KWAME NKRUMAH UNIVERSITY OF SCIENCE AND TECHNOLOGY,
KUMASI

EFFECT OF SUPPLY CHAIN RESPONSIVENESS ON SERVICE PERFORMANCE.

BY

DORCAS SARPONG (BSc. Business Administration)

A THESIS SUBMITTED TO THE DEPARTMENT OF SUPPLY CHAIN AND INFORMATION SYSTEMS, INSTITUTE OF DISTANCE LEARNING IN PARTIAL FULFILLMENT OF THE REQUIREMENT FOR THE AWARD OF THE DEGREE OF

MASTER OF SCIENCE (LOGISTICS AND SUPPLY CHAIN MANAGEMENT)

MAY, 2022
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 material published by another person nor materials which have been accepted for the award of any other degree of the University, except where due acknowledgments have been made in the text.

Dorcas Sarpong
(PG3755620)
Signature
Date

Certified by:
Dr. Dorcas Nuertey
(Supervisor)
Signature
Date

Certified by:
Dr. Abdul Samed Muntaka
(Head of Department)
Signature
Date
DEDICATION

I dedicate this work to my dear husband and children
ACKNOWLEDGEMENT

I thank Almighty God for His marvelous love towards me throughout this work. My sincere gratitude goes to my supervisor, Dr. Dorcas Nuertey for her excellent supervision, and encouragement through this thesis. I am much grateful to the entire staff of the Department of Supply Chain and Information Systems for their unflinching support. I also thank the CARISCA scholarship team for the funding opportunities and my family and friends who have been there for me until this time.
ABSTRACT

The economic environment is dynamic and the only certainty about it is that it will continue to change. Supply chain responsiveness looks at the extent to which a firm along with its supply chain partners responds to changes in the business environment. Meanwhile, service perishability gives rise to many problems for service providers and especially when service demand fluctuates. The concept of supply chain responsiveness can be a sustainable tool for increasing service performance. This study examines the relationship between supply chain responsiveness and service performance and the inter relations among the various supply chain responsiveness elements (operation process responsiveness, logistics responsiveness and supply network responsiveness). The study employed a questionnaire survey instrument to collect data from manufacturing firms within Ashanti Region based on the purposive sampling techniques. The result of the study indicates that supply chain responsiveness had positive and significant impact on service performance. The study also revealed that there were positive significant inter relationship among operation system responsiveness, logistics process responsiveness and supply network responsiveness. The study therefore suggested that firm should pursue supply chain responsiveness an end-to-end process.
# TABLE OF CONTENTS

DECLARATION ........................................... ii  
DEDICATION ........................................... iii  
ACKNOWLEDGEMENT .................................. iv  
ABSTRACT ............................................. v  
TABLE OF CONTENTS ................................. vi  
LIST OF TABLES ..................................... ix  
LIST OF FIGURES ................................... x  

## CHAPTER ONE

INTRODUCTION ....................................... 1  
1.1 Background to the Study ................. 1  
1.2 Statement of the Problem ............... 4  
1.3 Research Objectives ....................... 6  
1.4 Research Questions ......................... 7  
1.5 Justification of the Study ............... 7  
1.6 Research Methodology .................... 8  
1.7 Scope of the Study ......................... 8  
1.8 Limitation of the Study ................. 8  
1.9 Organization of the Study ............... 9  

## CHAPTER TWO

LITERATURE REVIEW ............................... 10  
2.0 Introduction .................................. 10  
2.1 Conceptual Review ......................... 10  
2.1.1 Definition of Supply Chain Responsiveness 10  
2.1.2 Operation System Responsiveness ........ 14  
2.1.3 Logistics Process Responsiveness (LPR) .... 15  
2.1.4 Supply Network Responsiveness ........ 16  
2.1.5 Service Performance .................... 17  
2.2 Theoretical Review ......................... 19  
2.2.1 Resource Based View .................... 19  
2.2.2 Dynamic Capability Theory ............ 19  
2.2.3 The Organizational Information Processing Theory (OIPT) 22  
2.3 Empirical Review ............................ 23  
2.3.1 Dimensions of Supply Chain Responsiveness 24
2.3.2 Supply Chain Responsiveness and Supply Chain Management 27
2.4 Conceptual Framework of the Study 30
2.4.1 Description of Variables in the Model 30
2.4.2 Supply Chain Responsiveness and Service Performance 31
2.4.3 Operation System Responsiveness and Logistics Process Responsiveness 32
2.4.4 Logistics process responsiveness and supply network responsiveness 34
2.4.5 Operation System Responsiveness And Supply Network Responsiveness 34

CHAPTER THREE

METHODOLOGY AND ORGANISATIONAL PROFILE 36

3.0 Introduction 36
3.1 Research Design 36
3.2 Research Methods 37
3.3 Study Population 37
3.4 Sample Size and Sampling Techniques 38
3.5 Types and Sources of Data 39
3.6 Data Collection Method 39
3.7 Data Analysis 40
3.8 Validity and Reliability Test 41
3.9 Ethical Consideration 41
3.10 Profile of Study Area 42

CHAPTER FOUR

DATA PRESENTATION, ANALYSIS AND DISCUSSION 45

4.0 Introduction 45
4.1 Demographic Characteristics of Respondents 45
4.2 Statistical Tests 48
4.3 Descriptive Statistics of Study Variables 49
4.3.1 Supply chain responsiveness 50
4.3.2 Service Performance 52
4.4 Correlation Analysis 53
4.5 Regression Analysis 55
4.5.1 The Relationship Between Supply Chain Responsiveness and Service performance 55
4.5.2 The Relationship Between Operation System Responsiveness and Logistics Process Responsiveness 56
CHAPTER ONE

1.2.5 The Relationship between Operation System Responsiveness and Supply Network Responsiveness 57

CHAPTER TWO

2.5 The Relationship Between Logistics Process Responsiveness and Supply Network Responsiveness 58

CHAPTER THREE

3.6 Hypothesis Table 60

CHAPTER FOUR

4.7 Discussion of Findings 61

4.7.1 Impact of Supply Chain Responsiveness on Service Performance 61

4.7.2 Impact of Operation System Responsiveness, Logistics Process Responsiveness and Supply Network Responsiveness on Service Performance 61

4.7.3 The Inter Relationship Between Operation System Responsiveness, Logistics Process Responsiveness and Supply Network Responsiveness 62

CHAPTER FIVE

5.0 Introduction 63

SUMMARY OF FINDINGS, CONCLUSION AND RECOMMENDATIONS 63

5.1 Summary of Findings 63

5.1.1 The Impact of Supply Chain Responsiveness on Service Performance 63

5.1.2 The Impact of Operation System, Logistics Process and Supply Network Responsiveness on Service Performance 64

5.1.3 The Inter Relationship among operation system responsiveness, logistics process responsiveness and supply network responsiveness 64

5.2 Conclusion 65

5.3 Recommendations 66

5.3.1 Implication to Practices 66

5.3.2 Implication to Policy 67

5.3.3 Suggestion for Further Studies 68

REFERENCE 69

APPENDICES 74
**LIST OF TABLES**

<table>
<thead>
<tr>
<th>Table</th>
<th>Description</th>
<th>Page</th>
</tr>
</thead>
<tbody>
<tr>
<td>Table 4.1</td>
<td>Demographic Characteristics of Respondents</td>
<td>46</td>
</tr>
<tr>
<td>Table 4.2</td>
<td>Tests of Validity and Reliability</td>
<td>48</td>
</tr>
<tr>
<td>Table 4.3</td>
<td>Supply Chain Responsiveness</td>
<td>50</td>
</tr>
<tr>
<td>Table 4.4</td>
<td>Service Performance</td>
<td>52</td>
</tr>
<tr>
<td>Table 4.5</td>
<td>Correlation Analysis</td>
<td>54</td>
</tr>
<tr>
<td>Table 4.6</td>
<td>Model Summary</td>
<td>55</td>
</tr>
<tr>
<td>Table 4.7</td>
<td>ANOVA</td>
<td>56</td>
</tr>
<tr>
<td>Table 4.8</td>
<td>Coefficient of Variation</td>
<td>56</td>
</tr>
<tr>
<td>Table 4.9</td>
<td>Model Summary</td>
<td>56</td>
</tr>
<tr>
<td>Table 4.10</td>
<td>Analysis of Variation (ANOVA)</td>
<td>57</td>
</tr>
<tr>
<td>Table 4.11</td>
<td>Coefficient of Variation</td>
<td>57</td>
</tr>
<tr>
<td>Table 4.12</td>
<td>Model Summary</td>
<td>57</td>
</tr>
<tr>
<td>Table 4.13</td>
<td>Analysis of Variation</td>
<td>58</td>
</tr>
<tr>
<td>Table 4.14</td>
<td>Coefficient of Variation</td>
<td>58</td>
</tr>
<tr>
<td>Table 4.15</td>
<td>Model Summary</td>
<td>58</td>
</tr>
<tr>
<td>Table 4.16</td>
<td>Analysis of Variation</td>
<td>59</td>
</tr>
<tr>
<td>Table 4.17</td>
<td>Coefficient of Variation</td>
<td>59</td>
</tr>
<tr>
<td>Table 4.17</td>
<td>Hypothesis Table</td>
<td>60</td>
</tr>
</tbody>
</table>
LIST OF FIGURES

<table>
<thead>
<tr>
<th>Figure</th>
<th>Description</th>
<th>Page</th>
</tr>
</thead>
<tbody>
<tr>
<td>Figure 2.1</td>
<td>Conceptual Framework of the Study</td>
<td>31</td>
</tr>
<tr>
<td>Figure 3.1</td>
<td>A Map of Ashanti Region</td>
<td>44</td>
</tr>
<tr>
<td>Abbreviation</td>
<td>Description</td>
<td></td>
</tr>
<tr>
<td>--------------</td>
<td>-------------------------------</td>
<td></td>
</tr>
<tr>
<td>LPR</td>
<td>Logistics Process Responsiveness</td>
<td></td>
</tr>
<tr>
<td>OSR</td>
<td>Operation System Responsiveness</td>
<td></td>
</tr>
<tr>
<td>SCM</td>
<td>Supply Chain Management</td>
<td></td>
</tr>
<tr>
<td>SCR</td>
<td>Supply Chain Responsiveness</td>
<td></td>
</tr>
<tr>
<td>SNR</td>
<td>Supply Network Responsiveness</td>
<td></td>
</tr>
<tr>
<td>SP</td>
<td>Service Performance</td>
<td></td>
</tr>
</tbody>
</table>
CHAPTER ONE
INTRODUCTION

1.1 Background to the Study

Companies in today’s unstable business environment face volatile market conditions. The emergence of technological breakthrough is turning things around. Organisations that had enjoyed monopolies in their fields of operation or localities are now struggling to remain in operation with the free entry of new firms. The removal of entry barriers to new firms coupled with technological advancement, customer demand variability, shorten life cycle of products, new product varieties and globalisation have placed all entities on the same pedestal. In fact, irrespective of time, place and type of business, every firm is competing in the same globalised market. Prediction of the market condition based on customer demand pattern and supply capabilities may woefully not reflect in reality due to uncertain and changing environmental factors (Ahmed et al., 2019; Wu et al., 2017).

The nature of competition among companies have changed lately. The time when firms gained competitive advantage from producing high quality products at a low cost that can be sold at lower price margins relative to market price has passed. Competitiveness currently is derived from the delivery capabilities of the firm. Criteria for measuring competitiveness comprises variables that enable firms to deliver the right products at the right quantity and quality to customers in a timely manner (Naway & Ramat, 2019). Formulating and designing supply chain strategy to provide values stream, waste free operation process and responsive systems in this globalized unpredicted business environment is a top priority of corporations (Ahmed et al., 2019). Competition which used to be based on firm level of capabilities has turned into supply chain against supply chain. The obvious implication is that competitive advantage comes from the ability of supply chain partners to coordinate and integrate strategies aimed at satisfying the ultimate customers of the supply chain at a relatively low total cost (Madhani, 2018).

The ever-changing market conditions has aroused the interest in supply chain actors and researchers in supply chain responsiveness in business planning process (Nooraie et al., 2019). Supply chain responsiveness looks at the extent to which a company collaborates with the members in its supply and distribution channel to appropriately
meet the demands of the environment. To survive in a rapidly changing environment, firms seek to develop responsive supply chains. Supply chain responsiveness entails “quickly responding to changing customer or supplier needs and competitor strategies by developing new products or services or adjusting supply chain operations to match the changing markets through strategic collaboration with partners” (Yu et al., 2019).

Supply chain forms an important component of the competitive business environment. It consists of complex set of activities including flow of material, product funds and information. It involves the interconnection of suppliers, producers, wholesalers, distributors, transporters, retailers and consumers themselves. From the competitive and complexity associated with business activities today, companies must have the ability to respond to the various ever-changing tastes and preferences coming from customers who demand low cost but high-quality goods and services (Ortiz and Gomez, 2017). Firms would have to influence the actions of the chain members at each stage of the value chain to achieve the desired customer satisfaction level (Thatte, 2007).

Supply chain management in today’s business environment remains great source of competitiveness across industries. The practice of sharing information has become very pronounced in managing supply chains for positive business performance outcome (Topal & Sahin, 2018). The purpose of supply chain management (SCM) is to position firms to become more customer-centric, information-intensive, and flexible. The end product of the new perspective of supply chain management is responsiveness. Responsiveness is an alternative supply chain approach relative to traditional cost efficiency. Whilst cost efficient supply chain approach emphasises low-cost processes, responsiveness promote value adding activities that ensure long term returns to the firm. (Roh et al., 2013).

Yu et al. (2019) accepts that responsiveness concepts are closely linked with supply chain flexibility and agility. The term responsiveness refers to “being quick or speedy in responding to changing market or customer needs, which can be achieved with any of the following antecedents: short lead time, quick response capability, flexibility, agility, and visibility”. Responsiveness to customer demand has become an important competitive tool in today’s unstable business environment which is plagued with alternative sources of fulfilling customers’ needs through variety of products.
Products are experiencing shorter life cycle, new products are developed rapidly, existing ones are modified easily to meet the prevailing market conditions. Getting the right product, at the right time to the right customer has become the focus of all supply chains. To be responsive in this volatile market economies, the firm and its supply chain members needs to be flexible and have high speed in satisfying customers (Feutes et al., 2016).

Naway & Ramat. (2019) emphasize that supply chain operational performance should be gauged from process reliability, responsiveness, flexibility and cost. The overarching goal of any supply chain is to ensure effective delivery of its products and services to customers at the highest level of quality whilst keeping a cost and time requirement at the possible minimum level. Low cost, high quality, flexible process and quick response to demand are critical success factors supply chains need to carefully deal with. Logistics process deals with the movement of products, materials, funds, information and ideas from point of origin to the point of consumption. This process can be effective to the extent that the logistics structures support timely flow in the right quantum and direction. A close relationship with suppliers improves operational responsiveness. Information sharing with suppliers enhances coordination of inbound processes. Suppliers can therefore supply the required orders to producers on time and in a more secure fashion. It is also said that external integration immensely improves organisations’ responsiveness (Ishtiaque et al., 2018).

Responsiveness in the context of supply chain is the ability to react persistently and within an apt period to client’s demand or changes in the marketplace, besides to generate or sustain a competitive advantage as the way forward (Rojagopal et al., 2016). The overall objective of supply chain network is to link source to the consumers so that flow of money, materials and information can be managed effectively and efficiently. Here, effectiveness and efficiency will be measured in terms of supply chain surplus, time and customer satisfaction (Dubey et al., 2014).

Ishtiaque et al. (2018) acknowledge that operational responsiveness is attained when organisations involve suppliers in design and production processes. Again, to be responsive to customers, manufacturers need to engage in seamless information sharing with their suppliers. Timely and adequate information sharing promotes effective planning at the supply firm which increases supplier responsiveness to
operation demand of the focal organisation. Operational responsiveness in turn enables the organisation to respond swiftly to the changes in product volumes requested by different customers. At the customer side, retail agents serve as interface between the manufacturer and the final consumer. Interestingly, is the responsiveness of the retailer which would be most likely perceived by customers as the supply chain responsiveness (Sharma et al., 2020)

Supply chain responsiveness in the assessment made by Nooraie et al., (2019) is how a supply chain adapts its output within the available levels of four external flexibility types: product, mix, volume, and delivery in respond to external factors. Holweg (2005) stated “responsiveness is the strength to respond purposefully and within a suitable timescale to customers’ demand or innovations in the marketplace, to bring about or sustain an ambitious advantage”. A responsive supply chain reduces the lead time and enhances service reliability, fast responses, and adaptability. Many supplies are not ready to endure global competition because of responsiveness absence to satisfy market needs (Singh, 2015). Bernardes & Hanna (2008) predicted a new breed of customer who demands greater responsiveness to a dynamic set of requirements, and a new competitive environment which expose local companies to competition from companies around the globe, form a new scenario that has challenged firms in most industries. As a result, responsiveness has become most important capabilities needed for achieving competitive advantage.

1.2 Statement of the Problem

The market conditions continue to be unstable and things will forever change. The continuous market instability is forcing enterprises to identify new ways of creating values to their customers. Firms are now drawing their attention to relationship management and strategic alliance with both local and foreign trading partners. Besides, firms should be more cooperative with key partners in order to sustain local and global presence (Pereira, 2009). Any failure in one part of the supply chain network will extend multiple and adverse impact on the entire supply chain (Rojagopal et. al., 2016).

Responsiveness which is a firm’s ability to speedily adapt to environmental changes and market conditions is a critical subject, which needs to be further researched
(Ahmed et al., 2019) in this era of global disruption. Godsell (2009) emphasised the need for a manufacturing strategy to be driven by marketing strategy which in turn was driven by corporate strategy. A supply chain network must essentially provide quick responses to customer demands and preferences, in order for the individual chain members to remain competitive in the ever-changing marketplace. Meeting customers’ expectations in acceptable timescales sounds like a reasonable assumption for surviving in the competitive and dynamic market condition. Responsiveness is the fundamental key to cater for all such needs, enhancing the service quality, customer satisfaction, behavioural intentions and customer service (Sharma et al., 2020).

Studies have established that flexibility and agility have significant impact on both customer service, efficiency and improve firm’s competitiveness (Ahmed et al., 2019). Most of the studies reviewed investigated the effect of supply chain responsiveness on competitive advantages. Hayat et. al. (2012) assessed the different factors that affect supply chain responsiveness. Al - Hawajreh & Attiany (2014) analyzed the effect of supply chain responsiveness on competitive advantage. Thathe (2013) had earlier conducted a similar investigation into the effect of supply chain responsiveness on competitive advantage. Responsiveness was assessed as organisational competitive tool. Previous studies were limited to assessing supply chain responsiveness under a competitive environment. Studies on supply chain responsiveness under a cooperative environment is still lacking. Previous studies have established the impact of supply chain responsiveness on organisational performance. These studies (Gunasekaran, 2018); Sukati, 2012 and Thatte (2007) found out that there is a significant relationship between supply chain responsiveness and organizational performance.

These studies focused on manufacturing operation system of the focal firms (Sukati, 2012; Hayat, 2012 and Thatte 2007). Obviously, supply chain responsiveness role in improving service performance or customer satisfaction with service provided has not been extensively studied. Previous studies assessed responsiveness from manufacturing operation perspective therefore, a study on responsiveness from both service and manufacturing or service operation perspective is required. Sandberg and Jafari (2018) stated that “the majority of the body of the literature on responsiveness pertains to the manufacturing setting since manufacturing is considered as the main source for creation of responsiveness in the supply chain. Other supply chain
members such as retailers, distributors or service providers are generally neglected in literature”

Few studies in the early years of supply chain responsiveness literature evaluated the relationship among the sub construct of supply chain responsiveness. Research work focusing on the inter relationship between the various dimensions of supply chain responsiveness is woefully inadequate. Current studies have gone beyond assessing the significant relationship between supply chain responsiveness and firm performance. Asamoah et al. (2021) and Ibrahim & Babiker (2020) have investigated the relationships among the three major supply chain responsiveness sub constructs (operation process responsiveness, logistics responsiveness and supply network responsiveness). However, these studies on supply chain responsiveness were principally conducted on production systems. Impact of supply chain responsiveness on the service delivery has not been extensively studied. Meanwhile, Service perishability gives rise to many problems for service providers and especially when service demand fluctuates. The fundamental challenge facing service providers is how firms adopt strategies to match capacity and demand (Bielen & Demoulin, 2007). The concept of supply chain responsiveness can be a sustainable tool for increasing customer satisfaction. This study examines the relationship between supply chain responsiveness and service performance and the inter relations among the various supply chain responsiveness elements (operation process responsiveness, logistics responsiveness and supply network responsiveness). The study adopted service satisfaction dimensions as the service performance variables namely, service delivery or provision time, waiting time, speed of making changes in service provision and service customization.

1.3 Research Objectives

This study aimed at investigating the impact of supply chain responsiveness on service performance. The following research objectives have been set to help achieve the overall goal of the study.

I. Evaluate the impact of supply chain responsiveness on service performance
II. Evaluate the impact of operation process, logistics and supply network responsiveness on service performance
III. Examine the inter-relationship between operations system, logistics process and supply network responsiveness

1.4 Research Questions

The study attempted to answer the following research questions to achieve the aforementioned specific research objectives.

I. What is the impact of supply chain responsiveness on service performance?
II. What are the effects of operation system responsiveness, logistics process responsiveness and supply network responsiveness on service performance?
III. What is the inter-relationship between operation systems, logistics process responsiveness and supply network responsiveness

1.5 Justification of the Study

The global pandemic has disrupted many business models. As a result, the old-fashioned way of doing business will now yield little to no result. The study shall thus bring to light how firms can aptly adapt to unstable business environment in this era of global pandemic and the new norm of doing things including business.

The study shall add to the pool of empirical evidence on supply chain responsiveness specifically, the interrelatedness among the key constructs which is barely investigated. The findings of this study shall be useful to academia and the research community in understanding the interrelationship between the various dimensions of supply chain responsiveness. The research outputs produced by this study shall promote a greater awareness and a deeper understanding of how focal firms can rely on flexibility in their supply networks to improve internal operation responsiveness and in turn achieve customer side responsiveness.

The study shall provide new knowledge on how companies can reconfigure their corporate resources revitalised value chain processes in meeting the market trend and its requirements. The study is intended to underscore the relevance of firms constantly modify internal operations and manage external relationship to improve flexibility and quick delivery systems.
1.6 Research Methodology

The study followed a quantitative research design in gathering and collecting primary data. Primary data was collected by following the following research procedure. Firstly, a quantitative research survey approach was followed in gathering field data. A questionnaire instrument was the main data collection instrument used. In terms of sampling and sampling techniques, purposive sampling techniques was employed in selecting individual firms as respondents to participate in the survey. Statistical Package for Social Sciences (SPSS) and Microsoft Excel application were the main tools for the data analysis and presentation. Statistical Package for Social Sciences (SPSS) and Microsoft Excel applications were used to perform the correlation and regression analysis to determine the significant relationship among the study variables. The results and findings were visually presented in frequency tables and statistical charts.

1.7 Scope of the Study

The study covers three key dimensions of supply chain responsiveness; supply network responsiveness which measures the flexibility and speed in the upstream chain, operation system responsiveness which measures flexibility and speed in the internal operation capability of the focal firm, logistics process responsiveness which measures the responsiveness of the distribution channel or the inbound process. The study focused on effect of responsiveness level of the manufacturing operation, its inbound and outbound process and performance. The study also concentrated on measuring service performance as a competitive tool in different manufacturing firms in Ghana. Geographically, the study was conducted using firms that are situated within the borders of Ashanti Region. Again, the study was limited to firms in the manufacturing sector with both production and service operation systems.

1.8 Limitation of the Study

The study concentrated on the impact of responsiveness on service performance. Service performance is traditionally measured from either internal organisational perspective or from external perspective which usually focus customers assessment of
service. Customers are the recipients of service provision. Responsiveness to customers can best be evaluated by the consumers of the service. This study however focused on measuring service performance from internal employee perspective other than external customer perspective.

Again, the study was limited to the forward supply chain context. Responsiveness issues in reverse supply chain process is likely to have different impact on performance. This study however concentrated on the forward supply chain using the manufacturing firm as the focal company.

1.9 Organization of the Study

This study is arranged in major parts titled as chapters and sub sections under each chapter. There are five major chapters in the entire study. The first chapter is the introduction chapter which serves as synopsis of the entire study. This comprises of the study background, statement of problem, research objectives, research questions, justification of the study, research methodology, scope of the study, limitation and organization of the study. The second, chapter two is the literature review section which is subdivided into four sections; conceptual review, theoretical review, empirical review and conceptual framework sections. The third chapter outlines the research methodology and organizational profile. It covers the research design, population, sampling size and techniques, data collection methods, data analysis method, internal reliability and profile of organization. The last but one chapter presents the data analysis of the study whilst the final chapter gives summary of study findings, conclusion, recommendation and direction of future studies.
CHAPTER TWO
LITERATURE REVIEW

2.0 Introduction

This chapter presents a review of literature published in the field of operations management, logistics, procurement and supply chain management. It covers a review of the research constructs, and theories related to supply chain responsiveness and service operation management. The chapter is presented in four sections. Section one identifies and defines terms and concept relevant in understanding supply chain responsiveness, section two gives a theoretical review of supply chain management perspectives on responsiveness. In section three, report on the dynamics of similar empirical studies that are recently carried out on supply chain responsiveness and its related subjects is present. Section four illustrates the conceptual framework of the study.

2.1 Conceptual Review

Under this section, discussion on supply chain responsiveness and related concepts are presented. The review includes definition and dimensions of supply chain responsiveness; operation system responsiveness, logistics process responsiveness and supply network responsiveness. The section also covers review on service performance.

2.1.1 Definition of Supply Chain Responsiveness

Various authors have attempted to define supply chain, the definition of supply chain in Christopher (1998) remains popular among logistics and supply chain management literature. By the definition of Christopher (1998), supply chain refers to “the network of connected and interdependent organizations that are mutually and co-operatively working together and involved, through upstream and downstream linkages, in the different processes and activities to control, manage and improve the flow of materials and information (from suppliers to end users) that produce value in the form of products and services in the hands of the customer”. Supply chain in other words denotes activities associated with the flow and transformation of goods from the raw materials stage, through to the end user, as well as the associated
information flows (Handfield and Nichols, 2002). The supply chain should not be considered as the connection between a company and its suppliers alone but rather extends to other parties involved in the activities of moving, storing and retailing the products to customers. Interestingly, the consumers of a company’s products and services form integral part of the supply chain (Putra et al., 2019).

Supply chain management is defined as the coordination of resources and the optimization of activities across the value chain to obtain competitive advantages (Gunasekaran et al., 2008). Supply chain management encompasses “the planning and management of all activities involved in sourcing and procurement, conversion, demand creation and fulfilment of all logistic management activities”. Supply chain management involves the integration among the activities of material procurement and service, the process of transforming the materials into half-finished goods and final products, and their delivery to the end consumers (Heizer & Render, 2011; Putra et al., 2019). Ikechukwu (2019) also defines supply chain management as the co-ordination and collaboration with channel partners which can be suppliers, intermediaries, third party service providers and customers. Supply chain management is best understood among researchers as an end-to-end process involving the management of activities from point of origin of inputs to point of consumption of finished goods.

Responsiveness refers to the ability to react to sudden or immediate changes in the marketplace (Ghosh et al., 2014). Kim et al. (2013) defines supply chain responsiveness as the “ability of a supply chain to satisfy customers’ needs”. In the views of Kim and Lee (2010), supply chain responsiveness “denotes capability of a firm to deploy resources available along the supply chain to identify and react to market changes”. According to Jahre and Costes (2015), supply chain responsiveness represents the coordination of activities of the members of the supply chain and the integration of key business processes both within and across firms. Responsiveness is considered as rapid attempt to meet customer requirement. Supply chain responsiveness is marketplace or customer oriented. In other words, the ultimate goal of supply chain responsiveness is to satisfy the customer. Though supply chain responsiveness strategy focuses on satisfying the customer, it is regarded as reactive or adaptive strategy rather than traditional static strategy without consideration of the customer related factors. Supply chain responsive processes are customer induced
activities. The responsiveness of a supply chain is the combination of the firm’s response to customer behaviour, the responsiveness of the firm’s supply chain members and the collaborative activities among the supply chain members.

Supply chain responsiveness is therefore attained from two key supply chain management concepts or practice namely; supply chain coordination and integration. As it has already been stated by Kim and Lee (2010) that it is by the coordination of activities and seamless integration of process both within and across firms that responsiveness can be achieved. According to Jahre & Costes (2015), there exist two school of thought among supply chain researchers on the basis of responsiveness; responsiveness based on flexibility and responsiveness based on lean and agility. One school of thought posits that responsiveness must be based on different form of flexibility and another side regard responsiveness as having lean and agile supply chain. Flexibility in general denotes the ability of a system to make the necessary adjustment in accordance with the need and time (Khanal & Tamang, 2017). Flexibility in this sense may not be limited to but implies operation flexibility, supply flexibility, logistics flexibility, production or manufacturing flexibility, technology flexibility and process flexibility (Kim & Lee, 2010).

The concept of lean system focuses on waste elimination. Gunasekaran et al. (2008) describes agility as the capability of an organization, to proactively establish a virtual manufacturing with an efficient product development system that meet the changing market requirements, maximize customer service level, and minimize the cost of goods, with an objective of being competitive in a global market and for increased chance of long-term survival and profit potential. Agility can only succeed when there is enough flexibility in human resources, business processes and technologies. The concept of lean system is more practice at the upstream chain where inbound activities are structured to reduce cost and waste. Lean practices such as lean manufacturing, just in time production, etc. increase the level of flexibility at the supply side. Agile supply chain essentially denotes the swiftness in meeting customer requirements or dynamic market conditions. Čiamienė & Vienažindienė (2014) reported that the evolution of supply chain management and agile supply chain have given rise to quick response movement. A lean supply chain strategy attempt to ensure value stream from the suppliers to the final customers in order to eliminate all kinds of buffering cost in the supply chain and to ensure a stable schedule in
production in order to improve process efficiency and then maintain the competitive advantage through economies of scale in a stable and predictable marketplace. On the other hand, an agile supply chain strategy aims to develop a flexible and reconfigurable network with partners to share competences and market knowledge in order to ensure survival and prosperity in a fluctuating market environment by achieving a rapid response to market changes. A agile supply chain strategy, which combines some elements of both lean and agile strategies, utilizes make-to stock strategies for high volume, stable demand products, while using make-to-order strategies for everything else (Roh et al., 2014).

Hum et al. (2018) defines supply chain responsiveness as the probability of fulfilling a customer order within a quoted lead-time. Supply chain responsiveness is measured as the likelihood of a customer receiving his or her order at a preferred due date. In the views of Christopher (2016), supply chain responsiveness refers “to the ability of a supply chain to respond to market demand in time effective manner” These authors liken responsiveness to speed of delivery. In addition, Giannakis et al. (2019) elaborated on three dimensions of supply chain responsiveness. In their review, supply chain responsiveness was used to mean the speed of supply chain to deliver customers’ orders. Responsiveness in this regard can be determined based on the order fulfilment time. Another dimension of supply chain responsiveness is the ability to rapidly detect and react to risks associated with the supply chain. This is measured in terms of how the supply chain can make rapid change to product mix, volume, delivery sequence, and supply capacity. The third dimension of supply chain responsiveness according to Giannakis et al. (2019) is the ability of the firm to operate on flexible system. Responsiveness is recognized based on how the system adapt to uncertainty and disruption, make operational adjustment and realign processes. Thus, responsiveness was herein equated to flexibility. Khanal & Tamang (2017) also described supply chain responsiveness bases on the dimension of speed and flexibility. They view Supply chain responsiveness as the supply chain efficiency and effectiveness which can address volatile customer demand. The generally accepted view that supply chain responsiveness comprises of speed and flexibility dimension dominate supply chain management literature. Empirically, both speed and flexibility directly affect responsiveness (Khanal & Tamang, 2017).
From the strategic point of view, Roh et al. (2014) emphasise that responsiveness is an alternative supply chain strategy to efficiency which involves a trade off in strategic decision of supply chain members. A responsive supply chain strategy focuses on product and functional innovativeness which can be one or combination of lean and agile strategy. A firm can pursue an efficient strategy when the market is mature and competitive advantage has been attained through low-cost strategy. Whereas, responsiveness is the ideal strategy when an organization intend to compete on distinctive innovation, customization and customer centered processes (Roh et al., 2014).

2.1.2 Operation System Responsiveness

Operations system responsiveness is defined as “the ability of a firm’s operations system to address volatile customer demand” (Thatte & Nathan, 2013). Responsive operation system responds swiftly in labelling, packaging and documentation, reconfigures process to address demand change, responds rapidly to changes in shipment, effectively expedites emergency orders, adjusts capacity and reallocation of employees (Khanal & Tamang, 2011) in the changing business environment. In the short run, supply chain can achieve operational responsiveness through its product mix and volume mix. Short term operational responsiveness is the ability to adjust a firm’s output to short-term demand changes (Reichhart & Holweg, 2015). Organization’s operations system could either be production operations and service operations. Both service and production operation systems must responsive to sustain competitiveness for the firm. Considering the nature of service operations which is characterized with intangibility and perishability features, service operations should always run in a system rooted in reliability and timeliness in order to meet the variabilities in customers’ demand. reliable and timely to satisfy customer demand. whilst achieving production operation system responsiveness might aim at attaining a competitive edge over others. Responsiveness in the service operation systems is a fundamental requirement for the service operations to be carried out successfully even under noncompetitive environment. An alternative competitive operations strategy to responsiveness is efficiency (Chopra & Meindl, 2013). Efficient operations system is the one that can considerably reduce cost at the same time eliminate waste and non – value adding activities. Firms are aware of the fact that demand uncertainty and
variability are inherent to their operations call for different types of responsiveness which attempts to meet customers requirement (Reichart & Holweg, 2015). Beyond the quest for organizational competitiveness, operation system responsiveness contributes immensely to value creation strategies of supply chain members (Khanal & Tamang, 2011).

2.1.3 Logistics Process Responsiveness (LPR).

Logistics process responsiveness is the firm’s ability in warehouse management, distribution, and transportation to address volatile customer demand. Logistics management deals with packaging, warehousing, transportation, shipping, order tracking and delivery. Logistic process responsiveness remains an integral part of the end-to-end supply chain responsiveness strategy that can create superior value for customers (Thatte & Nathan, 2013; Khanal & Tamang, 2011). The evolving business environment has resulted in a corresponding evolution in logistics process. Supply chain Literature now pays attention to the broader spectrum of logistic processes focusing on value addition and better logistics solution. Both researchers and practitioners seek to improve the outlook of logistics activities with innovativeness in vital components like packaging, third party inventory management, electronic sensors, and advanced information systems (Mentzer et al., 2001). Manufacturing and logistics operations are increasingly driven by customer needs rather than forecasts, increasing the importance of demand and inventory information visibility across the supply chain (Holweg & Pil, 2007; Gunasekaran, 2005). Organisations are now designing and implementing their logistics strategies not just to reduce cost but to create value for customers in the competitive way (Mentzer et al., 2001). Excellent Logistic capability can serve as the competitive strategy of the supply chain focal firm for achieving differentiation, low cost or customer segmentation strategy. A firm may utilize its logistics process to support its marketing strategy by increasing market share, practicing mass customization, increased service performance. Customer value creation is driven by logistics process responsiveness (Mentzer et al., 2001). In the value creation logistics provide the time and place utility of product. Logistics process responsiveness creates greater portion of product value which is more pronounce in what has been termed as the seven Rs (7Rs). Logistics enhances the firm’s ability to
deliver the right quantities of product with the right quality at the right place at the right time in the right condition at the right price with the right information.

2.1.4 Supply Network Responsiveness

Thatte et al, (2013) define supplier network responsiveness as the ability of a firm’s major suppliers to address changes in the firm’s demand. Having a responsive upstream and downstream partner is key to achieving supply chain responsiveness. Supply chain firms need to appropriately select supplier that have quick response ability and can adapt to changing demands in order to be responsive. (Ibrahim & Babiker, 2020). A responsive supply chain is a network of firms that is capable of creating wealth to its stakeholders in a competitive environment by reacting quickly and cost effectively to changing market requirements. There is a need to meet the changing market requirements by developing a suitable network of collaborative firms based on the core-competencies and on leveraging people and information as quickly as possible and in the most cost-effective manner (Gunasekaran et al., 2008).

The responsive level of one chain member depends on the other stages within the supply chain configuration. In view of that, product related decisions are jointly taken by all supply chain actors across the chain which facilitates alignment of individual operational objectives with the collective actions of the entire supply chain (Reichhart & Holweg, 2015). Decision on how a focal firm design its supply chain network remains most important strategic level decisions in supply chain management. Supply chain network structures depict the nature of connectivity and linkage across the stages of the chain. It portrays how suppliers, focal firm, distribution outlets and customers are located relative to the other members along the value chain. Undoubtedly, supply chain networks affect overall supply chain agility (Babazadeh et al 2012). Supplier network flexibility supplier network responsiveness are basic ingredient for achieving responsiveness to changes in customer demand (Ibrahim & Babiker, 2020).

Supply chain focal firms use relationship arrangement to reduce risk of failure from their supply network. Supply chain risk management encompasses the collaborative effort among supply chain members to apply risk management tools in dealing with risk in all logistics activities. ‘It is the management of risks for the supply chain, through a coordinated approach among supply chain members, to reduce supply chain
vulnerability as a whole’ (Juttner et al., 2003). Kim et al. (2013) established that proper implementation of manufacturing flexibility can mitigate supply chain risk and in turn makes the supply chain more responsive. They further built their argument based on work of Christopher and Lee (2004) which suggested that responsive supply chain networks can be achieved through risk mitigating strategies. They articulated the significance of information sharing, early detection of abnormalities and responsive corrective action. Through information sharing and supply chain collaboration, firms are reducing demand uncertainty that results from transparent demand information accessible to all players in the supply chain in the most timely manner (Reichhart & Holweg, 2015). Supply risk management approaches enhances responsiveness through alliance relationships where the firm and its suppliers become connected in reducing risk associated with supplies. There is a consolidated gain from collaborative supply network strategy focusing on supply risk mitigation. These gains are consolidated from supply side flexibility and collaboration which in turn improves supply network responsiveness of the supply chain (Kim et al., 2013). A responsive supply chain is achieved from the integrating of information systems across firms, networking of partners and knowledge management approaches among supply chain members (Gunasekaran et al., 2008).

### 2.1.5 Service Performance

Performance of a system generally falls into two major categories; financial and non-financial performance measures. Financial performance metrics focus on the profitability outcomes including turnover, net income, revenue growth, cost reduction consideration, etc. whereas non-financial performance includes non-profitable metrics such as market share, productivity, customer satisfaction, corporate governance, employee’s condition of service among others (Ikechukwu, 2019). Service business operators often assess the service quality provided to their customers in order to improve their service, to quickly identify problems, and to better assess client satisfaction. Service quality means the ability of a service provider to satisfy customer in an efficient manner through which he can better the performance of business. Service quality is used as an assessment of how well a delivered service conforms to the client’s expectations (Ramya et al., 2019).
The success of a supply chain is dependent on effective management process. Supply chain performance assessment should pay attention to the manner in which supply chain activities were planned, organized and conducted to get products and services to customers and the accompanied value customers derived from the consumption of the products (Putra et al., 2019). Competitive advantage is defined as the “capability of an organization to create a defensible position over its competitors” (Li et al., 2006). It is the ability of a firm to differentiate itself from its competitors and is an outcome of critical management decisions. Competitive advantage is either built upon low-cost strategy or unique product or service offering that creates greater value to customers relative to what competitors can offer (Khanal & Tamang, 2017).

Organizational performance is the ability of an organization to use its resources efficiently and effectively to produce outputs that meet or are consistent with the goals or objectives and relevant to its users (Ikechukwu, 2019). Service performance measures include customer satisfaction and internal performance analysis. Customer satisfaction measures involves surveys where individual customers or corporate customer may be asked to rate their specific and overall impression of service delivery. Whilst internal service performance analysis includes employee surveys that are conducted to determine perception of the quality of service delivered to customers on specific dimensions (Ramya et al., 2019). Responsiveness is one key dimension of service quality in the midst of tangibility, empathy, assurance and service reliability. Responsiveness dimension of service quality looks at the willingness to help customers and to provide prompt service. This dimension focuses in the attitude and promptness in dealing with customer requests, questions, complaints and problems. Responsive production operation system can be a source of competitive advantage to manufacturing organizations yet in a service operations environment responsiveness forms part of the essential components in the delivery and consumption of services (Thatte, & Nathan, 2013).
2.2 Theoretical Review

This section presents propositions of relevant theories that provide justification for implementing a supply chain responsiveness strategy. The theories review under this section consists of resource-based view (RBV), dynamic capability theory (DCV) and Organizational Information Processing Theory (OIPT).

2.2.1 Resource Based View

Studies by Barnes (1991) and Grant (1991) have been generally used in strategic management and organizational studies to emphasis how competitive advantage is gained from the array of organizational resources. The resource – based view posits that firms consist of “bundles of resources which are both tangible and non-tangible assets that are tied to the firm in relatively permanent fashion. Organizational resources cut across human, capital, physical and technology. These resources are not limited to assets, capabilities, internal procedures and processes, information, corporate attributes, knowledge and culture. The extent to which firms can build competitive advantage depends on the ability of the firm to control these resources that are valuable, unique, non – substitutable and inimitable. Organisations can assume a competitive position to the extent that their resources and processes are rare and cannot be easily copied by other firms (Liao et al., 2009). Based on the resource based view, the competitive advantage firms obtain in operational domains like manufacturing results from hard-to-duplicate resources that firms build up through external and internal learning processes (Holweg & Pil, 2007). The resource based view as used in this study suggest that supply chain responsiveness becomes a resource when it possesses the ability to create organizational processes intended to facilitates supply chain relationship building. From this theoretical point of view supply chain responsiveness as a valuable intangible asset enable firms to achieve their competitive priorities

2.2.2 Dynamic Capability Theory

Dynamic capability has been defined by Helfat et al. (2007) as “the capacity of an organisation to purposefully create, extend or modify its resource base”. The word dynamic connotes the capability to regenerate competences that correspond with changing environment. Capability also stresses on various forms of adaptation, integration, reconfiguration of both internal and external organizational resources in
response to the changing environment (Chein & Tsai, 2012). A dynamic capability theory underscores how organisations are able to develop or acquire externally resources needed to make them competitive in the changing business environment they operate within. Dynamic capabilities are the firm’s processes that uses resources to integrate, configure, gain and release resources to match and even create market changes. Dynamic capabilities are firm specific organisational processes and strategic practices through which firms allocate resources based on the prevailing market condition (Kim et al., 2013; Winter, 2003). A firm has dynamic capabilities if it can make changes in its resources and process in satisfactory manner (Menon & Maharty, 2008).

With the resource-based view, proponents argue that competitive advantage is gained when a firm possesses rare and valuable resources which have been uniquely acquired or developed to the extent that others cannot find substitution for them or imitate easily. But dynamic capability view argues that possessing rare, unique and valuable resources which cannot be substituted or imitated is not enough to guarantee competitive advantage over time. The dynamic capability theorists emphasis that in addition to the valuable resources, firm must exhibit the ability to be adaptive and flexible to changing market conditions (Liao et al., 2009). Dynamic capabilities unlike the traditional resource-based view which is static, react to the market uncertainty in the dynamic business environment. Therefore, dynamic capability theory is an extension of the resource-based view (Chowdhury & Quaddus, 2017). Teece et al. (1997) and Eisenhardt & Martin (2000) who were the pioneers in laying the foundation for the dynamic capability theory moved the discussion on resource-based view further. In their respective works, they introduce the concept of organizations developing capabilities to face unexpected changes in the business environment. The dynamic capability theorists believe competitive advantage stem from distinctive processes and products that can respond to changing market requirements. RBV is criticized for its failure to provide a strong theoretical framework for organisations to develop capabilities that can be tailored towards addressing the dynamism in the external environment. In comparison, resource-based view is limited to using resources for what it is intended to do whilst dynamic capability view focus on using resources adapt to rapid shift in the environmental conditions (Chowdhury & Quaddus, 2017; Liao et al., 2009).
Dynamic capability view rest on the premise that organizations need to plan and coordinate resources that are can best meet changing market condition under the atmosphere of uncertainties (Chowdhury & Quaddus, 2017). The highest level of capability lies in the appropriate, timely and efficient reconfiguration of existing resources to create new competences. Reconfiguration of organizational resources involves modification of the manner in which existing resources are allocated, and combined in wake of shifting market opportunities in order to achieve competitive advantage (Menon & Moharty, 2008). Based on the dynamic capability view, firm must adapt, integrate and configure resources to respond to the changes in the environment. In this sense, system flexibility and adaptation form the basis of responsiveness (Chowdhury & Quaddus, 2017). Liao et al. (2009) proposed that organizational dynamic capability originates from two core concepts; integrative capacity and firm innovation. Menon & Moharty (2008) referred to capacity as the ability to perform a task in a satisfactory manner. Integrative capacity in the views of Liao et al. (2009) measures “the ability of firms to configure and reconfigure its resources whilst deploying and redeploying the resources to capture and take advantage of the changing market condition. Integrative capacity comes in the form of either internal or external capabilities. External capabilities enable the firm to identify opportunities whereas internal integrative capabilities enable the firm to capitalize on opportunities through resource reconfiguration and redeployment. On the other hand, Liao et al. (2009) describe firm innovation as a firm’s ability to create new value propositions through offering of new products and services, adopting new operating practice, technological, organizational, or market-oriented, or creating new skills and competencies. In their description, firm innovation composed of both content-wise and process-wise innovation. Content-wise innovation emanates from the firm’s ability to comes create new value propositions in the form of tangible assets or products. In Process-wise innovation, a firm attempt to create new form of business processes and systems. Innovation results in the creation of new products and services (Liao et al., 2009).

Menon & Moharty (2008) listed some of the dominant pattern of collective engagements available to organisations and has been reported in dynamic capability literature. These include “distributing and assigning knowledge resources, sharing individual knowledge in the group, capturing synergies among tasks and resources,
appointing the right person to the right unit, integration strategies during corporate acquisitions, keeping managers informed of collective activities, etc”. Kim et al. (2013) adopted the dynamic capability as the theoretical foundation for investigating the influence of changing business environment on market flexibility and supply chain responsiveness. The dynamic capability theory explains the need for supply chains to develop a more robust operation system and supply network that can aptly respond to the changing market demands and pressure from the external environment. The dynamic capability theory in this study explains that firms reconfigure and redeploy their resources including supply chain processes to adapt to external changes from the environment.

2.2.3 The Organizational Information Processing Theory (OIPT)

The Organizational Information Processing Theory (OIPT) stresses on the essence of firms engaging in active gathering, analysis, and usage of information in the most effective and efficient manner, to accomplish complex tasks given greater degrees of uncertainty and interdependence (Yu et al., 2020). From the perspective of organizational information processing theory (OIPT), firm must endeavour to use the information they have at their disposal to remain competitive under uncertain business environment. Uncertainty refers to the difference between level of information required to carry out a task and the actual level of information available to perform the task. Organizational information processing theory (OIPT) states that firms can tackle uncertainty by enhancing information processing within the organization. Defenders of the organizational information processing theory (OIPT) argue that lack of information increases business uncertainty and that information sharing is pivotal in managing uncertainty in a competitive enterprise (Bryde et al., 2020). Simultaneously, uncertainty within the business environment hinders the organization from undertaking effective planning and operational activities. Therefore, the higher the uncertainty an organization faces, the higher the firm’s need for information. To reduce uncertainties, organisations need to invest in vertical information systems and maintain strong ties among actors on the horizontal level (Bodes et al., 2010; Yu et al, 2020).

According to the Organizational Information Processing Theory (OIPT), organizations must develop their information processing capacity to meet the growing need of information due to uncertainty (Yu et al., 2019). Information itself is
intangible resources which needs to be managed appropriately and the ability of firms to process information likewise presents superior form of organizational competitive positioning. The speed and direction of information dissemination affects the information processing (Bryde et al., 2020; Cao & Zhang, 2011). According to the Organizational Information Processing Theory (OIPT), strategic formulation and decision making of organisations are influenced by how information flow internally within the organization and how information is exchange with externally among organisations. Organizational structure must be designed to increase the capability of the firm to capture, process and share information in order to stay competitive in the uncertain business environment (Yu et al., 2019). The organizational information processing theorists focus on how competitive edge is achieved from internal organizational procedures, process and structures with little attention on inter–firm interactions (Bodes et al., 2010). Information processing perspectives support the belief that information processing capability of organisations essentially determines the competitive position of firms in the ever-evolving business environment and provides justification for organisations to promptly respond to changes in the external environment (Schoenher, 2015; Bodes et al., 2010). The information processing theory in this study explain that firms that are able to develop their information processing capabilities become responsive to their customers which improves service performance outcomes.

2.3 Empirical Review

This section presents review of empirical investigation on supply chain responsiveness, service performance and related concepts. Most of the previous studies on responsiveness were conducted from manufacturing perspective, as it is regarded as the prime origin of responsiveness (Sharma et al. 2020, Sandberg & Jafari, 2018). Reichhart & Holweg (2007) stated that demand uncertainty and variability are the driving forces behind responsiveness objectives pursued by manufacturing or supply chain firms. These studies, Al – Hawajreh & Attiany (2014), Roh et al. (2013) Sukati (2012), Thatte et al (2013) explore the competitiveness with pursuing a supply chain responsive strategy.
2.3.1 Dimensions of Supply Chain Responsiveness

In Squire et al. (2009), flexibility and responsiveness were considered related but distinct concepts; to them, flexibility denotes an ability to adapt or change but not necessarily with the speed implied of responsiveness. Nair (2005) finds that value chain flexibility is an important moderator between postponement, centralized distribution and responsiveness. This was explained using the case of the buyer organization working with a supplier to reduce lead times or minimum lot sizes, or to ensure that the supplier has an approved subcontractor to cope with significant demand fluctuations.

Ying (2010) performs analysis of supply chain flexibility and responsiveness: in the Chinese textile and clothing industry. The study aimed at analyzing how the implementation of supply chain flexibility strategies impacts on the responsiveness of the supply chain beyond the boundaries of an individual. Flexibility was demonstrated in four dimensions, namely sourcing flexibility, operating system flexibility, distribution flexibility, and information system flexibility. The study reveals that supply chain flexibility fosters responsiveness to customers’ enquiries and requirements, and the ability to meet their various demand. Lummus et al, (2003) analyzed supply chain responsiveness in the dimensions of operation system, logistics process, supply network, organizational design and information systems and proposed to corresponding outcomes; customer satisfaction in the form of service and responsiveness perception and improvement in supply chain asset utilization. Gunasekaran et al. (2008) suggested that a responsive supply chain displays interconnected information network configuration involving key supply chain partners. They hypothesized that information systems, knowledge management and network of partnering firms enhance supply chain responsiveness with speed and flexibility as the outcomes.

Closs & Swink (2005) investigated the role of information connectivity in achieving responsive logistics operation. They conceptualized logistics responsiveness in terms of flexible logistics program and information connectivity. Flexible logistics program in their model covers the planning and decision-making capabilities firms use to enhance flexibility in their logistics function. Information connectivity construct consisted of information sharing and collaborative effort of supply chain members. Holweg (2005) studied responsiveness based on three operation system flexibility
variables; volume, product and process flexibility. These variables were arrived at in considering customer lead times, order to delivery time, distribution lead time, supply chain response lead time, volume stability, demand specifications, product variety, degree of product customization, product life cycle, and decoupling points. Stevenson & Spring (2009) analyse empirical evidence on supply chain flexibility arising from inter firm relationship. Linking a firm’s flexibility to the wider supply chain Ibrahim & Babiker (2020) was among the first researches that extended the study on supply chain responsiveness to service industry. Ibrahim and Babiker (2020) explore supply chain responsiveness in service industry in Sudanese environment. Sukati et al. (2011) focus their investigation on supply chain responsiveness in the consumer goods industry. Then, Sharma et al. (2020) expanded the study of responsiveness to retail sector.

In supply chain responsiveness literature, most researches were conducted by adopting a case study approach in examining responsiveness. Kaneberg et al. (2020) demonstrated impact of network responsiveness on supply chains within emergency preparedness, in an explorative case study. The study reveals that challenges in the supply network remain the main setback in attaining responsiveness in complex supply chains and suggested that a responsive strategy must include all relevant actors and share the necessary and most correct information. Gunasekaran et al. (2008) use a case study approach in examining the critical success factors for achieving responsive supply chain. These factors include an extensive distribution channel (logistics), global suppliers, accurate demand forecasts, just-in-time deliveries, and applications of various technologies such as the Internet-based solutions. Squire et al. (2009) found out the relationship among three supplier manufacturing capabilities, namely responsiveness, flexibility and modularity, and their effect on buyer firm performance as measured by levels of customer responsiveness. Based on factor loading analysis conducted in the study of Closs & Swink (2005), flexible logistics program positively impacts on delivery responsiveness whereas information connectivity partially mediates between the relationship between logistics flexibility and delivery responsiveness. Thatte et al. (2013) using a survey tested the relationship between supply chain responsiveness and operational performance based on structural equation modeling. The results revealed that supply chain responsiveness have positive effect on operational performance. There was also a positive relationship between supply...
chain management practices and supply chain responsiveness; supply chain management practices and operational performance.

Sharma et al. (2020) perform a systematic review on responsiveness from retailer’s perspective. Holweg & Mienczyk (2002) had earlier assessed logistics responsiveness in a distribution system using lead time and efficiency as the outcomes. Based on their study, responsive delivery system is more cost efficient than the traditional distribution channel in the UK automobile industry. The study also reveals that logistics responsiveness alone does not guarantee supply chain performance. Logistics system responsiveness needs to be embarked upon in addition to other sub – system activities in order to maintain supply chain optimization.

In response to the scanty empirical evidence on supply chain responsiveness constructs, studies in the last decades have attempted to conceptualize supply chain responsiveness into sub constructs and empirically investigated the effects of the individual sub construct on performance. Thatte et al. (2013) conceptualized three dimensions of supply chain responsiveness and developed an instrument for measuring each constructs of SCR. Again, Sukati et al. (2011) drew inspiration from Thatte et al. (2009) and evaluated the relationship between supply chain management practices namely strategic supplier partnership, customer relationship and information sharing and supply chain responsiveness and it’s sub constructs; operation system responsiveness, logistics process responsiveness, supply network responsiveness as well as competitive advantage variables including price, quality, delivery dependability, time to market, and product innovation.

Thatte & Agrawal (2017) studied two dimension of supply chain responsiveness; operation system responsiveness and supply network responsiveness and found out that Operation System responsiveness and Supply network responsiveness have positive impact on operational performance. Thatte et al. (2013) specifically analyze the relationships between supply chain responsiveness and operation performance, supply chain management practice and supply chain responsiveness as well as supply chain responsiveness and operational performance. Ibrahim & Babiker (2020) extended the contribution of Thatte & Agrawal (2017) and Thatte et al. (2013) on supply chain responsiveness and operational performance. They (Ibrahim & Babiker, 2020) were among the pioneer researchers in studying the inter relationship among
the dimensions of supply chain responsiveness. Ibrahim & Babiker (2020) contributed uniquely by assessing the inter relationship between operation system responsiveness and supply network responsiveness.

However, Ibrahim and Babiker (2020) studied two major dimensions of supply chain responsiveness; supply network responsive and operation system responsiveness as the independent constructs and their impact on operational performance in terms of cost and service performance. The study showed that a strong inter relationships and interactions among the two components of supply chain responsiveness. Both supply network responsive and operation system responsiveness had significant relationship with operational performance but there was medium relationship between supply chain responsiveness and operational performance.

2.3.2 Supply Chain Responsiveness and Supply Chain Management

Earlier literature on supply chain management concepts measured supply chain responsiveness as supply chain performance variable. Sukati et al (2011) assessed the relationship between supply chain management practices, supply chain responsiveness and competitive advantages. Supply chain responsiveness was measured as a dependent variable in addition to competitive advantages. Sukati et al. (2011) discovered that supply chain management practices were key determinants on supply chain responsiveness comprising of all the three dimensions; operation system, logistics process and supply network. Information sharing showed a stronger relationship with supply chain responsiveness than customer relationship management and strategic supplier partnership. Hayat et al. (2012) also examine various factors affecting supply chain responsiveness. These factors included top level commitment to coordinate, mutual understanding among supply chain firms, organizational factors like structures, culture and training, flow of information, relationships and decision making had significant impact on supply chain responsiveness. Roh et al. (2013) identify the implications of pursing a responsive supply chain strategy in global complexity: focusing on manufacturing firms and conclude that responsive supply chain thrives well in strategic integration between the focal firm and its customers and suppliers. Kim et al. (2013) examine the effect of manufacturing flexibility and market flexibility on supply chain responsiveness and the moderating effect of business environment on the relationship between market flexibility and supply chain responsiveness.
Sukati et al (2012) analyze the relationship between supply chain integration, supply chain responsiveness and competitive advantages and found a positive relationship between supply chain integration and supply chain responsiveness; supply chain responsiveness and competitive advantages. Al – Hawajreh & Attiany (2014) assess the effect of supply chain responsiveness on competitive advantages and reveal that supply chain responsiveness significantly impacts on competitive advantage. The study further analyze the relationship between the three variables under supply chain responsiveness; operation system responsiveness, logistics process responsiveness, supply network responsiveness and competitive advantage. Operation system responsiveness in particular significantly impact on competitive advantage.

Several studies on responsiveness lacks strong theoretical justification (Sharma et al, 2020). Sharma et al. (2020) employed the resource-based view as the theoretical guide in exploring responsiveness as an internal dynamic capability of the firm to internalize the customer demands and choices. Squire et al. (2009) also based their study on the extended resource-based view theory. They argue that collaboration is a key determinant of external resource access or acquisition where it promotes in-depth communication and two-way interaction. Buyer firms are better able to identify complementary capabilities which help increase performance, while supplier firms are more likely to be open and committed to the relationship.

2.3.3 Supply Chain Responsiveness in Service Operation

Jaakelaineen et al (2013) research survey sought to understand the dimensions of service performance measurement. They theorized that service performance measurement could be conducted from two levels of examination; strategic management view point and operation management perspective. Strategic management views pay attention to organizational level of success related factors hovering around profitability and productivity. Popular strategic management metric is the balanced scored card perspectives. Service operations management metrics focus on the distinctive features of service; intangibility, heterogeneity, inseparability, perishability of the service delivery and consumption.

Service operations is embedded in every industrial sector (Jääskeläinen et al., 2013). Service performance measurement is regarded as important due to the increasing significance of service activities, but it is also regarded as a more complicated one
compared to the manufacturing context (Pawar et al., 2009). Service supply chains are more process centered (Drzymalski, 2012). Service performance can be evaluated from customers perspective as the degree of quality of customer service or measurement of the service operations from internal perspective. Service performance in this case represent an external perspective of firms. Yet perception of external customers is based on internal behaviour of employees (Ibrahim & Babiker, 2020). Service operation performance denotes the configurations of resources and processes that create and deliver service to the customer (Jääskeläinen et al., 2013). Um (2018) discloses that service supply chain performance measures either focus on input factors comprising of service capacity, service productivity, service delivery and profit or output performance representing the quantity and quality of the final service. This also reflects the customer service level. Output performance variables are categorized into service quality, service agility and service effectiveness.

Jääskeläinen et al. (2013) categorized service performance measurement into two organizational level of performance measurement and service operation level. Organisation level of examining service performance consider context-specific nature of an organization’s performance measurement such as firm size, industry and strategy. Service operation perspective stresses on marketing orientation which present the organization to the outside world. Service operation measurement considers customer being the output of operation perceive service delivery and how customer presence affects resources during service delivery. Service operation performance measurement combines the perspective of service provider on one hand and perspective of customer on the other hand. The service performance metrics are not limited to length of customer contact, criticality of service, degree of customer orientation. Famiyeh et al. (2018), Agnihotri et al. (2016) have stated that responsiveness is a significant ability in positioning the firms’ image in the minds of customers by renewing the services delivery. Almutawa et al. (2018), Meesala and Paul (2018) studies have focused their analysis about responsiveness by considering service quality. Responsiveness and service quality have been used in numerous studies as key service dimensions for measuring firm performance and customer satisfaction (Sharma et al., 2020).
2.4 Conceptual Framework of the Study

This section presents the conceptual framework of the current study based on concepts and theories reviewed in relevant literature related to the subject. The section is presented in three major parts; the first part gives introduction and description of the variables in the model; the second part presents the pictorial view of the model in the form of a diagram and the third part presents a brief discussion of the relationship between the variables in the model and the resultant hypothesis formed.

2.4.1 Description of Variables in the Model

Figure 2.1 shows the conceptual framework of the study. In the framework, supply chain responsiveness which refers to the ability of a supply chain to respond and adapt time-effectively based on the ability to read and understand actual market signals (Reichhart & Holweg, 2007) represents the independent variable of the study. There are three sub constructs under supply chain responsiveness namely; operation system responsiveness, logistics process responsiveness and supply network responsiveness. On the other hand, service performance dimensions consisting of service delivery time, queuing and waiting environment, speed of change management and customised services represents the dependent variable. The main variables are illustrated in rectangular blocks while sub constructs are illustrated in an oval within the rectangular boxes. Supply chain responsiveness and service performance which represents the main independent and dependent variables respectively were illustrated in a rectangular box. The three sub – constructs of the independent variable; operation system responsiveness, logistics process responsiveness and supply network responsiveness were illustrated in an oval within the supply chain responsiveness rectangle. Service performance as a dependent variable is measured in the dimension of delivery time, service waiting environment, speed of changes to service, and degree of service customerisation. The arrows and straight lines depict the relationship between the variables. Based on the framework, supply chain responsiveness has impact on service performance.
2.4.2 Supply Chain Responsiveness and Service Performance

Responsiveness brings to mind the ability of a firm to take action in response to changing customer needs in an effective and profitable manner (Squire & Cousins, 2009). Companies employ supply chain responsiveness strategy to meet customer needs and create value proposition through product variety and shortened lead times (Reichhart & Holweg, 2007). Jääskeläinen et al. (2013) reiterate that structuring the service delivery system and streamlining the ability to respond to demand require effective resource configuration and capacity management as proposed in the dynamic capacity theory. In a typical manufacturing system, responsiveness corresponds to the ability of the production system to achieve its operational goals in the presence of supplier, internal and customer disturbances (Reichhart & Holweg, 2007). Service is a process and customer is an evaluator (Jaakelainen et al., 2013). Service should be responsive in the sense that always service delivery will match customers' presence since there is no inventory in service provision (Um, 2018). Pereira (2009) argues that...
flexibility should reflect in higher services levels and low costs. Responsiveness is the fundamental key to enhance service performance and meet customer expectation in the globally competitive market (Sharma et al., 2020). Ibrahim & Babiker (2020) shows a strong relationship between supply chain responsiveness and service performance. However, Sharma (2020) hypothesized that responsiveness had significant influence on service performance and customer relationship management under the moderation of customer orientation. Squire et al. (2009) shows that flexibility in supply network enables the buyer organisation to respond to changes in its customer orders in terms of volume and mix without whilst maintain cost and quality levels. Um (2018) discloses that flexibility and responsiveness is a perquisite in service supply chain for both customized and standardized service. Both operation system responsiveness and supply network responsiveness have positive impact on service performance and operational cost (Ibrahim & Babiker, 2020). Ying (2010) used supply chain responsiveness to measure firms’ customer support capabilities and promptness in service delivery. Based on the discussion the following hypothesis were formed.

**H1:** Supply chain responsiveness has a positive and significant impact on service performance

**H1a:** Operation system responsiveness has a positive and significant impact on service performance

**H1b:** Logistics process has a positive and significant impact on service performance

**H1c:** Supply network responsiveness has a positive significant impact on service performance

### 2.4.3 Operation System Responsiveness and Logistics Process Responsiveness

In the views of Reichhart & Holweg (2007), the responsiveness of a manufacturing or supply chain system is defined by the speed with which the system can adjust its output within the available range of the four external flexibility types: product, mix, volume and delivery, in response to an external stimulus. Pereira (2009) comments that flexibility can be gained from products variety by offering a wide product, or product volume and emphasize that firm’s ability to react quickly to unexpected
demand or changes in supply affect supply chain performance. To effectively respond to customer requirement both operation system and the logistics system of the focal firm must be flexible enough. Reichhart & Holweg, (2007) argue that firm’s responsiveness will be visible to the customer when four key forms of flexibility exist in the firm’s operation and distribution chain; product, mix, volume and delivery flexibility. Product flexibility describes the ability to introduce new products or changes to existing products. Mix flexibility is the ability to alter the product mix within the existing product range that the system delivers. Volume flexibility refers to the ability to change the system’s aggregated output and delivery flexibility is the ability to alter agreed delivery agreements including shortening lead-times and to an extreme extent of changing the place of delivery or the actual destination of the product. In other times, delivery flexibility comes as the ability of the firm to make changes to the pre-determined delivery sequence. Without a responsive logistics processes operation system flexibility cannot consolidate much gain to the supply chain. Zhang et al. (2005) concede that logistics flexibility originates from the physical distribution responsiveness which externally focused on customer to the extent that there is internally driven customer value creation agenda value, competence and operation capabilities that support the logistics drive. Operations system responsiveness and logistics process responsiveness are reported as nearly the same concept. To Pereiro (2009) logistics responsiveness encompasses both inbound and outbound, shipments, and manufacturing support and flow of information, which coordinates these efforts at the same time Holweg (2005) infers that responsiveness is the manufacturing ability to adapt to customers’ requests. Manufacturing operation flexibility concepts seems to have given rise to logistics responsiveness and agility. Flexible manufacturing strategy creates avenue for improving supply chain that can respond to changing needs of the market (Kim et al., 2013). Therefore the following hypothesis is proposed.

H2: There is significant inter – relation between operation system responsiveness and logistics process responsiveness

2.4.4 Logistics process responsiveness and supply network responsiveness

Pereira (2009) recounts that the increasing degree of business uncertainty coupled with global dynamism drives companies that seek superior value proposition in delivering meeting customer requirement to integrate business of key trading partners
in more cooperation and information sharing efforts. An excellent customer side logistics process must be complemented with a supply side responsiveness both local and global for total supply chain goals to be achieved. Outbound logistics partners particularly, retailers have assumed powerful position on the value chain. Retailers are providing source of input that depict customers taste and preferences, product features, service quality and timing requirements. Achieving responsiveness requires advancing relationship with suppliers. Strategic alliances with suppliers create both agility and efficiency for the contracting firms (Gunasekaran et al., 2008). The internal responsiveness capability of the supplier should have a direct impact on the responsiveness of the buyer firm to their customers. Based on the argument above the following hypothesis is proposed

**H3: There is significant inter – relation between logistics process responsiveness and supply network responsiveness**

### 2.4.5 Operation System Responsiveness And Supply Network Responsiveness

Reichhart & Holweg (2007) argue that the level of responsiveness of a firm’s upstream trading partners affects its internal operations responsiveness. The level of responsiveness changes among the different actors in the supply chain. Its imperative for the focal firm to align its responsive objectives with upstream members for efficient and sustainable responsive system. For instance, adapting to short term operational changes depends on the responsive levels of immediate tiers at the supply side. Continuous cooperation and communication among supply nodes and warning capabilities with inherent actionable response along the chain undoubtedly safeguard the operation system against environmental disruption (Pereira, 2009). Internal capability of a firm depends on the capability of supply base (Squire et al., 2009). Smith et al. (2007) pointed out two forms of risk that needs to be tackle together as internal system risk arising from demand and supply mismatch and external risk arising from interaction among parties in a supply chain network. Using supply chain thinking as a basis for planning and integrating actors in networks has already been suggested as a solution to achieve responsiveness (Kaneberg et al., 2020). Squire et al. (2009) suggest that greater levels of collaboration enable a firm to have greater access to their suppliers’ capabilities, thus moderating the effect on performance. Ibrahim & Babiker (2020) found a significant inter – relationship between operation system
responsiveness and supply network responsiveness. Against this background, the following hypothesis is developed.

\textit{H4: There is significant inter – relation between operation system responsiveness and supply network responsiveness}
CHAPTER THREE
METHODOLOGY AND ORGANISATIONAL PROFILE

3.0 Introduction

The chapter presents the research methodology and organizational profile of the study. The chapter specifically covers ten sub sections. Section one presents the research design of the study. Section two presents the research methods applied during the conduct of the study. Section three and four presents the study population, sample size and sampling techniques respectively. Section five, six and seven reports on the sources of data, methods used in collecting data and data analysis method respectively. Section eight focuses on the research validity and reliability test whilst section nine highlights the ethical consideration of the study. The final section presents a profile of the study area.

3.1 Research Design

Research design is the framework within which a study is carried out. The research design of a study depicts the research plan that constitutes, methods of data collection, measurement and analysis (Akhtar, 2016). Lodico et al. (2010) stated that research designs suitable for quantitative approaches include descriptive survey research, correlational, experimental research, single-subject researched, causal-comparative research method. Correlational research is a type of quantitative research method within the positivism paradigm. This attempts to explain phenomena by collecting numerical data that are analysed using mathematically based methods. Correlation research also referred to as associational research is the study that investigate relationships among two or more variables without any attempt to influence them. There is no manipulation of variables in correlational research as in the case of experimental designs (Asamoah, 2014).

Descriptive research design focuses on providing a static picture about variables but correlational research is designed to discover relationships between variables and allow the prediction of future events from present knowledge. The study however used the explanatory approach to investigate the relationship between the constructs. Explanatory designs give account of why event or phenomenon looks, changes or varies in a research environment. Explanatory designs provide complete and comprehensive understanding of the research problem (Asad et al., 2018).
3.2 Research Methods

Research is categorized as quantitative or qualitative in nature. Quantitative research employs the use of numbers and accuracy, while qualitative research focuses on lived experiences and human perceptions (Polit & Beck, 2012). Quantitative research involves studies that make use of statistical analyses to obtain their findings. Qualitative research involves studies that do not attempt to quantify their results through statistical summary or analysis (Kaufman et al., 2005).

This study followed on the quantitative research approach through a questionnaire survey methodology in collecting and analysing data. Survey research according to Sukamolson (2007) encompasses the use of scientific sampling method with a designed questionnaire to measure a given population's characteristics through the utilisation of statistical methods.

Survey study is advantageous because large numbers of people can be studied in terms of behaviors, attitudes, and opinions. Some surveys merely describe what people say, think and do. Other survey studies attempt to find relationships between the characteristics of the respondents and their reported behaviours and opinions (Kaufman et al., 2005). This study was carried out to find relationship between two variables namely supply chain responsiveness and service performance. The survey was a form of quantitative research that was conducted through a questionnaire instrument.

3.3 Study Population

Polit and Hungler (1999) refer to research population as an aggregate or totality of all the objects, subjects or members that conform to a set of specifications. A population is an entire group about which some information is required to be ascertained (Banerjee & Chaudhury, 2010). A population is all the individuals or units of interest. According to Best & Kahn (2007), “a population is any group of individuals who have one or more characteristics in common that are of interest to the researcher. The population may be all the individuals of a particular type or a more restricted part of that group.

The population of the study comprises all manufacturing and processing firms that are located within the Ashanti Region. This includes firms in the manufacturing
industry covering electronics manufacturing, car manufacturing, electric car manufacturing, automotive manufacturing, light manufacturing, aluminum smelting, food processing, cement, and small commercial ship building.

3.4 Sample Size and Sampling Techniques

A sample is any part of the fully defined population (Banerjee & Chaudhury, 2010). A sample is a subset of the individuals in a population. Population is all individuals of interest to the researcher but due to numerical constraints, researchers typically study a subset of the population, and that subset is called a sample. Because researchers may not be able to study the entire population of interest, it is important that the sample be representative of the population from which it was selected (Kaufman et al., 2005). To make accurate inferences, the sample has to be representative. A representative sample is one in which each and every member of the population has an equal and mutually exclusive chance of being selected. A sample of one hundred and ten (110) firms was used for the study.

Sampling techniques are categorised into random and non-random techniques. Probability sampling or random sampling techniques are those sampling methods in which every element of the group has an equal chance of selection. These methods exhibit the greatest freedom from bias but may represent the most costly sample in terms of time and energy (Taherdoost, 2016). This study employed a purposive sampling technique. Purposive or judgmental sampling is a strategy in which particular settings, persons or events are selected deliberately in order to provide important information that cannot be obtained from other choices. Under purposive sampling participants are included in the sample based on certain characteristics that justify their inclusion (Taherdoost, 2016).

Purposive sampling technique which is a non-probability sampling technique was adopted in choosing individual respondents among the sample of the population to be surveyed. Purposive sampling is believed to increase the likelihood of obtaining information from a particular group of people with the requisite knowledge on the matter being studied. Only manufacturing firms were sampled and top management or supply chain practitioners were included in the study. The rationale being that the pre-defined group which are limited to key staff whose duties or roles in the organization are directly associated with supply chain management practices possess
in-depth knowledge and practical experience in the area of study. Experts in procurement, transport, warehouse, depot, distribution, sales, marketing accounts, operation departments were included in the sample. These people were selected because they have had considerable experience and knowledge in the subject matter within the manufacturing sector in Ashanti Region.

3.5 Types and Sources of Data

Data is facts or figures from which conclusions can be drawn. Data as a general concept refers to the fact that some existing information or knowledge is represented or coded in some form suitable for better usage or processing. Data is collected and analyzed; data only becomes information suitable for making decision in some fashion (Ajayi, 2017). Gathering data can be accomplished through a primary source when the researcher is the first person to obtain the data or a secondary source when the researcher obtains the data that has already been collected by other sources, such as data disseminated in a scientific journal (Mesly, 2015).

Primary data is one which is collected for the first time by the researcher while secondary data is the data already collected or produced by others. Primary data sources include surveys, observations, experiments, questionnaire, personal interview etc. Secondary data collection on the other hand, are government publications, websites, books, journal articles, internal records etc. (Ajayi, 2017). Primary data were utilized for the conduct of the research. Primary data were collected from the field survey by means of questionnaire survey. This data provided the empirical data for the analysis of the results.

3.6 Data Collection Method

Data collection is “the process of gathering and measuring information on variables of interest, in an established systematic fashion that enables one to answer stated research questions, test hypothesis, and evaluate outcomes” (Kabir, 2016). The study employed a survey method for the collection of primary data. Two types of survey designs including cross-sectional and longitudinal surveys can be employed for a study. This study was a cross sectional survey which is a one-time survey using questionnaire survey instrument. One hundred and ten (110) copies of questionnaires were administered among respondents from the manufacturing industry.
The questionnaires were self-administered by respondents as respondents included the top management, and practitioners in the supply chain management field. The questionnaires organized into three major parts; part one demanded respondents background information, part two addressed components of supply chain responsiveness and part three addressed service performance variables. Both the independent and dependent variables were gauged on a seven-point Likert scale ranging from 1 which represents strongly disagree to 7 which represents strongly agree. A seven–point Likert scale is more sensitive and robust in reducing possibility of errors (Sauro and Dumas, 2009)

3.7 Data Analysis

Ader (2008) defines data analysis as “the process of editing, cleaning, transformation, and modelling data with the goal of highlighting useful information, suggestion, conclusions, and supporting decision making”. Data analysis covers the process of turning data into meaningful information for decision making. The data collected through the questionnaire survey was first scrutinized and then coded before the actual analysis. The results of the analysis were presented using both descriptive analysis and inferential statistics. Inferential statistics help us to draw conclusions beyond our immediate samples and data (Kaufman, 2005). Uzunboylu and Asiksoy (2014) argue that descriptive statistics have been relied upon as the most efficient means of communicating research outcomes. In their views “descriptive analysis methods are the most commonly used data analysis techniques, yet various other techniques are also frequently used by various researchers. The examples of such analysis techniques are t-test, ANOVA, ANCOVA, correlation, regression, factor analysis, and nonparametric test. In this study, the demographic data of respondents were presented using descriptive statistics whilst the analysis of the relationship among the study variables were performed using inferential statistics”.

Correlation and regression analysis were the main inferential statistics adopted for the analysis of data. Statistical Package for Social Sciences (SPSS) and Microsoft Excel application were the main tools for the data analysis and presentation. Statistical Package for Social Sciences (SPSS) and Microsoft Excel applications were used to perform the correlation and regression analysis to determine the significant relationship among the study variables.
3.8 Validity and Reliability Test

Reliability refers to “the consistency or dependability of a measurement technique, and it is concerned with the consistency or stability of the score obtained from a measure or assessment over time and across settings or conditions” (Kaufman, 2005). To test the consistency or internal reliability different test can be performed including test – retest, split half reliability and alternative form reliability. Interrater reliability is another form of assessing consistency in a dataset that measures the degree harmony in the response. Interrater reliability test ascertains the level of agreement between different participants in terms of their opinion on a subject. (Kaufman et al., 2005).

Validity refers to “the conceptual and scientific soundness of a research study or investigation, and the primary purpose of all forms of research is to produce valid conclusions” (Kaufman et al., 2005) The concept of validity answers the question as to whether or not the research tools can effectively obtain the required information needed on the subject matter (Kaufman et al., 2005).

Validity can be assessed from internal and external perspective. Internal validity refers “to the ability of a research design to rule out or make implausible alternative explanations of the results, or plausible rival hypotheses whereas external validity refers to the generalizability of the results of a research study”. Construct validity refers to “the basis of the causal relationship and is concerned with the congruence between the study’s results and the theoretical underpinnings guiding the research”. Statistical validity concerns with the impact of quantitative assessment of the data that can influence the truthfulness of the findings of the study. External validity measures the extent to which findings of a study can be applied to a similar group of respondents under different study area and period (Mitchell & Holley, 2010). In this study, an internal consistency test was conducted and Cronbach alpha values were computed for each construct in order to determine the degree of precision or reliability of the study findings.

3.9 Ethical Consideration

Ethics involve learning what is right and wrong and doing what is right thing (Prabhakar, 2011). According to Fleming (2018) ethical research should be conducted based on three vital principles: informed consent, anonymous and confidentiality and conflict of interest. The most commonly infringed upon of ethical issue is informed
consent (Denzin & Lincoln, 2011). Informed consent is rooted in two distinct concepts, fundamental in research and ethical issues; informed and consent. Ethically, it was required that respondents were made aware of their participation in the survey. Respondents had the rights to permit access to their information and the right to withdraw from the survey at any point. This study clearly explained in advance to respondents who the researcher was, what the study sought to achieve, the information needed from them and how the data would be analyzed and presented. Only respondents who were willing and ready to participate in the survey were eventually included after their consent had been completely sought.

Also, ethical research demands that respondent’s information is kept anonymous and confidential. Participant anonymity means “the participant’s identity was unknown to the researcher. Participant confidentiality means the participant’s identity were known to the researcher but the data was de-identified and the identity is kept confidential” (Fleming, 2018).

The study through the design of questionnaire and the presentation of results provided the highest assurance of anonymity and confidentiality. The assurance of anonymity and confidentiality was enhanced as no question in the questionnaire intended to collect personal and identification information. The research questionnaire avoided self-identifying statements and information.

Researchers previous association and interaction can create a conflict of interest situation (Fleming, 2018). However, the researcher had no such relationship so ever to create conflict of interest situation. Meanwhile, the study appropriately cited all sources from which ideas, information and other forms of data were accessed to prevent plagiarism.

**3.10 Profile of Study Area**

Ashanti Region is one of the regions in the middle zone of the country. It is situated within longitudes 0.15W and 2.25W and latitudes 5.50N and 7.46N. The region alone have total land area of 24,389 square kilometre which represents about 10.2% of the country’s land area. The region is one of the busiest Regions in Ghana with Kumasi as the administrative capital or capital town. Ashanti region is surrounded by four neighbouring regions. Brong Ahafo Region is bordered to Ashanti Region in the
northern direction, Eastern Region to the east, Central Region to the South and Western Region to the South West.

Demographically, the region is the second largest in terms of population. The region has a population of 4,780,380 representing 19.47% of Ghana’s total population. Currently there are forty – three districts assemblies within the Ashanti Region, where rural communities dominate. Majority of the districts comprise of greater portions of rural dwellers. Agriculture is the leading economic activities with cocoa farming and mining activities being the most leading economic activities (GSS, 2010). Wholesale and retail trade, manufacturing, personal services, water, transport, storage and communication activities are the predominant economic activities in order of engagement. Approximately, 30.5% of the active labour force in the region are employed under agricultural activities except fishing which is widely practised in the region. About 25.4% are employed by the wholesale and retail of goods whilst 10.5%, 6.1% respectively engaged in manufacturing and hospitality services (GSS, 2010).

The social administration of the Asante communities has been a traditional and customary practices presided by chiefs and elders. In every Asante locality, there is some designated authority who exercise rulership over the residents. The Asantehene remains the only king over the entire Asante Kingdom with other chiefs being his divisional chiefs and elders. The Asante chieftancy is practised matrilinear system and kings are enthroned from their mother’s linage. The people of Asante speaks a major Akan language called Asante Twi. Asante region inhabits about 30.5% of Akans. However, the region is made up of people from different ethnic background. Approximately, 74.3% of the populace are Akans, 11.3% are Mole-Dagbani, Ewe (3.8%) and Gurma (2.8%).
Figure 3.1 A Map of Ashanti Region

Source: Ghana Statistical Service, 2010
CHAPTER FOUR
DATA PRESENTATION, ANALYSIS AND DISCUSSION

4.0 Introduction

This chapter presents the results of the study and discussion of the findings. The Chapter is organized into seven (7) main sections. Section one presents the demographic characteristics of respondents and section two presents the results of reliability and data validity test. Section three presents the descriptive statistics of the study variables. Section four and five present the correlation and regression analysis. The next section presents the hypothesis table whilst the final section covers the discussion of key findings.

4.1 Demographic Characteristics of Respondents

This section presents the description statistics of the items measured. It covers the mean response, standard deviation, minimum and maximum values of each item under the study variables. The mean scores were used to describe the central position of the response or opinion of respondents on the study variables whilst the standard deviation was used to describe how the responses were spread out away from the mean. The minimum and maximum values were used to describe the range of responses for each item. To determine the extent to which respondents agree to the various statements measuring the study variables, respondents were asked to range their responses on a scale from 1 to 7 where 1 represents strongly disagree and 7 represent strongly agree.
<table>
<thead>
<tr>
<th>VARIABLE</th>
<th>FREQUENCY (N)</th>
<th>PERCENTAGE (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Gender</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Male</td>
<td>64</td>
<td>58.2</td>
</tr>
<tr>
<td>Female</td>
<td>46</td>
<td>41.8</td>
</tr>
<tr>
<td><strong>Age</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>18 – 30 years</td>
<td>49</td>
<td>44.5</td>
</tr>
<tr>
<td>30 – 50 years</td>
<td>59</td>
<td>53.6</td>
</tr>
<tr>
<td>Above 50 years</td>
<td>2</td>
<td>1.8</td>
</tr>
<tr>
<td><strong>Education</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Senior High</td>
<td>4</td>
<td>3.7</td>
</tr>
<tr>
<td>HND</td>
<td>11</td>
<td>10.1</td>
</tr>
<tr>
<td>Degree</td>
<td>56</td>
<td>51.4</td>
</tr>
<tr>
<td>Masters</td>
<td>38</td>
<td>34.9</td>
</tr>
<tr>
<td><strong>Industry</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Food And Beverages</td>
<td>16</td>
<td>14.6</td>
</tr>
<tr>
<td>Agro processing</td>
<td>18</td>
<td>16.4</td>
</tr>
<tr>
<td>Health And Pharmaceuticals</td>
<td>23</td>
<td>20.9</td>
</tr>
<tr>
<td>Water And Bottling</td>
<td>16</td>
<td>14.5</td>
</tr>
<tr>
<td>General Merchandise</td>
<td>16</td>
<td>14.5</td>
</tr>
<tr>
<td>Others</td>
<td>21</td>
<td>19.1</td>
</tr>
<tr>
<td><strong>Job Position</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>CEO</td>
<td>27</td>
<td>24.5</td>
</tr>
<tr>
<td>Supply /Procurement Officer</td>
<td>33</td>
<td>30</td>
</tr>
<tr>
<td>General Manager</td>
<td>26</td>
<td>23.6</td>
</tr>
<tr>
<td>Transport Manager</td>
<td>8</td>
<td>7.3</td>
</tr>
<tr>
<td>Operations Manager</td>
<td>8</td>
<td>7.3</td>
</tr>
<tr>
<td>Finance/Accounts Officer</td>
<td>8</td>
<td>7.3</td>
</tr>
<tr>
<td><strong>Department</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Administration</td>
<td>40</td>
<td>36.4</td>
</tr>
<tr>
<td>Procurement And Supply</td>
<td>13</td>
<td>11.8</td>
</tr>
<tr>
<td>Logistics And Transport</td>
<td>22</td>
<td>20</td>
</tr>
<tr>
<td>Accounts/Finance</td>
<td>16</td>
<td>14.5</td>
</tr>
<tr>
<td>Operations</td>
<td>19</td>
<td>17.3</td>
</tr>
<tr>
<td><strong>Experience</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Below 5 Years</td>
<td>36</td>
<td>32.7</td>
</tr>
<tr>
<td>5-15 Years</td>
<td>66</td>
<td>60.0</td>
</tr>
<tr>
<td>Above 15 Years</td>
<td>8</td>
<td>7.3</td>
</tr>
</tbody>
</table>

Source: Field Survey (2021)

Table 4.1 illustrates the demographic characteristics of respondents presented in both frequency and percentage of responses. Out of 110 respondents, 64 representing 58.2% were male and 46 representing 41.8% were female. The ratio of male to female representations in the survey were fairly apportioned. The table indicates that 49 of the total respondents representing 44.5% were aged between 18 and 30 years, 59
participants representing 53.6% were between the ages of 30 and 50 years while only two respondents representing 1.8% were above 50 years old. The results suggest that respondents fall within the appropriate age bracket suitable for participating in this survey. Also, information on respondent’s educational background were solicited and the shows that only 4 respondents had only completed Senior High School with WASSCE as the highest educational qualification. This indicates that 3.7% of respondents were yet to attain a tertiary educational qualification. Meanwhile, 11 respondents accounting for about 10.1% had an HND, 56 respondents accounting for 51.4% had obtained their first degree and the remaining 38 respondents accounting for 34.9% had obtained their masters degree. Respondents’ educational qualification evidently justifies their ability to comprehend the concepts and requirement of the study and therefore response appropriately to the questions.

Again, respondents were asked to indicate the industry within which their organizations operate. Table 4.1 indicates that 16 respondents each which represents 14.5% of the total responses works in the food and beverages, water and bottling and general merchandise industries respectively. Within the agroprocessing industry, 18 respondents were surveyed which represents 16.4% and 23 which respondents 20.9% work in the health and pharmaceuticals sector. The remaining 21 respondents representing 19.1% work in other industries comprising of petroleum and construction industries respectively (7 respondents representing 6.3%) each and electronics (6 respondents representing 5.4%).

The respondents moreover indicated their job roles in their respective companies ant it was revealed that 27 respondents which accounts for approximately 24.5% of the total respondents were Chief Executive Officers (CEOs) and Managing Directors of their firms, 26 general managers representing 23.6%, 33 were supply or procurement officers representing 30%. Each of transport officers, operation managers and finance or account officers were 8 respondents respectively representing 7.3% each. These respondents work in the following departments; administration 40 respondents representing 36.4%, procurement and supply 13 which is 11.8%, logistics and transport 22 respondents representing 20%, operations had 19 respondents representing 17.3% and accounts or finance department were 16 respondents representing 14.5% of the total research participants. In terms of respondents’ work experience, the study indicates that 36 (32.6%) respondents had work in their current
job position for less than five years. Almost 66 respondents have worked between 5 to 15 years in their current position and only 8 (7.3%) had work for more than 15 years in their current job positions. Respondents occupy key roles in their respective firms and likely to possess the work-related experience in the subject matter of this survey.

4.2 Statistical Tests

To test for internal reliability and data validity, a Cronbach alpha was determined for the various study constructs. Generally, a Cronbach alpha of one indicates a perfect reliability. A Cronbach alpha above 0.7 is accepted as highly reliable whilst Cronbach alpha below 0.7 indicates weak data validity and questionable reliability. In cases of lower Cronbach alpha values, some items measuring the constructs need to be deleted to further check for the reliability level.

<table>
<thead>
<tr>
<th>Construct</th>
<th>No. of items</th>
<th>Cronbach’s Alpha</th>
</tr>
</thead>
<tbody>
<tr>
<td>Operation System Responsiveness</td>
<td>7</td>
<td>0.956</td>
</tr>
<tr>
<td>Logistics Process Responsiveness</td>
<td>5</td>
<td>0.951</td>
</tr>
<tr>
<td>Supply Network Responsiveness</td>
<td>6</td>
<td>0.953</td>
</tr>
<tr>
<td>Service Performance</td>
<td>11</td>
<td>0.871</td>
</tr>
</tbody>
</table>

Source: Field Survey (2021)

Table 4.2 shows the results of the test of internal reliability of the study’s constructs based on the Cronbach alpha scores. The results indicate that operation system responsiveness which was measured using 7 items had a Cronbach alpha value of 0.956. This suggests a high degree of inter item reliability of the operation system responsiveness sub-construct. Likewise, logistics process responsiveness sub-construct measured with 5 items had a Cronbach alpha value of 0.951. A Cronbach alpha value close to 1 indicates a perfect internal reliability of the logistics process responsiveness construct. Moreover, supply network responsiveness was measured with 6 items and obtained a Cronbach alpha score of 0.953 which is very close to 1. The Cronbach alpha value suggest a perfect internal reliability for supply network responsiveness. Lastly, service performance was measured on 11 items but obtained a Cronbach alpha of 0.871 suggesting a higher reliability level for service performance construct. The results show that the Cronbach alpha values for all the sub-constructs under supply chain responsiveness were very close to 1 indicating a perfect internal reliability and validity of supply chain responsiveness constructs. Similarly, service performance construct exhibited an acceptable degree of internal reliability and data
validity greater than the standard alpha value of 0.7. Hence, the predictions of the study will be valid in other situations and the methods of measurement especially the variables will yield a similar result if carried out in a different environment.

4.3 Descriptive Statistics of Study Variables

This section presents the descriptive statistics of the study variables; supply chain responsiveness and service performance. The descriptive statistics comprising of the mean, standard deviations, minimum and maximum values were used to describe the level of agreement in respondents’ opinions. The study asked respondents to express their opinion on various statements measuring the study variables. These responses from the respondents were rated on a seven-point Likert scale where 1 represents strongly disagree and 7 represents strongly agree. Based on the Likert scale, mean values lower than 1.5 indicates that strongly disagreement, mean range of 1.50 to 2.49 indicates disagreement to the statements and mean range from 2.50 to 3.49 indicates that respondents somewhat disagree. Mean values ranging from 3.50 to 4.49 suggest neutral opinion from respondents. Mean values ranging from 4.50 to 5.49 also suggest somewhat agree and mean values ranging from 5.50 to 6.49 indicate that respondents agree to the statement whilst mean values above 6.5 indicates strong agreement.
4.3.1 Supply chain responsiveness

Table 4.3 Supply Chain Responsiveness

<table>
<thead>
<tr>
<th>Dimensions</th>
<th>Min</th>
<th>Max</th>
<th>Mean</th>
<th>Std. Deviation</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Operations System Responsiveness</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Our operations system responds rapidly to changes in product volume demanded by customers</td>
<td>1</td>
<td>7</td>
<td>5.02</td>
<td>0.07</td>
</tr>
<tr>
<td>Our operations system responds rapidly to changes in product mix demanded by customers</td>
<td>1</td>
<td>7</td>
<td>5.06</td>
<td>1.42</td>
</tr>
<tr>
<td>Our operations system effectively expedites emergency customer orders</td>
<td>1</td>
<td>7</td>
<td>5.10</td>
<td>1.47</td>
</tr>
<tr>
<td>Our operations system rapidly reconfigures equipment to address demand changes</td>
<td>1</td>
<td>7</td>
<td>5.01</td>
<td>1.49</td>
</tr>
<tr>
<td>Our operations system rapidly reallocates people to address demand changes</td>
<td>1</td>
<td>7</td>
<td>5.04</td>
<td>1.50</td>
</tr>
<tr>
<td>Our operations system rapidly changes processes to address demand changes</td>
<td>1</td>
<td>7</td>
<td>4.98</td>
<td>1.35</td>
</tr>
<tr>
<td>Our operations system rapidly adjusts capacity to address demand changes</td>
<td>1</td>
<td>7</td>
<td>4.96</td>
<td>1.58</td>
</tr>
<tr>
<td><strong>Logistics Process Responsiveness</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Our logistics system responds rapidly to unexpected demand change</td>
<td>1</td>
<td>7</td>
<td>4.95</td>
<td>0.15</td>
</tr>
<tr>
<td>Our logistics system rapidly adjusts warehouse capacity to address demand changes</td>
<td>1</td>
<td>7</td>
<td>5.08</td>
<td>1.40</td>
</tr>
<tr>
<td>Our logistics system rapidly varies transportation carriers to address demand changes</td>
<td>1</td>
<td>7</td>
<td>4.94</td>
<td>1.46</td>
</tr>
<tr>
<td>Our logistics system rapidly accommodates special or non-routine customer requests</td>
<td>1</td>
<td>7</td>
<td>4.84</td>
<td>1.61</td>
</tr>
<tr>
<td>Our logistics system effectively delivers expedited shipment</td>
<td>1</td>
<td>7</td>
<td>4.76</td>
<td>1.56</td>
</tr>
<tr>
<td><strong>Supplier Network Responsiveness</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Our major suppliers change product volume in a relatively short time</td>
<td>1</td>
<td>7</td>
<td>5.24</td>
<td>1.26</td>
</tr>
<tr>
<td>Our major suppliers change product mix in a relatively short time</td>
<td>1</td>
<td>7</td>
<td>5.27</td>
<td>1.24</td>
</tr>
<tr>
<td>Our major suppliers consistently accommodate our requests</td>
<td>1</td>
<td>7</td>
<td>5.29</td>
<td>1.24</td>
</tr>
<tr>
<td>Our major suppliers provide quick inbound logistics to us</td>
<td>1</td>
<td>7</td>
<td>5.24</td>
<td>1.31</td>
</tr>
<tr>
<td>Our major suppliers have outstanding on-time delivery record with us</td>
<td>1</td>
<td>7</td>
<td>5.23</td>
<td>1.28</td>
</tr>
<tr>
<td>Our major suppliers effectively expedite our emergency orders</td>
<td>1</td>
<td>7</td>
<td>5.15</td>
<td>1.45</td>
</tr>
<tr>
<td><strong>Overall</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Source: Field Survey (2021)</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

In table 4.3, all the statement or items measuring operation system responsiveness had a mean value within the range of 4.96 and 5.10. The mean values imply that respondents somehow agree that there is operation system responsiveness in their focal firm. The standard deviation values were all greater than 1 which suggest that
the responses were farther dispersed from the mean value. The overall mean value for operation system responsiveness sub construct was 5.02 with a corresponding standard deviation value of 0.07. The mean value suggests that respondents somehow agree to the statements that their firms have operation system responsiveness. The standard deviation value lower than 1 imply that the responses were closely concentrated around the mean. Also, all the mean values for items that measure logistics process responsiveness were within the ranges of 4.76 and 5.12 which suggest that respondents somehow agree to the statements. The corresponding standard deviation values were all greater than 1 which implies that the individual responses were widely dispersed from the mean. The responses were range from 1 to 7. The overall mean value for logistics process responsiveness was 4.95 with a corresponding standard deviation value of 0.15. The mean indicates that respondents somehow agree that there is logistics process responsiveness in their firms and the items were close to the mean since the standard deviation value was lower than 1. Supply chain responsiveness as a whole obtained an overall mean value of 5.07 with a corresponding standard deviation value of 0.15 which suggests that respondents agree that there is supply chain responsiveness in their respective firms. And the standard deviation value implies that the items were closely concentrate around the mean.
### 4.3.2 Service Performance

<table>
<thead>
<tr>
<th>Dimension</th>
<th>Min</th>
<th>Max</th>
<th>Mean</th>
<th>Std. Deviation</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Service Delivery Performance</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>We fulfil customer/client needs within a shorter time</td>
<td>1</td>
<td>7</td>
<td>3.78</td>
<td>0.03</td>
</tr>
<tr>
<td>We have improved the speed of service by eliminating waste and non – value adding activities</td>
<td>1</td>
<td>7</td>
<td>3.59</td>
<td>1.69</td>
</tr>
<tr>
<td>We have shorter throughput time (the time between when a particular client service begins and the time service ends)</td>
<td>1</td>
<td>6</td>
<td>4.15</td>
<td>1.75</td>
</tr>
<tr>
<td><strong>Waiting Time Satisfaction</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>We have a satisfactory waiting time</td>
<td>1</td>
<td>7</td>
<td>4.25</td>
<td>0.02</td>
</tr>
<tr>
<td>We have a satisfactory waiting environment</td>
<td>1</td>
<td>7</td>
<td>4.06</td>
<td>1.57</td>
</tr>
<tr>
<td>We have reduced the frequency of queues during service delivery</td>
<td>1</td>
<td>7</td>
<td>4.26</td>
<td>1.57</td>
</tr>
<tr>
<td><strong>Speed of Responding to Change</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>We provide adequate information to clients when there is change</td>
<td>1</td>
<td>7</td>
<td>4.42</td>
<td>0.04</td>
</tr>
<tr>
<td>Our clients are satisfied with information provided in case of delay</td>
<td>1</td>
<td>7</td>
<td>4.38</td>
<td>1.58</td>
</tr>
<tr>
<td>We have the ability to make desirable changes to meet customer/client request</td>
<td>1</td>
<td>7</td>
<td>4.43</td>
<td>1.62</td>
</tr>
<tr>
<td><strong>Service Customization</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>We are able to provide customized service tailored to meet specific needs of clients</td>
<td>1</td>
<td>7</td>
<td>4.54</td>
<td>0.16</td>
</tr>
<tr>
<td>We can easily alter our service process to meet special needs of clients</td>
<td>1</td>
<td>7</td>
<td>4.66</td>
<td>1.63</td>
</tr>
<tr>
<td><strong>Overall</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>1</td>
<td>7</td>
<td>4.25</td>
<td>1.92</td>
</tr>
</tbody>
</table>

**Source: Field Survey (2021)**

Table 4.4 illustrates the mean and standard deviation values for the four service performance metrics (service delivery performance, waiting time satisfaction, speed of responding to change and service customization). Table 4.4 shows that responses for items 1 and 2 under service delivery performance ranges from 1 to 7. The mean values and corresponding standard deviations for items 1 and 2 were 3.59 (1.69) and 4.15 (1.69) respectively. The mean values suggests that respondents gave neutral opinions on items 1 and 2 which measure service delivery performance. The standard deviation values greater than 1 imply that the responses were dispersed farther from the mean. Response for item 3 ranges from 1 to 6. This suggests that no respondent strongly agree to the statement that there is shorter throughput time (the time between when a particular client service begins and the time service ends). The mean and standard deviation values for the statement were 3.62 and 1.75 suggesting that
respondents were uncertain about the statement and the responses were dispersed from the mean. In summary, respondents were uncertain about the statement that service delivery performance has improved. A mean value of 3.78 with corresponding standard deviation of 0.03 were obtained for service delivery performance variable.

The range of responses for waiting time satisfaction was 1 to 7 and the mean response for all the items we’re above 4 with corresponding standard deviation values greater than 1. The results indicate that respondents agree to the statements and the responses were dispersed from the mean. The overall mean value for waiting time satisfaction variable was 4.25 with a corresponding standard deviation of 0.02. This implies that respondents somehow agree that waiting time satisfaction has improved in their firms. Similarly, the range of responses for both speed of responding to change and service customization was 1 to 7. The mean values for all the items under the two service performance dimensions were above 4 suggesting general agreement to the statements. The standard deviation values were however greater than 1 which implies that the responses could be widely dispersed from the mean. The overall mean responses for the variables were above 4 indicating that respondents somehow agree that speed of responding to changes and customizing services have improved. The results reveals that respondents do not fully agree to the statements. Stated differently, respondents partially agree that service performance has improved in their firms.

4.4 Correlation Analysis

Correlation is the measure of association or relationship existing between two study variables usually based on the assumption of linear relationship. Correlation is the measure of both the strength and direction of association between two or more study variables. The strength of association determines the degree or extent of relationship between the variables whilst direction of association determines whether the relationship is positive or negative (Gogtay & Thatte, 2017). Correlation analysis centers on the value of the correlation coefficient represented as r. According to Gogtay & Thatte (2017), correlation coefficients represent an integer on a straight line ranging from -1 to +1 where negative coefficients indicates an inverse association or indirect relationship whereas positive coefficient indicates a positive or direct linear relationship. Correlation coefficient of 1 suggest a perfect linear association between the study variables. This implies that a coefficient of +1 indicates a direct perfect relationship while -1 indicates a perfect indirect relationship. Correlation Coefficient
of 0 indicates that no linear association exist between two variables. Therefore, correlation coefficient ranging from -1 to 0.5 indicate strong association in the negative linear manner, coefficients ranging from -0.6 to -0.9 and 0.9 to 0.4 indicates weak strength of association in their respective directions whilst coefficient of 0.5 and above indicate strong direct linear association.

Table 4.5 Correlation Analysis

<table>
<thead>
<tr>
<th></th>
<th>SCR</th>
<th>OSR</th>
<th>LPR</th>
<th>SNR</th>
<th>SP</th>
</tr>
</thead>
<tbody>
<tr>
<td>SCR</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Pearson Correlation</td>
<td>1</td>
<td>.935**</td>
<td>.910**</td>
<td>.938**</td>
<td>.578**</td>
</tr>
<tr>
<td>Sig. (2-tailed)</td>
<td>.000</td>
<td>.000</td>
<td>.000</td>
<td>.000</td>
<td>.000</td>
</tr>
<tr>
<td>N</td>
<td>110</td>
<td>110</td>
<td>110</td>
<td>110</td>
<td>110</td>
</tr>
<tr>
<td>OSR</td>
<td>.935**</td>
<td>1</td>
<td>.747**</td>
<td>.857**</td>
<td>.517**</td>
</tr>
<tr>
<td>Sig. (2-tailed)</td>
<td>.000</td>
<td>.000</td>
<td>.000</td>
<td>.000</td>
<td>.000</td>
</tr>
<tr>
<td>N</td>
<td>110</td>
<td>110</td>
<td>110</td>
<td>110</td>
<td>110</td>
</tr>
<tr>
<td>LPR</td>
<td>.910**</td>
<td>.747**</td>
<td>1</td>
<td>.770**</td>
<td>.515**</td>
</tr>
<tr>
<td>Sig. (2-tailed)</td>
<td>.000</td>
<td>.000</td>
<td>.000</td>
<td>.000</td>
<td>.000</td>
</tr>
<tr>
<td>N</td>
<td>110</td>
<td>110</td>
<td>110</td>
<td>110</td>
<td>110</td>
</tr>
<tr>
<td>SNR</td>
<td>.938**</td>
<td>.857**</td>
<td>.770**</td>
<td>1</td>
<td>.581**</td>
</tr>
<tr>
<td>Sig. (2-tailed)</td>
<td>.000</td>
<td>.000</td>
<td>.000</td>
<td>.000</td>
<td>.000</td>
</tr>
<tr>
<td>N</td>
<td>110</td>
<td>110</td>
<td>110</td>
<td>110</td>
<td>110</td>
</tr>
<tr>
<td>SP</td>
<td>.578**</td>
<td>.517**</td>
<td>.515**</td>
<td>.581**</td>
<td>1</td>
</tr>
<tr>
<td>Sig. (2-tailed)</td>
<td>.000</td>
<td>.000</td>
<td>.000</td>
<td>.000</td>
<td>.000</td>
</tr>
<tr>
<td>N</td>
<td>110</td>
<td>110</td>
<td>110</td>
<td>110</td>
<td>110</td>
</tr>
</tbody>
</table>

**. Correlation is significant at the 0.01 level (2-tailed).

Source: Field Survey (2021)

Table 4.5, the correlation analysis reveals that supply chain responsiveness (SCR) positively and significantly related with service performance (SP). The correlation coefficient (r) for the association between supply chain responsiveness and service performance was 0.578 and significant at p < 0.01. Also, operation system responsiveness (OSR) had positive significant relationship with service performance; r (109) = 0.517 and p < 0.01. Logistics process responsiveness (LPR) had positive and significant relationship with service performance. The results of the correlation test were; r (109) = 0.515 and p < 0.01. Besides, supply network responsiveness (SNR) was also positively and significantly correlated with service performance. The pearson correlation coefficient obtained was 0.581 significant at p < 0.01. The results
indicates that supply chain responsiveness and all the three sub constructs had positive and significant effect on service performance. This implies that any variation in values of supply chain responsiveness and it’s sub constructs will result in a significant variation in the values of service performance. This relationship is direct or positive in the sense that an increase in responsiveness will lead to a corresponding increase in service performance and a reduction in supply chain responsiveness will lead to reduction in service performance. The strength of the association between all the independent variables and service performance is determined to be strong.

4.5 Regression Analysis

This section presents the results of the regression analysis between the predictor variables and the dependent variable. The regression results further examine the level of prediction and the extent of variation in the dependent variable than can be explained by the independent predictor. The independent variable; supply chain responsiveness was regressed on the dependent variable and the regression results of the relationship between the sub constructs were also performed.

4.5.1 The Relationship Between Supply Chain Responsiveness and Service performance

Table 4.6 Model Summary

<table>
<thead>
<tr>
<th>Model</th>
<th>R</th>
<th>R Square</th>
<th>Adjusted R Square</th>
<th>Std. Error of the Estimate</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>.578&lt;sup&gt;a&lt;/sup&gt;</td>
<td>.334</td>
<td>.327</td>
<td>.89694</td>
</tr>
</tbody>
</table>

<sup>a</sup> Predictors: (Constant), SCR

Source: Field Survey (2021)

Table 4.6 presents the regression model summary of supply chain responsiveness and service performance. The r square value was 0.338. This indicates that about 33.8% of the variations in service performance can be linked to changes in operation system responsiveness.
Table 4.7 ANOVA

<table>
<thead>
<tr>
<th>Model</th>
<th>Sum of Squares</th>
<th>Df</th>
<th>Mean Square</th>
<th>F</th>
<th>Sig.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Regression</td>
<td>43.487</td>
<td>1</td>
<td>43.487</td>
<td>54.054</td>
<td>.000a</td>
</tr>
<tr>
<td>Residual</td>
<td>86.887</td>
<td>108</td>
<td>.805</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Total</td>
<td>130.373</td>
<td>109</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

a. Dependent Variable: SP
b. Predictors: (Constant), SCR

Source: Field Survey (2021)

The total sum of squares for service performance is 130.373. The sum of squares implies the variation in the dependent variable. The sum of squares for the regression model is 43.487, implying that 43.487 of the variations in service performance is caused by supply chain responsiveness. The regression model is also significant as p < 0.01.

Table 4.8 Coefficient of Variation

<table>
<thead>
<tr>
<th>Model</th>
<th>Unstandardized Coefficients</th>
<th>Standardized Coefficients</th>
<th>T</th>
<th>Sig.</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>B</td>
<td>Std. Error</td>
<td>Beta</td>
<td></td>
</tr>
<tr>
<td>1</td>
<td>(Constant)</td>
<td>1.524</td>
<td>.377</td>
<td>4.046</td>
</tr>
<tr>
<td>SCR</td>
<td>.533</td>
<td>.072</td>
<td>.578</td>
<td>7.352</td>
</tr>
</tbody>
</table>

a. Dependent Variable: SP

From table 4.8, B = 0.533 implying that when supply chain responsiveness is increased by 1-unit, service performance will also increase by 0.533. The relationship is also significant as p < 0.01.

4.5.2 The Relationship Between Operation System Responsiveness and Logistics Process Responsiveness

Table 4.9 Model Summary

<table>
<thead>
<tr>
<th>Model Summary</th>
<th>Model</th>
<th>R</th>
<th>R Square</th>
<th>Adjusted R Square</th>
<th>R Std. Error of the Estimate</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>1</td>
<td>.747a</td>
<td>.558</td>
<td>.554</td>
<td>.90617</td>
</tr>
</tbody>
</table>

a. Predictors: (Constant), OSR

Source: Field Survey (2021)

Table 4.9 shows the regression model summary of operation system responsiveness and logistics process responsiveness. The r square value of 0.558. This indicates that
about 55.8% of the variations in logistics process responsiveness can be attributed to changes in operation system responsiveness.

Table 4.10 Analysis of Variation (ANOVA)

<table>
<thead>
<tr>
<th>Model</th>
<th>Sum of Squares</th>
<th>Df</th>
<th>Mean Square</th>
<th>F</th>
<th>Sig.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Regression</td>
<td>112.011</td>
<td>1</td>
<td>112.011</td>
<td>136.409</td>
<td>.000a</td>
</tr>
<tr>
<td>Residual</td>
<td>88.683</td>
<td>108</td>
<td>.821</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Total</td>
<td>200.694</td>
<td>109</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

a. Dependent Variable: LPR
b. Predictors: (Constant), OSR

Source: Field Survey (2021)

The total sum of squares for logistics process responsiveness is 200.694. The sum of squares implies the variation in the dependent variable. The sum of squares for the regression model is 112.011, implying that 112.011 of the variations in logistics process responsiveness is caused by operation system responsiveness. The regression model is also significant as p < 0.01.

Table 4.11 Coefficient of Variation

<table>
<thead>
<tr>
<th>Coefficientsa</th>
<th>Unstandardized Coefficients</th>
<th>Standardized Coefficients</th>
<th>T</th>
<th>Sig.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Model</td>
<td>B</td>
<td>Std. Error</td>
<td>Beta</td>
<td></td>
</tr>
<tr>
<td>1</td>
<td>(Constant)</td>
<td>1.071</td>
<td>.343</td>
<td>3.124</td>
</tr>
<tr>
<td>OSR</td>
<td>.773</td>
<td>.066</td>
<td>.747</td>
<td>11.679</td>
</tr>
</tbody>
</table>

a. Dependent Variable: LPR

Source: Field Survey (2021)

From the table 4.11, \( B = 0.773 \) implying that when operation system responsiveness is increased by 1-unit, logistics process responsiveness will also increase by 0.773. The model is also significant as p < 0.01.

4.5.3 The Relationship between Operation System Responsiveness and Supply Network Responsiveness

Table 4.12 Model Summary

<table>
<thead>
<tr>
<th>Model Summary</th>
<th>Model</th>
<th>R</th>
<th>R Square</th>
<th>Adjusted R Square</th>
<th>Std. Error of the Estimate</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>1</td>
<td>.857a</td>
<td>.735</td>
<td>.733</td>
<td>.60432</td>
</tr>
</tbody>
</table>

a. Predictors: (Constant), OSR

Source: Field Survey (2021)
Table 4.12 shows the regression model summary of operation system responsiveness and supply network responsiveness. The r square value of 0.735. This indicates that about 73.5% of the variations in supply network responsiveness can be attributed to changes in operation system responsiveness.

Table 4.13 Analysis of Variation

<table>
<thead>
<tr>
<th>ANOVA*</th>
<th>Sum of Squares</th>
<th>Df</th>
<th>Mean Square</th>
<th>F</th>
<th>Sig.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Model</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>1</td>
<td>Regression</td>
<td>109.464</td>
<td>1</td>
<td>109.464</td>
<td>299.738</td>
</tr>
<tr>
<td></td>
<td>Residual</td>
<td>39.441</td>
<td>108</td>
<td>.365</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Total</td>
<td>148.905</td>
<td>109</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

a. Dependent Variable: SNR  
b. Predictors: (Constant), OSR  
Source: Field Survey (2021)

The total sum of squares for supply network responsiveness is 148.905. The sum of squares implies the variation in the dependent variable. The sum of squares for the regression model is 109.464, implying that 109.464 of the variations in supply network responsiveness is caused by operation system responsiveness. The regression model is also significant as p < 0.01.

Table 4.14 Coefficient of Variation

<table>
<thead>
<tr>
<th>Coefficients*</th>
<th>Unstandardized Coefficients</th>
<th>Standardized Coefficients</th>
</tr>
</thead>
<tbody>
<tr>
<td>Model</td>
<td>B</td>
<td>Std. Error</td>
</tr>
<tr>
<td>1</td>
<td>(Constant)</td>
<td>.1403</td>
</tr>
<tr>
<td></td>
<td>OSR</td>
<td>.764</td>
</tr>
</tbody>
</table>

From table 4.14, B = 0.764 implying that when operation system responsiveness is increased by 1-unit, supply network responsiveness will also increase by 0.764. The model is also significant as p < 0.01.

4.5.4 The Relationship Between Logistics Process Responsiveness and Supply Network Responsiveness

Table 4.15 Model Summary

<table>
<thead>
<tr>
<th>Model Summary</th>
<th>Model Summary</th>
<th>Std. Error of the Estimate</th>
</tr>
</thead>
<tbody>
<tr>
<td>Model</td>
<td>R</td>
<td>R Square</td>
</tr>
<tr>
<td>1</td>
<td>.770^a</td>
<td>.593</td>
</tr>
</tbody>
</table>

a. Predictors: (Constant), LPR
Table 4.15 above presents the regression model summary of logistics process responsiveness and supply network responsiveness. The r square value of 0.593. This indicates that about 59.3% of the variations in supply network responsiveness can be explained by changes in logistics process responsiveness.

<table>
<thead>
<tr>
<th>Model</th>
<th>Sum of Squares</th>
<th>Df</th>
<th>Mean Square</th>
<th>F</th>
<th>Sig.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Regression</td>
<td>88.354</td>
<td>1</td>
<td>88.354</td>
<td>157.590</td>
<td>.000</td>
</tr>
<tr>
<td>Residual</td>
<td>60.551</td>
<td>108</td>
<td>.561</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Total</td>
<td>148.905</td>
<td>109</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

a. Dependent Variable: SNR  
b. Predictors: (Constant), LPR  
Source: Field Survey (2021)

Table 4.16 shows that the total sum of squares for supply network responsiveness is 148.905. The sum of squares implies the variation in the dependent variable. The sum of squares for the regression model is 88.354, implying that 88.354 of the variations in supply network responsiveness is caused by logistics process responsiveness. The regression model is also significant as p < 0.01.

<table>
<thead>
<tr>
<th>Model</th>
<th>Unstandardized Coefficients</th>
<th>Standardized Coefficients</th>
<th>T</th>
<th>Sig.</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>B</td>
<td>Std. Error</td>
<td>Beta</td>
<td></td>
</tr>
<tr>
<td></td>
<td>(Constant)</td>
<td>1.952</td>
<td>.271</td>
<td></td>
</tr>
<tr>
<td>LPR</td>
<td>.664</td>
<td>.053</td>
<td>.770</td>
<td>12.553</td>
</tr>
</tbody>
</table>

a. Dependent Variable: SNR  
Source: Field Survey (2021)

From table 4.16, B = 0.664 implying that when logistics process responsiveness is increased by 1-unit, supply network responsiveness will also increase by 0.664. The model is also significant as p < 0.01.
4.6 Hypothesis Table

Table 4.17 Hypothesis Table

<table>
<thead>
<tr>
<th>Hypothesis</th>
<th>Relationship</th>
<th>R square</th>
<th>Remarks</th>
</tr>
</thead>
<tbody>
<tr>
<td>H1</td>
<td>Supply chain responsiveness has positive and significant relationship with service performance</td>
<td>0.334</td>
<td>Accepted</td>
</tr>
<tr>
<td>H1a</td>
<td>Operation system responsiveness has positive and significant relationship with service performance</td>
<td>0.267</td>
<td>Accepted</td>
</tr>
<tr>
<td>H1b</td>
<td>Logistics process responsiveness positive and significant relationship with service performance</td>
<td>0.265</td>
<td>Accepted</td>
</tr>
<tr>
<td>H1c</td>
<td>Supply network responsiveness positive and significant relationship with service performance</td>
<td>0.337</td>
<td>Accepted</td>
</tr>
<tr>
<td>H2</td>
<td>There is significant inter – relation between operation system responsiveness and logistics process responsiveness</td>
<td>0.558</td>
<td>Accepted</td>
</tr>
<tr>
<td>H3</td>
<td>There is significant inter - relation between operation system responsiveness and supply network responsiveness</td>
<td>0.735</td>
<td>Accepted</td>
</tr>
<tr>
<td>H4</td>
<td>There is significant inter – relation between logistics process responsiveness and supply network responsiveness</td>
<td>0.593</td>
<td>Accepted</td>
</tr>
</tbody>
</table>

**. Correlation is significant at the 0.01 level (2-tailed).

Table 4.16 shows that in all the relationships tested, there were positive significant relationship. Supply chain responsiveness had a positive significant effect on service performance and therefore the Hypothesis that supply chain responsiveness has positive and significant relationship with service performance was accepted. In addition, the second hypothesis that there is significant inter – relation between operation system responsiveness and logistics process responsiveness was accepted. Third and fourth hypotheses “There is significant inter - relation between operation system responsiveness and supply network responsiveness and There is significant inter – relation between logistics process responsiveness and supply network responsiveness” respectively were all accepted.
4.7 Discussion of Findings

4.7.1 Impact of Supply Chain Responsiveness on Service Performance

The results of the study indicate that pursuing supply chain responsiveness is very important in the manufacturing sector. All the forms of responsiveness were practised throughout the supply chain. The findings suggest that the firms were keenly interested in supply chain responsiveness activities at the various points in the value chain. Uyoga (2018) concluded that responsiveness is rare and worth pursuing by an organisation. Responsiveness must be among the priorities of any firm that wants to survive in the dynamic business environment.

This study is consistent with prior studies on the effect of supply chain responsiveness on organizational performance and competitive priorities. Numerous studies including the work of Al-Hawajreh & Attiany (2014); Thatte et al. (2013); Sukati et al. (2012); Hayat et al. (2012) and Thatte (2007) had found responsiveness at different nodes of the supply chain to influence competitive advantages, organisational performance and service performance. This study found significant direct relationship between supply chain responsiveness and service performance. This study supports the findings of the study by Ibrahim & Babiker (2020) which also found a significant relationship between supply chain responsiveness and service performance.

4.7.2 Impact of Operation System Responsiveness, Logistics Process Responsiveness and Supply Network Responsiveness on Service Performance

The study also revealed that there were positive and significant relationship between the three dimensions of responsiveness and service performance. Both the correlation and regression results indicate that operation system responsiveness positively related to service performance. Supply network responsiveness also positively and significantly related service performance. In addition, logistic process had positive relationship with service performance. Consistent with this study, Uyoga (2018) found out that customer side responsiveness positively and significantly related with service performance. Ibrahim & Babiker (2020) had earlier found similar relationship between operation system responsiveness and service performance in the health care service. They also found a significant relationship between logistics process and service performance.
4.7.3 The Inter Relationship Between Operation System Responsiveness, Logistics Process Responsiveness and Supply Network Responsiveness

The study found out that there was significant inter-relationship between supply network responsiveness and operation system responsiveness, operation system responsiveness and logistics process responsiveness, logistics process responsiveness, and supply network responsiveness. The relationship and interaction among the three sub variables; operation system, logistics process and supply network were positive. This result indicates that any variation in the variables of one dimension of supply chain responsiveness will directly influence the outcome of the other dimensions of supply chain responsiveness.

The findings of the current study conform to the finding of Ibrahim & Babiker (2020). The study of Ibrahim & Babiker (2020) equally showed that there were strong inter-relationships and interactions among the components of supply chain responsiveness. The authors investigated the relationship between operations system responsiveness and logistics system responsiveness and found significant relationship between them. This study was among the few studies that had attempted to examine the inter relations between the dimensions of supply chain responsiveness.

Though the empirical studies on the inter relationship between the various dimension of supply chain responsiveness is not pronounced yet the conceptual understanding in literature support the positive and significant relationship among the dimensions of responsiveness. Al Hawajreh & Attiany (2014) has pointed out that ensuring operation responsiveness at each node of the chain is an integral component of supply chain responsiveness. Similarly, Ibrahim & Babiker (2020) and Holweg & Pil (2001) believed that supplier networks are the essential building blocks of a flexible system and their flexibility is an important ingredient of being responsive to customers.
CHAPTER FIVE
SUMMARY OF FINDINGS, CONCLUSION AND RECOMMENDATIONS

5.0 Introduction

This chapter summarises the entire study by laying emphasis of on the key research findings, conclusion and recommendation from the study. The chapter also suggests areas for future research directions and draws attention to the theoretical and practical implications of the study.

5.1 Summary of Findings

This study was conducted to investigate the effects of supply chain responsiveness on service performance. The results of the survey that was carried out among supply chain practitioners from different industries in the manufacturing sector recorded higher level of intern item reliability. The study sought to assess three different but related relationships among the study variables namely supply chain responsiveness and service performance. In this section, summary of the key findings on the relationship between supply chain responsiveness and service performance; the effect of the sub-dimensions of supply chain responsiveness on service performance and the inter relationship among the sub dimension or components of supply chain responsiveness is presented.

5.1.1 The Impact of Supply Chain Responsiveness on Service Performance

The primary objective of the study was to assess the impact of supply chain responsiveness on service performance. The study discovered that supply chain responsiveness had positive and significant impact on service performance. The findings of the study shows that respondents agreed that their firms practice supply chain responsiveness. Supply chain responsiveness construct obtain a mean value of greater than 5 suggesting that respondents generally agree that there is supply chain responsiveness process in their firms. This was equally translated into the service performance outcome of their firms in terms of service delivery, waiting time reduction, speed of change in service and service customisation. The study found out a strong positive and significant relationship between supply chain responsiveness and service performance. It was revealed that about thirty four percent (34%) of changes
in service performance outcome can be attributed to changes in supply chain responsiveness process.

5.1.2 The Impact of Operation System, Logistics Process and Supply Network Responsiveness on Service Performance

The second objective of the study was to evaluate the effect of the three dimensions of supply chain responsiveness on service performance. Among the three components of supply chain responsiveness, Supply network responsiveness activities were the most widely practiced by respondent firms. Operation system responsiveness was the second ranked supply chain responsiveness dimension practice within the firms that was surveyed. Logistics process responsiveness was the last with least mean response. The firms were more concerned about achieving supply network responsiveness deals with making suppliers responsive to the focal firm. The findings of the study imply that, the firms first and foremost responsiveness priority is the supply networks which is usually controlled by external parties. It follows that supply chain responsiveness comes from supply network responsiveness.

Again, all the sub-components of supply chain responsiveness were positively and significantly related to service performance. Supply Network responsiveness had the strongest correlation with service performance among the three supply chain responsiveness sub-components. Supply network is the building block for responsiveness and achieving responsiveness in the firms supply network could greatly improve service performance. Operation system responsiveness was the next sub-construct in terms of degree of influence on service performance. Logistic process responsiveness exhibited the least influence on service performance.

5.1.3 The Inter Relationship among operation system responsiveness, logistics process responsiveness and supply network responsiveness

The final objective was to examine the relationship that exist among the three dimensions of supply chain responsiveness. Thus, the study assessed the inter-relationship between supply network responsiveness and operation system responsiveness, operation system responsiveness and logistics process responsiveness, logistics process responsiveness, and supply network responsiveness. The study revealed that there was a positive and significant relationship among the three sub-constructs. There were strong significant relationship among the three
sub-constructs. The significant relationship between supply network responsiveness and operation system responsiveness was the strongest whilst the relationship between logistics process responsiveness and supply network responsiveness was stronger than the relationship between operation system responsiveness and logistics process responsiveness. The findings of the study shows that supply network responsiveness highly contributes to the level of responsiveness in both operation system and logistics process. The extent to which firms achieve operation system responsiveness and logistics process responsiveness depends greatly on the level of responsiveness coming from the supply network. The responsiveness of the upstream partners including firm’s suppliers and supplier's suppliers affect the operations system and logistics process responsiveness.

5.2 Conclusion

In the dynamic business environment especially under changing market conditions, the focus on service performance outcome is essential for the survival and success of both manufacturing and service operations. Competitiveness is moving from organisations to supply chains and firms are practicing supply chain management in an attempt to achieve responsiveness. The study highlighted how responsiveness can be achieved at most important nodes of the supply chain being supply side, within the organisation’s business operations and downstream side. The study revealed that supply chain responsiveness is required to improve service performance outcomes. Supply chain responsiveness positively and significantly affects service performance and therefore ensuring a responsive supply chain will transform the level of its service performance outcome.

The study also found out that the all three dimensions of supply chain responsiveness individually had positive and significant influence on service performance. And again, there were significant direct inter - relationships among the three components of supply chain responsiveness (operation system responsiveness, logistics process and supply network responsiveness). Supply network responsiveness had the strongest positive and significant relationship with service performance and the other dimensions of supply chain responsiveness. The study discovered that achieving supply side responsiveness was linked to all forms of responsiveness including the overall supply chain responsiveness, operation system responsiveness and downstream responsiveness as well as service delivery responsiveness. The study
therefore concluded that supply network responsiveness had greater influence on end-to-end supply chain responsiveness which in turn significantly affect service performance.

5.3 Recommendations

Generally, the study found out that the logistic system of the firms studied were least adaptable to changes in the business environment. The study reveals that logistics process of majority of the firms had low rate of responding to external changes. There is the need for digitization of the logistics process of these firms. Advanced transport technologies that facilitate data capturing, processing and analysis in real time must be employed through the firms’ outbound operations. In vehicle technologies and en route applications should be applied to control outbound operations and enhance speed and flexibility of the logistics process in order to meet customers’ diverse demands.

Besides, the performance of one dimension of supply chain responsiveness is contingent on the other dimensions. Efficiency in the logistics process is dependent on the efficiency from the previous processes consisting of supply network responsiveness and the operation system performance. It is therefore recommended that supply chains design their logistics process in connection with their internal operation system as well as suppliers’ operations.

Logistics process responsiveness is the most visible service performance indicator in terms of customer perception of satisfaction. The study also recommended that firms must build strategic partnership with third party logistics providers as means to increase their logistics efficiency.

5.3.1 Implication to Practices

The study has revealed that supply chain responsiveness relates positively with service performance. It is thus recommended that focal firms that seek to improve service performance outcomes should make efforts to increase responsiveness of the supply chain. The study also revealed that all the three sub constructs of supply chain responsiveness positively influence service performance. The study recommends that firms which seek to achieve sustainable service performance improvement must not only invest resources in supply chain responsiveness but ensure appropriate
investment into responsiveness at each stage of the supply chain principally at the upstream, within the organization and at the downstream. The study suggests that focal firms in building supply side relationships must incorporate strategies to improve customer service performance into the relationship since supply network responsiveness significantly affects service performance.

Moreover, the study found out that there was inter relationship among supply network responsiveness, operation system responsiveness and logistics process responsiveness. The study therefore suggests that firms should ensure appropriate linkages between their upstream networks, internal operation systems and downstream channels. Responsiveness at any stage of the supply chain significantly affects the other components and therefore firms should make sure all the stages are connecting together in order to unleash the potential benefits of end-to-end supply chain responsiveness that can be visible to customers. Hence, integrating internal operation systems within the focal firm with upstream or key suppliers and downstream process especially key logistics partners is required.

In line with the finding that supply network responsiveness had the strongest significant relationship with operations system responsiveness and logistics process responsiveness, the study finally recommends a strategic partnership and alliance between focal firms and their key trading partners whose activities and influence on the supply chain cannot be ignored. Similarly, focal firms can replicate their relationship with upstream partners at the downstream side to increase the level of logistics process responsiveness.

5.3.2 Implication to Policy

Chopra, and P, Meindl (2001) had already established that supply chain comprises of every member at each stage of the chain who directly or indirectly contribute to meeting the customer demands. The chain which starts with suppliers extend beyond the manufacturing firm, transporting companies, wholesalers, retail outlets, carriers, forwarders and the final customer. The essence of managing the supply chain is to optimize value delivered at each node of the chain whilst maximizing profit for the entire supply chain. This study found out that effective supply chain responsiveness process is the one that target all the stages of the supply chain rather than focus on specific aspect of the supply chain. The study informs government and its agencies,
supply chain practitioners and management of corporations to develop policies that outline comprehensive supply chain responsiveness plan and practices throughout the supply chain. A comprehensive responsive plan should provide strategies for achieving responsiveness in the operations of each player including the responsiveness of manufacturer, its supplying and transporting partners, wholesale and retail channels, courier services and customer service representatives.

5.3.3 Suggestion for Further Studies

The study explored how responsiveness in supply chain influence service performance within the context of manufacturing sector. The study further examined the interaction between the three dimensions of supply chain responsiveness and their effect on service performance outcome. There are other variables that might influence the relationship between supply chain responsiveness and service performance. the study suggests that future studies should introduce mediating or moderating factor in the relationship between supply chain responsiveness and service performance.
REFERENCE


Ibrahim N. A & Babiker L. M. (2020). Supply Chain Responsiveness and Operational Performance In Sudanese Service Institutions, Medical Sector. EJVE.


70


APPENDICES

APPENDIX

KWAME NKRUMAH UNIVERSITY OF SCIENCE AND TECHNOLOGY
KNUST SCHOOL OF BUSINESS

SURVEY QUESTIONNAIRE

I am a Postgraduate student at the Kwame Nkrumah University of Science and Technology, Department of Supply Chain and Information system, Kumasi. This survey instrument has been designed to enable me carry out a research on the topic: ‘SUPPLY CHAIN RESPONSIVENESS AND SERVICE PERFORMANCE’

Any information provided will ONLY be used for academic purpose, and it will be treated as HIGHLY CONFIDENTIAL.

Please write in ink in the box which corresponds to the statement, which in your opinion is the most appropriate answer to the related question. For the following questions, kindly select by checking (✓) all that apply.

SECTION A: DEMOGRAPHICS OF RESPONDENTS

1. Gender of Respondent.
   Male [ ] Female [ ]

2. Age of respondent.
   18-30 years [ ] 31-50 years [ ] above 50 years [ ]

3. What is your level of education?
   Junior High [ ] Secondary School [ ] Tertiary [ ] Second degree [ ]

4. Type of industry:
   Food [ ] Agroprocessing [ ] Transport [ ] Health [ ] Pharmaceuticals [ ] Beverages [ ] Petroleum [ ] Electronics [ ] Furniture [ ] General merchandise [ ] Construction [ ]

5. Position/Job Title:
   CEO [ ] General Manager [ ] Supply Officer [ ]
   Transport Officer [ ] Operations Manager [ ] Procurement Officer [ ]
   Accounts Officer [ ] Customer Service REP [ ] Marketing Officer [ ]
   Logistics Officer [ ] Others (Specify) …………

6. Department:
   Operations [ ] Logistics & Transport [ ] Marketing [ ]
   Procurement [ ] Accounts [ ] Administration [ ] Others (Specify) …………

7. How long have you worked in the organisation?
   Below 5 years [ ] 5-10 years [ ] 11-15 years [ ] 16-20 years [ ]
   above 20 years [ ]

74
SECTION B: SUPPLY CHAIN RESPONSIVENESS (Source: Al – Hawajreh & Attianny, 2014; Thatte et al., 2013)

Please using a scale of 1=strongly disagree; to 7=strongly agree, please select the number that accurately reflects the extent of your supply chain’s current level of responsiveness

<table>
<thead>
<tr>
<th></th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>5</th>
<th>6</th>
<th>7</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Strongly Disagree</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>2</td>
<td>Disagree</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>3</td>
<td>Somehow Disagree</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>4</td>
<td>Indifferent/Not sure</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>5</td>
<td>Somehow Agree</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>6</td>
<td>Agree</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>7</td>
<td>Strongly Agree</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**Operations system responsiveness**

1. Our operations system responds rapidly to changes in product volume demanded by customers
2. Our operations system responds rapidly to changes in product mix demanded by customers
3. Our operations system effectively expedites emergency customer orders
4. Our operations system rapidly reconfigures equipment to address demand changes
5. Our operations system rapidly reallocates people to address demand changes
6. Our operations system rapidly changes our manufacturing processes to address demand changes
7. Our operations system rapidly adjusts capacity to address demand changes

**Logistics process responsiveness**

8. Our logistics system responds rapidly to unexpected demand change
9. Our logistics system rapidly adjusts warehouse capacity to address demand changes
10. Our logistics system rapidly varies transportation carriers to address demand changes
11. Our logistics system rapidly accommodates special or non-routine customer requests
12. Our logistics system effectively delivers expedited shipment

**Supplier network responsiveness**

13. Our major suppliers change product volume in a relatively short time
14. Our major suppliers change product mix in a relatively short time
15. Our major suppliers consistently accommodate our requests

16. Our major suppliers provide quick inbound logistics to us

17. Our major suppliers have outstanding on-time delivery record with us

18. Our major suppliers effectively expedite our emergency orders

**SECTION C: SERVICE PERFORMANCE (Source: Um, 2019; Bielen & Demoulin, 2007)**

**Using a scale of 1 to 7 [where 1=much worse; 7=much better], indicate the service performance level of your agency:**

<table>
<thead>
<tr>
<th>1 Worst</th>
<th>2 Worse</th>
<th>3 Somehow Worse</th>
<th>4 Somehow Better</th>
<th>5 Good</th>
<th>6 Better</th>
<th>7 Best</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>Service Delivery Performance</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>19. We fulfil customer/client needs within a shorter time</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
<td>6</td>
</tr>
<tr>
<td>20. We have improved the speed of service by eliminating waste and non – value adding activities</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
<td>6</td>
</tr>
<tr>
<td>21. We have shorter throughput time (the time between when a particular client service begins and the time service ends)</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
<td>6</td>
</tr>
</tbody>
</table>

22. **Waiting time Satisfaction**

23. We have a satisfactory waiting time

24. We have a satisfactory waiting environment

25. We have reduced the frequency of queues during service delivery

**Speed of responding to changes**

26. We provide adequate information to clients when there is change

27. Our clients are satisfied with information provided in case of delay

28. We have the ability to make desirable changes to meet customer/client request

**Customised Service**

29. We are able to provide customised service tailored to meet specific needs of clients
| 30. We can easily alter our service process to meet special needs of clients |   |   |   |