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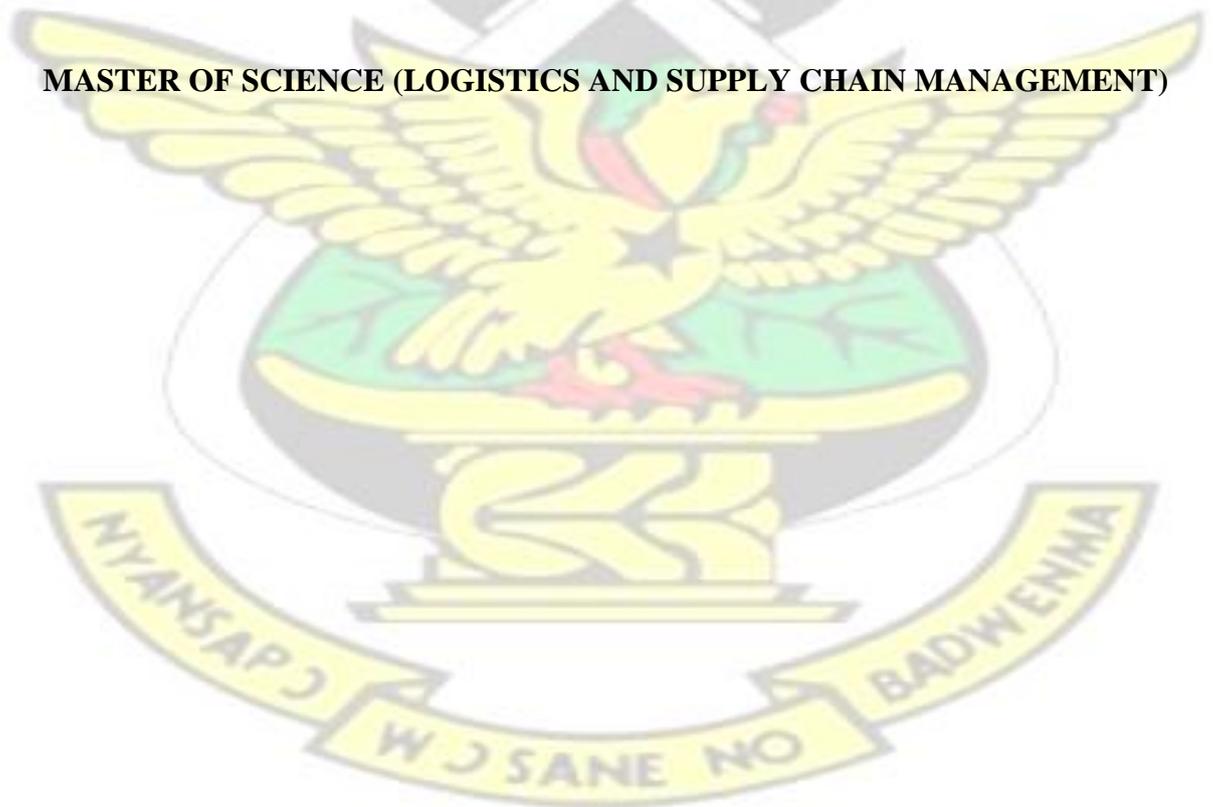
**EXAMINING THE RELATIONSHIP BETWEEN SUPPLY CHAIN
INTEGRATION AND OPERATIONAL PERFORMANCE AMONG FIRMS
IN THE GREATER ACCRA METROPOLIS: THE MODERATING
EFFECT OF A FIRM'S EXTERNAL LEARNING.**

BY

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*A THESIS SUBMITTED TO THE DEPARTMENT OF SUPPLY CHAIN AND
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FULFILMENT OF THE REQUIREMENTS FOR AWARD OF DEGREE OF*

MASTER OF SCIENCE (LOGISTICS AND SUPPLY CHAIN MANAGEMENT)



AUGUST, 2023

DECLARATION

I hereby declare that this thesis is the result of my original work towards the MSc in Logistics and Supply Chain Management and that, to the best of my knowledge, it neither contains materials published by another person, nor materials which have been accepted for the award of any other degree of the University, except where due acknowledgements have been made in the text.

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ABSTRACT

A study that seeks to examine the moderating effect of external learning on the relationship between supply chain integration (SCI) and operational performance is one that cannot be overemphasized. As such, this study focused on firms in the Accra metropolis in Ghana to examine these relationships. Using a purposive and convenience sampling techniques, one hundred and forty-nine (149) responses were gathered from selected organisations in the Accra metropolis from the 200 questionnaires administered. This represents 74.5% response rate. Analysis was made on only valid responses from the field study. The findings 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 effectively to operational 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 operational performance in the selected organisations, 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.

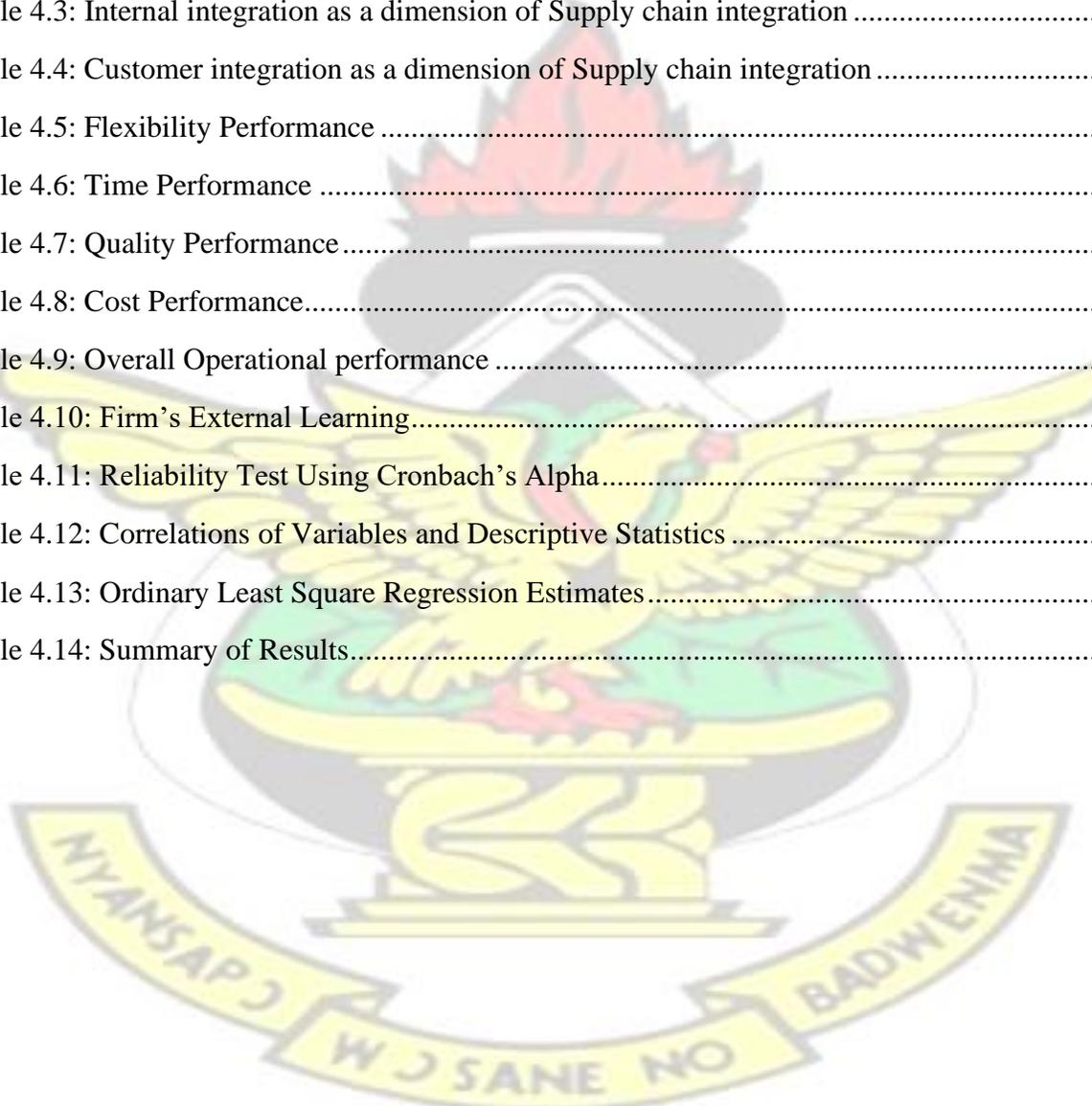
TABLE OF CONTENT

DECLARATION _____	i
ABSTRACT _____	ii
TABLE OF CONTENT _____	iii
LIST OF TABLES _____	v
LIST OF FIGURES _____	vi
DEDICATION _____	vii
ACKNOWLEDGEMENTS _____	viii
CHAPTER ONE _____	1
INTRODUCTION	1
1.1 Background of the Study _____	1
1.2 Problem of the Study _____	3
1.3 Objectives of the Study _____	5
1.4 Research Questions _____	6
1.5 Justification of the Study _____	6
1.5 Overview of Methodology _____	7
1.7 Scope of the Study _____	7
1.8 Limitations of the Study _____	8
1.9 Organization of the Thesis _____	8
CHAPTER TWO _____	10
LITERATURE REVIEW	10
2.1 Introduction _____	10
2.2 Definitions and Overview of Supply Chain Integration _____	10
2.3 Supply Chain Integration Elements _____	12
2.3.1 Supplier Integration _____	16
2.3.2 Internal Integration _____	16
2.3.3 Customer Integration _____	17
2.5 External learning _____	19
2.6 Operational Performance _____	20
2.6.1 Flexibility _____	21
2.6.2 Time _____	22
2.6.3 Quality _____	22
2.6.4 Cost _____	23
2.7 Theoretical Review _____	24
2.7.1 Process – Based Management Theory _____	27
2.7.2 Firm’s Dynamic Capability Theory _____	28
2.8 Empirical Review _____	29
2.9 Conceptual Framework _____	41
2.9.1 Supply Chain Integration and Operational Performance _____	47
2.9.2 Internal Integration and Operational Performance _____	50
2.9.3 Customer Integration and Operational Performance _____	52
2.9.4 Moderating Role of External Learning _____	53
CHAPTER THREE _____	54
RESEARCH METHODOLOGY	54

3.1 Introduction	54
3.2 Research Design	54
3.3 Population of the Study	55
3.4 Sample Size	55
3.4.1 Sampling Techniques	55
3.5 Data Collection Method	56
3.5.1 Primary Data	56
3.5.2 Secondary Data	56
3.5.4 Data Collection Tools	56
3.6 Data Analysis	57
3.8 Data Validity and Reliability	57
CHAPTER FOUR	58
DATA PRESENTATION, ANALYSIS AND DISCUSSIONS	58
4.1 Introduction	58
4.2 Demographic Information of Respondents	58
4.3 Extent of supply chain integration (SCI) among Ghanaian firms in the Accra metropolis of Ghana	60
4.3.1 Supplier Integration	60
4.3.2 Internal Integration	62
4.3.3 Customer integration	64
4.3 Operational performance	66
4.2.4 External Learning	70
4.4 The Effect of Supply Chain Integration on Operational performance	72
4.4.1 Exploratory Factor Analysis	72
4.4.2 Model Assessment	74
4.4.3 Hypothesis Testing and Findings	76
4.5 Discussion of Results and Implications	78
CHAPTER FIVE	80
SUMMARY OF FINDINGS, CONCLUSIONS AND RECOMMENDATIONS	80
5.1 Introduction	80
5.2 Summary of Findings	80
5.2.1 Supplier integration and Operational Performance	80
5.2.2 Internal integration and Operational Performance	80
5.2.3 Customer integration and Operational Performance	81
5.2.5 Test of Moderation Effect of External learning	81
5.3 Conclusion	82
5.4 Implications of the Study	83
5.4.1 Theoretical Implication	84
5.4.2 Managerial Implication	86
5.4.3 Suggestions for Future Studies	87
References	88
Appendix	93

LIST OF TABLES

Table 2.1: Definitions of Supply Chain Integration.....	10
Table 2.2: Summary of comparison of supply chain management frameworks.....	26
Table 2.4: Summary of Empirical Review	37
Table 4.1: Demographic breakdown of respondents	59
Table 4.2: Supplier integration as a dimension of Supply chain integration	61
Table 4.3: Internal integration as a dimension of Supply chain integration	63
Table 4.4: Customer integration as a dimension of Supply chain integration	65
Table 4.5: Flexibility Performance	66
Table 4.6: Time Performance	67
Table 4.7: Quality Performance	68
Table 4.8: Cost Performance.....	69
Table 4.9: Overall Operational performance	70
Table 4.10: Firm’s External Learning.....	71
Table 4.11: Reliability Test Using Cronbach’s Alpha.....	72
Table 4.12: Correlations of Variables and Descriptive Statistics	74
Table 4.13: Ordinary Least Square Regression Estimates.....	75
Table 4.14: Summary of Results.....	78



LIST OF FIGURES

Figure 2.1: Conceptual Framework of the Study..... 47

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DEDICATION

I dedicate this thesis to Almighty God for His grace and mercies and then my lovely wife and children for their immense supports and prayers.

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I am grateful to the Almighty God who granted me life, good health and protection during this programme.

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I am also grateful to my family, friends, course mates and my department.



CHAPTER ONE

INTRODUCTION

1.1 Background of the Study

During the past two decades, 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., 2013). 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; Bagchi 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.

This study therefore concentrates on external learning to determine the function of learning capacity in SC integration. A company can accept fresh information from other businesses through external learning and incorporate it into its own intelligence. External learning has been shown to enhance organizations' innovation in previous studies (Laursen and Salter, 2005; Bao et al., 2012). Learning from the chain members in the context of supply chain management can assist an organization in being well-prepared with the most recent knowledge on systems, procedures, technologies, and benchmarking in order to respond to market changes quickly and effectively (Ngai et al., 2011). Although the effect of “learning orientation” on SC integration has been studied in previous studies, Braunscheidel and Suresh (2009) argue that this cultural trait has an indirect impact in this area. There has not been much analysis of how external learning affects SC integration, especially in Ghana and the rest of sub-Saharan Africa. Therefore, this work intends to fill the research gap by identifying the moderating role of external learning in the relationship between SC integration and operational 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 moderating effect of external learning on the relationship between supply chain integration (SCI) and operational performance is one that cannot be overemphasized. There have been several extant studies that have analyzed the relationship between supply chain integration and operational performance and showed positive results (Asgari, 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 analyze that SCI as a construct views the construct from internal integration point of view or external integration (Huo et al., 2014; Droge et al., 2012). Furthermore, some studies suggest the existence of moderating effects of the SCI measures (Wiengarten et al., 2022; 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 (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. It can be seen that there is little evidence of research that delves into how external learning influence supplier integration with resulting influence on firm performance.

As such, this study sought to fill this gap by identifying supplier integration practices that are influenced by external learning to influence firm performance.

According to this study, external learning significantly improves SC integration. According to Dumaine (1994), Antonacopoulou and Chiva (2007), Bennet and Bennet (2004), and others, a corporation is more likely to be described as agile if it has a higher level of organizational learning. While increasing learning from the market, customers, and suppliers enables the organization to better its responsiveness to uncertainty, SC integration is an externally focused skill (Swafford et al., 2006). Consequently, this study focuses on external learning to identify the relevance of learning capacity in SC integration. A company can accept fresh information from other businesses through external learning and incorporate it into its own intelligence. External learning has been shown to enhance organizations' innovation in previous studies (Laursen and Salter, 2005; Bao et al., 2012).

Analysis of how external learning affects SC integration is still in progress. Therefore, by pinpointing the role of external learning in SC integration, this work aims to close the research gap. This necessitated this study to examine the moderating effect of external learning on supply chain integration to affect firm operational performance and so the purpose of this research is to answer the following question: To what extent does external learning influence supply chain integration to impact on operational performance at Ghanaian business sector?

1.3 Objectives of the Study

The general objective of the study is to assess the moderating effect of firm's external learning on the relationship between supply chain integration and operational performance: empirical study of organisations in the Accra metropolis of Ghana. However, the specific objectives are as follows;

1. To determine the effect of supplier integration on a firm's operational performance.
2. To assess the influence of internal integration on a firm's operational performance.
3. To determine the effect of customer integration on a firm's operational performance.
4. To examine the moderating effect of a firm's external learning on the relationship between supply chain integration and operational performance of firms.

1.4 Research Questions

1. What is the effect of supplier integration on a firm's operational performance?
2. What is the effect of internal integration on a firm's operational performance?
3. What is the effect of customer integration on a firm's operational performance?
4. What is the moderating effect of a firm's external learning on the relationship between supply chain integration and operational performance of firms?

1.5 Justification of the Study

Theoretically, this study contributes to the field of literatures on operational performance and supply chain integration. The study provides a further literature on the relationship between supply chain integration and operational performance especially within Ghanaian firms. Although many researchers have proven the existence of relationship between supply chain integration and operational 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 lead to the improvement of operational 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 operational 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.

1.5 Overview of 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. The study would look at whether the dimensions of supply chain integration positively relate to operational performance of firms. It will look at how a firm's external learning moderates the relationship between supply chain integration and operational 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). Operational performance is measured in 4 dimensions namely cost performance, time performance, quality performance and flexibility performance. The geographical scope of the study is Accra metropolis in the Greater Accra region of Ghana. The unit of analysis is firm-level represented by top management members in the supply chain management unit of selected organisations.

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 operational performance of firms. It also looks at how a firm's external

learning moderate the relationship between supply chain integration and operational 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). Operational performance is measured in 4 dimensions namely cost performance, time performance, quality performance and flexibility performance. The geographical scope of the study is Accra metropolis in the Accra metropolis of Ghana. The unit of analysis is firm-level represented by top management members in the supply chain management unit of selected organisations.

1.8 Limitations of the Study

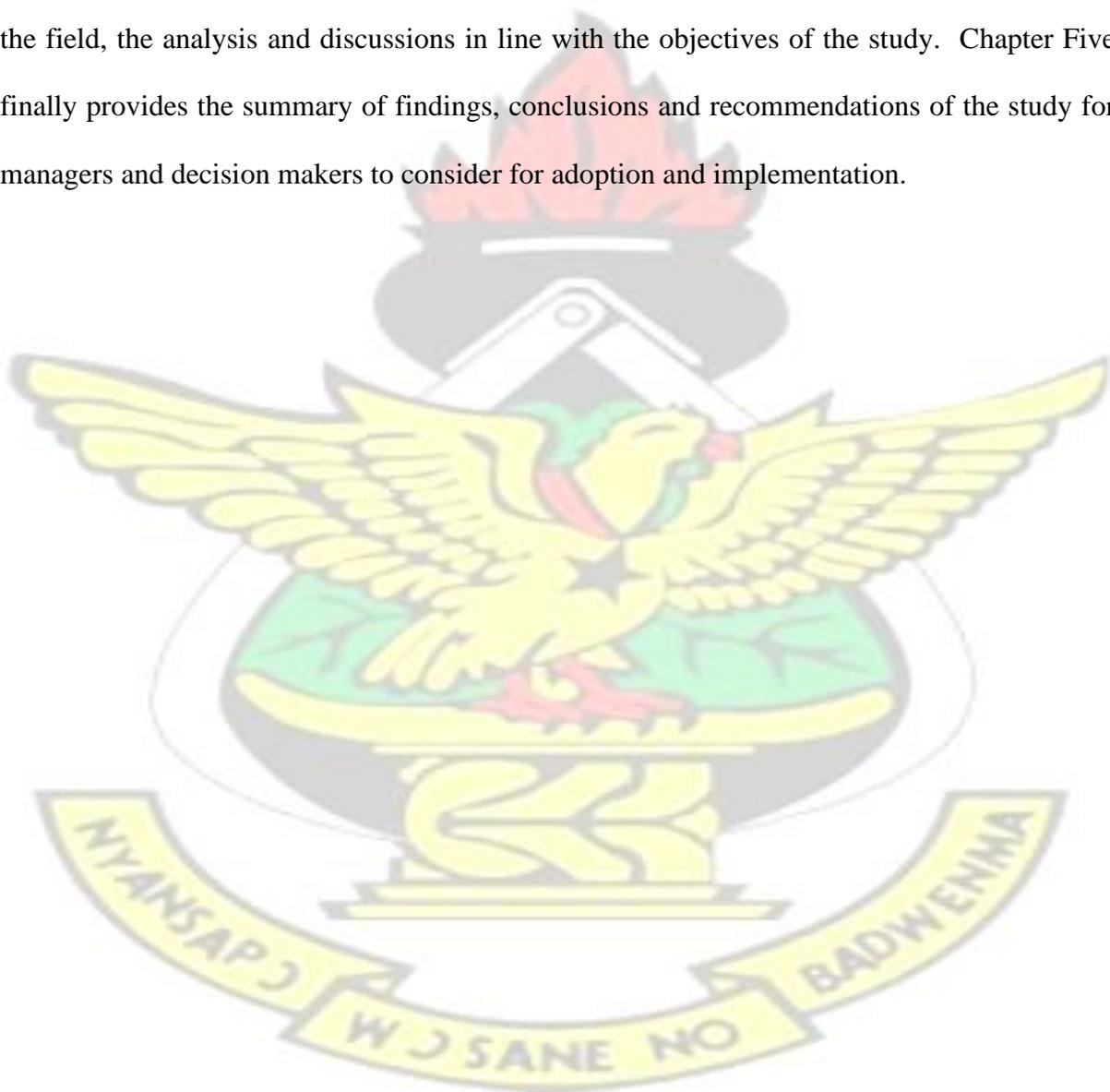
Almost every field research encounters some challenges, this study was no exception. The research design was constrained by limited access to objective verifiable quantitative data, in part due to commercial confidentiality on the part of some players. Apart from the challenge of bearing huge financial 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 around supply chain integration and operational 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 operational 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, operational performance and the theoretical framework for the study.

2.2 Definitions and Overview of Supply Chain Integration

There are numerous definitions of supply chain and these include the following in Table 2.1:

Table 2.1: Definitions of Supply Chain Integration

Author (year)	Definition
Krajewski et al. (2013)	Supply chain integration is “the effective coordination of supply chain processes through the seamless flow of information up and down the supply chain.
Flynn et al. (2010)	Supply chain integration which is defined as ‘the degree to which a manufacturer strategically collaborates with its supply chain partners and collaboratively manages intra- and inter-organisational processes, in order to achieve effective and efficient flows of products and services, information, money and decisions, to provide maximum value to the customer at low cost and high speed
Han & Omta (2007)	Supply chain integration is the process of collaboration in which companies work together in a cooperative manner to arrive at mutually acceptable outcomes
Bagachi, et al. (2005)	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.

Stock & Tatikonda (2004)	It is the level to which all activities in an organisation and that of its suppliers, customers, and other supply chain members are integrated
Marquez, Bianchi, & Gupta (2004)	It 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.
Pagell (2004)	Supply chain integration is a process of collaboration in which companies work together in a cooperative manner to arrive at mutually acceptable outcomes
Li et al. (2002)	It refers to the physical flow of goods and flow of information as well as the flow of funds.
Frohlich and Westbrook (2001)	Supply chain integration is ‘a set of activities that manufacturers use to integrate their internal processes with both suppliers and customers’

Source: Author’s Construct (2022)

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 Frohlich 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.

2.3 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 research 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 clearly shows 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.

2.3.1 Supplier Integration

Suppliers are considered 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. Moreover 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.

2.3.2 Internal Integration

Internal integration is the centre of gravity for both suppliers and customers 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.

2.3.3 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.

2.5 External learning

The literature of the knowledge-based view, which has its roots in the conventional theory of resource-based view (Conner, 1991; Grant and Baden-Fuller, 1995; Huang et al., 2008), place a strong emphasis on the strategic significance of organizational knowledge. Knowledge is "dynamic, personal, and distinctly different from data and information", as iterated by Sveiby (2001). It is a type of intangible asset for a company that can produce real values. (Spender, 1996; Nonaka, 1991, 1994; Huang et al., 2008) The theory of knowledge-based view aims to analyze the mechanisms that cause a corporation to acquire and generate organizational knowledge. According to the knowledge-based view theory (Huang et al., 2008; Schroeder et al., 2002), external learning can be defined as the knowledge creation and acquisition through inter-organizational learning through collaboratively solving problems with customers and suppliers. A foundation for the company to share tacit knowledge can be established through close cooperation with supply chain participants (Linderman et al., 2004). Then, the implicit knowledge produced by outside learning might become the explicit knowledge of the company (Nonaka, 1994).

The external learning in the context of a supply chain may include learning from upstream suppliers and learning from downstream customers. A company's innovation speed can be predicted based on how well it learns from its customers, claim Bierly and Daly (2007). For instance, a company can improve its product or service by paying attention to customer feedback. According to Matting et al. (2004), client recommendations are more imaginative than professional advice (such as advice from a consultant firm).

Additionally, the tacit knowledge acquired through encounters with clients, according to Madhok and Tallman (1998), is challenging to recreate. A long-term partnership with the suppliers could be helpful for the external learning as well. Contextual learning from

suppliers can happen in a variety of ways, such as regular supplier involvement in the design of new products or processes and the enhancement of product quality (Gerwin, 1993; Schroeder et al., 2002).

2.6 Operational Performance

Academicians and researchers have investigated operational performance from many different perspectives. Wang and Kafouros (2009) developed operational 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 operational 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 operational 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 operational performance metrics as a standard framework to assess operational 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 operational 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 operational 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.

2.6.1 Flexibility

Building the competitive strategy to be flexible requires the commitment toward certain actions and activities, among these are educating the employee for different tasks, motivate employee for more flexible work schedules, working in teams, and enhancing communication in the organization. Rosenzweig et al. (2002) defined flexibility as" the ability of the firm to develop flexible operations in hypercompetitive environment to meet the frequent changes in volume, product mix and schedules occur". The researcher defined the flexibility as the ability of organization to adapt to fluctuation in demand in term of product or service specification, volume, and on-time delivery. It was measured by specific items that reflect the ability of the organizations to overcome these fluctuations in demand.

2.6.2 Time

Building a strategy on the basis of reducing the time between customer demands until meeting these demands entails work on the following: forecasting demand system, coordination of work processes, and change organizational layout, and managing the transportation.

The traditional dimension to measure the performance that expressed by delivery time and lead time. Different studies were defined time, lead time, and cycle time. Cycle time is the time between one completion jobs or tasks to another, i.e. from starting one process or task to start the same process or task again. Lead time is the time that is required from setting the order by customer to deliver the product or service (company and supplier) including manufacture, transportation, processing, warehousing, and delivering the product or service to the final customer. Gimenez et al. (2011) defined the lead time as the time needed for the delivery of the products to the key buyer. The researcher adopts delivery time that is required by the company to provide the product or and services to the customer according to agreed timetable. It was measured by selected items that reflect the speed in delivering the products and services to customers.

2.6.3 Quality

Building the strategy based on quality of products, services, and processes requires matching the following: educate employee with specific tasks, applying monitoring system, motivating committed employee of quality standard, and monitoring for complaints.

The degree through which the supply chain activities and processes seek to meet customer needs, requirements, and demands by following rules and standards of Good Manufacturing Practice (GMP), International Standards Organisation (ISO) and other bodies. From the customer perspective the organization should provide reliable service such as order entry,

document preparation, and warehouse picking accuracy. Juran and Godfrey (1998) defined quality as "those features of products which meets customer needs and thereby provide customer satisfaction". In this study quality defined as the degree to which supply chain integration meets customer needs and demands. It was measured by items that embodied the concept of quality.

2.6.4 Cost

Building the strategy based on reducing the overall costs entail to run out the following: reducing inventories, maximum utilization of resources, work- in- process inventory turnover, and eliminating non- added value activities.

Likely the most common and important measure in evaluating operational supply chain is cost. Bowersox et al. (2009) defined the cost as the total cost incurred to accomplish specific operation. Organizations attempt to decrease prices and maximizing profit. Vaidya and Hudnurkar (2012) defined cost as the summation of all costs that includes: inbound and outbound freight, warehouse cost, third party storage cost, order processing cost, direct labour cost, administrative and service costs. Cirtita et al. (2012) defined the cost as "the total costs associated with operating the supply chain". In this research the author defined the cost as the total costs and expenses that are incurred by completing all/and or specific activities and operations within supply chain. It was measured by selected items that reflect the total incurred costs and expenses.

Referring to the above previous studies and the referring to the importance of supply chain management and the resulting of substantial benefits as a result of integration, the researcher was investigating the supply chain integration as an independent variable represented by: supplier, internal, and customer integration, and the operational performance as a dependent variable represented by: cost, quality, time, and flexibility.

2.7 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 (Akkermans et 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).

The study on SCM theory, practice and future challenges conducted by Storey et al. (2006) revealed that “supply chain management is, at best, still emergent in terms of both theory and practice. Few practitioners were able – or even seriously aspired – to extend their reach across the supply chain in the manner prescribed in much modern theory.” Many researchers (e.g., Skjoett-Larsen, 1999; Madhok, 2002) use different theories to SCM and still there are some differences in accepting a single theory in the literature to solve SCM problems. Skjoett-Larsen (1999) and Madhok (2002) discuss SCM theories, such as the principal-agent theory, transaction cost analysis, the network perspective, and the resource-based view. Lambert et al. (2005) identify the following five SCM frameworks that emphasize the requirement to implement business processes across firms:

(1) The Global Supply Chain Forum (GSCF) framework. The GSCF defines SCM as “the integration of key business processes from end user through original suppliers that provide products, services, and information that add value for customers and other stakeholders” (Lambert et al., 1998a).

(2) Supply-Chain Operations References (SCOR) framework (Supply Chain Council, 2003).

(3) The framework with three business processes: customer relationship management, product development management, and supply chain management (Srivastava et al., 1999);

(4) The framework based on three areas: operational, planning and control, and behavioural (Bowersox et al., 1999). The framework was extended (Melnik et al., 2000) to include eight business processes: plan, acquire, make, deliver, product design/redesign, capacity management, process design/redesign, and measurement.

(5) Mentzer, 2004; Mentzer, 2001; and Mentzer et al. (2001) developed SCM framework that focuses on cross-functional interaction in an organisation and the relationships with supply chain members.

Lambert et al. (2005) argue that “only the GSCF and SCOR frameworks include business processes that could be used by management to achieve cross-functional integration and are described in the literature with enough detail to draw meaningful comparisons.” Managers can select the best framework that meets their organization’s supply chain. The comparison of SCM frameworks is indicated in Table 2.2.

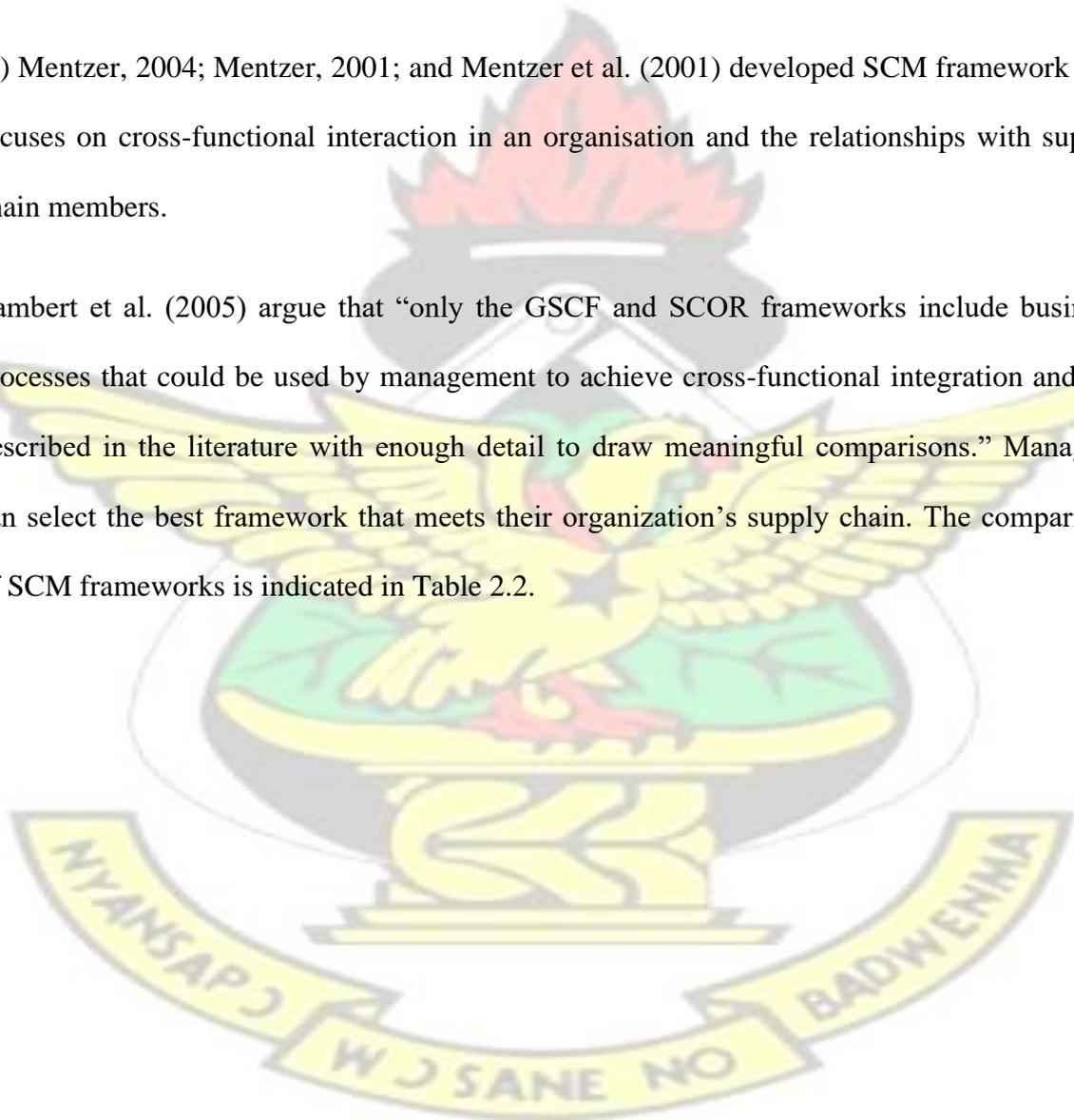


Table 2.2: Summary of comparison of supply chain management frameworks

Criteria	GSCF	SCOR
Scope: strategic driver	Corporate and functional strategies	Operations strategy
Scope: breadth of activities	All activities related to the successful implementation of the eight business processes.	All transactional activities related to demand-supply planning, sourcing, production, distribution and reverse logistics
Intra-company connectedness	Organisation-wide cross-functional integration	Cross-functional interaction and information sharing
Inter-company connectedness	Relationship management	Transactional efficiency
Drivers of value generation	Economic value-added	Cost reduction and asset utilization

Source: Lambert et al. (2005)

The management theories, especially the process-based management theory provides theoretical guidance for this research because it deals with critical business processes in an organisation. The process management theory assists to explain the nature of SCI, as claimed by Lambert (2004, 2008).

2.7.1 Process – Based Management Theory

The process management theory is one of the theories (such as resource- based theory, SCOR model, etc.), which helps to describe the nature of SCI. Lambert et al. (1998) and Lambert (2004, 2008) define SCM as “the integration of business processes from end user through original suppliers that provide products, services, and information that add value for customers”. The use of the process - based management theory in addressing SCI operational issues, such as: supply chain initiatives, performance improvement, organisation environmental forces, barriers to SCI highlighted by Fawcett and Magnan (2001), and organisation strategy, and their impact on supplier commercial relationships and order fulfilment, is less known. Hammer (2001) states that “although the concept of supply chain integration has been around for some time now, companies have had trouble making it reality. In most cases, that is because they have viewed it as merely a technological challenge rather than as what it really is: a process and management challenge.” There is a need for further study to enhance the process-based theory because previous studies on SCI did not consider operational issues, such as supply chain initiatives, performance improvement, environment forces, and barriers to SCI highlighted by Fawcett and Magnan (2001) and their impact on commercial supplier relationships and order fulfilment, and also their effect on the focused SCI.

Many researchers recognize the SCI as a process-based initiative (e.g., Christopher, 1992; Porter, 1997; Van Hoek, 1998 (a) & (b); Lambert, et al., 1998; Lambert, 2004, 2008; Akkermans, et al., 1999). However, the researchers have differences in the areas of emphasis regarding SCM and SCI initiatives.

2.7.2 Firm's Dynamic Capability Theory

Teece et al.'s (1990) working paper is generally regarded as the first contribution developing explicitly the notion of dynamic capability. The authors work in this paper was precipitated by their realization that once successful firms were struggling or failing as their environments changed; they were unable to adapt successfully (Harreld et al., 2007). The authors stated, 'our view of the firm is something richer than the standard resource-based view ... it is not only the bundle of resources that matter, but the mechanisms by which firms learn and accumulate new skills and capabilities, and the forces that limit the rate and direction of this process' (Teece et al., 1990). In the subsequent publication in 1994, Teece and Pisano argued that the RBV was limited in providing explanations as to how successful firms demonstrated 'timely responsiveness and rapid and flexible product innovation, along with the management capacity to effectively coordinate and redeploy internal and external competences' (Teece and Pisano, 1994). Also, it was argued that as the external environment changes, strategic management plays a vital role in 'adapting, integrating and reconfiguring internal and external organisational skills, resources and functional competences towards the changing environment' (Teece and Pisano, 1994). In their subsequent work, Teece et al. (1997) argued how dynamic capability could specifically overcome the limitations of RBV and a dynamic capability was defined as 'the firm's ability to integrate, build, and reconfigure internal and external competences to address rapidly changing environments. This is widely recognised as the first definition of the concept in literature. Although Teece and Pisano (1997) are generally regarded as the founding authors of the dynamic capability theory, their work builds most specifically on Nelson and Winter's (1982) an Evolutionary Theory of Economic Change, which elaborates on the role of routines and how they shape and constrain the ways in which firms grow and cope with changing environments. Significantly, in their exploration of the sources of firm competitive advantage, both Teece et al. (1997) and Nelson and Winter

(1982) emphasis an efficiency approach to firm performance rather a privileged market position approach which is the cornerstone of Porter's (1980) theory of competitive advantage. Competitive advantage, they argue, stems from internal factors of a firm and their alignment to the external environment rather than external or industry factors. This brings to the fore the importance of path dependency effects on internal factors, and the need to adapt a firm's resources to enable the firm to change and evolve. Nascent work on dynamic capability seeks to build a better theory of firm performance as well as inform managerial practice.

Dynamic capability is 'the firm's ability to integrate, build, and reconfigure internal and external competences to address rapidly changing environments' (Teece et al., 1997). 'A firm's dynamic capability is a learned and stable pattern of collective activity through which the organization systematically generates and modifies its operating routines in pursuit of improved effectiveness' (Zollo and Winter, 2002). Zollo and Winter (2002) also argue that dynamic capability emerges from the co-evolution of tacit experience accumulation processes with explicit knowledge articulation and codification activities at organizations. Dynamic capabilities 'are those that operate to extend, modify, or create ordinary capabilities' (Winter, 2003). They are 'the abilities to reconfigure a firm's resources and routines in the manner envisioned and deemed appropriate by its principal decision-maker' (Zahra et al., 2006). Dynamic capabilities are 'a firm's behavioural orientation constantly to integrate, renew and recreate its resources and capabilities and, most importantly, upgrade and reconstruct its core capabilities in response to the changing environment to attain and sustain competitive advantage' (Wang and Ahmed, 2007)

2.8 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 operational 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 analyses 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 operational performance”, aimed at examining the impact of supply chain linkages on operational 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 operational 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 Operational Performance in Large and Medium Sized Jordanian Industrial Companies: A Field Study”, aimed at exploring the impact of supply chain integration on operational 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 operational 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 operational performance which affect organizations' overall performance. Ghanaian organizations are not exceptional; therefore, this research was dedicated to exploring the impact of supply chain integration on operational performance at Ghanaian business sector with emphasis on the Accra metropolis.

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Table 2.4: 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)	Txamining the impact of supply chain linkages on operational performance	RBV	Survey of 145 manufacturing firms multiple regression approach	It found that power, benefits, and risk reduction linkages were positively and significantly impact operational 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 operational 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 operational 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
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2.9 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 are strong relationships between supplier and customer integration and organizational performance, other studies comment the presence of relationship between upstream and downstream interactions and operational 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 operational 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 operational 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 operational 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 operational 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 operational 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 research, 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 is 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 evidence 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 operational performance (Das et al., 2006; Devaraj et al., 2007; Germain and Iyer, 2006). While several authors empirically agree that SCI improves operational 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 “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 dimension 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 operational 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 operational 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:

Supply Chain Integration (SCI)

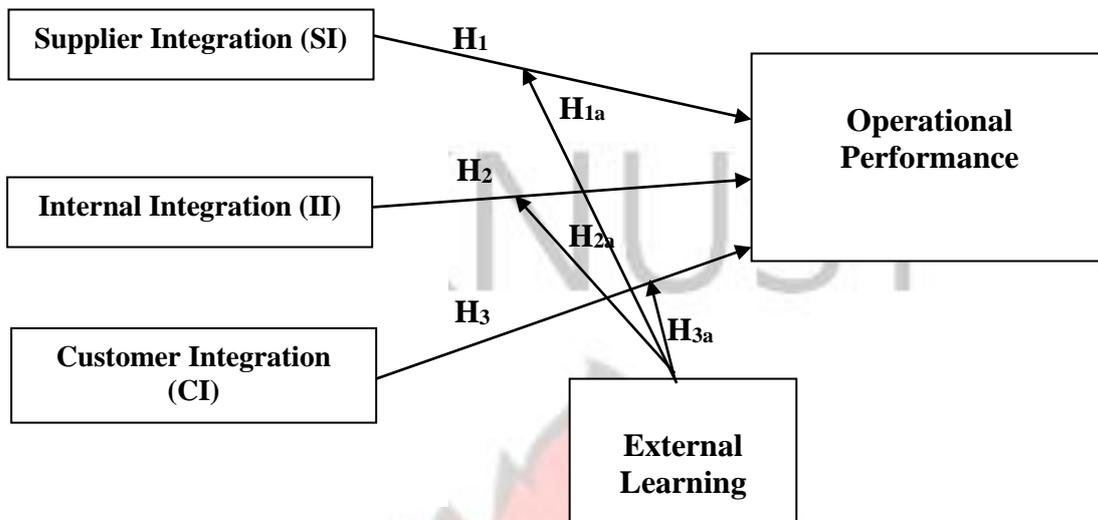


Figure 2.1: Conceptual Framework of the Study

Source: Author's Construct, 2022

2.9.1 Supply Chain Integration and Operational 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, 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 focal 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).

On the other hand, suppliers also play an essential role as strategic collaborators permitting focal companies to access their operational and technological resources (Alfalla-Luque et al., 2013; Droge et al., 2004; Narasimhan et al., 2010). Because suppliers tend to collaborate with the focal company in different processes, authors have also term it as supplier process integration. However, Koufteros et al. (2007a) termed such type of integration as the gray-box approach. They argued that the supplier integration generates communication, leverages supplier competencies, and accomplish shared goals. Accordingly, Droge et al. (2004) noted that by utilizing the critical technological ability and competency of suppliers, the focal company could then diminish any alteration in design, avoid delays, and give itself a good chance of carrying out parallel processing. The authors further suggested that qualified and competitive supplier are more beneficial to focal companies since they tend to have technical capabilities, innovative capacity, and a dynamic business network, which they have established through supplier development programs (e.g. certification program, site visit by buying firm, feedback loop in relation to performance evaluation). The view of suppliers acting as strategic collaborators has also been reflected in Petersen et al. (2005), where the authors suggested that suppliers could also support the focal company in several product development steps, such as generating ideas, initial technological appraisal, developing concepts and carrying out tests.

Based on the transaction cost perspective, supplier integration can decrease transactional costs (Flynn et al., 2010; Zhao et al., 2008; Zhao et al., 2011). The shared vision and

cooperative goals achieved through supplier integration reduces opportunistic behavior. Additionally, supplier integration helps decrease uncertainties, which reduces costs. For example, Das et al. (2006) argued that reduction in environment uncertainties were hugely successful by investing in definite assets (e.g. information systems and committed staff), which enable data sharing and mutual processes. It has been suggested that supplier integration facilitates the reduction of production and operational costs. Some have argued that the increased level of supplier integration is typically associated with smaller number of suppliers. This enables suppliers to achieve economies of scale and consequently a reduction in material and product costs (Cao and Zhang, 2011; Wong et al., 2011b; Zhao et al., 2013). Furthermore Zhao et al. (2013) suggested that by creating trust and collaboration with suppliers, the focal company would be motivated to invest more in fixed assets and R&D processes to enhance the suppliers and their own product and process quality and reduce cost. The authors concluded that supplier integration (sharing data) enables companies to decrease their inventory and increase delivery speed, quality, and customer service.

Based on this the first hypothesis and sub-hypothesis are posited as follows;

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

2.9.2 Internal Integration and Operational 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).

Although in some research a direct association was not found amongst internal integration and operational performance (Koufteros et al., 2005; Gimenez and Ventura, 2005), other researchers managed to find direct positive associations including, enhancing customer satisfaction, productivity, financial performance and development time (Allred et al., 2011; Chen et al., 2007); developing competitive capabilities and process efficiency (Rosenzweig et al., 2003; Saeed et al., 2005); improving quality, cost, delivery, and flexibility (Boon-itt and Wong, 2011; Swink et al., 2007; Wong et al., 2011b); improving responsiveness and time-based performance (Danese et al., 2013; Droge et al., 2004); enhancing logistics and service performance (Germain and Iyer, 2006; Stank et al., 2001a; Stank et al., 2001b); and improving schedule attainment and competitive performance (Zhao et al., 2013).

Based on this, the last hypothesis and sub-hypothesis are formulated as follows.

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

2.9.3 Customer Integration and Operational 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.

Additionally, in a study carried out by Flynn et al. (2010) it was suggested that communicating with customers largely depended on the company's technological ability and infrastructure. Therefore, companies that have demand-oriented activities are also enabled to reduce business environment uncertainty, avoid costly errors, and possible delays (Danese

and Romano, 2012; Koufteros et al., 2005). Different authors have suggested that data and information sharing is an important aspect of coordination in SCI which affects performance. Based on this, the third hypothesis and sub-hypothesis are formulated as follows.

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

2.9.4 Moderating Role of External Learning

According to Li and Lin (2006), a strong supply chain partnership built on strategic supply chain coordination can guarantee accurate and high-quality information across the supply chain. This study suggests a relationship between SC integration and outside learning, as seen in Figure 2.1. Schroeder et al. (2002) claim that long-term relational contracts with suppliers (Gerwin, 1993) and sustainable relationships with customers (Madhok and Tallman, 1998; Ward, 1995) can both result in the creation of unduplicated knowledge. According to Love et al. (2002), businesses must think about establishing long-lasting bonds that will enable both parties to construct symbiotic learning alliances. Businesses might create a collaborative learning environment that might facilitate knowledge exchange by integrating supply chain partners.

Consequently, this study proposes that SC integration has a good impact on outside learning.

Therefore, this study hypothesizes that SC integration positively influence external learning as follows.

H3(a,b,c): A firm's external learning positively moderate the relationship between supplier integration on operational 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 blueprint for conducting 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 since the study required multiple sources of evidence. 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 employees including management and all staff of firms in the Accra metropolis in 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 the organization.

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 perform logistics-related activities in the Accra metropolis.

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 random sampling 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.

3.5.4 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 operational 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 to 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.

3.8 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 operational performance using selected organisations in Ghana as a case. Data were gathered from the field by administering questionnaires to procurement professionals as well as individuals who deal with suppliers of firms in the Accra metropolis in Ghana. 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 institutions in the Accra metropolis 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 institutions, it was realized that most of them (34.2%) have been with their respective institutions 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 institutions 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, 2023

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 institutions. 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 in the Accra metropolis of Ghana

The first objective of the study was to examine the extent of supply chain integration (SCI) among Ghanaian firms in the Accra metropolis of Ghana. The study examined extent of the three dimensions of supply chain integration within selected organisations in the Accra metropolis. 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).

4.3.1 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;

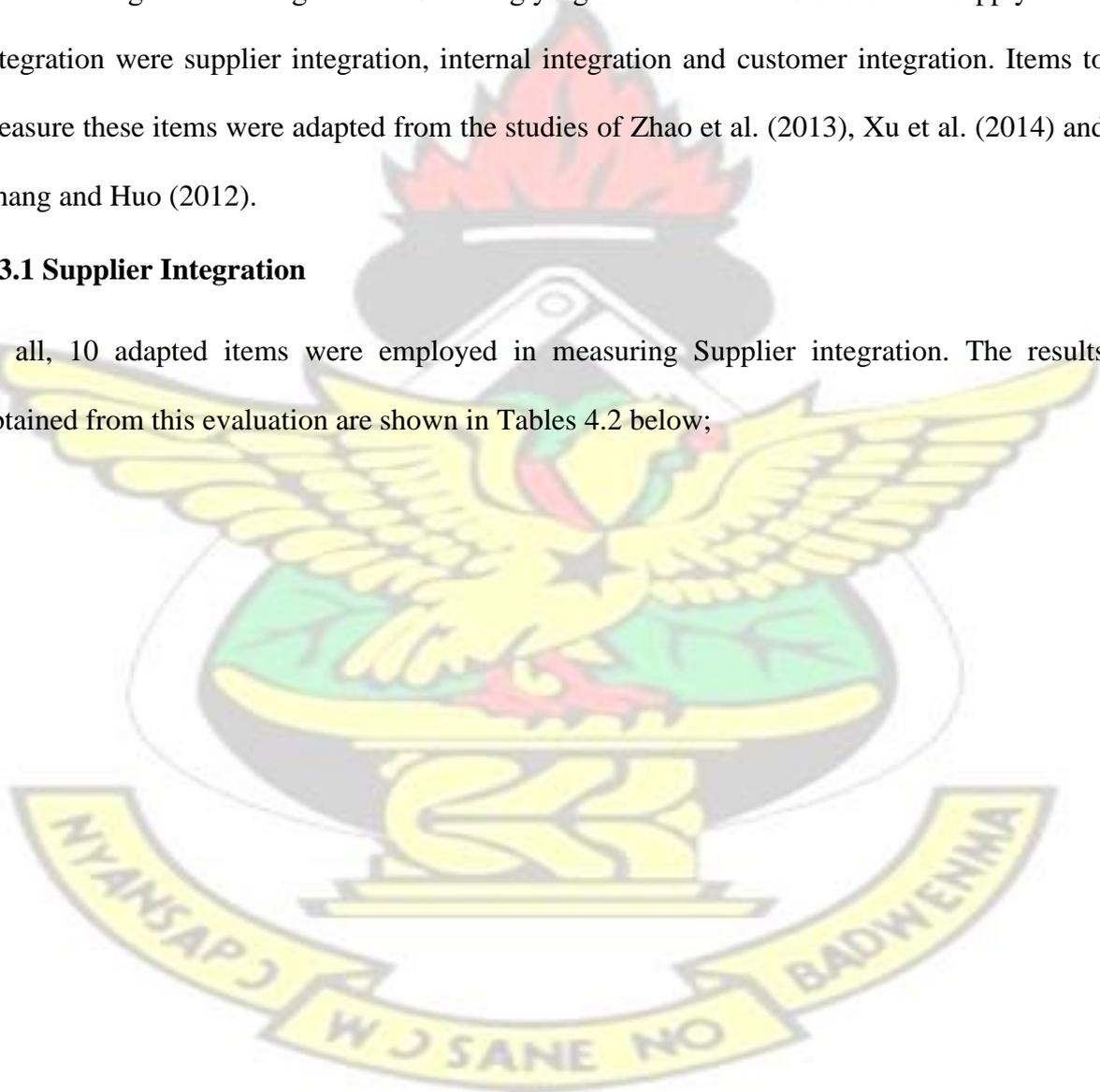


Table 4.2: Supplier integration as a dimension of Supply chain integration

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: Field Work, 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 selected organisations in the Accra metropolis, 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

As part of the first of objective of the study was to examine the level of supply chain integration, the study examined internal integration as a dimension of supply chain integration among firms in Ghana. The study assessed the impact of internal integration as a dimension by focusing on perceptions of players of selected organisations in the Accra metropolis 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: Field Work, 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 selected organisations in the Accra metropolis, 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

As part of the first of objective of the study was to examine the drivers of supply chain integration. The study examined customer integration as a dimension of supply chain integration among firms in Ghana. The study assessed the influence of customer integration as a dimension by focusing on perceptions of staff of selected organisations in the Accra metropolis. 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;

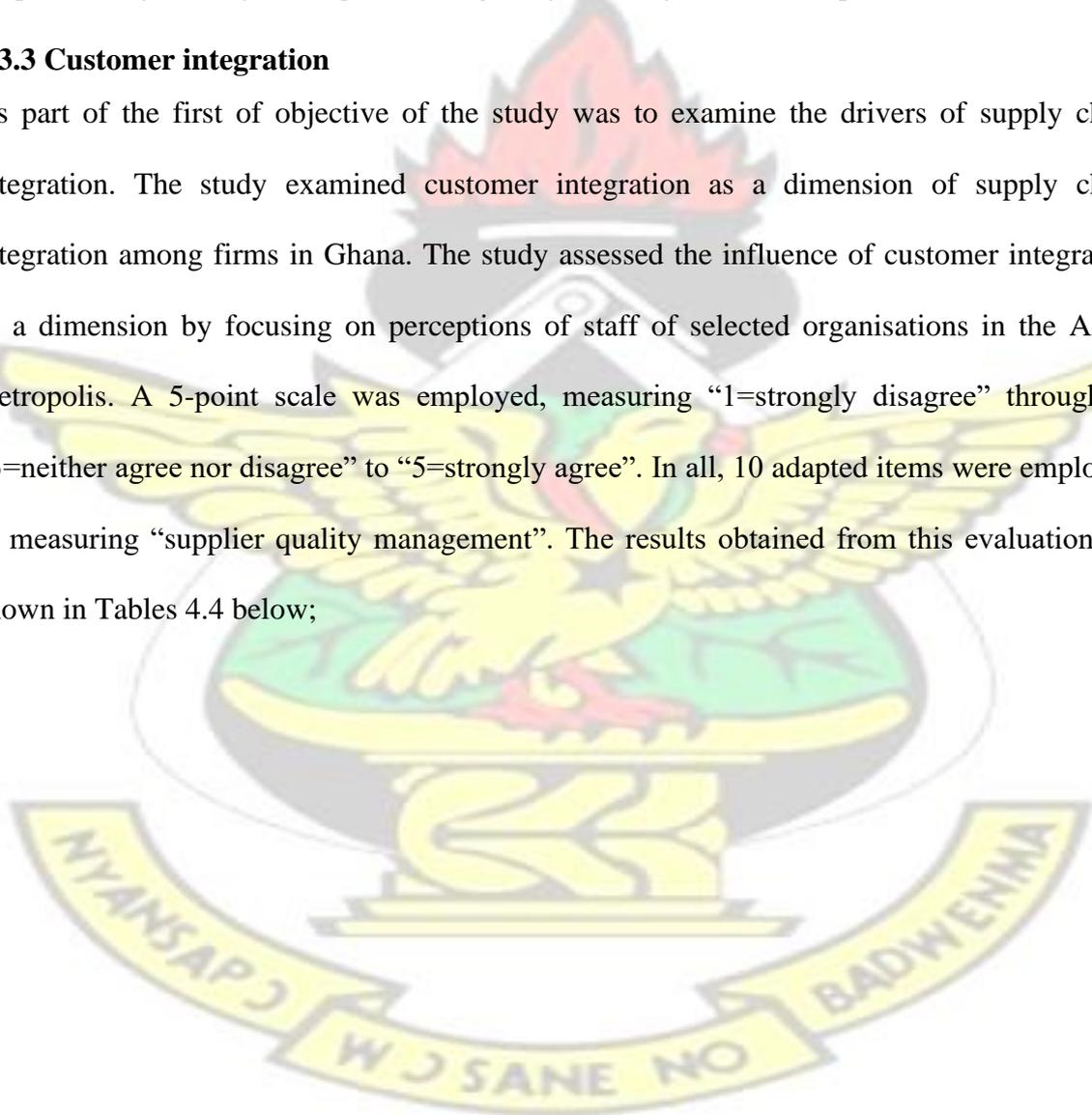


Table 4.4: Customer integration as a dimension of Supply chain integration

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: Field Work, 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 selected organisations in the Accra metropolis, 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).

4.3 Operational performance

The third objective of the study was examining the level of operational performance among Ghanaian firms in the Accra metropolis of Ghana. The items to measure operational performance were adopted from literature (Zhang and Huo (2012). However, there were four dimensions of operational performance namely flexibility performance, time performance, quality 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: Flexibility Performance

Measuring Items	Min	Max	Mean	Std. Dev
1. Our company is able to amend the characteristics of the products according to customer's needs (without conflicting with the regulations and instructions)	1	5	3.91	.888
2. Our company has the ability to respond to changes in production volumes	1	5	3.95	.971
3. Our company possesses the ability to respond rapidly to changes in the work Environment (internal and external changes)	1	5	3.91	1.037
4. Our company chooses suppliers who are flexible in responding to requests of the company when needed	1	5	3.95	.974
5. Our company is characterized by openness to new ideas at work	1	5	4.01	.873
6. Our company gives its customers pay facilities after checking their financial status	1	5	3.80	1.152
Overall Average	1.67	5.00	3.91	.715

Source: Field Work, 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

flexibility performance, reveal that a staff of selected organisations in the Accra metropolis, to agrees that there is high level of operational performance (given overall mean score =3.91). For the 6 items measuring “Flexibility performance”, the highest mean score was obtained on the fifth item: “*Our company is characterized by openness to new ideas at work*” (M=4.01; SD=0.873) while the least mean score was obtained on the sixth item: “*Our company gives its customers pay facilities after checking their financial status*” (M=3.80; SD=1.152).

Table 4.6: Time Performance

Measuring Items	Min	Max	Mean	Std. Dev
1. Our company is committed to provide fast service to our customers	1	5	4.24	.860
2. Our company is committed to deliver orders to our customers within the agreed delivery times	2	45	4.35	.479
3. Suppliers are committed to supply orders by the agreed timetables	1	5	4.05	.850
4. Our company reserves the minimum limit of stock which could continue to be used for work in the case of raw material delay	1	5	3.96	.835
5. Our company bears the differences in transportation costs in order to meet the deadlines of supplying orders to our customers	1	5	3.77	1.008
6. Our company is characterized by quick exchange of information with stakeholders.	1	5	4.05	.806
Overall Average	2.00	11.00	4.06	.825

Source: Field Work, 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 time performance, reveal that a staff of selected organisations in the Accra metropolis, to agrees that there is high level of operational performance (given overall mean score =4.06). For the 6 items measuring “Time performance”, the highest mean score was obtained on the second item: “*Our company is characterized by openness to new ideas at work*” (M=4.35; SD=0.479) while the least mean score was obtained on the fifth item: “*Our company is committed to deliver orders to our customers within the agreed delivery times*” (M=3.77; SD=1.008).

Table 4.7: Quality Performance

Measuring Items	Min	Max	Mean	Std. Dev
1. Our company is committed to provide the production according to local and international standards	1	5	4.07	.859
2. Our company produces various forms of the products to suits customers' needs (provide several forms of the medication)	1	5	3.99	.900
3. Our company uses transportation means that maintain the products quality (such as refrigerators to keep the temperature)	1	5	4.00	.944
4. Our company is committed to proper storage conditions according to the specifications	1	5	3.99	.870
5. Our company has control tracking system to keep the inventory valid (Expiry date)	1	6	3.97	.933
6. Our company choses their suppliers on the basis of high-quality	1	7	3.95	1.150
Overall Average	1.67	5.00	3.99	.701

Source: Field Work, 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 quality performance, reveal that a staff of selected organisations in the Accra metropolis, to agrees that there is high level of operational performance (given overall mean score =3.99). For the 6 items measuring “quality performance”, the highest mean score was obtained on the first item: “*Our company is committed to provide the production according to local and international standards*” (M=4.07; SD=0.859) while the least mean score was obtained on the last item: “*Our company has control tracking system to keep the inventory valid (Expiry date)*” (M=3.95; SD=1.150).

Table 4.8: Cost Performance

Measuring Items	Min	Max	Mean	Std. Dev
1. Our company is seeking to reduce the wasteful use of resources (electricity, water, raw materials)	1	8	4.19	.913
2. Our company is working to reduce defective input/output (the proportion of damaged products)	1	5	4.06	.953
3. Our company arrange its internal processes in a manner to shorten performing activities (layout)	1	5	3.97	.834
4. Our company is working to reduce the inventory to minimum level to the extent that does not hinder the continuation of work	1	5	3.95	.964
5. Our company uses the cheapest transportation means without compromising the quality of the products	1	5	3.54	1.255
6. Our company is working on economy of scale (large-scale production to reduce the cost per unit)	1	5	3.86	1.104
Overall Average	2.17	5.00	3.93	.630

Source: Field Work, 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 selected organisations in the Accra metropolis, to agrees that there is high level of operational performance (given overall mean score =3.93). For the 6 items measuring “cost performance”, the highest mean score was obtained on the first item: “Our company is seeking to reduce the wasteful use of resources (electricity, water, raw materials)” (M=4.19; SD=0.913) while the least mean score was obtained on the last item: “Our company uses the cheapest transportation means without compromising the quality of the products” (M=3.54; SD=1.1255).

Table 4.9: Overall Operational performance

Measuring Items	Min	Max	Mean	Std. Dev
1. Flexibility Performance	1.67	5.00	3.91	.715
2. Time Performance	2.00	11.00	4.06	.825
3. Quality 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: Field Work, 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 operational performance, reveal that a staff of selected organisations in the Accra metropolis, to agrees that there is high level of operational performance (given overall mean score =3.97). For the 4 items measuring “Operational performance”, the highest mean score was obtained on the second item: “*Time 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).

4.2.4 External Learning

In all, 8 adapted items were employed in measuring external learning. The results obtained from this evaluation are shown in Tables 4.10 below;

Table 4.10: Firm’s External Learning

Measuring Items	Min	Max	Mean	Std. Dev
1. It is common to establish joint teams to solve operational problems in our suppliers and client relationships.	1	5	2.03	1.538
2. It is common to establish joint teams to analyze and discuss strategic issues.	1	5	2.43	1.694
3. The atmosphere in our suppliers and client relationships stimulates productive discussion encompassing a variety of opinions.	1	5	2.11	1.545
4. There is integration into a relationship-specific memory	1	5	1.85	1.384
5. In in our suppliers and client relationships, we frequently evaluate and, if needed, adjust our routines in order delivery processes.	1	5	1.97	1.488
6. We frequently evaluate and, if needed, update the formal contracts in in our suppliers and client relationships.	1	5	2.26	1.573
7. We frequently evaluate and, if needed, update information about in our suppliers and client relationships stored in our electronic databases.	1	5	2.34	1.572
8. It is common to establish joint teams to solve operational problems in our suppliers and client relationships.	1	5	1.83	1.344
Overall Average	1.0	5.00	2.10	1.055

Source: Field Work, 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 4.10 concerning the indicators of external learning, reveal that a staff of selected organisations in the Accra metropolis, to agrees that there is low level of external learning (given overall mean score =2.10). For the 8 items measuring “external learning”, the highest mean score was obtained on the second item: “*Time It is common to establish joint teams to analyze and discuss strategic issues*” (M=2.43; SD=1.694) while the least mean score was obtained on the fourth item: “*There is integration into a relationship-specific memory*” (M=1.84; SD=0.715). This implies that the extent of external learning of firms is low.

4.4 The Effect of Supply Chain Integration on Operational 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 4.11.

Table 4.11: 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. Flexibility Performance	6	0.819
5. Time Performance	6	0.412*
6. Quality Performance	6	0.835
7. Cost Performance	6	0.688
8. External learning	8	0.846

Source: Field Work, 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 time performance and cost performance measures. This implies that, only flexibility performance and quality performance passed as operational performance and used for subsequent analysis.

4.4.1 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 Kaiser-Meyer-Okin (KMO) value was 0.804, which far exceeded the minimum recommended value of 0.6, with Bartlett's Test of Sphericity 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%, 3.7% and 3.32% 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 flexibility performance and quality performance remained whereas items 1 – 3 remained for cost performance but for firm's external learning, items remaining included 3-7. The remaining items per construct were thus composited and used for the model run analysis.

In establishing the influence of supply chain integration on operational 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 Operational performance (P).

The regression estimates were given as:

$$FP = b_0 + \beta_1S + \beta_2I + \beta_3C + \beta_4SE + \beta_5IE + \beta_6CE + \varepsilon \dots\dots\dots \text{Model 1}$$

$$QP = b_0 + \beta_1S + \beta_2I + \beta_3C + \beta_4SE + \beta_5IE + \beta_6CE + \varepsilon \dots\dots\dots \text{Model 2}$$

$$CP = b_0 + \beta_1S + \beta_2I + \beta_3C + \beta_4SE + \beta_5IE + \beta_6CE + \varepsilon \dots\dots\dots \text{Model 3}$$

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
 β_{4-6} = Coefficient of Firm's external learning moderating with independent variables
 ε = error term
S = supplier integration
I = internal integration
C = customer integration
E = firm's external learning
FP = Flexibility performance
QP = Quality Performance
CP = Cost Performance

Table 4.12: Correlations of Variables and Descriptive Statistics

Variables	1	2	3	4	5	6	7
1. Supplier integration	1						
2. Internal integration	.549**	1					
3. Customer integration	.637**	.801**	1				
4. Flexibility Performance	.469**	.709**	.621**	1			
5. Quality Performance	.469**	.691**	.640**	.727**	1		
6. Cost Performance	.464**	.494**	.519**	.511**	.554**	1	
7. External learning	.008	.023	-.022	.014	.113	.036	1
Mean	3.78	3.91	3.95	3.91	3.99	4.07	3.78
Standard Deviation	0.938	0.773	0.709	0.715	0.701	0.69	0.938

Note:

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

Source: Field Work, 2023

The correlation results shown in Table 4.11 above generally revealed that staff of selected organisations in the Accra metropolis partly attributes their operational 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 the coefficients (r) are more than 0.5.

4.4.2 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 operational performance variable.

The researcher used ordinary least square regression analysis to estimate the study's model. The main outcome variable was operational 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 operational performance (P).

Table 4.13: Ordinary Least Square Regression Estimates

Variables:	Standard Estimates		
	Flexibility Performance	Quality Performance	Cost Performance
	Model 1	Model 2	Model 3
<i>Hypothesized</i>			
<i>Direct Effect</i>			
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)
<i>Moderating Effect</i>			
Firm's external learning (E)			
E × S	.114(1.102)	-.005(-.096)	-.064(-.439)
E × I	-.133(-1.716)	.142(3.940)*	.230(.905)
E × C	.110(.877)	.067(1.134)	-.161(-.593)
FIT INDICES			
χ^2 (df)	47.478(6)	66.665(6)	22.372(6)
χ^2/df	7.913	11.111	3.729
F-Statistics	39.960	257.312	11.022
R²	.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: Field Work, 2023

The R-square of **0.628** for flexibility performance implies that about 62.8% changes in flexibility performance among selected firms in the Accra metropolis can be explained by supply chain integration. However, for quality performance, the R-square of **0.916** implies that 91.6% changes in quality performance among selected firms in the Accra metropolis can

be explained by supply chain integration. This implies that supply chain integration contributes massively to operational performance (measured by flexibility and quality) among selected organisations in Ghana. Finally, the R-square of **0.318** for flexibility performance implies that about 31.8% changes in cost performance among selected firms in the Accra metropolis can be explained by supply chain integration.

4.4.3 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 operational performance. From reviewed literature, it was found out that supplier integration improves operational 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 FP was negative ($\beta = -.379$; $t=-.911$), and it was not statistically significant at 5%. Similarly, the path from C to FP was also negative ($\beta = -.271$; $t=-.555$). However, the path from I to FP was partially supported as it was positive and statistically significant ($\beta = .844$; $t=2.742$) but it was statistically not significant at 5%. The study revealed that supplier integration and customer integration have a negative influence on flexibility performance, but internal integration only had a positive and significant effect on flexibility 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 ($\beta = -.341$; $t=-2.370$) and customer integration ($\beta = -.218$; $t=-.956$) had negative effect on quality 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 quality 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.

In looking at moderating effect of firm's external learning on the relationship between supply chain integration (SCI) and operational performance (OP) from all three models revealed that external learning not positively moderate the SCI-OP as only the moderating of external learning on internal integration on quality performance was positive ($\beta = .142$; $t = 3.940$) and statistically significant at $p < 0.5$. This implies that firm's external learning is not a perfect moderator for the relationship between supply chain integration and firm performance. However, with individual dimension of integration, it moderates well with internal integration to positively impact on quality performance.

Table 4.14: Summary of Results

	Hypothesis	β	T-Value	Remarks
H1	Supplier integration has a positive and significant effect on operational performance.	-.379 .020 .44	-.911 .102 .667	Not supported Not supported Not supported
H1a	A firm's external learning positively moderates the relationship between supplier integration on operational performance.	.114 -.005 -.064	1.102 -.096 -.439	Not supported Not supported Not supported
H2	Internal integration has a positive and significant effect on operational performance.	.844 -.341 -.816	2.742 -2.370 -.743	Supported Not supported Not supported
H2a	A firm's external learning positively moderates the relationship between internal integration on operational performance.	.142 .230 -.133	3.940 .905 -1.716	Supported Not supported Not supported
H3	Customer integration has a positive and significant effect on operational performance.	-.271 -.218 .913	-.555 -.956 .764	Not supported Not supported Not supported
H3a	A firm's external learning positively moderates the relationship between Customer integration and operational performance.	.110 .067 -.161	.877 1.134 -.593	Not supported Not supported Not supported

Source: Field Work, 2023

4.5 Discussion of Results and Implications

This study sought to investigate the effect of supply chain integration on operational 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 operational 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 operational performance. From the standardized estimates of Model 1 and 2, this hypothesis was not supported because as the path was negative ($\beta = -.379$; $t=-.911$) and insignificant for Model 1 and positive but insignificant for Model 2 ($\beta = .020$; $t=.102$) and it was statistically significant at 5%. This presupposes that for the organisations in Ghana to benefit from operational 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. Similarly, the second hypothesis asserts that internal integration significantly and positively influence operational performance. There was partially supported in Model 1 as internal integration had a positive and significant effect on flexibility performance ($\beta=.844$; $t=.742$). Unfortunately, Model 2 did not find support for this hypothesis as there was a negative statistically insignificant relationship between internal integration and quality performance ($\beta=-.341$; $t=-2.370$). This implies that internal integration though important, may not necessarily lead to improved operational performance but just flexibility performance.

Finally, the last hypothesis posits that firm's external learning moderate the positive relationship between supply chain integration and operational performance. Again, the study did not find support for this hypothesis as the relationship tested was not statistically significant for most of the moderation effects except for internal integration and quality performance which implies that when there is supplier quality management, it may not necessarily lead to operational 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. Therefore, there is the need for effective supply chain integration to help the various players in the selected organisations supply chain to overcome challenges in their operations so as to improve on their efficiency and operational 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 selected organisations in the Accra metropolis 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 Operational Performance

As part of the first of objective of the study was to determine the effect of supplier integration on a firm's operational 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 Operational Performance

The second objective of the study was to assess the influence of internal integration on a firm's operational 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 Operational Performance

The third objective of the study was to determine the effect of customer integration on a firm's operational 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).

5.2.5 Test of Moderation Effect of External learning

The last objective of the study was to examine the moderating effect of a firm's external learning on the relationship between supply chain integration and operational performance of firms. Three main dimensions of supply chain integration were considered: Supplier integration (S), internal integration (I) and customer integration (C); while the dependent variable was Operational performance (P).

The first hypothesis postulates that that supplier integration significantly and positively lead to operational performance. From the standardized estimates of Model 1, 2 and 3, this hypothesis was not supported because as the path was negative ($\beta = -.379$; $t=-.911$) and insignificant for Model 1 and positive but insignificant for Model 2 ($\beta =.020$; $t=.102$) and it was statistically significant at 5%. Similarly, the second hypothesis asserts that internal integration significantly and positively influence operational performance. There was partially supported in Model 1 as internal integration had a positive and significant effect on flexibility performance ($\beta = .844$; $t=.742$). Unfortunately, Model 2 did not find support for

this hypothesis as there was a negative statistically insignificant relationship between internal integration and quality performance ($\beta = -.341$; $t=-2.370$).

Finally, the last hypothesis posits that firm's external learning moderate the positive relationship between supply chain integration and operational performance. Again, the study did not find support for this hypothesis as the relationship tested was not statistically significant for most of the moderation effects except for internal integration and quality performance, which implies that when there is supplier quality management, it may not necessarily lead to operational performance.

5.3 Conclusion

This study concerns empirically exploring the influence of supply chain integration on operational performance using selected organisations in the Accra metropolis as a case. For a business organization or industry to succeed, it should be able to manage the integration of the business, technology, people, and processes not just within the organization only but also across extended enterprises. However, when there is poor relationship and coordination among other business partners, it can cause dysfunctional operational performance. These could lead to negative consequences such as higher inventory costs, longer delivery times, higher transportation costs, higher levels of loss and damage, and lowered customer service. Also, the tendency for buyers to behave opportunistically is expected to reduce when relationship duration increases so why would buyers behave opportunistically when it is detrimental to the relationship.

Therefore, this study sought to investigate the extent of supply chain integration (SCI) among Ghanaian firms in the Accra metropolis of Ghana, examine the effect of internal integration on supplier integration and customer integration among Ghanaian firms in the Accra metropolis of Ghana, examine the level of operational performance among Ghanaian firms in

the Accra metropolis of Ghana and establish the moderating effect of firm's external learning on the relationship between supply chain integration and operational performance among Ghanaian firms in the Accra metropolis of Ghana. This was done by selecting sample of respondents who were actors among firms in the Accra metropolis of 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 operational 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 operational performance in the selected organisations, 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 Implications of the Study

This study developed and tested the direct relationship for three key variables, namely supply chain integration (SCI), external learning and operational performance. It also examined the

direct effect of internal, supplier and customer integration on operational performance. Furthermore, the moderating effect of external learning on each dimension of SCI on operational performance was investigated. The research findings support and contribute to the contingency view of the process-based and external learning theories of the firm. This section provides the theoretical and managerial implications of the study.

5.4.1 Theoretical Implication

The findings of the study offered fascinating answers to the four research questions developed under this research. This research included insights from the process-based theory to examine the moderating impact of external learning on the relationship between the three dimensions of SCI (i.e. internal, supplier and customer) and operational performance among firms in Ghana.

In carrying out the systematic literature review, it was suggested that in fields of SCI, evolving conceptualizations had resulted in mixed outcomes in both the association between SCI-performance (e.g. Claver-Cortés et al., 2012; Cosh et al., 2012; Germain et al., 2007; Koufteros et al., 2007b) and SCI-performance (e.g. Danese and Romano, 2011; Devaraj et al., 2007; Koufteros et al., 2010). Furthermore, a number of authors had suggested that in order to achieve a better level of organizational performance, companies would need to match their internal structures, strategies, and procedures with the external environment (e.g. Baum and Wally, 2003; Droge and Calantone, 1996; Flynn et al., 2010; Germain et al., 2007; Walker and Ruekert, 1987). Therefore, the SCI-operational performance relationship has received significant attention. Although SCI strategy, features and its enablers have been researched quite extensively, no study investigated the moderating role of external learning on the relationship between SCI and operational performance. Furthermore, it was argued that, while all dimension of SCI impact operational performance very little was the influence of external learning of the firm.

Second, this research makes theoretical contributions to the organizational theory and operations management field by examining the direct association between three SCI dimensions (internal, supplier and customer) and operational performance. By doing so an attempt is made to bridge the contextual in empirical studies that looks at this relationship especially in Sub-Saharan Africa.

Third prior research had focused on the relationships between -OP (e.g. Flynn et al., 2010; Prajogo and Olhager, 2012). By examining the moderating role of external learning, this research found that in the unpredictable and uncertain the Ghanaian contexts, as companies' external learning do not much influence the positive relationship between SCI and operational performance.

Fourth, by conceptualizing SCI dimensions as internal, customer, and supplier integration, this study contributes to the field of operations management by providing a more comprehensive taxonomy of SCI. It was argued that most of the existing study on SCI was categorized by developing explanations and dimensions. For example, authors such as He et al. (2014), Devaraj et al. (2007), and Danese and Romano (2011) have all conceptualized SCI as customer and supplier integration and did not contain internal integration. Additionally, numerous authors have also referred to SCI as a single construct and did not break it down to internal and external integration (Huang et al., 2014; Kim, 2009; Lau et al., 2010; Liu et al., 2013; Vickery et al., 2003; Villena et al., 2009). Therefore, by viewing SCI as three distinct dimensions, this study developed a better understanding of the direct effects of SCI on operational performance, and its mediating impact on the relationship between OS and operational performance.

5.4.2 Managerial Implication

By investigating the direct impact of SCI- operational performance, and the moderating role of a firm's external learning on the relationship between SCI on and operational performance in the uncertain Ghanaian business sector, 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 operational performance. It is recommended that the supply chain partners collaborate in coming out with appropriate actions and remedies 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 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 operational 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 operational performance in the long run.

5.4.3 Suggestions for Future Studies

Although the dimensions of supply chain integration considered in this research were based on the literature reviewed and were found to be significant, there is no doubt that other supply chain integration (SCI) practices may also be considered in future research.

Most of the hypotheses of the study were supported. It is recommended that future studies can replicate this study in different setting to determine if similar findings would be achieved or otherwise to make informed recommendations for theory and practice.

The scope of the study can be extended to cover selected organisations across all regions in Ghana to have a holistic picture of supply chain integration among selected organisations 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 Science in Logistics and Supply Chain Management, I am undertaking a research work on the topic: “*assessing the moderating effect of external learning on the relationship between supply chain integration and operational performance: empirical study of organisations in the Accra metropolis of Ghana*”. 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
4. What is your occupation?
 Public work Private Work Own Business Retired
 Other, please specify:
5. How many years have you 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

Source - Xu et al. (2014) and Zhao et al. (2013)

6. **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.**

<u>Strongly Disagree</u>	<u>Disagree</u>	<u>Indifferent</u>	<u>Agree</u>	<u>Strongly Agree</u>	
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
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PART C INTERNAL INTEGRATION

Source - Xu et al. (2014) and Zhao et al. (2013)

7. 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.

<u>Strongly Disagree</u>	<u>Disagree</u>	<u>Indifferent</u>	<u>Agree</u>	<u>Strongly Agree</u>			
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

Source - Xu et al. (2014) and Zhao et al. (2013)

8. 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.

<u>Strongly Disagree</u>	<u>Disagree</u>	<u>Indifferent</u>	<u>Agree</u>	<u>Strongly Agree</u>			
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	1	2	3	4	5		

customers					
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: OPERATIONAL PERFORMANCE

Source: Zhang and Huo (2012)

9. Indicate your agreement to the following as indicators of operational performance in your organization. You can circle the appropriate number that follows.

<u>Strongly Disagree</u>	<u>Disagree</u>	<u>Indifferent</u>	<u>Agree</u>	<u>Strongly Agree</u>	
1	2	3	4	5	
Measures			RESPONSE		
Flexibility			Responses		
1. Our company is able to amend the characteristics of the products according to customer's needs (without conflicting with the regulations and instructions)	1	2	3	4	5
2. Our company has the ability to respond to changes in production volumes	1	2	3	4	5
3. Our company possesses the ability to respond rapidly to changes in the work Environment (internal and external changes)	1	2	3	4	5
4. Our company chooses suppliers who are flexible in responding to requests of the company when needed	1	2	3	4	5
5. Our company is characterized by openness to new ideas at work	1	2	3	4	5
6. Our company gives its customers pay facilities after checking their financial status	1	2	3	4	5
Time (Speed)			Responses		
1. Our company is committed to provide fast service to our customers	1	2	3	4	5
2. Our company is committed to deliver orders to our customers within the agreed delivery times	1	2	3	4	5
3. Suppliers are committed to supply orders by the agreed timetables	1	2	3	4	5
4. Our company reserves the minimum limit of stock which could continue to be used for work in the case of raw material delay	1	2	3	4	5
5. Our company bears the differences in transportation costs in order to meet the deadlines of supplying orders to our customers	1	2	3	4	5
6. Our company is characterized by quick exchange of information with stakeholders.					
Quality			Responses		
1. Our company is committed to provide the production	1	2	3	4	5

according to local and international standards					
2. Our company produces various forms of the products to suits customers' needs (provide several forms of the medication)	1	2	3	4	5
3. Our company uses transportation means that maintain the products quality (such as refrigerators to keep the temperature)	1	2	3	4	5
4. Our company is committed to proper storage conditions according to the specifications	1	2	3	4	5
5. Our company has control tracking system to keep the inventory valid (Expiry date)	1	2	3	4	5
6. Our company choses their suppliers on the basis of high-quality	1	2	3	4	5

<u>Strongly Disagree</u>	<u>Disagree</u>	<u>Indifferent</u>	<u>Agree</u>	<u>Strongly Agree</u>	
1	2	3	4	5	
Measures			Responses		
Cost					
1. Our company is seeking to reduce the wasteful use of resources (electricity, water, raw materials)	1	2	3	4	5
2. Our company is working to reduce defective input/output (the proportion of damaged products)	1	2	3	4	5
3. Our company arrange its internal processes in a manner to shorten performing activities (layout)	1	2	3	4	5
4. Our company is working to reduce the inventory to minimum level to the extent that does not hinder the continuation of work	1	2	3	4	5
5. Our company uses the cheapest transportation means without compromising the quality of the products	1	2	3	4	5
6. Our company is working on economy of scale (large-scale production to reduce the cost per unit)	1	2	3	4	5

PART F: EXTERNAL LEARNING

Source: (Kohtamäki & Partanen, 2016)

10. Indicate your agreement to the following as indicators of external learning in your company. You can circle the appropriate number that follows..

<u>Strongly Disagree</u>	<u>Disagree</u>	<u>Indifferent</u>	<u>Agree</u>	<u>Strongly Agree</u>	
1	2	3	4	5	
			Response		
9. It is common to establish joint teams to solve operational problems in our suppliers and client relationships.	1	2	3	4	5
10. It is common to establish joint teams to analyze and discuss strategic issues.	1	2	3	4	5
11. The atmosphere in our suppliers and client relationships stimulates productive discussion encompassing a variety of opinions.	1	2	3	4	5
12. There is integration into a relationship-specific memory	1	2	3	4	5
13. In in our suppliers and client relationships, we frequently evaluate and, if needed, adjust our routines in order delivery processes.	1	2	3	4	5

14. We frequently evaluate and, if needed, update the formal contracts in in our suppliers and client relationships.	1	2	3	4	5
15. We frequently evaluate and, if needed, update information about in our suppliers and client relationships stored in our electronic databases.	1	2	3	4	5
16. It is common to establish joint teams to solve operational problems in our suppliers and client relationships.	1	2	3	4	5

Thank you for being part of the research.

