1**	**2**	**3**	**4**	**5**
SPREL1: Our firm offers products that are highly reliable					
SPREL2: Our firm offers high quality products to our customers					
SPREL3: Our firm and supply chain partners have helped each other to improve product quality					
SPREL4: Our firm with supply chain partners increases the rate at which we fulfill customer orders					
SPREL5: Our firm with supply chain partners increases our inventory turns					

Efficiency Performance	1	2	3	4	5
SPEFF1: Our firm with supply chain partners reduces inbound and outbound cost of transport					
SPEFF2: Our firm with supply chain partners reduces warehousing and inventory holding costs					
SPEFF3: Our firm with supply chain partners meets on-time delivery requirements for all product					
SPEFF4: Our firm with supply chain partners reach agreed costs per unit as compared with industry					
Flexibility Performance	**1**	**2**	**3**	**4**	**5**
SPFLX1: Our firm with supply chain partners offers a variety of products and services efficiently					
SPFLX2: Our firm with supply chain partners offers customized products and services with different features.					
SPFLX3: Our firm with supply chain partners meets different customer volume requirements efficiently					
SPFLX4: Our firm with supply chain partners has short customer response time as comparison to industry					
SPFLX5: Our firm with supply chain partners responds to and accommodates demand variations					

9. Using the 7-point Likert scale below, please indicate your level of significance with respect to the following statements about your organization

Not at all	To some degree	Relatively significant	Very significant	Absolutely Significant				
1	2	3	4	5				
Cost Performance				**1**	**2**	**3**	**4**	**5**
For the past 3 years, there has been:								
SPCP1: decrease of cost for purchased materials.								
SPCP2: consideration of the purchasing price when making financial decisions.								
SPCP3: consideration of the cost of managing the purchasing process in all purchases								

Thank you for being part of the research.