

KWAME NKRUMAH UNIVERSITY OF SCIENCE AND TECHNOLOGY, KUMASI

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The effect of purchasing volume flexibility and purchase mix flexibility on sourcing
flexibility among multinational firms in Ghana

By

Bridget Awusi Addo

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DECLARATION

I hereby declare that this submission is my work towards the Masters of Science in Logistics and Supply Chain Management and that, to the best of my knowledge, it contains no material previously published by another person nor material which has been accepted for the award of any other degree of the University, except where due acknowledgment has been made in the text.

Bridget Awusi Addo

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(PG9443721)

Signature

Date

Certified by:

Prof. Kwame Owusu Kwateng

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(Supervisor)

Signature

Date

Prof. David Asamoah

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.....

(Head of Department, SCIS)

Signature

Date

DEDICATION

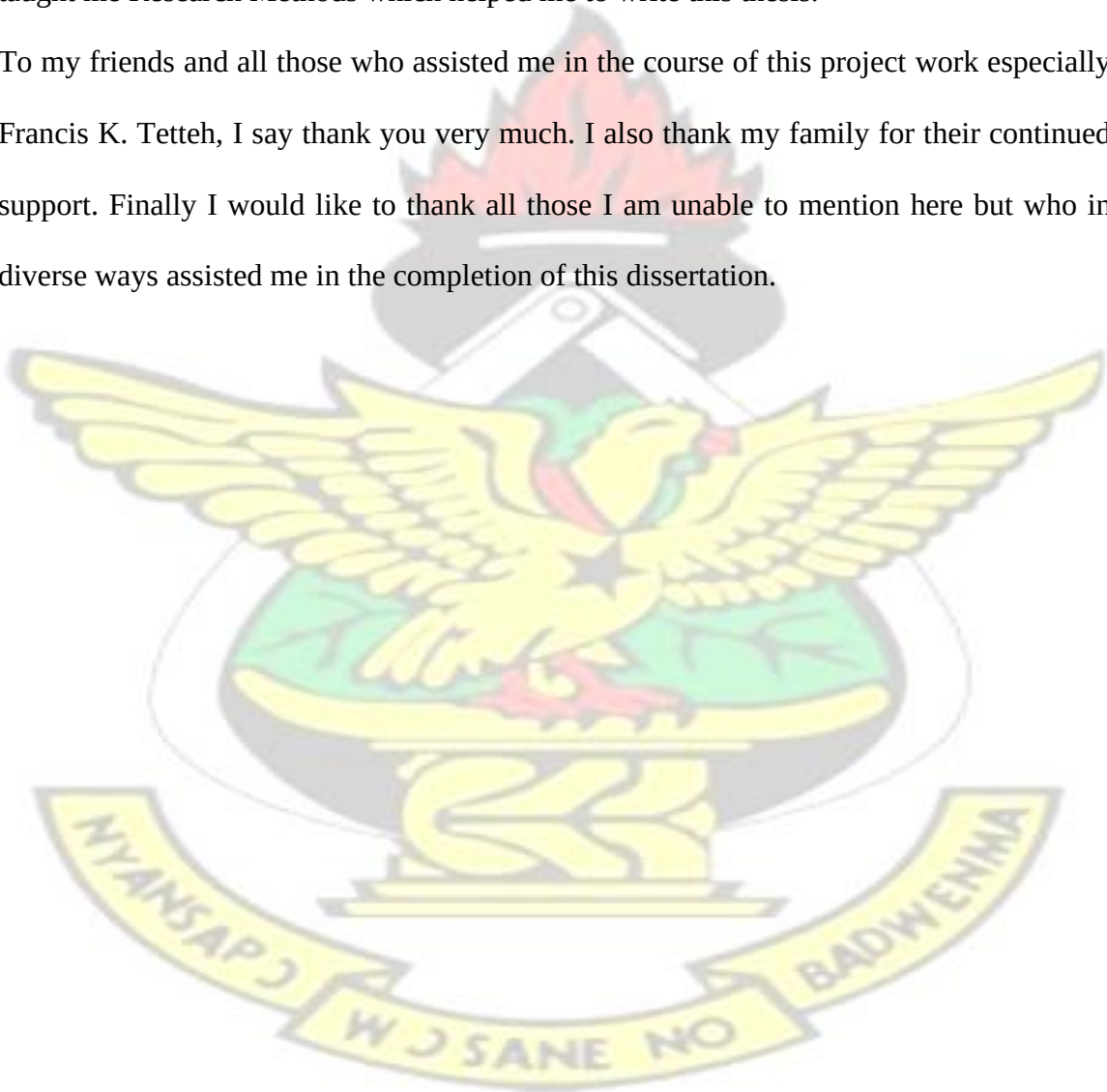
This work is dedicated to the Almighty God for His support throughout this study. This work is dedicated to my dearest husband and my lovely children my sisters and my brothers for their dedication and support.



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ABSTRACT

The focus of this study was to examine the effect of purchasing volume flexibility and purchase mix flexibility on sourcing flexibility among manufacturing firms in Ghana. To address the major goal of this study, two specific objectives were formulated. To achieve this, 350 individuals from the manufacturing companies in Ghana were sampled. SPSS and Smart PL-SEM were used for the analyses. The results indicate that purchasing mix flexibility significantly influences sourcing flexibility among manufacturing firms in Ghana. Again, evidence from the results indicates that purchasing volume flexibility significantly enhances sourcing flexibility of manufacturing firms in Ghana. The study therefore recommend managers in the manufacturing to pay close attention to purchasing volume flexibility and purchase mix flexibility in the quest to optimize sourcing flexibility.

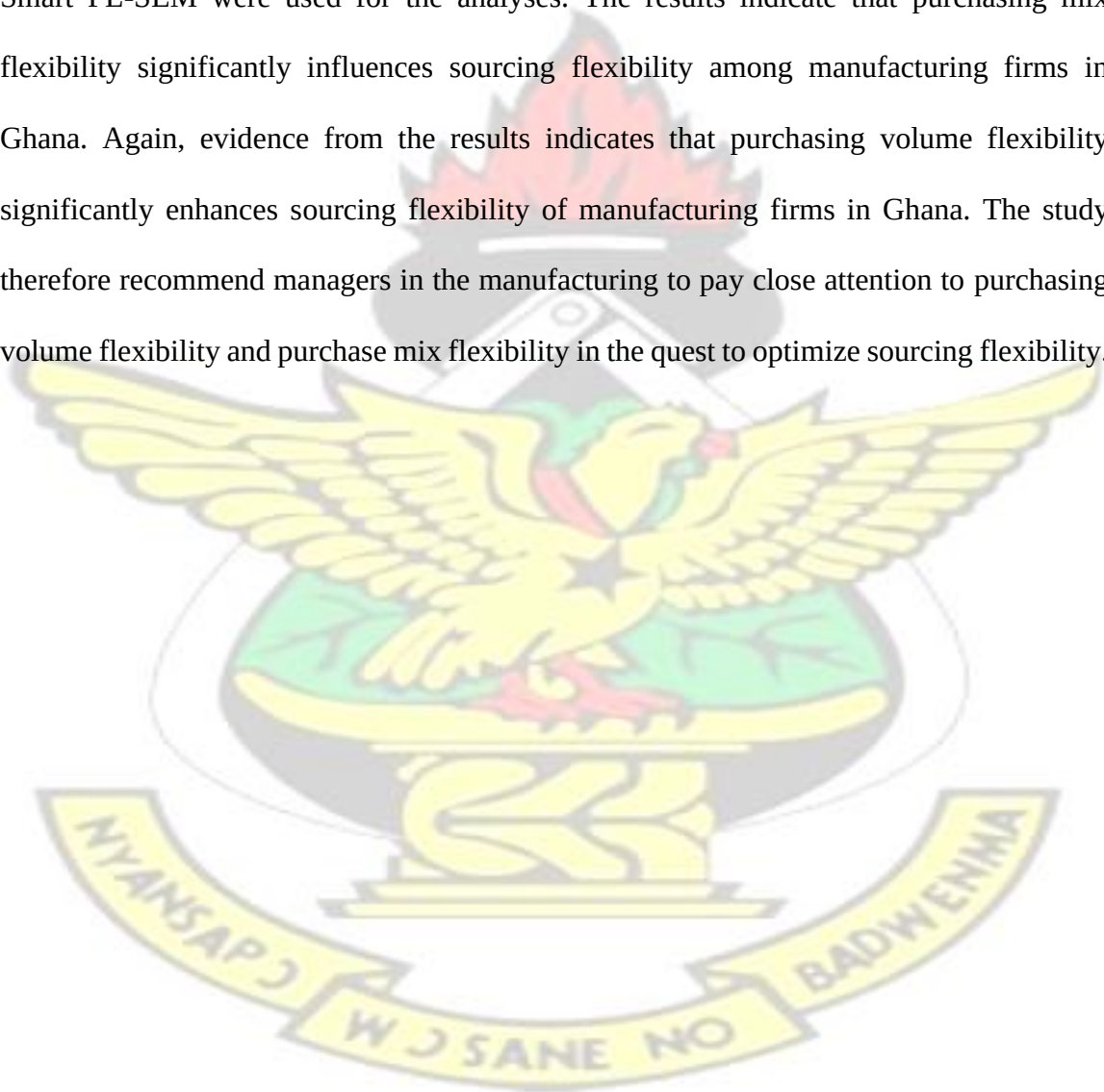


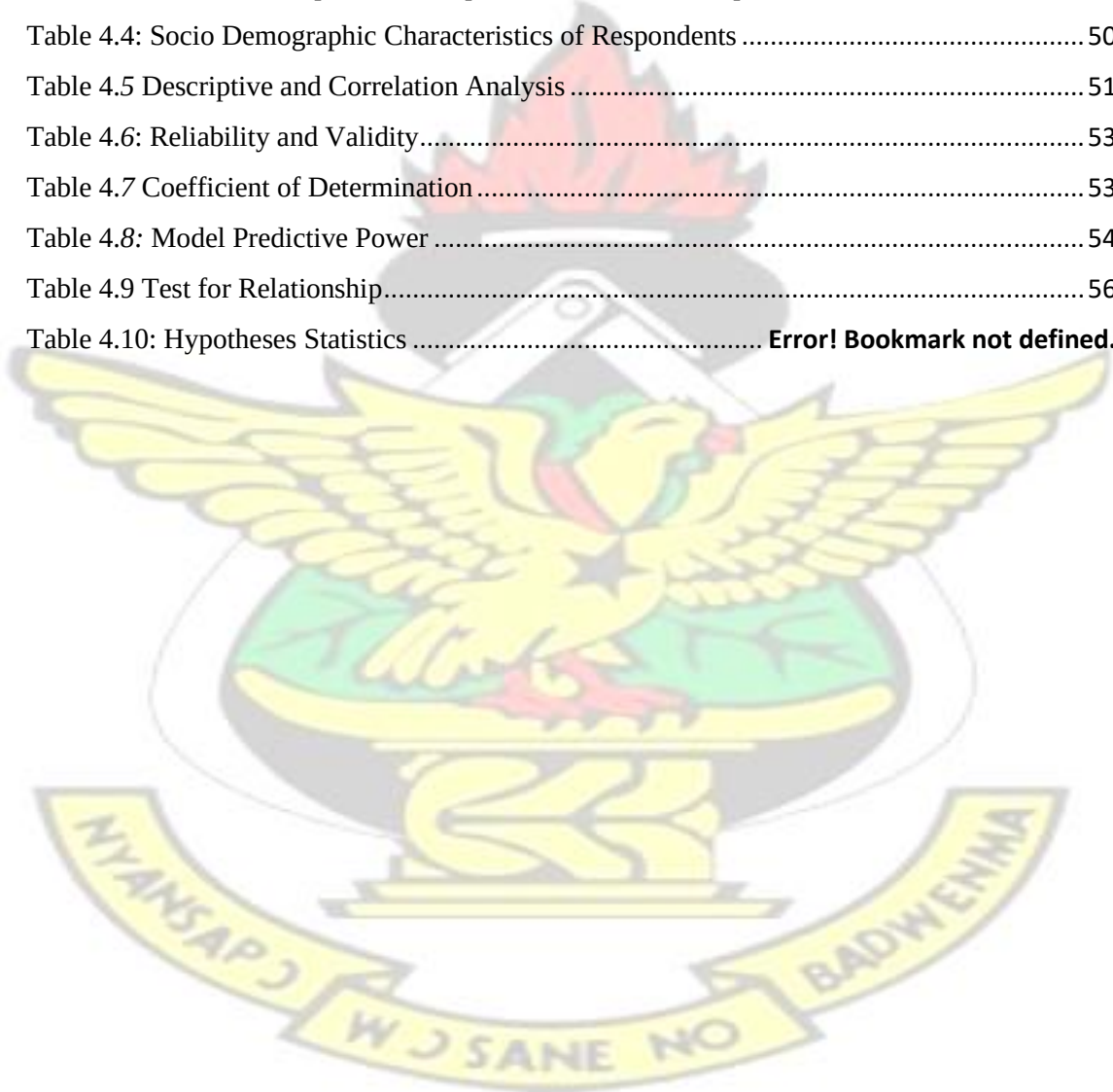
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CHAPTER ONE

INTRODUCTION

1.1 Background of the Study

Increase in global competition, technological changes, and demanding customers have resulted in more knowledge-intensive, unstable, complicated, and an uncertain environment. Firms in the quest to provide the best of services to their customers outsource most parts of their processes. Despite the many advantages of sourcing, it increases the firm's dependence on external sources of supply and adds complexity in the upstream supply chain (Wagner et al., 2018), which constrains a firm's ability to effectively serve its customer base. In order to overcome the tough circumstances, firms are required to investigate methods to increase flexibility (Chiang et al., 2012; Fayezi et al., 2017; Kim et al., 2017; Namdar et al., 2018). Flexibility is being considered as one of the major indications for competitiveness in today's intensive competitive marketplace (Gutiérrez, 2021). Extant literature highlighted the importance of flexibility as a factor contributing to competitive advantage of firms. Because it enables firms to make rapid and cost-effective responses according to changes occurring in specific customer requests (Kim et al., 2017). Flexibility has been discussed in the supply chain has received global recognition owing to its essential role in achieving high customer value. Though the concept has been extensively discussed, sourcing flexibility which is imperative for achieving supply chain flexibility has received less attention.

According to Wagner et al. (2018), sourcing flexibility is defined as the capability of the buying firm and its processes to respond or react rapidly to changing supply requirements. It plays a key role in managing challenges due to dependence and complexity, and is therefore an important trait for firms to adequately meet their customer demands.

Recently, the importance of a sourcing flexibility has been increasingly emphasized in the context of supply chain management (Çankaya, 2020). The growth in sourcing flexibility interest could also be traced to the global impact of the coronavirus disease (COVID-19), which placed many challenges on firms due to the uncertainty of the global business environment and changes in sourcing function (Su and Gargeya, 2012; Wang et.al, 2020). The Covid-19 pandemic disrupted many activities of firms, particularly those that relied heavily on external sourcing. This made sourcing flexibility a crucial part of a firm's strategic decision-making process, to require firms to integrate various activities such as procurement, logistics, operations and marketing (Gottfredson et al., 2005; Wang et.al, 2020).

Even after the disruption of the pandemic on global supply chain, firms including multinomial firms increasingly outsource production activities to their suppliers. It cannot be discounted that sourcing has benefits, however, despite its many advantages, outsourcing complexity in the supply chain (Spieske et al., 2022), which constrains a firm's ability to be agile. Despite the numerous and promising benefits of sourcing flexibility, it is unclear how sourcing flexibility may be achieved by firms. In other words, managers of firms continue to search how they can achieve sourcing flexibility. Extant literature (Jack and Raturi, 2002; Tachizawa and Thomsen, 2007; Devaraj et al., 2012; Busch et al., 2014; Arbabi, 2015; Yao and Paik, 2016; Teich and Claus, 2017; Zwolińska and Zaręba, 2018) have argued purchasing volume flexibility and purchase mix flexibility as essential strategies to achieve sourcing flexibility.

Purchasing volume flexibility is the ability of the organisation to operate at various batch sizes and at different production output levels economically and effectively (Yao and Paik, 2016). Volume flexibility reveals the competitive potential of the firm to increase and decrease production volume to meet increasing demands and to keep inventory low as demand fluctuates

(Teich and Claus, 2017; Zwolińska and Zaręba, 2018). Besides volume flexibility, product mix flexibility is regarded as one of the most important flexibility dimensions in literature. Product mix flexibility refers to the ability of manufacturing systems to produce a broad range of products with low changeover costs (Berry and Cooper, 1999). Gerwin (1993) defined product mix flexibility as the capability of producing a number of products/or numerous variations within a line. This flexibility amplifies a company's potential to switch from one product to another in a lower set up time. Gerwin (1993) also stated that this flexibility could be achieved by having efficient and automated production planning and control systems in place for both automatic operation procedures and automatic material handling.

Despite literature (Jack Devaraj et al., 2012; Busch et al., 2014; Arbabi, 2015; Yao and Paik, 2016; Teich and Claus, 2017; Zwolińska and Zaręba, 2018) highlighting purchasing volume flexibility and purchase mix flexibility as essential strategies to achieve sourcing flexibility, this has not been empirically validated hence this study is necessary to empirically understand purchasing volume flexibility and purchase mix flexibility as essential strategies to achieve sourcing flexibility.

1.2 Statement of the Problem

Sourcing flexibility plays a crucial role in the supply chain continuity, even in the non-pandemic period, by providing current sources for the downstream supply chain's flow. But, especially in the context of the COVID-19 pandemic, strategic sourcing is of paramount importance in maintaining supply chain continuity when compared with a non-pandemic period, mainly with regards to its process perspective which supports the implementation of sourcing strategies. Decisions around sourcing strategies play a significant role in preventing supply chain disruptions by helping supply chains to become resilient to demand variations. The wide

consequences of the pandemic effect on many supply chains may be traced to lack of flexibility in their sourcing.

In this regard, prior studies (Chiang et al., 2012; Wagner et al., 2018) have hinted the importance of sourcing flexibility in mitigating risks in uncertain environments as well as improving retail firm competitiveness. In the context of COVID-19 as a strong event that brought an uncertain environment for supply chains, this statement of Chen and Guo (2014) reinforces the importance of a deeper understanding of flexibility in strategic sourcing process. Boehmke et al. (2020) have studied the use of data analytics for the strategic sourcing process, which may enhance its performance. Cox (2015) suggested more research regarding the phenomenon of the sourcing process flexibility require more investigation. Van Hoek and Thomas (2021) also called for the need for more investigations around the sourcing phenomenon amid the pandemic context. Therefore, this study aims to explore how to empirically understand purchasing volume flexibility and purchase mix flexibility as essential strategies to achieve sourcing flexibility. Though the concept of flexibility in supply chain is not new (Shekarian et al., 2020; Delic and Eysers, 2020; Chandak et al., 2021; Chirra et al., 2021; Kumar et al., 2021; Bokhari et al., 2022; Kwateng et al., 2022), sourcing flexibility is neglected. Meanwhile, sourcing flexibility is an important building block of supply chain flexibility (Wagner et al., 2018). Few studies such as Swafford et al. (2006) found that sourcing flexibility has a positive and direct impact on agility. In general, flexibility in business processes has become increasingly important for firms to respond efficiently to evolving customer requirements, intense global competition, and rapid technological advancements (Yao and Paik, 2016; Swafford et al., 2006). Thus, flexibility has been a topic of intense interest among operations management (OM) researchers (Suarez et al., 1996; Busch et al., 2014; Arbabi, 2015; Yao and Paik, 2016; Teich and Claus, 2017; Zwolińska

and Zaręba, 2018). However, prior research has focused predominantly on examining the different dimensions of manufacturing flexibility, the relationship between these dimensions, and the impact of these dimensions of flexibility on performance (Cao and Dowlatshahi, 2005), neglecting the effect of purchasing volume flexibility and purchase mix flexibility as essential strategies to achieve sourcing flexibility. Thus, the effect of purchasing volume flexibility and purchase mix flexibility on sourcing flexibility has not yet been tested in literature.

This study therefore closes the gap by testing the effect of purchasing volume flexibility and purchase mix flexibility on sourcing flexibility has not yet been tested in literature. Drawing from the transactions costs economics (TCE) and social exchange theory (SET), this study envisages that that flexibility allows managers to change product mix and volume, relatively quickly and without much struggle which could facilitate sourcing flexibility. This study therefore seeks to examine the effect of purchasing volume flexibility and purchase mix flexibility on sourcing flexibility among multinational firms in Ghana.

1.3 Objective of the Study

The overall objective of the study is to examine the effect of purchasing volume flexibility and purchase mix flexibility on sourcing flexibility among multinational firms in Ghana. The specific objectives are as follows;

1. To examine the relationship between purchasing volume flexibility and sourcing flexibility among multinational firms in Ghana
2. To assess the relationship between purchase mix flexibility and sourcing flexibility among multinational firms in Ghana.

1.4 Research Questions

In order to verify this study, the following questions were answered:

1. What is the relationship between purchasing volume flexibility and sourcing flexibility among multinational firms in Ghana?
2. What is the relationship between purchase mix flexibility and sourcing flexibility among multinational firms in Ghana?

1.5 Significance of the Study

A study on how firms' sourcing flexibility affects strategic sourcing is important because it would give policymakers, practitioners, and academics the knowledge they need to better outsourcing activities by leveraging firms' sourcing flexibility and sourcing capabilities in sourcing. The results would be very beneficial to numerous stakeholders in both the public and commercial sectors.

Second, the study's contribution to the literature on sustainable supply chain management in Ghana and other developing nations is significant because it gives other researchers the opportunity to perform in-depth research into the topic while taking factors like sourcing flexibility into account.

This study is important because it is anticipated to significantly advance attempts to implement sustainable supply chain management strategies at the departmental and corporate levels in businesses, particularly in the service and industrial sectors. Additionally, it would serve as a hint for regulatory authorities to modify their sustainable supply chain management operations in accordance with institutional guidelines.

Finally, the study would add to the body of literature already written about sub-Saharan Africa by bringing to light important material and expanding the boundaries of knowledge in the field.

Both the academic community as a whole and the various stakeholders involved in an organization's supply chain would greatly benefit from the study.

1.6 Research Methodology

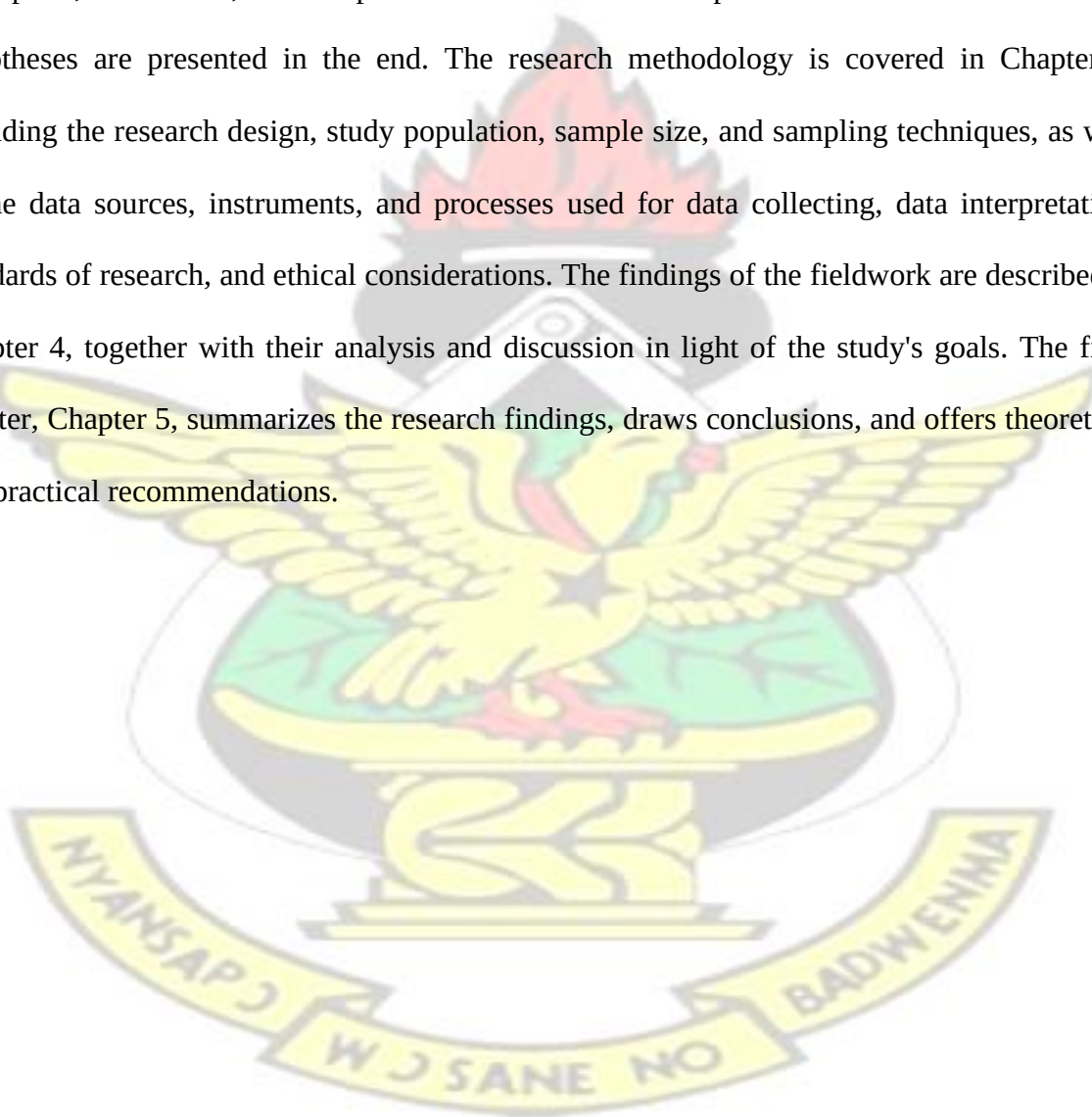
Cross sectional survey design is employed to examine the effect of purchasing volume flexibility and purchase mix flexibility on sourcing flexibility among multinational firms in Ghana. The study targets supply chain managers and senior managers of multinational firms in Ghana. Purposive sampling is employed to sample 100 managers of multinational firms in Ghana in this study. A structured questionnaire covering the variables used in the study was developed using items from previous studies. Questionnaire was piloted prior to the main data collection using 25 respondents. The revised questionnaire was used to gathered which aided in testing the proposed research model. Data gathered was analysed using both SPSS and Smart PLS SEM. While the SPSS was used to conduct the descriptive and exploratory factor analysis, Smart PLS SEM was used for confirmatory factor analysis and the structural model evaluation (hypotheses testing). Results are presented and discussed in line with the objectives of he studies. Conclusions and recommendation were arrived from the findings.

1.7 Scope of the Study

The theoretical focus of the study is on the sourcing of enterprises and their sourcing flexibility. This suggested study aims to examine the effect of purchasing volume flexibility and purchase mix flexibility on sourcing flexibility among multinational firms in Ghana. In order to measure the important factors for evaluating the research model, the study will use the key respondents to express their thoughts through the questionnaires that will be presented to them. The study's geographic focus is on multinational firms in Ghana.

1.8 Organization of the thesis

There are five (5) chapters in the study. The background of the study, problem statement, study objectives, research questions, study significance, methodology summary, study scope, study constraints, and study organization are all included in Chapter One, which is the introduction. The literature review is covered in Chapter 2 and follows the goals of the study by conducting conceptual, theoretical, and empirical reviews. The conceptual framework and associated hypotheses are presented in the end. The research methodology is covered in Chapter 3, including the research design, study population, sample size, and sampling techniques, as well as the data sources, instruments, and processes used for data collecting, data interpretation, standards of research, and ethical considerations. The findings of the fieldwork are described in Chapter 4, together with their analysis and discussion in light of the study's goals. The final chapter, Chapter 5, summarizes the research findings, draws conclusions, and offers theoretical and practical recommendations.



CHAPTER TWO

LITERATURE REVIEW

2.1 Introduction

The second chapter of this study is divided into five major subheadings. The conceptual review, which offers definitions, operationalisations, and information on how the constructs were employed in the study, is covered in the first sub-heading. The theoretical review, which also offers the theoretical aspects for the investigation, is discussed in the following subheading. The empirical review, which presents a linked publication based on the study, is also discussed in the third subheading. The construction of hypotheses and the conceptual framework were covered in the subsections that followed. The chapter concludes with a summary that emphasises the gap that the study attempted to fill.

2.2 Conceptual Review

This section provides a conceptual overview of the main concepts used in this study. These concepts include sourcing flexibility, strategic sourcing, and sourcing capabilities. Therefore, the important concepts are explained here.

2.2.1 Sourcing Flexibility

To adapt to changing requirements connected to supply of purchased components, Singh et al. (2019) describe sourcing flexibility as the availability of a range of possibilities and the capacity of the purchasing process to effectively utilise them. In the event of a rise in demand, sourcing flexibility is the process that enables the company to obtain a single product from many providers (Wagner et al., 2018; Singh and Kumar, 2019; Irfan et al., 2019). The upstream element of a flexible supply chain is sourcing flexibility, which has been described as the availability of variety of alternatives and the capacity of the purchasing process to effectively utilise them so as

to adapt to changing needs connected to the supply of acquired components by Benzidia and Makaoui (2020) and similarly by Irfan et al. (2019) as the availability of sources of qualified goods and services, an ability to implement effective purchasing processes to respond to changing requirements. The study therefore defines sourcing flexibility in accordance with these principles of Singh et al. (2019) as the ability of the purchasing organisation and its procedures to adjust or react quickly to changing supplier requirements.

According to Wagner et al. (2018), Sisay (2020), and Mishra (2020), sourcing flexibility exists when a firm supplier is able to produce a wide range of products, mix different items into a delivery load, delivery materials in various speed options, and respond quickly to changes in required delivery quantities and/or delivery times. Sourcing flexibility have access to enough capacity at suppliers and on the supply market to manage inconsistent demand or unexpected increases in the number of materials needed. Basically, sourcing flexibility refers to a company capacity to change the type, volumes/quantities, lead times, and delivery dates of materials and goods it needs from suppliers to meet customer demands (Wagner et al., 2018; Sisay, 2020; Mishra, 2020).

Sourcing flexibility offers several benefits. It aids the purchasing company in lowering their backorders, responding to and preparing for seasonal changes and variations in demand, especially in complicated supply chains (Chandak et al., 2019; Qamar et al., 2018). The capacity to react to and tolerate periods of supply uncertainty is also increased by the appropriate amount of sourcing flexibility (Delic and Eysers, 2020; Qamar et al., 2018). Customers receive better service as a result of the company becoming more customer-focused overall and being able to offer greater value for the customer through sourcing flexibility (Chandak et al., 2019).

2.2.2 Strategic sourcing

To meet operational and performance goals, strategic sourcing involves designing a supply network and managing suppliers (Monroe, 2022). According to the definition of SS, it involves managing and planning a supply network in line with a company's operational and performance-related objectives (Çankaya, 2020). SS choices incorporate implementation and the creation of long-term partnerships with suppliers in addition to the selection and evaluation of potential strategic suppliers (Frederico, Kumar, and Garza-Reyes, 2021). In this view, sourcing may be characterised as creating positive working relationships with suppliers in order to gain a competitive edge. Positive effects produced by SS have evolved into a competitive advantage, particularly in highly competitive market environments. Strategic sourcing is becoming a supply chain approach that managers may employ in a variety of ways, drawing a lot of attention in the literature on supply chain management. The conventional buying function, internal coordination, and cooperative supply chain activities including information exchange with suppliers and supplier growth were all covered by Çankaya (2020). Improvements in cost and performance were found when a typical strategic sourcing viewpoint was applied to the air force as a provider of public services (Landale et al., 2018). Numerous studies have looked at the use of strategic sourcing as a supply chain approach meant to strengthen connections between buyers and suppliers. Strategic sourcing enhances a company's supply chain agility and strategic flexibility (Mubarik et al., 2021). Learning orientation, performance orientation, planning orientation, and relationship orientation are the four aspects of strategic sourcing customer orientation that are positively correlated with profitability (Frederico et al., 2021). The buyer-supplier relationship, supplier assessments, and sourcing performance in the US textile and apparel sector have all benefited from strategic sourcing (Waileruny, 2018). Consequently, even though strategic

sourcing has been referred to as a useful supply chain approach, several considerations must be taken into account before adoption.

From a theoretical viewpoint, top management views strategic sourcing as a crucial resource of a company that can be used to build or support the firm's capabilities and enhance the firm's competitiveness (Vegter et al., 2020; Brandon-Jones and Knoppen, 2018; Belo et al., 2020). Sourcing is engaged in the organization's process of strategic planning and sourcing is viewed as significant as other main tasks in the firm (Çankaya, 2020; Brandon-Jones and Knoppen, 2018). Because of this, strategic sourcing is now most often acknowledged as a crucial component of effective supply chain management (Semuel et al., 2018). The theoretical construct of strategic sourcing is defined by its proactive and long-term emphasis, top management support, sourcing contributions to the firm's performance, and strategically managed supplier relationships (Jermstittiparsert and Rungsisawat, 2019; Guesh, 2021).

2.2.3 Sourcing Capabilities

In order to implement strategic sourcing and enhance the company's competitive position by getting access to best-in-class skills across the value chain, capability sourcing is an organising process. This ensures long-term competitive advantage (Karttunen, 2018). The decision of whether to source a capability or activity in today's fast-moving and complex global business environment has been replaced with how to source every activity throughout the value chain and the sourcing manager's capacity to manage and maximise important capabilities. By placing a stronger emphasis on their sourcing business skills, forward-thinking firms are increasing the elasticity of their supply chains and the flexibility of their organisations. Al-Hawary and Al-Syasneh (2020) identified the important sourcing manager's competencies as sophisticated cost analytic skills, a knowledge of global supply markets, the capacity to negotiate and construct

global contracts, excellent communication and presentation skills, an understanding of the development process for global sourcing strategies, the capacity to think systemically further than a place or area, and proficiency in working with other cultures. The knowledge and abilities needed for strategic sourcing are very different from those needed for routine operational purchasing. According to Elfawal et al. (2021), in order to meet upcoming technological and competitive challenges, purchasing professionals must understand market dynamics and customer expectations, keep up with newer information technologies and customer relationship management, participate in strategic planning processes, and comprehend the ethical, legal, and social implications of doing business. They also need to learn about the strategic cost of doing business. A major distinction between local and international sourcing is the sharp rise in communication complexity and dangers (Kumar et al., 2021; Kumar et al., 2018). For the following reasons, strategic offshore outsourcing necessitates placing more focus on specific knowledge and skills as well as a unique set of capabilities than domestic sourcing (Baker et al., 2022; Ávila, 2022). First of all, companies using offshore sourcing run across a variety of language difficulties, social and cultural challenges, time zone differences, business practises, rules, and legal systems.

Second, strategic offshore sourcing initiatives may have a greater impact than domestic sourcing on other business divisions. Working with partners that are complicated and culturally varied is a challenge for other business units of a company. Thirdly, offshore sourcing entails risks related to currency exchange rates, as well as political and economic unrest in other nations. A good strategic sourcing initiative revolves around the tasks of supplier identification, development, and management. Strategic offshore sourcing exposes the dynamics of managing buyer-supplier relationships to even larger problems, including as cultural and social disparities, as well as other

regional and demographic variables. To skilfully scan and find partnership prospects with foreign suppliers, sourcing managers must have the necessary expertise and capabilities. They must also build the right processes to coordinate operations and manage the relationship. Long-term buyer-supplier relationships that work well result in profitable business operations for both suppliers and customers (Subagio et al., 2022; Jernsittiparsert and Rungsisawat, 2019; Guesh, 2021).

2.3 Theoretical Review

This section discusses the theoretical literature that underpins this research. Dynamic capabilities view and Information Processing theory are two examples of the theoretical literature the study takes into account. A brief overview of these theories is given in the following subsections.

2.3.1 Dynamic Capabilities View

Teece, Pisano, and Shuen (1997, 516) defined the term "dynamic capabilities" as "the firm's ability to integrate, create, and reconfigure internal and external competencies to handle quickly changing contexts." Many academics consider the dynamic capabilities view to be an extension of the resource-based view (RBV) (Ambrosini and Bowman 2009; Eisenhardt and Martin 2000; Wang and Ahmed 2007). While the RBV primarily focuses on the firm's current resources, the dynamic capabilities perspective emphasises how resources and organisational capabilities may adapt and evolve to attain and maintain competitive advantage (Schilke 2014). According to Teece, Pisano, and Shuen (1997), businesses must rely more on "functional competencies" and "organisational skills" than on easily replicated assets in the age of fast technological change. By tacitness, complexity, and specificity in resources and talents, Reed and Defillippi (1990) emphasise the significance of "causal ambiguity," or the difficulty for competitors to understand how actions lead to consequences. Causal ambiguity may be pertinent when addressing how

particular SC skills or decision-making elements are connected to or affect performance in the operations and SCM literature (Gunessee and Subramanian, 2020). For instance, Laursen and Andersen (2016) explored the consequences of causal ambiguity for supplier collaboration during new product development in their quasi-experimental study at Unilever.

A dynamic capability is "the power of an organisation to actively generate, extend, and adjust its resource base," according to Helfat et al. (2009, 4). Sensing, seizing, and reconfiguring are three key components that Teece (2007) takes into account for his dynamic capabilities' framework. Sensing entails tasks that involve scanning, learning, and analysing the surrounding environment (Fainshmidt et al. 2019). Seizing focuses on seizing fresh business possibilities or eliminating hazards brought forth by tumultuous conditions (Blome, Schoenherr, and Rexhausen 2013). The capacity to reconfigure resources, competencies, and organisational structures in response to changes in tumultuous situations is required for reconfiguration (Eisenhardt and Martin 2000; Wilden, Devinney, and Dowling 2016). It is possible to define the intra- and inter-firm dynamism of organisations in reaction to change by theorising dynamic capacities based on sensing, seizing, and reconfiguring (Teece, 2018). In the face of uncertainty, businesses reengineer their current competencies and reorganise their SCs in this manner (Aslam et al. 2018; Chowdhury and Quaddus 2017). Despite being widely discussed in the literature on strategic management (Barreto 2010, Eisenhardt and Martin 2000, Schilke 2014; Winter, 2003), there is little empirical research exploring the causes of dynamic capabilities in operations and SCM (Aslam et al. 2020; Aslam et al. 2018, Brandon-Jones and Knoppen, 2018). Due to the complexity of their structures, their worldwide dispersion, and the fast-shifting consumer behaviour, today's SCs frequently exhibit extremely volatile and dynamic behaviours (Azadegan et al. 2019; Hall 2000; Wong and Hvolby 2007). Dynamic capability is a suitable theoretical framework to describe such

behaviours as a result (Sandberg 2021; Beske 2012). For instance, Sandberg and Hultberg (2021) investigate how Swedish fashion merchants leverage dynamic capabilities with relation to growing circular projects in market-competitive situations. This study employs DCT to is to examine the relationship between sourcing flexibility and strategic sourcing, the moderating role of sourcing capabilities among manufacturing firms in Ghana.

2.2.2 Information Processing Theory

To deal with supply uncertainty, sourcing flexibility is necessary. Information processing theory (IPT) acknowledges that businesses are open social systems that must adapt to ambiguity (in this example, supply uncertainty) (Galbraith 1974; Tushman and Nadler 1978). In order to meet the substantial information processing needs that arise from uncertainty and ultimately produce the desired results, businesses must have information processing capabilities that enable them to acquire and analyse more information. The study of Tushman and Nadler (1978) represented by supplier evaluation and selection, information systems integration, IPT proposes two strategies to increase information processing capacities in order to match high information processing requirements: (1) lateral relations, and (2) information systems (Tushman and Nadler 1978). From the standpoint of information processing, the buying business will be better able to manage supply uncertainty and to develop and capitalise on sourcing flexibility the greater the information processing capacity.

IPT was developed from organisation theory (Galbraith 1973; Tushman and Nadler 1978) and has more recently been used in supply chain management, procurement, and operations research. Researchers have examined a variety of information processing techniques for dealing with complexity and uncertainty in a manufacturing environment (Flynn and Flynn 1999), the impact of information processing on supply chain outcomes (Hult, Ketchen, and Slater 2004), the

relationship between supply chain and supply chain information systems strategies and performance (Qrunfleh and Tarafdar 2014), and the information processing capabilities of ERP systems for facilitation of business processes (Bode, Wagner, Petersen, and Ellram 2011), the link between product customisation and the required information processing capabilities for order management in make-to-order manufacturing (Tenhiälä and Ketokivi 2012), how information processing can be slowed down through slack resources and how this affects the link between supply disruptions brought on by supply base complexity and plant performance (Brandon-Jones, Squire, and Van Rossenberg 2015), the impact of internal, cross-functional integration on financial performance dependent on the length of the supply chain processes (Swink and Schoenherr 2015) and how supply chain sustainability-related risks lead to information processing requirements (Busse, Meinlschmidt, and Foerstl 2017).

In the context of procurement, IPT has been used to examine various buyer-supplier relationship configurations (e.g., Bensaou and Venkatraman 1995; Premkumar, Ramamurthy, and Saunders 2005), methods that buying firms can use to manage interfaces between suppliers involved in NPD (Hong and Hartley, 2011), and the impact of supplier integration on planning comprehensiveness (Srinivasan and Swink, 2015). Last but not least, IPT has lately been suggested as a foundation for research on supply management and buying as an "external great theory" (Spina, Caniato, Luzzini, and Ronchi, 2016). IPT provides a sound and practical theoretical foundation for this research when taken as a whole. This study focuses on information processing capacities and examines how the three mechanisms of flexibility suggested by IPT, which firms can use to increase their information processing capacities, relate to sourcing flexibility, in contrast to the previous studies above, which either highlighted information processing requirements, information processing capacities, or both.

2.3 Conceptual Framework

This study sought to examine the relationships between sourcing flexibility and strategic sourcing through the moderating role of sourcing capabilities. Sourcing flexibility formed the independent variable while strategic sourcing was the dependent variable. Sourcing capabilities serve as a moderating role. Figure 2.1 illustrates the interrelationship between these variables.

moderating role. Figure 2.1 illustrates the interrelationship between these variables.

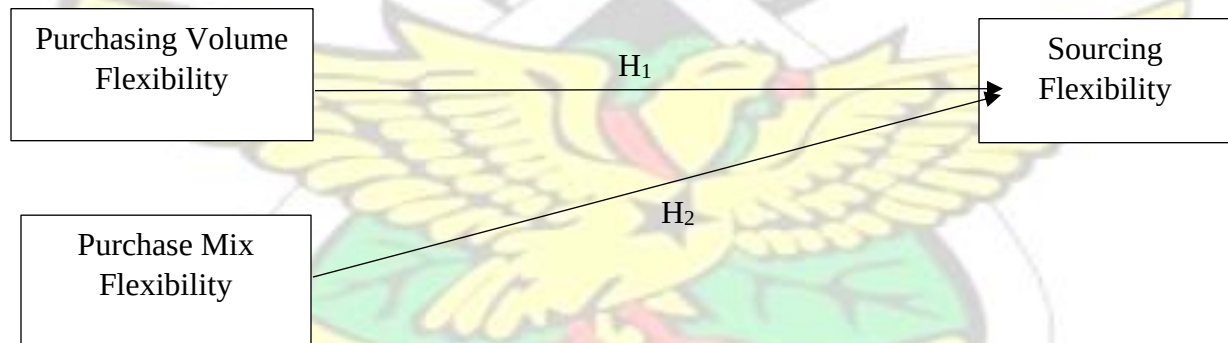


Figure 2.1: Conceptual framework of the study

2.4 Hypothesis Development

Based on the conceptual framework from the above section the following hypotheses were formulated.

2.4.1 Effect of Sourcing Flexibility on Strategic Sourcing

Flexibility in sourcing offers several benefits. It aids the purchasing company in lowering their backorders, responding to and preparing for seasonal changes and variations in demand, especially in complicated supply chains (Sáenz et al., 2018; Liao, 2020). The capacity to react to and tolerate periods of supply uncertainty is also increased by the appropriate amount of sourcing flexibility (Radhakrishnan et al., 2018; Zitzmann and Karl, 2018). Customers receive better service as a result of the company becoming more customer-focused overall and being able to offer greater value for the customer through flexible sourcing (Delic and Evers, 2020). Although it is frequently intuitively assumed in the literature that "the greater the flexibility, the better the performance" (Abbas et al., 2021 p. 512), previous studies have been unable to find conclusive results on the relationship between different supply chain flexibility building blocks and performance (including sourcing flexibility) (Chirra, Raut, and Kumar, 2021; Phadnis and Darkow, 2021), and some even discovered "the possible negative consequences of being flexible" (Chirra et al., 2021). Therefore, Delic and Evers (2020, p. 40) note that there is a need for more research since "the empirical explanation of the benefits of deploying flexible supply chains is rare and in-depth empirical studies are weak" in the literature. According to Tiwari, Tiwari, and Samuel (2015, p. 783), empirical research on supply chain flexibility "does not seem sufficient. Therefore, further empirical study must be done in order to develop correct insight, awareness, and knowledge of flexibility and to maximise its potential advantages. Consequently, the research suggests the following:

H1: Sourcing flexibility places more value on strategic sourcing.

2.4.2 Effect of Sourcing Capabilities on Strategic Sourcing

Strategic sourcing calls for a sourcing manager to keep an eye on the macroenvironment of the company, forecast changes in that environment, build relationships with key suppliers, engage actively with other business functions, and assess the company's competitive advantages and disadvantages in relation to its suppliers. Strategic sourcing at the micro level entails the identification of critical materials and components, the assessment of potential supply uncertainty, risks, and disruptions for each critical material and component, and the creation of corresponding contingency plans for all identified supply issues. A certain set of sourcing skills come to be more prominent as a result of strategic sourcing. As more and more top companies see the value of strategic sourcing, Giunipero et al. (2019) provided evidence of the rising significance of sourcing managers' strategic talents and competences. Nguyen et al., (2020) noted that there is a higher requirement for skilled and competent individuals with substantial global abilities due to the difficulty of managing a worldwide supply base. People with the appropriate capabilities are essential for a successful supply chain collaboration, as Rialti et al. (2020) showed. It's interesting to note that a prior study indicated that a firm's global sourcing structures and procedures had a significant impact on the growth of global sourcing skills required for effective global sourcing (Shalender and Yadav, 2019). According to Shou et al. (2021) and Çankaya (2020), top management must understand that successful sourcing strategies increase the importance of the sourcing manager's business capabilities to manage global business and environmental uncertainty. This is because satisfying sourcing performance requires talented and well-trained sourcing personnel. On the basis of the discussion above, the study recommends the following:

H2. Sourcing capabilities places more value on strategic sourcing.

2.4.3 Moderating Role of Sourcing Capabilities

According to Shou et al. (2021), the most important aspect in successful sourcing is qualified employees with the necessary knowledge, skills, and abilities. Of the twelve possible issue areas, a lack of skilled personnel to assist the sourcing process stands out as the most significant. According to Jiang and Li (2019), sourcing skills and behaviours are connected to a firm's success since various strategies call for different kinds of individuals to work well. According to the dynamic capabilities approach, a company's resources include its physical and financial assets, as well as its personnel's abilities, skills, and expertise. According to Walton et al. (2020) and Zgarni and Lamia (2019), the primary sources of long-term competitive advantage are in-demand, hard-to-copy business resources and talents. Personnel capabilities play a key role in determining how talents, expertise, and resources are coordinated and managed, which in turn affects how well an organisation performs. The following hypothesis captures how a strategic sourcing is significantly impacted by placing more attention on sourcing capabilities:

H3. Sourcing capabilities positively moderate the association between sourcing flexibility and strategic sourcing.

2.5 Empirical Review

Jafari et al. (2022) look at the relationship between responsiveness and flexibility in the supply chain (SC) by analysing how SC flexibility, as a multi-dimensional construct, influences customer responsiveness and if this link is moderated by a firm innovation orientation. The study employed a positivist approach to solve the research questions of this study. Using dynamic capabilities view and 225 Swedish manufacturers, the study tested the empirical model and found out that supply flexibility (SF) has a positive effect on customer responsiveness (CR). The study first drawback is due to the lack of research on how different SCF types interact. Future studies

are necessary to determine if these flexibilities complement or substitute for one another impact on CR.

Onyokoko and Needorn (2021) examined how the operational flexibility of manufacturing companies affected their adaptation capabilities in Nigeria's South-South. A sample of 217 participants in the study who provided responses was modelled using the partial least squares structural equation method. Operational flexibility is evaluated using technology and market-focused adaptive capabilities, whereas manufacturing companies' adaptability is evaluated using new product and volume flexibility. The study employed contingency theory, cross-sectional survey, quasi-experimental design, and systematic sampling method. The findings shows that new product flexibility has a positive link with technology and market focused adaptive capabilities. The study suggested that for manufacturing companies to improve their capability to discover and capture new market opportunities, they should develop strong partnerships with all functional divisions and divisions inside their organisations.

Yousuf et al. (2021) look at the connection between operational flexibility and a company's performance to see how environmental uncertainty affects these linkages. This research was carried out using quantitative methods. The surveys included 228 managers from these pharmaceutical firms in Iran. Measures of product development flexibility typically have a significant impact on the success of pharmaceutical companies. The study concluded that since external business environment remains unaffected, strategic flexibility might serve as both a defensive wall against environmental uncertainty and umbrella for operational flexibility in the future.

Üstündağ and Urgan (2020) look at the variables that affect supplier flexibility and the connection between supplier performance and flexibility. A quantitative research approach was

used. Structural equation modelling was used to examine data from 119 Turkish industrial enterprises. The findings indicated that supplier flexibility positively affect supplier performance. The study suggested that examining the connections between the elements determining supplier flexibility may be another avenue of research.

Yousuf et al. (2019) look at the connection between operational flexibility and firm performance. A questionnaire was distributed to senior and operational managers, product development, financial and marketing department of 90 industrial companies in Jordan. The study is quantitative and descriptive analysis (correlation and regression) was obtained to arrive the results. The results revealed that flexible new products have a strong impact on these firms' operational and financial performance. The study seeks future researchers to carry out a number of investigations on operational and strategic flexibility as potential tools that might be used by Jordanian businesses to enhance performance and gain a competitive advantage.

Singh et al. (2019) identifies the main supply chain flexibility (SCF) factors that have an influence on the Indian personal hygiene market and map the causal relationships between them. The study focused on literature published between 1983 to 2017. The research was carried out using quantitative approach. The results demonstrated that product flexibility has a positive impact on the SCF. The study suggested that future studies can measure flexible supply chain performance on efficiency, responsiveness, sales growth, and return on sales.

Huo et al., (2018) explores how SC flexibility promotes operational and financial performance from the standpoint of organisational capabilities. The study employed a stratified sampling approach to choose organisations from a directory given by China National Bureau of Statistics. The conceptual model is practically tested using data from 216 Chinese enterprises. There was no strong link between supplier flexibility and operational performance. Because of the

organisational capability viewpoint used in this study, the study measure of SC flexibility is universal in nature. To replicate this study, future research might use more specific measures.

Ko et al. (2018) investigate the impact of external supply chain (SC) flexibility on the ability of small- and medium-sized firms (SMEs) to innovate new products, as well as the potential contribution of informal control mechanisms to the moderating of such an effect. 236 SME manufacturers in the UK participated in a cross-sectional questionnaire survey for this study. The performance of SMEs in terms of product innovation is more positively impacted by inbound supplier flexibility (ISF) than outbound logistic flexibility (OLF). The study suggested that future studies may allow participants to pick and evaluate a few of their SC partners before averaging their ratings to provide more reliable assessments.

Wagner et al. (2018) employs hierarchical regression analysis and partial least squares (PLS) modelling to assess a model that responds to the following research questions: What factors influence sourcing flexibility, first? Second, how flexible should supply chains inside businesses be when it comes to sourcing? Third, how does sourcing flexibility affect the performance of products that are seen from the downstream (i.e., delivery performance) and their financial performance? Based on a study of 336 manufacturing companies in Europe and the US, it can be seen that sourcing flexibility is positively correlated with supplier evaluation and selection as well as the integration of information systems at the buyer-supplier interface. Our model might be expanded in future studies by include environmental uncertainty and demand uncertainty as new variables. Such factors would make it easier to comprehend how sourcing flexibility interacts with various environmental factors.

Harsasi (2017) examine the effect of supply flexibility on the effectiveness of the supply chain. In order to perform the study, 100 workers from Indonesia's fashion industry were recruited.

Purposive sampling is the method of sampling that is being employed. Validity testing, reliability testing, and multiple linear regression analysis were all used in the examination of the data. The study discovered that supply chain performance is impacted by supplier flexibility but not by supply network flexibility. The study therefore concluded that suppliers with flexible systems and procedures are better able to adapt to changing business conditions, which improves supply chain efficiency. Flexible suppliers can supply ideas, product designs, and mutual cooperation with greater coordination and communication. Suppliers who are more flexible make better contributions to the supply of goods and services and are more responsive.

Moseley et al. (2017) analyse the correlations between PV, PC, and certain MOP measurements in current scholarly literature and identifying future research paths. The study was conducted using systematic literature review approach. 30 article was reviewed for full text reading and coding. According to the findings, product variety has a constantly negative association with MOP across various time, cost, quality, and flexibility variables, although product complexity lacks evidence of significant correlations with MOP measures. The study concluded that future research could examine how moderating variables influence the correlations between PC and MOP and PV and MOP.

Chan et al. (2017) uses a resource-based viewpoint as a lens for examining the key causes and effects of supply chain agility at both the strategic and operational levels in an effort to address this issue. Structural equation modelling was used to examine data from a sample of 141 clothing manufacturers. The findings show that supply chain agility is favourably influenced by both strategic flexibility and manufacturing flexibility. The study advices further researchers to think about increasing the dimensions of each construct or utilising various measurements of structural features to account for certain constructions.

Literature Table for Existing Studies

Author/Year	Country	Purpose	Theory	Method	Findings	Future studies
Jafari et al. (2022)	Sweden	To look at the relationship between responsiveness and flexibility in the supply chain (SC) by analysing how SC flexibility, as a multi-dimensional construct, influences customer responsiveness and if this link is moderated by a firm innovation orientation.	Dynamic capabilities view	Quantitative research	Supply flexibility (SF) has a positive effect on customer responsiveness (CR).	Future studies are necessary to determine if these flexibilities complement or substitute for one another impact on CR.
Üstündağ and Urgan (2020)	Turkey	To look at the variables that affect supplier flexibility and the connection between supplier performance and flexibility.		Quantitative research approach	Supplier flexibility positively affect supplier performance.	The study suggested that examining the connections between the elements determining supplier flexibility may be another avenue of research
Huo et al., (2018)	China	To explores how SC flexibility promotes operational and financial performance from the standpoint of organisational capabilities.		Stratified sampling approach	There was no strong link between supplier flexibility and operational performance.	Because of the organisational capability viewpoint used in this study, the study measure of SC flexibility is universal in nature. To replicate this study, future research might use more specific measures
Harsasi (2017)	Indonesia	To examine the effect of supply flexibility on the		Purposive sampling	Supply chain performance is	

		effectiveness of the supply chain. In order to perform the study, 100 workers from Indonesia's fashion industry were recruited.			impacted by supplier flexibility but not by supply network flexibility.	
Onyokoko and Needorn (2021)	Nigeria	To examined how the operational flexibility of manufacturing companies affected their adaptation capabilities in Nigeria's South-South.	Contingency theory	Quasi-experimental design	Product flexibility has a positive link with technology and market focused adaptive capabilities.	
Yousuf et al. (2021)	Iran	To look at the connection between operational flexibility and a company's performance to see how environmental uncertainty affects these linkages.		Quantitative methods	Product development flexibility typically have a significant impact on the success of pharmaceutical companies.	The study concluded that since external business environment remains unaffected, strategic flexibility might serve as both a defensive wall against environmental uncertainty and umbrella for operational flexibility in the future.
Yousuf et al. (2019)	Jordan	To look at the connection between operational flexibility and firm performance.		Quantitative and descriptive analysis	Flexible new products have a strong impact on these firms' operational and financial performance.	The study seeks future researchers to carry out a number of investigations on operational and strategic flexibility as potential tools that might be used by Jordanian businesses to enhance performance and gain a competitive advantage.

Singh et al. (2019)	India	To identifies the main supply chain flexibility (SCF) factors that have an influence on the Indian personal hygiene market and map the causal relationships between them.		Quantitative approach	Product flexibility has a positive impact on the SCF.	The study suggested that future studies can measure flexible supply chain performance on efficiency, responsiveness, sales growth, and return on sales.
Moseley et al. (2017)	Denmark	To analyse the correlations between PV, PC, and certain MOP measurements in current scholarly literature and identifying future research paths.		Systematic literature review approach	Product variety has a constantly negative association with MOP across various time, cost, quality, and flexibility variables, although product complexity lacks evidence of significant correlations with MOP measures.	Future research could examine how moderating variables influence the correlations between PC and MOP and PV and MOP.
Ko et al. (2018)	United Kingdom	To investigate the impact of external supply chain (SC) flexibility on the ability of small- and medium-sized firms (SMEs) to innovate new products, as well as the potential contribution of informal control mechanisms to the moderating of such an effect.		Quantitative research approach	The performance of SMEs in terms of product innovation is more positively impacted by inbound supplier flexibility (ISF) than outbound logistic flexibility (OLF).	Future studies may allow participants to pick and evaluate a few of their SC partners before averaging their ratings to provide more reliable assessments
Wagner et al. (2018)	Europe and	To look at how flexible should supply chains		Quantitative research	Sourcing flexibility is positively correlated	Future studies can include environmental

	Unites States	inside businesses be when it comes to sourcing and how does sourcing flexibility affect the performance of products that are seen from the downstream (i.e., delivery performance) and their financial performance			with supplier evaluation and selection as well as the integration of information systems at the buyer-supplier interface	uncertainty and demand uncertainty as new variables
Chan et al. (2017)	China	To examine the key causes and effects of supply chain agility at both the strategic and operational levels in an effort to address this issue	Resource-based theory	Quantitative methods	Supply chain agility is favourably influenced by both strategic flexibility and manufacturing flexibility	Future study should think about increasing the dimensions of each construct or utilising various measurements of structural features to account for certain constructions

CHAPTER THREE

RESEARCH METHODOLOGY AND ORGANIZATIONAL PROFILE

3.1 Introduction

The study examines the effect of purchasing volume flexibility and purchase mix flexibility on sourcing flexibility among multinational firms in Ghana. This chapter provides details of the research methodologies used to solve the research topic and accomplish the study's objectives. Consequently, this section of the study deals with the research design and approach, study population, sample size, sampling technique, source of data, research instrumentation and data collection procedure, validity and reliability, and ethical consideration.

3.2 Research Design

The positivism research philosophy is the underpinning philosophy for this study. The choice of the positivist approach is justified by the fact that the study examines the moderating role of sourcing capabilities in relationship between sourcing flexibility and strategic sourcing all the variables in are measurable and can be overserved numerically hence is considered to fit well with the objectives of the research study. Subsequently, the study employed quantitative methods of data collection in a single study according to the nature of the study.

The quantitative research approach was chosen on the basis that it produces accurate and measurable data that can be generalized to a broader population (Goertzen, 2017). Aside from that, it is ideal for evaluating and verifying already known concepts about how and why events occur by testing hypotheses developed before data collection. In general, quantitative research is regarded as a deductive approach to the investigation (Ragab and Arisha, 2018). The study combines both descriptive and explanatory research types. While the descriptive provides

description of purchasing volume flexibility, purchase mix flexibility and sourcing flexibility. The explanatory research will also aid in examining the effect of purchasing volume flexibility and purchase mix flexibility on sourcing flexibility. Finally, the study will employ the cross-sectional survey design where deductive reasoning is applied for the quantitative data (Cohen, Manion, and Morrison, 2017). The survey design allows the collection of data from different units over a specific time period. Since the study is conducted over a limited time period, the cross-sectional survey is deemed more appropriate to examining the effect of purchasing volume flexibility and purchase mix flexibility on sourcing flexibility among multinational firms in Ghana

3.3 Population of the Study

Etikan, Musa and Alkassim (2016) defined population as the range of the instances, persons, or objects that are the focus of a study. The population consists of a diverse variety of persons from whom a sample should be drawn (Shamsuddin et al., 2017). In the context of this study, the population comprised of senior managers on multinational firms in Ghana.

3.4 Sample Size and Sampling Technique

The nature of the study and the research design, according to Kothari (2012), determine the number of study participants who should be included in the sample. In obtaining the sample size in a given population, three main methods in estimating a sample size can be identified. Firstly, the sample size can be calculated by using formulas (Israel, 1992). Secondly the use of a published statistical table to estimate the sample size, for instance, the published statistical table of Krejcie and Morgan (1970) and Cohen et al., (2013, 2009). Lastly, a researcher can decide to utilize census methods by collecting data from the entire population. The nature of the study and the research design, according to Kothari (2012), determine the number of study participants

who should be included in the sample. In obtaining the sample size in a given population, three main methods in estimating a sample size can be identified. For this study, sample size determination will be established from Singh and Masuku (2014) formula of sample size determination.

$$n = \frac{Z^2(P)(1 - P)}{C^2}$$

Where Z= the standard normal deviation set at 95% confidence level

P=percentage picking a choice or response (50%)

C=Confidence interval

$$n = \frac{(1.96)^2(0.50)(1-0.50)}{0.05^2}$$

$$n=384.16$$

$$n \sim 384$$

Based on the formula, 384 senior managers on multinational firms in Ghana will be drawn for the study. The processes used to choose a sample for a research endeavor are referred to as the sampling techniques. Probability procedures and non-probability procedures are the two types of sampling procedures (Taherdoost, 2016). For this investigation, a purposive sampling strategy will be used. This approach will be selected because the target population includes senior managers on multinational firms in Ghana who have understanding of the issues under enquiry.

3.5 Data Collection

This study dwells on the use of primary data that will be collected using primary data. The data will be gathered using questionnaire. The questionnaire is designed in four parts. The first part

contains the demographic information of the respondents. The second part contains questions on purchasing volume flexibility. The third part contains questions on purchase mix flexibility and the last section on sourcing flexibility. A five-point Likert scale was used to code the responses, with 1 denoting "strongly agree," 2 denoting "agree," 3 denoting "uncertain," 4 denoting "disagree," and 5 denoting "strongly disagree."

In the survey, participants will be asked to choose a number from 1 to 5 that best represented their thoughts on each statement. The items used to measure the constructs are included in the appendix. Though the items were already validated and tested in previous studies, this study will also conduct different types of validity and reliability of the items to ensure the final results are reliable. To encourage participation, each questionnaire was accompanied by a cover note from the researcher clarifying the aim of the study as well as soliciting respondent involvement in the study; it as well provided assurance of confidentiality of the selected participants and briefly introduce the research work.

3.6 Data Processing and Analysis

The method of data analysis forms an essential component of any research such that the choice of the method of analyzing data plays important role in the quality of findings, conclusions and recommendations that are drawn from the data. Being a quantitative study, this study employed multiple quantitative techniques in analyzing the data to fulfill the goal outlined in chapter one. After gathered was gathered, all the data was compiled in excel for scrutiny. After the scrutiny, few questionnaires that were found incomplete were discarded. The analysis employed Statistical Package for Social Sciences (SPSS) version 26.0. The Statistical Package for Social Sciences (SPSS) was used for the analysis such as frequencies, means, standard deviations,

independent sample t test and correlation analysis. Smart PLS SEM was used for the inferential analysis to test the various hypotheses proposed in the model.

3.7 Reliability and Validity

Internal consistency reliability is defined as the extent to which a particular group of items on the test truly measure the same construct or idea (Hair et al., 2006). To measure internal consistency reliability, the studies make use of the Cronbach alpha and composite reliability. Composite reliability (pc) will be used as a reliable substitute measure of internal consistency reliability i.e. Joreskog's rho. It measures the reliability of a set of indicators and the threshold and interpretation same as the Cronbach Alpha. It takes account of different outer loadings of individual variables. Composite reliability is calculated based on equation 1 (Hair et al., 2014). PLS-SEM algorithm's iterative procedure will be used based on a selected value of 500 for the maximum number based on iterations to obtain final results.

To determine the convergent validity in this study, the outer loading of indicators and the AVE will be used. The outer loadings should be greater than 0.78 i.e. the latent variables can explain at least 50% of its indicators variance. Loading of 0.4, 0.5, 0.6, and 0.7 can be accepted if it will lead to AVE that is larger than 0.5. AVE compare the proportion of variance explained in the factor analysis. The value for AVE ranges from 0-1. It should exceed 0.5 to show adequate convergent validity (Bagozzi and Y, 1988; Fornell and Larcker, 1981).

Discriminate validity measures the extent to which a variable is truly distinct from other variables. It shows that a variable is unique. Cross loading and Fornell and Larcker criterion, can be used to evaluate discriminant validity (Hair et al., 2014) and Hetero Trait-Mono trait (HTMT), which will be developed to arrest the insensitivity of the Fornell and Larcker and cross loading criterion of ratio (Henseler, Ringer and Sarstedt, 2015). This study will use HTMT,

which considered the correlation between variable, based on the average of hetero trait-heteromethod correlation (Henseler, Ringer and Sarstedt, 2015). The ratio of the HTMT is expected to be lower than 0.90 at 95% confidence interval, $HTMT > 0.9$ will indicate that there is a lack of discriminate validity.

3.8 Ethical Considerations/Issues

A consent form was presented to the authorities of all respondents to inform them of all benefits and risks involved in the participation and further sought their consent for their inclusion in the study. Selected farmers had the right to decline their participation in the study. The researcher indicated in the consent form that all forms of anonymity and confidentiality would be observed. Privacy of farmers in terms of freedom to define the time, extent and the conditions of sharing information was also observed. The researcher avoided any form of action in their relation with participants that amounts to deception. All forms of plagiarism and falsification of data were also avoided by the researcher.

CHAPTER FOUR

DATA ANALYSIS, PRESENTATION AND DISCUSSION OF RESULT

4.0 Introduction

Data acquired using the methods described in the previous chapter are analyzed in this chapter. The focus of this study was to examine the effect of purchasing volume flexibility and purchase mix flexibility on sourcing flexibility among multinational firms in Ghana. This section of the study contains five main sections, the first section dealt with the exploratory analysis of the data to check the quality of the data used in the study. The second section contains the socio-demographic background information of respondent involved in this study as well as the descriptive and correlational analysis of the study variables. The third section of the study contains the reliability and validity test of the items used in the model. The fourth section contains the structural equation model results and the last section contains the discussion of results obtained from the study. The analysis of the data obtained from the respondents were analyzed using Smart PLS-SEM, SPSS and excel.

4.1 Exploratory Analysis

The exploratory analysis of the data is presented in this first section of the study. The exploratory factor analysis was carried out in the study to provide a preliminary quality assessment of the data. The exploratory factor analysis was carried out using the statistical package for social sciences (SPSS). The response rate, none response bias, and common method bias are the three subsections that make up this section. The various tests and their interpretations are shown in the sections that follow for this initial data quality check. The sections that are listed below provide the findings of the data quality checks.

4.1.1 Response Rate

A low response rate could lead to nonresponse bias because response rates are typically used to evaluate the quality of the data used in studies (Giromini, Young and Sellbom, 2022; Jeon and Boeck, 2019). The survey response rate was explored using a test for response rate. The test is necessary, especially for surveys that go on for a while. Data for this study were gathered between December 20, 2022 and January 20, 2023. Consequently, the duration of the data collection process was roughly one month. Out of the three hundred and eighty-four (384) questionnaires distributed to respondents, only 350 were recovered and deemed to be appropriate for this study. This yield a response rate of 91%, which is sufficient for further analysis.

4.1.2 Test for Common Method Bias

EFA was used to assess common method bias, and the single factor test of Harman was employed to determine the adequacy of the measurement model's components. The one-factor test, also known as the Harman, evaluates whether a single component explains or accounts for more than 50% of the estimated variance, according to Podsakoff et al. (2003). This was done using exploratory factor analysis (EFA). The outcome, which is shown in Table 4.1 below, demonstrates that the largest variation explained by a single factor using the principal component analysis extraction method is 48.608%, which is less than the EFA's 50% threshold. This shows that the dataset does not include contain any CMB.

Additionally, the Bartlett sphericity test and the KMO were employed to measure sampling adequacy. The result as presented Table 4.2 showed the evidence of sampling adequacy as the KMO Measure of Sampling Adequacy was 89.6% while Bartlett's test also showed a significant value ($\chi^2 = 2074$; $df = 36$; $P < 0.000$).

Table 4. 1: Test for Common Method Variance

Comp onent	Initial Eigenvalues			Extraction Sums of Squared Loadings		
	Total	% of Variance	Cumulative %	Total	% of Variance	Cumulative %
1	5.275	48.608	48.608	5.275	48.608	48.608
2	1.243	23.807	72.415	1.243	23.807	72.415
3	.655	7.282	79.697			
4	.497	5.519	85.215			
5	.348	3.866	89.081			
6	.314	3.486	92.567			
7	.271	3.011	95.578			
8	.225	2.498	98.076			
9	.173	1.924	100.000			
Extraction Method: Principal Component Analysis.						

Table 4.2: Bartlett's Test of Sphericity and KMO Test

Kaiser-Meyer-Olkin Measure of Sampling Adequacy.		0.896
Bartlett's Test of Sphericity	Approx. Chi-Square	2074.0
	df	36
	Sig.	.000

Source: Field Survey, 2023

4.1.3 Non-Response Bias

This study compared the responses of early and late respondents to examine non-response bias and attempt to mitigate it. Early and late responses from the study's respondents are included in this section. The study took about one month to complete, therefore the first two weeks of data collecting may be classed as early responses and the latter two weeks as late responses.

According to Holmes and Oppenheim (2001), there should be no statistically significant differences between the two groups for any of the model's input variables. The results show that this survey is free from non-response bias and that the samples fairly reflect the study's intended audience. To be more precise, the first 175 responses were regarded as early responses, and the latter 175 responses as late responses. An independent sample T-test was then performed to look for non-response bias. The results of the t-test did not show a statistically significant difference in the gender, age, supply chain learning, knowledge management and supply chain robustness, as shown in Table 4.3.

Table 4.3 Results of Independent-Samples t-Test for Non-Response Bias

Variables	Group	Mean	Levene's Test for Equality of Variances		
			F	Sig.	T
Gender	1.00	97.565	0.765	0.282	1.001
	2.00	100.782			
Age	1.00	22.954	0.176	0.675	1.125
	2.00	23.835			
SCL	1.00	18.290	5.904	0.016	0.212
	2.00	19.090			
KM	1.00	15.081	0.230	0.632	2.096
	2.00	15.309			
SCR	1.00	18.290	5.792	0.703	2.628
	2.00	19.090			

Source: Field Data, 2023

4.2 Socio Demographic Characteristics of Respondents

The study captures the demographic background information of the respondents involved in the study. The demographic background information captured in the study were gender, age, level of education, your position in the firm, years of firm operation, and number of employees. The results from the study as indicated in Table 4.4 revealed that 32.2% of respondents were females and 67.8% of respondents were males. Thus, majority of the respondents were males. The study revealed that 50% of the respondents were 18-30 years, 43.6% of the respondents were 31-40 years, and 6.4% of the respondents were 41-50 years. Hence, majority of the respondents were within 18-30 years. The level of education was also captured in this study, the results indicate that 7.6% of respondents were Senior High School certificate holders, 9.8% of respondents were diploma certificate holders, 67.8% of respondents were bachelor degree holders, 3.4% of respondents were postgraduate degree holders, 11.4% of respondents were having other educational background. Thus, majority of respondents involved in the study were bachelor degree certificate holders. Respondents position in the firm was further captured in the study. The results from the study showed that 5.3% of respondents were business owners, 28.4% was business owners and managers, and 66.3% of respondents were managers. Hence, majority of the respondents were managers in their firms. The study further indicates the years of the firm operation, the results from the study revealed that 5.3% of respondents have 1-5 years of firm operation, 51.1% of respondents also have 6-10 years of firm operation, 19.7% of respondents have operated in the firm within 11-15 years and 23.9% of respondents have operated in the firm for over 15 years. The results also revealed that 11.7% of respondents have 5-29 employees in the firm, 35.9% of respondents have 30-99 employees in their firm and 52.3% of respondents have more than 100 employees in their firm.

Table 4.4: Socio Demographic Characteristics of Respondents

Variable	Category	Frequency	Percent
Gender	Female	113	32.2
	Male	237	67.8
Age	18-30 years	175	50.0
	31-40 years	153	43.6
	41-50 years	22	6.4
Level of Education	Senior High School	27	7.6
	Diploma	34	9.8
	Bachelor Degree	237	67.8
	Graduate Studies (Master / PhD)	12	3.4
	Others	40	11.4
Your Position in the Firm	Business owner	19	5.3
	Business owner and Manager	99	28.4
	Managers	232	66.3
Years of firm operation	1 - 5 years	19	5.3
	6 - 10 years	179	51.1
	11 – 15 years	69	19.7
	16 years and above	84	23.9
Number of employees	5-29 employees	41	11.7
	30 – 99 employees	126	35.9
	More than 100	183	52.3
	Total	350	100

Source: Field Survey, 2023

4.3 Descriptive Statistics and Correlation Analysis

In order to describe respondents' opinions of the research variables, this employed descriptive technique (mean and standard deviations) and correlational analysis. This model includes three (3) variables: Purchasing Mix Flexibility, Purchasing Volume Flexibility and Sourcing Flexibility. Table 4.5 below displays the descriptive analysis of the findings. The mean for Purchasing Mix Flexibility (PMF) was 4.052 with respective standard deviation of 0.781, Purchasing Volume Flexibility (PVF) was 4.125 with respective standard deviation of 0.776 and Sourcing Flexibility (SF) was 4.017 with respective standard deviation of 0.871. Thus, all the means for the construct were high.

The results of the correlational analysis showed statistically significant positive association between Purchasing Mix Flexibility (PMF), Purchasing Volume Flexibility (PVF) and Sourcing Flexibility (SF) ($r=0.605$; $r=0.557$). The study also revealed a positive relationship between Purchasing Volume Flexibility (PVF) and Sourcing Flexibility (SF) ($r=0.525$). Hence, the results implied that Purchasing Mix Flexibility (PMF) and Purchasing Volume Flexibility (PVF) have a strong positive significant relationship with Sourcing Flexibility (SF).

Table 4.5 Descriptive and Correlation Analysis

Construct	Mean	StD	1	2	3
Purchasing Mix Flexibility (PMF)	4.052	0.781	1.000		
Purchasing Volume Flexibility (PVF)	4.125	0.776	0.605	1.000	
Sourcing Flexibility (SF)	4.017	0.871	0.557	0.525	1.000

Source: Field Survey, 2023

4.4 Confirmatory Factor Analysis

Using Smart PLS version 4, Confirmatory Factor Analysis was done to evaluate the model's reliability and validity. The maximum likelihood estimation method was used to examine the constructs' validity and reliability. The model measurement evaluation was completed as a pre-requisite to the structural model analysis. The model's validity and reliability were evaluated using the Cronbach Alpha (CA), Composite Reliability (CR), and Average Variance Extracted (AVE) metrics. The first phase in the model measurement evaluation is to examine the reflective model measurement. The outcome, as shown in Table 4.6 below, demonstrates that the indicator loading ranges between 0.808 to 0.919, indicating that the 0.70 criterion recommended by Hair et al. (2019) is achieved. The result demonstrates that the construct accounts for more than half

of the indicator variance, indicating that item reliability is adequate. In addition, the reliability of the constructs in this study was investigated using two internal consistency measures (Cronbach Alpha and Composite reliability). High Cronbach Alpha and Composite reliability values suggest high reliability (Hair et al., 2019). The Cronbach Alpha values in this study were all above the 0.70 threshold. The CA values were 0.808 for Purchasing Mix Flexibility, 0.770 for Purchasing Volume Flexibility and 0.925 for Sourcing Flexibility are considered satisfactory to good, according to Hair et al (2019). Composite reliability is another way to assess reliability of the constructs. Composite reliability value in this study for Purchasing Mix Flexibility was 0.912, Purchasing Volume Flexibility was 0.896 and Sourcing Flexibility was 0.925 which were also greater than the 0.70 threshold. As a result, all of the constructs had sufficient internal consistency and reliability (Cronbach Alpha and Composite reliability were both more than 0.7). (Fornell and Larcker, 1981; Henseler et al., 2015; Hair et al., 2019). In the third stage of the measurement model assessment, the convergent validity of each concept measure is discussed. Convergent validity is the degree to which a construct converges to explain the variance of its constituent parts. The statistic used to evaluate convergent validity is the average variance extracted (AVE) for all items on each concept. By squaring the loading of the indicators on a construct and calculating the mean value, the AVE is calculated. When the number is 0.60 or higher, the construct is said to account for at least 60% of the variation among its main components (Hair et al., 2019; Henseler et al., 2015). All the items were statistically significant ($P < 0.05$).

Table 4.6: Reliability and Validity

Construct	Items	Loading	CA	CR	AVE	VIF	T statistic	P value
Purchasing Mix Flexibility	PMF1	0.913	0.808	0.912	0.839	1.848	4.304	0.000
	PMF2	0.919				1.848	4.444	0.000
Purchasing Volume Flexibility	PVF1	0.890	0.770	0.896	0.812	1.643	4.827	0.000
	PVF2	0.912				1.643	4.954	0.000
Sourcing Flexibility	SF1	0.808	0.925	0.944	0.771	2.145	3.384	0.000
	SF2	0.886				3.286	4.166	0.000
	SF3	0.895				3.197	3.906	0.000
	SF4	0.891				3.675	3.978	0.000
	SF5	0.907				3.681	3.976	0.000

Source: Field Survey, 2023

4.4.3 Coefficient of Determination (R^2)

The coefficient of determination is a number between 0 and 1 that measures how well the model used in the study help in predicting the outcome. Hence, according to Hair et al. (2020), R^2 values of 0.75, 0.50 and 0.25 are considered large, medium and weak respectively. Hair et al. (2020) however, argue that it is necessary to interpret R^2 with a focus on the context of appropriate discipline (Hair et al., 2020). The results as showed in Table 4.7 and Figure 4.1 below indicate that the model shows a strong predictive accuracy (R^2) value of 0.366 (36.6%) for Sourcing Flexibility. These results show that Purchasing Mix Flexibility and Purchasing Volume Flexibility predict 36.6% of the firms Sourcing Flexibility.

Table 4.7 Coefficient of Determination

Construct	R-square	R-square adjusted
Sourcing Flexibility	0.366	0.362

Source: Field survey, 2023

4.4.4 Prediction Size (Q^2) Effect

To determine the value of Q^2 , the effect of prediction size as a method for a PLS model's accuracy tests was performed (Hair et al., 2020). This measurement is based on a technique whereby a point is deliberately removed from the data matrix, missing points are assigned, and the model's step is estimated (Zhang, 2022). Q^2 therefore integrates sample prediction data with the model's explanatory power rather than acting as a prediction method (Hair et al., 2020). This estimate serves as the input for the blindfold method, which interprets the results. Higher Q^2 values result from a little deviation from the baseline value, which implies greater accuracy (Zhang, 2022).

As a guideline, the value of Q^2 for a given endogenous should be greater than zero to demonstrate the accuracy of the design estimate for that construct. As a rule of thumb, Q^2 above 0, 0.25 and 0.50 indicates small, medium and small predictive values respectively for the PLS path model (Zhang, 2022). The results presented in Table 4.8 indicate that Q^2 value was 0.353. Results indicated a moderate interaction in the model (Zhang, 2022). Thus, Q -square values was above the threshold, indicating a good fit of the values and predictive value of the model.

Table 4.8: Model Predictive Power

Construct	Q^2predict	RMSE	MAE
Sourcing Flexibility	0.353	0.812	0.591

Source: Field survey, 2023

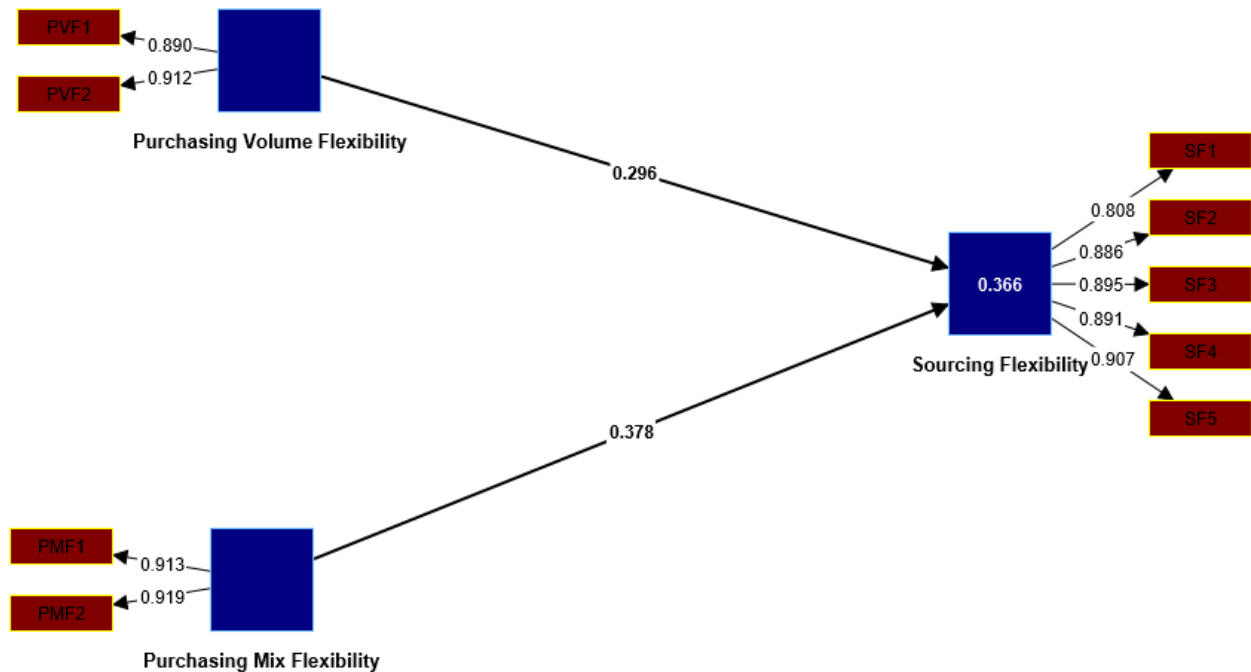


Figure 4.1: Measurement Model Evaluation for Organizational Learning

4.5 Test for Hypothesis

The main objective of this study was to examine the effect of purchasing volume flexibility and purchase mix flexibility on sourcing flexibility among multinational firms in Ghana. Two hypothesis were established based on the gaps in the research. Data were acquired from managers at manufacturing companies in Ghana using a questionnaire and the techniques described in the methodology chapter. The subsequent section below shows the results from the study based on the study's hypotheses and objectives.

The result in Table 4.9 below shows that the first (H_1) hypothesis of the study which investigated the effect of Purchasing Mix Flexibility on Sourcing Flexibility among manufacturing firms was supported ($B=0.378$; $t=6.619$; $P=0.000$; $Sig<0.005$). The result shows that a unit improvement in Purchasing Mix Flexibility improves Sourcing Flexibility for approximately 37.8%. Hence,

evidence from the results indicates that Purchasing Mix Flexibility significantly influences Sourcing Flexibility among manufacturing firms in Ghana.

Again, the second hypothesis (H₂) was also supported, thus Purchasing Volume Flexibility significantly affect Sourcing Flexibility among manufacturing firms in Ghana (B=0.296; t=4.837; P=0.000; Sig<0.005). The result revealed that a unit improvement in Purchasing Volume Flexibility Increases Sourcing Flexibility for approximately 30%. Hence, evidence from the results indicates that Purchasing Volume Flexibility significantly enhances Sourcing Flexibility of manufacturing firms in Ghana.

Table 4.9 Test for Relationship

Hypothesis	Path Coefficient (B)	T statistics (O/STDEV)	P values	Decision
Purchasing Mix Flexibility -> Sourcing Flexibility	0.378	6.619	0.000	Supported
Purchasing Volume Flexibility -> Sourcing Flexibility	0.296	4.837	0.000	Supported

Source: Field survey, 2023

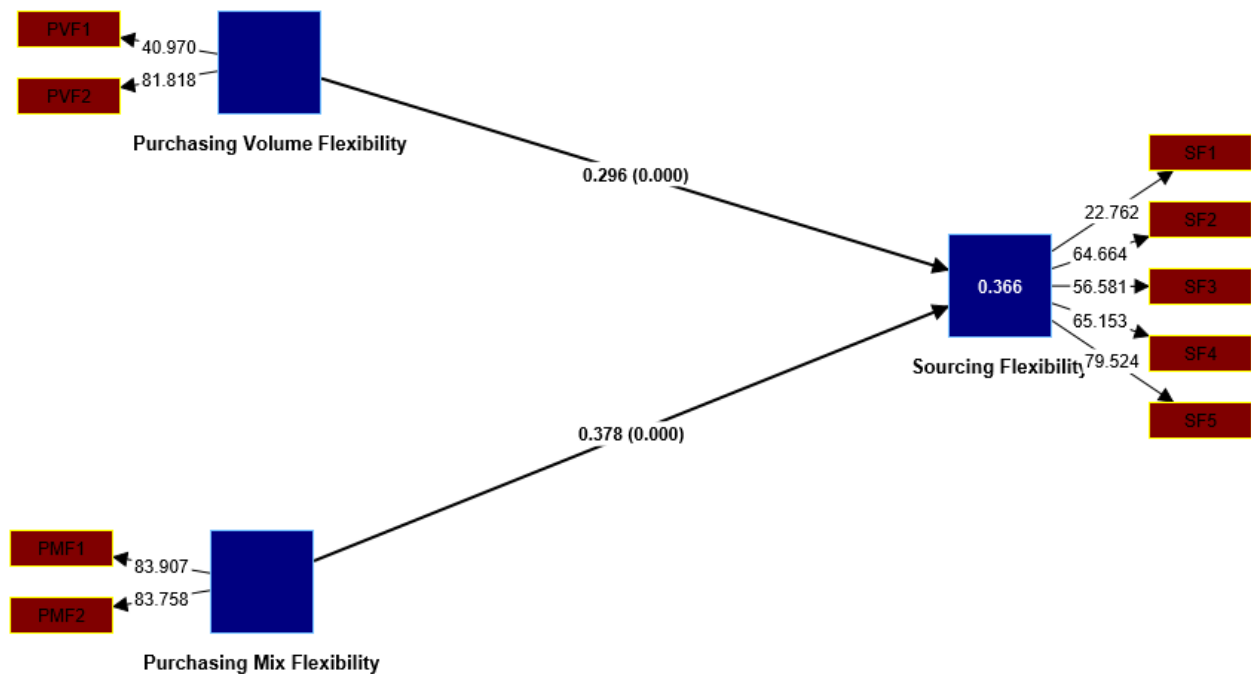


Figure 4.2: Bootstrapping Structural Model

4.6 Discussion of Findings

The main objective of this study was to examine the effect of purchasing volume flexibility and purchase mix flexibility on sourcing flexibility among multinational firms in Ghana. Two hypothesis were established based on the gaps in the research. Data were acquired from managers at manufacturing companies in Ghana using a questionnaire and the techniques described in the methodology chapter. The standardized route coefficients were used to examine the link between the construct and the hypothesis. The bootstrap resampling method (Henseler et al., 2009) was used to determine the significance level of the path, with 500 iterations of resampling (Chin, 1998). The subsequent section below shows the results from the study based on the study's hypotheses and objectives.

4.6.1 Effect of Purchasing Mix Flexibility on Sourcing Flexibility

The result shows that the first (H_1) hypothesis of the study which investigated the effect of Purchasing Mix Flexibility on Sourcing Flexibility among manufacturing firms was supported ($B=0.378$; $t=6.619$; $P=0.000$; $Sig<0.005$). The result shows that a unit improvement in Purchasing Mix Flexibility improves Sourcing Flexibility for approximately 37.8%. Hence, evidence from the results indicates that Purchasing Mix Flexibility significantly influences Sourcing Flexibility among manufacturing firms in Ghana.

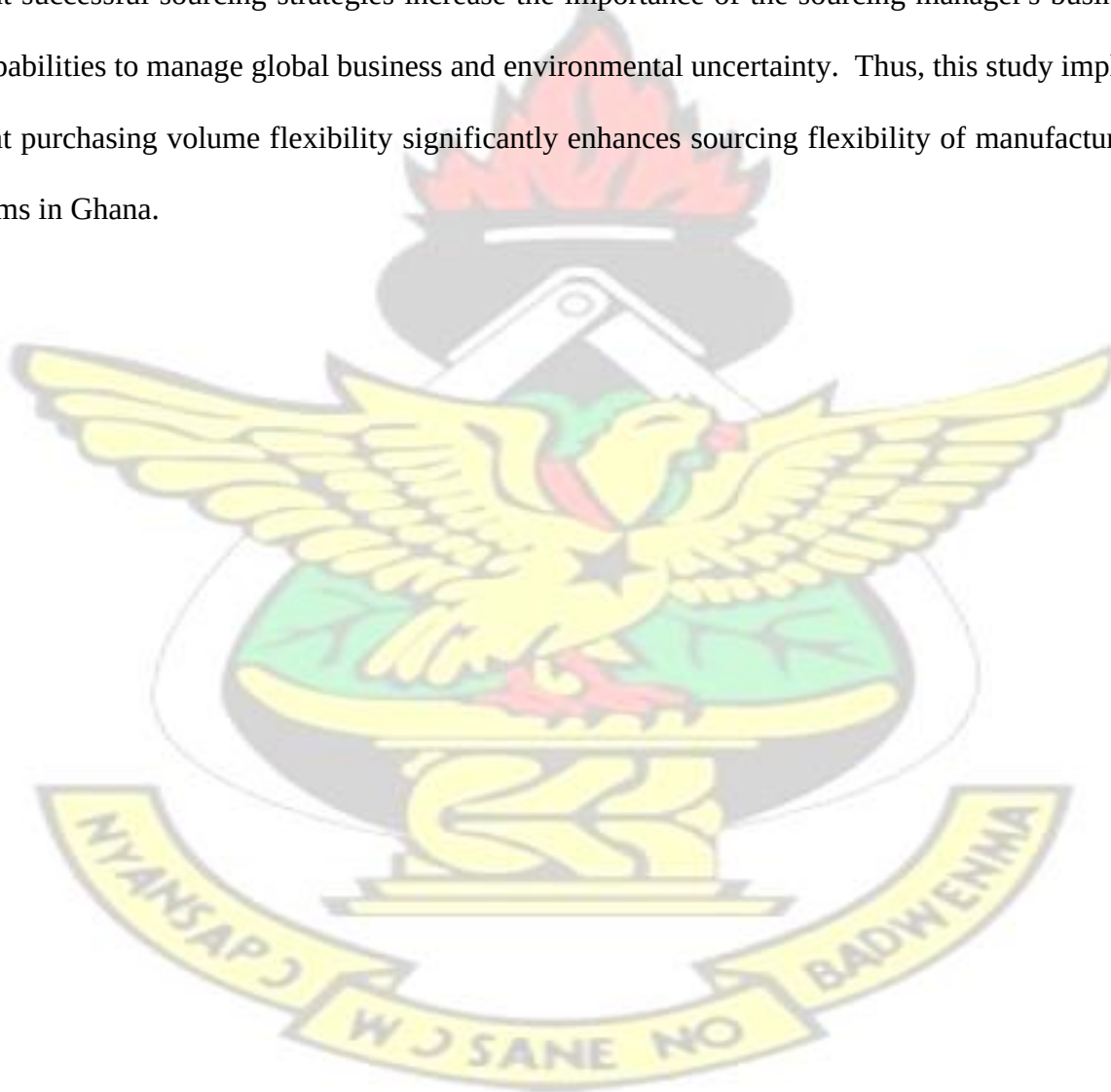
Similarly, Sáenz et al. (2018) and Liao (2020) found a significant relationship between sourcing flexibility and strategic sourcing. Additionally, prior studies indicate that although it is frequently intuitively assumed in the literature that "the greater the flexibility, the better the performance" (Abbas et al., 2021 p. 512). Again, other studies have been unable to find conclusive results on the relationship between different supply chain flexibility building blocks and performance (including sourcing flexibility) (Chirra, Raut, and Kumar, 2021; Phadnis and Darkow, 2021), and some even discovered "the possible negative consequences of being flexible" (Chirra et al., 2021). Tiwari, Tiwari, and Samuel (2015) on the other hand indicate that further empirical study must be done in order to develop correct insight, awareness, and knowledge of flexibility and to maximise its potential advantages. This results however showed that purchasing mix flexibility significantly influences sourcing flexibility among manufacturing firms in Ghana.

4.6.2 Effect of Purchasing Volume Flexibility on Sourcing Flexibility

Again, the second hypothesis (H_2) was also supported, thus Purchasing Volume Flexibility significantly affect Sourcing Flexibility among manufacturing firms in Ghana ($B=0.296$; $t=4.837$; $P=0.000$; $Sig<0.005$). The result revealed that a unit improvement in purchasing volume flexibility increases sourcing flexibility for approximately 30%. Hence, evidence from the results

indicates that purchasing volume flexibility significantly enhances sourcing flexibility of manufacturing firms in Ghana.

Jiang and Li (2019) also found that sourcing skills and behaviours are connected to a firm's success since various strategies call for different kinds of individuals to work well. Again, prior studies by Shou et al. (2021) and Çankaya (2020) showed that top management must understand that successful sourcing strategies increase the importance of the sourcing manager's business capabilities to manage global business and environmental uncertainty. Thus, this study implied that purchasing volume flexibility significantly enhances sourcing flexibility of manufacturing firms in Ghana.



CHAPTER FIVE

SUMMARY, CONCLUSION AND RECOMMENDATIONS

5.1 Introduction

This section of the study contains the summary of findings from the study as well as conclusions drawn from the study which are done in line with the objectives of the study. The section further elaborates on the recommendations and suggestions for further studies.

5.2 Summary of Findings

The main objective of this study was to examine the effect of purchasing volume flexibility and purchase mix flexibility on sourcing flexibility among multinational firms in Ghana. Two hypothesis were established based on the gaps in the research. Data were acquired from managers at manufacturing companies in Ghana. A questionnaire was used to collect information from 350 managers of manufacturing companies in Ghana.

The result shows that the first (H_1) hypothesis of the study which investigated the effect of purchasing mix flexibility on sourcing flexibility among manufacturing firms was supported. The result shows that a unit improvement in purchasing mix flexibility improves sourcing flexibility for approximately 37.8%. Hence, evidence from the results indicates that purchasing mix flexibility significantly influences sourcing flexibility among manufacturing firms in Ghana.

Again, the second hypothesis (H_2) was also supported, thus Purchasing Volume Flexibility significantly affect Sourcing Flexibility among manufacturing firms in Ghana. The result revealed that a unit improvement in purchasing volume flexibility increases sourcing flexibility for approximately 30%. Hence, evidence from the results indicates that purchasing volume flexibility significantly enhances sourcing flexibility of manufacturing firms in Ghana.

5.3 Conclusions

The focus of this study was to examine the effect of purchasing volume flexibility and purchase mix flexibility on sourcing flexibility among manufacturing firms in Ghana. To address the major goal of this study, two specific objectives were formulated. To achieve this, 350 individuals from the manufacturing companies in Ghana were sampled. SPSS and Smart PL-SEM were used for the analyses. The results indicate that purchasing mix flexibility significantly influences sourcing flexibility among manufacturing firms in Ghana. Again, evidence from the results indicates that purchasing volume flexibility significantly enhances sourcing flexibility of manufacturing firms in Ghana.

5.4 Theoretical Contributions

The study's theoretical contributions explain how firms maintain competitiveness by exchanging information with outside partners and being aware of the products, services, strategies, and best practices of their rivals. These theoretical contributions are called the dynamic capability view (DCV) and information processing theory (IPT) (Ambrosini and Bowman 2009; Eisenhardt and Martin 2000; Wang and Ahmed 2007). The results provide more information about how sourcing flexibility adoption in manufacturing enterprises is impacted by purchasing volume flexibility and purchasing mix flexibility. By analyzing the connection between purchasing volume flexibility and purchasing mix flexibility, these findings also help identify significant solutions that firms may use to manage with sourcing flexibility. The findings corroborate the core concepts of DCV and IPT, building on past research (Gunessee and Subramanian, 2020; Blome et al., 2014; Duarte Alonso et al., 2022). This study illustrates how DCV and OPT integration can be used to show how purchasing volume flexibility and purchasing mix flexibility affect

organizations' sourcing flexibility (Aslam et al. 2018; Chowdhury and Quaddus 2017; Qrunfleh and Tarafdar 2014).

5.5 Limitations and Suggestions for Further Studies

It is advised to conduct additional research to build on this study by expanding the sample size to improve the generalization of the findings to other industries as the study only focused on 350 manufacturing firms in Ghana. The results of the study may negatively affect the generalization of the findings to other industries.

Again, in order to achieve the research aims and because the research was conducted for academic purposes, all of the data used in this study were cross sectional data that were only collected once and during a short period of time. The employment of a longitudinal data gathering technique is advised for further research. As a result, it will be possible to collect data over a long period of time to verify the relationship between the dependent and independent variables.

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