

**KWAME NKRUMAH UNIVERSITY OF SCIENCE AND
TECHNOLOGY, KUMASI COLLEGE OF HUMANITIES AND
SOCIAL SCIENCES DEPARTMENT OF SUPPLY CHAIN AND
INFORMATION SYSTEMS**

**Assessing Supply Chain Management Practices and their impact on Supply
Chain Performance: The Moderating Role of Digitization**

By

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Institute of Distance Learning, in partial fulfillment of the requirements for the
Award
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DECLARATION

I hereby declare that this submission is my own research towards the Master of Science (Logistics and Supply Chain Management) degree, and that, to the best of my knowledge, it contains no material which has been previously published or material that been accepted for the award of any other degree of the University, except where due acknowledgement has been made in the text.

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DEDICATION

I dedicate this piece of work first and foremost to God Almighty for his grace and his protection throughout the period of my study in KNUST.

I further dedicate this research study to my family for their unflinching support and love throughout the entire journey of my study at KNUST.

God richly bless you all.

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ABSTRACT

The study sought to examine the effect of supply chain management practices on supply chain performance and the moderation effect of digitisation. The study therefore sought to achieve three specific objectives, including (1) to examine the relationship between supply chain management practices and supply chain performance, (2) to examine the relationship between digitisation and supply chain performance and (3) to assess the role of digitisation in moderating the relationship between supply chain management practices and supply chain performance. The study adopted the convenience sampling technique to a sample size of 115. Also, the study deployed semi-structured

questionnaire with the help of google form to gather data from the respondents. It could be noted that the Smart PLS4, version 23 was used to analyze the data. The study found that, supply chain management practices and supply chain performance are positively and significantly related, which lends support for hypothesis 1. Again, the results of the study found that digitisation has a positive and significant relationship with supply chain performance, which also supports hypothesis 2. The study further found a positive and insignificant moderation effect of digitisation between supply chain management practices and supply chain performance, hence H3 is rejected. Further, even though supply chain management practices seem to affect firm performance positively and significantly, most workers still lack the necessary skills and knowledge when adopting these supply chain practices, the study recommends that management must educate and train these workers to properly understand the practices of supply chain management. Finally, the current study adopted the manufacturing sector as a case study. The reason was that it is that sector which predominantly procures goods and materials for further production. Though the study found a positive relationship between supply chain and supply chain performance. However, the study suggests that future studies conduct a comparative analysis between the manufacturing and service sectors on supply chain practices and firm performance.

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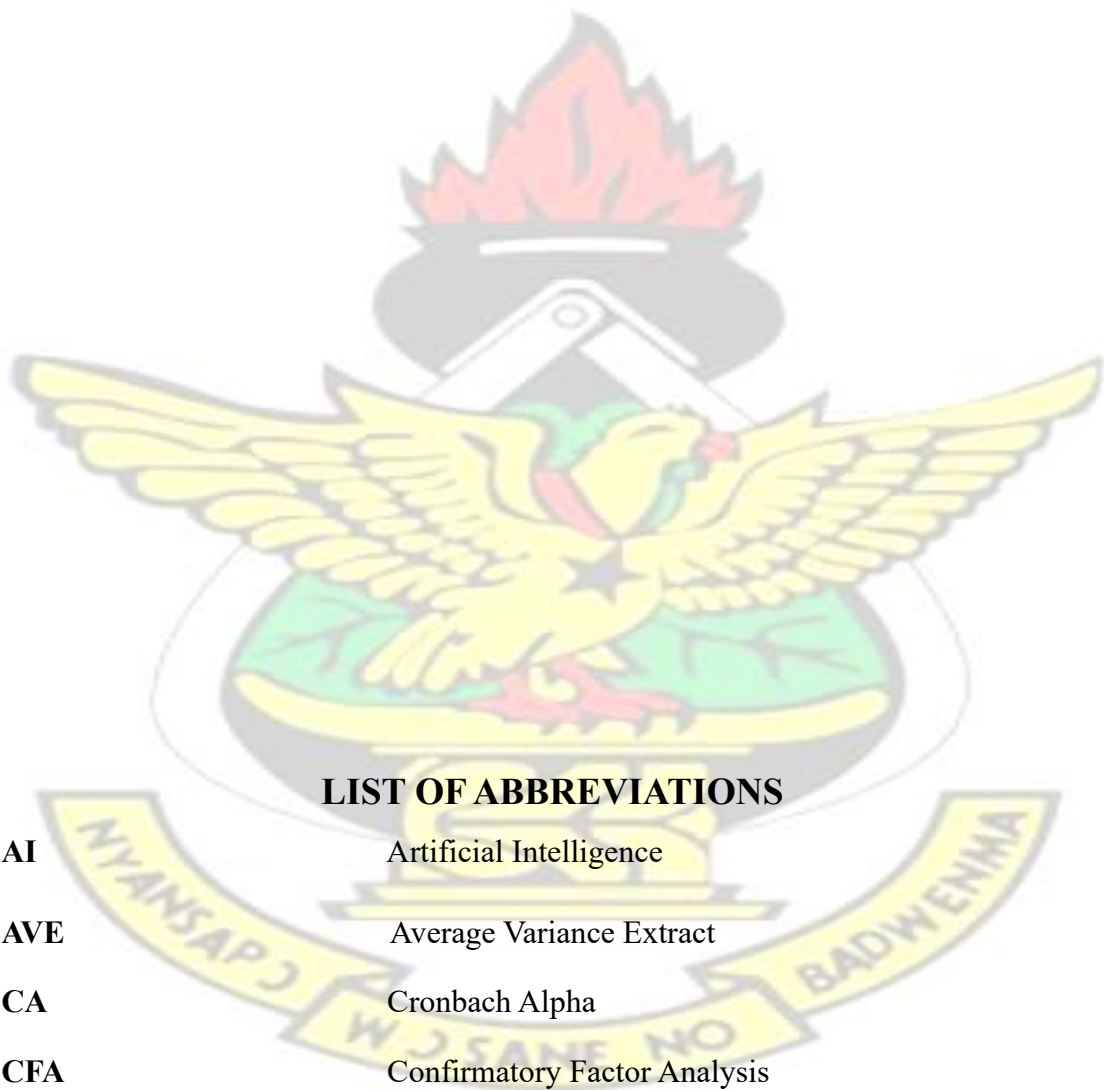
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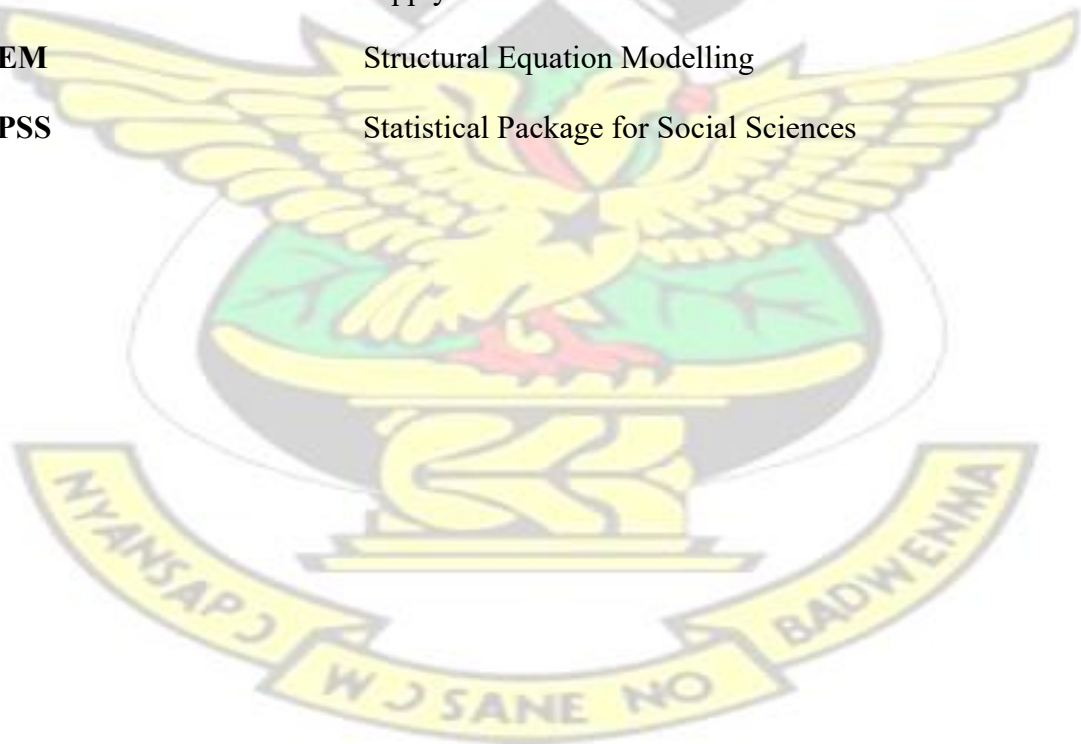
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LIST OF ABBREVIATIONS

AI	Artificial Intelligence
AVE	Average Variance Extract
CA	Cronbach Alpha
CFA	Confirmatory Factor Analysis
CR	Composite Reliability
CRM	Customer Relationship Management
DT	Digital Technology
ERP	Enterprise Resource Planning

IBM	International Business Management
ICT	Information and Communication Technology
IoT	Internet of Things
IT	Information Technology
JIT	Just In Time
PLS	Partial Least Square
RBV	Resource Base View
ROI	Return on Investment
SCI	Supply Chain Integration
SCM	Supply Chain Management
SCMP	Supply Chain Management Practices
SCP	Supply Chain Performance
SCR	supply Chain Resilience
SEM	Structural Equation Modelling
SPSS	Statistical Package for Social Sciences



CHAPTER ONE

INTRODUCTION

1.1 Background to the Study

Supply chain management (SCM) has emerged as a fundamental pillar for businesses in diverse industries, in this contemporary globalized world, marked by constant technological advancements and dynamic market changes (Power et al., 2019). SCM's importance in contemporary business operations can be attributed to its pivotal role in establishing a comprehensive and integrated approach to efficiently move goods, services, critical data, and financial resources from their source to end consumers (Shin et al., 2017). In this complex, interconnected network of operations, the effectiveness of SCM strategies is a fundamental requirement, playing a pivotal role in shaping the overall efficiency of the supply chain. This essential link between SCM methodologies and the resulting supply chain outcomes has attracted extensive research interest, drawing the attention of both academia and industry leaders, all eager to gain strategic advantages (Tan et al., 2016).

Traditionally, SCM methodologies have earned recognition for their undeniable impact on operational improvements and cost reductions. These methodologies encompass precise demand forecasting, meticulous inventory management, strategic procurement, and fine-tuned logistics (Moberg et al., 2017). However, the advent of the digital era, marked by unprecedented technological breakthroughs, compels businesses to reevaluate and recalibrate their existing SCM frameworks. This current age of digital transformation, propelled by groundbreaking technologies like the Internet, sophisticated data analytics, artificial intelligence and block-chain, a new era in supply chain operations has been ushered in. These technologies not only promise exciting opportunities but also present unique challenges, especially in terms of seamlessly integrating them into established supply chain structures (Power et al., 2019).

The incorporation of these digital tools has the potential to amplify the efficiency of established SCM practices, foster innovative strategies, and pave the way for revolutionary supply chain management techniques (Müller, 2018). Given these potential outcomes, it becomes imperative for businesses to deeply understand and navigate the intricate dynamics between SCM methodologies, supply chain performance, and the transformative influence of digitisation (Müller, 2018). In today's competitive business landscape, the battleground has evolved beyond individual

corporate entities, extending to encompass entire supply chains. Within this context, adept supply chain management (SCM) has firmly established itself as a crucial tool for preserving and elevating competitive positioning while optimising supply chain performance (Tan et al., 2016).

The complexities surrounding the delivery of products and services, ensuring their prompt arrival at the intended destination without inflating costs, have surged. This escalation can be attributed to heightened global competition and the pervasive globalization of markets since the 1990s. Tan et al. (2016) advocate that businesses have gradually shifted their focus from solely refining internal efficiencies to adopting a broader perspective that emphasizes the need to elevate the effectiveness of the whole supply chain network. They also emphasize the role of SCM in not only enhancing supply chain performance but also in elevating the competitiveness of the entire supply chain, emphasizing its importance in maintaining a resilient global competitive position. In this context, Feldmann and Müller (2018) emphasized the value of strategic collaboration within the supply chain, highlighting its role in optimising both individual entities and the overall supply chain.

Given the intensifying market competition, numerous businesses have identified SCM as the primary lever to establish a lasting competitive edge for their offerings (Shin et al., 2017). A plethora of academic literature has delved into SCM, exploring it through various lenses, including marketing, organisational dynamics, logistics, operations, procurement strategies, and advanced IT frameworks (Fantazy et al., 2018; Chopra and Meindl, 2018; Wisner et al., 2018). In these explorations, SCM emerges as an integrative approach that commences with the orchestration of materials, logistics, and data flows, ultimately transitioning from primary suppliers to the end consumer, underscoring its efficacy as a strategy for businesses keen on enhancing their supply chain performance (Brian et al., 2018).

Nevertheless, amidst these conversations, the significance of digital integration within the supply chain demands equal consideration. As companies navigate the intricate realms of supply chain management and performance, the pervasive impact of digital transformation becomes obvious. Delving deeper into the interconnected relationship between supply chain management, resulting performance, and the role of digitisation

is not only pertinent but also exceedingly timely for businesses. Hence, the current study aims to investigate these interrelationships.

1.2 Problem Statement

Over the last twenty years, there has been an increasing interest with supply chain management (SCM) in both the academia and the industrial sectors. This interest has highlighted the collaborative efforts of buyer and supplier organisations to improve the overall performance of supply chains, with a particular focus on the impact of digitisation. Several studies have explored various aspects of SCM and its relationship with performance, but there are still gaps in our understanding, especially regarding the role of moderators and mediators in enhancing firm performance, particularly in the manufacturing sector.

As an example, Agyeman-Mensah and Tang (2021) carried out research that unveiled the favorable influence of supply chain management (SCM) techniques on a company's financial performance. Nonetheless, their study did not delve into potential moderating or mediating elements that might amplify organisational performance. Likewise, Amin and Shahwan (2020) examined the connection between SCM and organisational effectiveness, with a focus on the moderating impact of information technology. Although their results underscored the significance of information technology, there is a requirement for additional research that delves into the nuanced role of information technology in SCM and its effects on performance.

Additionally, Bagshaw et al. (2017) demonstrated the favorable impacts of effective SCM on prompt delivery and the increase of sales. In a separate inquiry, Barczak et al. (2019) concentrated on the mediating role of competitive advantage while investigating the link between SCM practices, competitive advantage, and overall performance. Considering the evolving landscape of the supply chain management, both studies advocated for further investigation into how information technology shapes the connection between SCM practices and performance.

Moreover, considering the potential mediating role of digitisation, Ghomrassi and Tigu (2017) investigated the influence of SCM approaches on supply chain performance within the Romanian oil and gas industry. While they established a relationship between SCM practices and supply chain efficiency, their findings led them

to the conclusion that digitalization did not effectively mediate this relationship. However, they proposed the exploration of digitisation as a moderator in future research, offering insights into how SCM practices influence supply chain performance in the context of ongoing digital transformation.

Considering the existing research gaps, the primary objective of this study is to enhance our comprehension of the intricate connections among SCM practices, performance outcomes, and the moderating role played by digitisation, concentrating on the manufacturing sector.

1.3 Study Objectives

The central objective of this study is to examine the impact of digitisation on the relationship between supply chain management (SCM) practices and supply chain performance. To achieve this overarching aim, the research endeavors to address the following specific objectives:

1. To examine the relationship between supply chain management practices and supply chain performance.
2. To examine the relationship between digitisation and supply chain performance.
3. To assess the role of Digitisation in moderating the relationship between supply chain management practices and supply chain performance.

1.4 Research Questions

The purpose of the study is to assess the links between the variables by looking at the following research questions:

1. What is the relationship between supply chain management practices and supply chain performance?
2. What is the relationship between digitisation and supply chain performance?
3. What is the role of digitisation in moderating the relationship between supply chain management and supply chain performance?

1.5 Justification of the Study

This research underscores the importance of cultivating efficient and effective supply chain practices within organisations. This insight holds practical significance for management by highlighting the necessity of proactive strategies in supply chain

management to enhance overall organisational performance. This approach can result in improved allocation of resources and more informed decision-making in matters related to the supply chain.

Additionally, this research enriches the theoretical foundations of supply chain management by extending its scope to include strategic management aspects. It underscores the essential role that SCM plays in influencing supply chain performance, thus enhancing our understanding of how SCM influences the overall organisational performance. This extension is crucial as it aligns SCM with the broader organisational strategy, underscoring its strategic significance.

Again, this study investigates the moderating effect of digitisation on the interplay between supply chain management and supply chain performance. By integrating digitisation into the study's framework, it extends the boundaries of relational viewpoints and resource-based theories. It acknowledges the contemporary reality of digitisation's influence on businesses and supply chains, making it particularly pertinent in today's digital era.

From a pragmatic standpoint, this study offers valuable insights for management practitioners. It underscores the imperative of prioritizing supply chain management as a strategic lever for enhancing supply chain performance. These insights hold critical importance for businesses seeking to enhance their operational efficiency, cut costs, and gain a competitive edge in the market.

Moreover, the study underscores the essential need for commitment and collaboration between companies and their supply chain partners. This practical guidance emphasizes the significance of fostering robust relationships and cooperation throughout the supply chain, which can result in smoother operations and improved performance outcomes.

Lastly, the study's findings can serve as a valuable point of reference for professionals involved in procurement and other roles within supply chain management. It can offer guidance for informed decision-making and the development of strategies aligned with the study's insights. Furthermore, it provides a foundational platform for future researchers interested in exploring similar subjects, thus advancing the field of supply chain management.

1.6 Research Methodology

The research employed a quantitative research design to collect and analyze data. Specifically, it utilized a survey approach, with a focus on the manufacturing sector as the target population. Data was collected from manufacturing companies situated in the Greater Accra and Greater Kumasi regions of Ghana, using questionnaires as the primary data collection instrument. The sample for the study was selected through a convenience sampling technique, resulting in a sample size of 115 manufacturing firms. To analyze the data, the study utilized PLS4, version 23, and Structural Equation Modeling (SEM). These statistical tools were applied for both descriptive and inferential statistical analysis within the research.

1.7 Scope of the Study

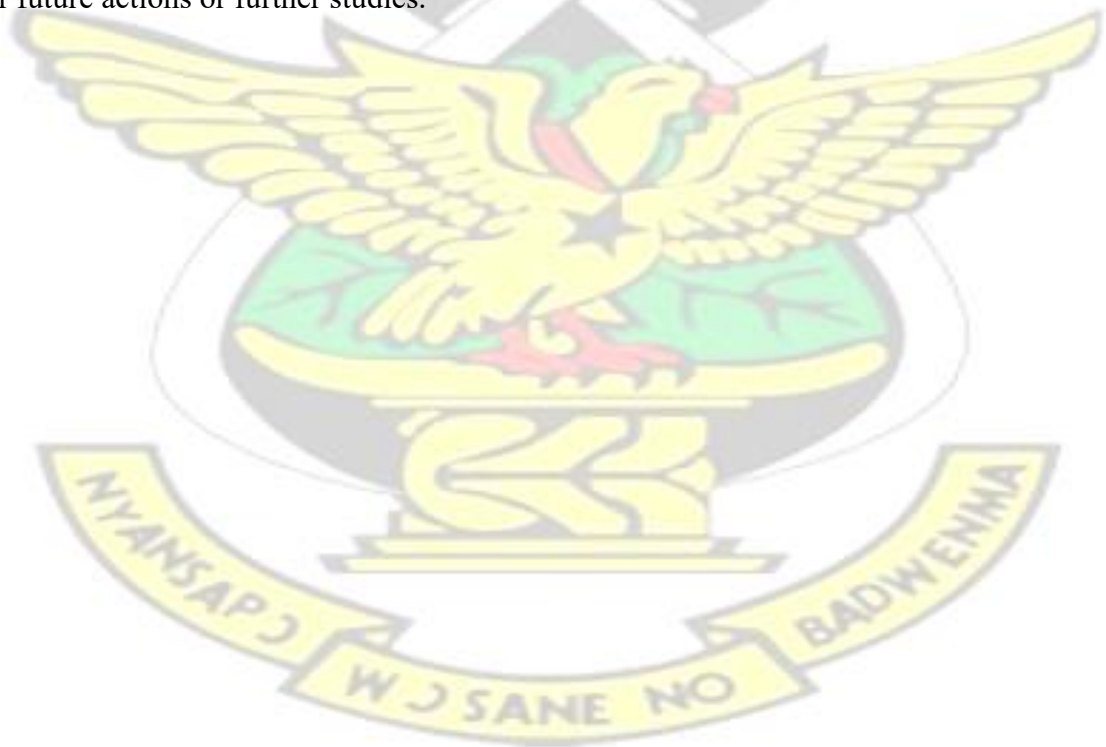
In this study, certain limitations regarding geographical coverage and the target audience were observed. Geographically, the research was limited to the metropolitan areas of Greater Accra and Greater Kumasi. The study focused primarily on manufacturing companies situated in these regions. The specific group under examination consisted of middle and senior managers responsible for procurement and supply chain operations. Conceptually, the primary objective of this study was to investigate the association between supply chain management practices and supply chain performance, along with an additional exploration of the moderating influence of digitisation on this connection.

1.8 Limitations of the Study

Several limitations were observed in this study. Firstly, the findings were contextspecific and confined to the manufacturing industry within the investigated regions, restricting the generalizability of the results to broader settings. Secondly, establishing causality between digitisation, SCM practices, and performance was challenging due to potential reverse causation and the influence of unaccounted-for variables. Additionally, defining and measuring the extent of digitisation and supply chain performance posed complexities, which could introduce measurement biases. Lastly, the selection of participants and organisations was subject to selection bias, potentially affecting the study's representativeness.

1.9 Organisation of the Study

The chapter one serves as the foundational section of the study, encompassing elements such as the study's background, problem statement, research objectives, research questions, justification for the investigation, an outline of the research methodology, the study's scope, limitations, and an overview of the research structure. Chapter two is dedicated to an extensive literature review, encompassing conceptual, theoretical, and empirical perspectives. This chapter also involves the development of the study's conceptual framework and hypotheses. Chapter three provides a comprehensive description of the research methodology employed, including details about the target population, sampling techniques, data collection procedures, methods for data processing, and ethical considerations that influenced the research process. Chapter four is dedicated to data analysis and the presentation of research findings. This chapter involves the analysis of the collected data and a discussion of the results derived from the analysis. Chapter Five serves as the conclusion of the study, summarizing the research findings, drawing conclusions based on these findings, and providing recommendations for future actions or further studies.



CHAPTER TWO

LITERATURE REVIEW

2.1 Introduction

This chapter encompasses the literature review, which includes an examination of fundamental concepts, a review of pertinent theories, an overview of empirical research, the construction of a conceptual framework, and the formulation of hypotheses.

2.2 Conceptual Review

In accordance with Kothari (2017), a conceptual review entails the scrutiny of preexisting data concerning a particular topic. In this section, we delve into various key concepts within the study, include digitisation, supply chain performance, and supply chain management strategies.

2.2.1 Supply Chain Management

To maintain a competitive advantage and enhance organisational performance, the implementation of effective supply chain management (SCM) has arisen as a crucial strategy. This shift is a response to the evolving landscape of competition, which now extends beyond individual businesses and encompasses broader supply chains and supplier networks. As a result, supply chain management have been defined differently in the literature. Chopra and Meindl (2017) assert that the supply chain is made up of all parties, whether directly or indirectly, engaged in satisfying consumer demand and that it includes all procedures involved in receiving and completing client requests. Waters (2017) defines a supply chain as a series of processes and entities through which goods travel from initial suppliers to ultimate customers. Waters (2017) also emphasizes that supply chains can differ among companies and across different products and services.

As stated by Larmin et al. (2019), the supply chain is an intricate system comprised of various procedures, processes, and sub processes such as procurement, manufacturing, transportation, warehousing, and other activities that support these functions. Its primary aim is to meet the desires of consumers or customers by delivering goods and/or services. Scholars and industry experts have shown considerable interest in the field of supply chain management (SCM). Because SCM encompasses aspects like buyer-supplier relationships, collaborative planning, long-term strategic partnerships,

inter-organisational inventory control, information sharing, and logistics management, it has become a widely adopted practice across various sectors. Efficient supply chain management (SCM) can attain the desired degree of customer satisfaction within a specific industry by optimising resources and enhancing customer service, achieved through improved product availability and shorter order cycle times (Banomyong and Supatn, 2011; Crainic and Laporte, 2016; Stevens and Johnson, 2016; Wang et al., 2016). Employing a holistic systemic approach and functioning as an integrated system across enterprises, SCM coordinates processes to achieve its objectives.

The council of supply chain management professionals offers a distinct definition of supply chain management (SCM). According to their definition, SCM involves the synchronization of various partners within the supply chain and encompasses the planning and oversight of all operations related to procurement, manufacturing, and logistics management. The effectiveness of SCM relies on an organisation's ability to develop and sustain specialized capabilities and competitiveness, enabling them to deliver products and services that effectively meet consumer requirements. Moreover, SCM relies on a firm's capacity to collaborate with other partners throughout the supply chain, effectively manage their personnel and resources for successful operations, and efficiently oversee and control their production to deliver maximum value to customers.

Supply chain management entails controlling the flow of resources, goods, and services inside and across various activities (Martins et al., 2019). In addition, the main objective of supply chain management is to guarantee that items are delivered to clients on time, in compliance with quality standards, and at a reasonable cost (Martins et al., 2019). The control of the flow of goods and services from suppliers to consumers is another aspect of supply chain management (SCM), which is a complex process that calls for the coordination and integration of numerous tasks such as procurement, production, transportation, inventory management, and customer service.

Planning: This involves developing a strategic plan for managing the supply chain, including forecasting demand, establishing production schedules, and determining inventory levels (Abbasi and Nilashi, 2020).

Sourcing: This involves selecting suppliers and establishing relationships with them, negotiating contracts, and managing supplier performance (Akhtar et al., 2018).

Manufacturing: This involves producing and assembling products, managing the production process, and ensuring quality control. (Abdul-Rahim and Shamsudin, 2021).

Logistics: This includes managing the transportation of products from suppliers to customers, including warehousing, distribution, and delivery (Azadi et al., 2019).

Customer service: This involves managing customer relationships and ensuring that their needs are met, including handling customer inquiries, complaints, and returns (Azadegan and Dooley, 2010).

All supply chain actors, including suppliers, manufacturers, distributors, retailers, and customers, must work together and coordinate their activities in order for the supply chain to be managed effectively. The use of cutting-edge technology and systems, such as enterprise resource planning (ERP) software, supply chain visibility tools, and analytics, is also a part of this process to boost supply chain efficiency and cut costs (Cheng and Yang, 2019).

Enhanced efficiency and cost savings are among the primary advantages of effective supply chain management. Through supply chain optimization, organisations can reduce inventory costs, improve delivery time, and minimize waste. Furthermore, it contributes to improved customer satisfaction by ensuring timely product delivery that meets customer expectations.

In conclusion, supply chain management is crucial for firms that produce and deliver goods and services to clients through complex networks of suppliers, manufacturers, and distributors. As recommended by the Council of Supply Chain Management Professionals, supply chain management (SCM) is defined in this study as the meticulous planning, coordination, and oversight of all activities connected with the procurement process, transformation, logistics management, and collaboration with chain partners.

2.2.2 Supply Chain Management Practices

Collaboration and coordination between the many supply chain players, including suppliers, manufacturers, distributors, retailers, and customers, are essential to effective supply chain management strategies. The goal is to guarantee the supply chain's

effectiveness, cost-effectiveness, and capacity to satisfy customer needs while also maximizing profitability (Gao et al., 2015).

Consequently, supply chain management (SCM) practices encompass a range of strategies and methods that companies employ to oversee their supply chain operations. These practices are designed to facilitate the smooth flow of goods and services from suppliers to customers, reduce costs, and enhance overall supply chain performance. SCM practices can encompass a wide array of tasks, including procurement, manufacturing, inventory management, transportation, logistics, and customer service (Ghosh and Vinodh, 2020). The specific practices adopted depend on the nature of the business, the type of products or services offered, and the supply chain's requirements. Here are some common supply chain management practices:

1. Demand forecasting: This involves utilising data and data analytics to predict future demand for products or services, allowing for the effective planning and management of the supply chain (Ghosh and Shah, 2019).
2. Supplier relationship management: This entails establishing strong relationships with suppliers, establishing clear communication channels, and collaborating to enhance performance and reduce costs (Guo and Zhang, 2020).
3. Inventory management: This includes managing stock levels to ensure an adequate supply to meet demand while minimizing excess inventory that can tie up resources and increase costs (Kamath and Gunasekaran, 2017).
4. Transportation and logistics management: This involves overseeing the movement of goods and services throughout the supply chain, including transportation, warehousing, and distribution (Kharouf et al., 2019).
5. Technology and data analytics: This entails utilising advanced technologies and data analytics to optimize supply chain performance, enhance visibility, and reduce costs (Khatib et al., 2021).
6. Sustainability: This involves integrating sustainable practices into the supply chain, such as using environmentally friendly materials, reducing waste, and minimizing the carbon footprint of operations (Gligor et al., 2017).

To effectively collaborate with the numerous stakeholders in the supply chain and ensure the sustained performance of businesses and their supply chains, supply chain management practices employ a range of approaches and processes (Chopra and

Meindl, 2017; Tseng, 2020). According to Donlon (2018), SCM practices encompass the measures that a business adopts to facilitate efficient supply chain management. Donlon (2018) also offers an overview of the latest developments in SCM practices, encompassing aspects such as supplier interactions, outsourcing, cycle time reduction, continuous process flow, and knowledge sharing. Furthermore, Tan et al.'s (2019) factor research unveils six additional dimensions of SCM practice, which include supply chain integration, information sharing, supply chain characteristics, customer service management, geographical proximity, and just-in-time (JIT) capability. Crossfunctional teams, communication, and supplier base reduction are also metrics considered by Chen and Paulraj (2017) in the context of SCM practices.

Supply chain management practices is defined in this study as a number of management activities aimed at enhancing supply chain performance (Li et al., 2017; Wong et al., 2018). The current study uses three (3) major sub-variables: customer interactions, information exchange, and strategic supplier alliances to measure and conceptualize supply chain management methods.

2.2.2.1 Strategic Supplier Partnership

Businesses and other institutions have realized the strategic value of working with suppliers to gain a competitive edge and improve their operational performance in terms of dependability, flexibility, cost, and quality over the past ten years (Rungtusanatham et al., 2020). According to Rungtusanatham et al. (2020), a strategic supplier partnership is a long-term engagement between an organisation and its suppliers with the goal of maximizing the benefits of their operational and strategic knowledge (Wong et al., 2018). In order to enhance collaborative planning and problem-solving, this strategic partnership places an emphasis on direct, long-term collaboration (Zhou and Benton, 2020). Such strategic alliances promote mutual gains among the involved parties and sustain their involvement in critical strategic domains, such as technology, goods, and markets (Wong et al., 2018).

A strategic supplier partnership goes beyond the typical buyer-seller relationship and involves a deeper level of collaboration, mutual trust, and long-term commitment, with the aim of achieving shared business objectives and creating value for both parties (Li et al., 2019). In this type of partnership, the buyer and supplier work together to identify opportunities for improving quality, reducing costs, increasing efficiency, and fostering

innovation. Trust forms the foundation of this partnership, with both parties sharing information, risks, and rewards. Here are some key features of a strategic supplier partnership:

1. Mutual commitment: Both the buyer and the supplier are deeply committed to the long-term success of the partnership and are willing to invest time, resources, and expertise to achieve shared objectives (Lee et al., 2020).
2. Collaboration: The buyer and supplier collaborate closely to identify opportunities for enhancing processes, products, and services. They share ideas and knowledge to drive innovation and create value (Kim and Choi, 2021).
3. Transparency: Transparency is key, with both parties openly sharing information about costs, quality, performance, and risks (Nandakumar and Ghobakhloo, 2019).
4. Performance metrics: The partnership operates based on mutually agreed-upon performance metrics, with regular monitoring and evaluation of progress (Kumar and Maqbool, 2018).
5. Continuous improvement: The partnership is dedicated to continuous improvement, with both parties actively seeking new ways to enhance quality, reduce costs, and improve efficiency (Mishra and Shah, 2015).

Strategic supplier partnerships offer numerous benefits, including increased supply chain efficiency, reduced costs, improved quality, enhanced innovation, and effective risk management. By working together in a collaborative and strategic manner, both the buyer and supplier can achieve greater success and drive growth in their businesses.

Lan et al. (2018) emphasized that close collaboration and the optimization of operations can result in significant time and effort savings. The success of a state-of-the-art supply chain often hinges on the efficiency of supplier collaboration (Lan et al., 2018). To establish strategic supplier partnerships, it is imperative for both the company and its suppliers to enhance their cooperation. Typically, businesses maintain enduring relationships with suppliers that provide additional value-added benefits.

In the context of this study, a strategic supplier partnership is characterized as a prolonged association between a corporation and its suppliers. This association exerts influence on the strategic and operational capabilities of each participating entity and leads to substantial and continuous benefits (Monczka et al., 2018). Such partnerships

involve the procurement of goods and services from suppliers, impacting their capabilities, generating value, and enhancing supply chain profitability (Monczka et al., 2018; Sufian, 2020). Organisations increasingly recognize the knowledge and expertise held by their suppliers and distributors, which can significantly enhance the quality of their products and customer service (Hitt and Vaidyanath, 2018). Valuable insights, technological knowledge, market expertise, and other skills can be acquired through collaboration with partners and distributors. This collaboration enables organisations to actively pursue continuous improvement and enhance the marketability of their products (Ansari and Modarress, 2020). When companies establish robust supply chain partnerships, they become better equipped to adjust to evolving markets and create products that resonate with their customers. According to Noble (2017), to foster innovation within a supply chain, it is essential to cultivate strong relationships with strategic suppliers. Businesses can achieve this by closely collaborating with suppliers who take shared responsibility for the success of their products, as emphasized by Li et al. (2017). This close cooperation with suppliers and other entities yields significant and positive effects on both incremental product innovation and process innovation, as highlighted by Radas and Bozic (2019).

2.2.2.2 Customer Relationship Management

Customer relationship management (CRM) has gained increasing importance for business sustainability, especially as mass customization and personalized services become more prevalent (Lan et al., 2018). Effective implementation of supply chain management (SCM) programs is vital for maintaining positive relationships with all stakeholders in the supply chain, including customers. Customer relationship management encompasses a wide range of strategies and practices aimed at addressing customer concerns, establishing long-lasting relationships with clients, and enhancing overall customer satisfaction (Noble, 2017). Flint (2017) contends that gaining a competitive edge in the dynamic business environment is possible by enhancing value for immediate downstream customers, the consumers of those customers, and ultimately the end-users. Furthermore, Tan et al. (2019) argue that engaging customers in decisions regarding quality and material flows can result in enhanced operational performance, particularly in terms of speed and delivery accuracy. Consequently, the customer relationship management (CRM) aspect should be appropriately prioritized when formulating supply chain management (SCM) strategies and processes.

According to Olhager and Selldin (2003), customer relationship management (CRM) is characterized as a corporate strategy with the objective of establishing and maintaining robust customer relationships. This strategy is achieved through efficient contact management and the provision of personalized experiences to customers.

CRM aids companies in gaining a deeper understanding of their customers' needs, preferences, and behaviours, enabling them to provide high-quality products and services that align with customer expectations. The key components of a CRM system include:

1. Customer data management: A CRM system collects and centralizes customer data from various sources such as social media, email, website interactions, and phone calls. This data is organized and stored in a central database, accessible to sales, marketing, and customer service teams (Nandakumar and Ghobakhloo, 2019).
2. Sales management: CRM systems offer tools and processes for sales teams to manage and monitor sales leads, opportunities, and customer interactions. This facilitates the identification of potential customers, tracking of customer interactions, and more efficient deal closure (Lee and Kwon, 2020).
3. Marketing automation: CRM systems can automate marketing campaigns, including email marketing, social media advertising, and targeted promotions, based on customer data and behaviour. This allows companies to deliver personalized marketing messages tailored to individual preferences and needs (Li et al., 2019).
4. Customer service and support: CRM systems equip customer service teams with the tools and information required to offer personalized and efficient support to customers. This includes access to customer data and history, enabling quick issue resolution and providing solutions aligned with customer needs (Liu et al., 2016).
5. Analytics and reporting: CRM systems provide analytics and reporting capabilities, enabling companies to track customer behaviour, preferences, and needs. This helps identify trends, growth opportunities, and areas requiring improvement (Mishra and Modi, 2019).

The advantages of implementing CRM include:

- a. Improved customer satisfaction: CRM enables companies to deliver personalized experiences, efficient support, and customized products and services, leading to increased customer satisfaction and loyalty (Mishra and Shah, 2015).
- b. Increased sales and revenue: By providing sales teams with access to customer data and insights, CRM systems help companies close deals more effectively, leading to higher sales revenue (Nandakumar and Ghobakhloo, 2019).
- c. Enhanced marketing campaigns: CRM systems leverage customer data to create personalized marketing campaigns, resulting in improved campaign effectiveness and higher return on investment (ROI) (Özçelik and Önsel, 2020).
- d. Improved customer retention: Strong customer relationships and personalized experiences fostered by CRM systems contribute to better customer retention and reduced customer churn rates (Özgen and Sahin, 2020).
- e. Better business insights: By analysing customer data and behaviour, companies gain valuable insights into customer preferences, market trends, and growth opportunities, allowing for more informed business decisions (Pal and Yadav, 2016).

In summary, CRM is a comprehensive business strategy that involves collecting, analysing, and utilising customer data to gain a deeper understanding of customer needs and preferences. By delivering personalized experiences, efficient support, and tailored products and services, companies can enhance customer satisfaction, boost sales revenue, and drive business growth. Businesses recognize the importance of understanding and meeting customer needs while also striving to exceed customer expectations in today's customer-centric environment (Noble, 2017). Through various processes and technologies, businesses aim to comprehend their customers' true demands, drive internal product and service improvements, and promote customer satisfaction and loyalty. The primary objective of customer relationship management is to achieve customer satisfaction and loyalty, as dedicated relationships provide a sustainable competitive advantage by creating barriers to competition (Day, 2019). Building strong customer relationships sets an organisation apart from competitors, fosters customer loyalty, and significantly enhances the value delivered to customers.

2.2.2.3 Information Sharing

Information sharing is a critical aspect of communication and collaboration, both within and across organisations. It involves the transfer of knowledge, data, and ideas between individuals or groups, and can take many different forms, such as:

1. Verbal communication: This involves the sharing of information through spoken words, either face-to-face or over the phone.
2. Written communication: This includes any written form of communication, such as emails, reports, memos, or letters.
3. Visual communication: This includes any form of communication that uses images, graphics, or videos to convey information.
4. Electronic communication: This includes any form of communication that takes place over digital platforms, such as instant messaging, social media, or video conferencing.

Information sharing is the act of exchanging information between individuals, groups, organisations, or systems. It is the process of conveying data, knowledge, or ideas from one person or entity to another (Pfohl et al., 2016).

Information sharing can take various forms, including verbal communication, written communication, visual communication, and electronic communication. It encompasses the sharing of various types of information, such as personal data, business information, scientific research, news, and current events, among others (Prahinski and Benton, 2004). The advantages of information sharing encompass the capacity to collaborate effectively, make well-informed decisions, enhance efficiency, facilitate problemsolving, and cultivate trust among individuals or organisations (Singh and Garg, 2017). However, there are associated risks with information sharing, including the potential for unauthorized disclosure of sensitive or confidential information.

Many businesses are currently engaged in information sharing, and it is proving to be highly effective (Young, 2020). Information exchange is considered a foundational element of any supply chain management (SCM) system (Moberg et al., 2020). According to Rahman and Subramanian (2013), the quality of information sharing refers to the information's completeness, accuracy, and timeliness. According to Li et

al. (2017), information sharing in the context of supply chain management refers to the volume of crucial and private information exchanged with a company's supply chain partners. Additionally, Li et al. (2017) define information sharing as a company's ability to effectively and productively share knowledge with its supply chain partners. Numerous scholars have explored the concept of information sharing within SCM strategies. Lalonde (2018) asserts that information exchange is a fundamental element of a company's supply chain.

Yu et al. (2021) confirm that consistent information exchange helps mitigate the adverse impacts of the bullwhip effect within a supply chain. Sharing knowledge is a means to attain a competitive advantage, as noted by Novack et al. (2019). The numerous advantages of information sharing in supply chain management have been extensively examined, as detailed by Cachon and Fisher (2020). The exchange of information contributes to the effective coordination of supply chain activities, thereby facilitating material flow and reducing inventory costs. Furthermore, information sharing significantly influences the overall performance of the supply chain in terms of total cost and service level, as emphasized by Zhao et al. (2020). Effective information sharing is regarded as a critical capability in the supply chain process. Information sharing stands out as a major strategy for establishing a coordinated and linked supply chain. According to Lee (2017), information should be interoperable, meaning it should have the capability to communicate effectively with other systems. According to Zailani and Rajagopal (2018), technological improvements in the internet and ecommerce can lead to the development of a -smart integrated supply chain.

Further, effective information sharing requires clear and concise communication, as well as a willingness to share information openly and honestly. It also requires trust between the individuals or organisations involved, as well as a shared understanding of the purpose and scope of the information being shared. Information sharing can have a variety of benefits, including:

Improved decision-making: When individuals or organisations have access to relevant and timely information, they are better equipped to make informed decisions (Shadiev et al., 2020).

Increased efficiency: Information sharing can help to streamline processes and reduce redundancies, leading to improved efficiency and productivity (Shen et al., 2020).

Improved problem-solving: By sharing information and working collaboratively, individuals or organisations can develop more effective solutions to problems (Srivastava, 2007).

Building trust: When individuals or organisations share information openly and transparently, it can help to build trust and strengthen relationships (Wang et al., 2016).

However, there are also risks associated with information sharing. For example, sensitive or confidential information may be inadvertently shared, or information may be misinterpreted or used inappropriately. To mitigate these risks, organisations should have clear policies and procedures in place for information sharing and should ensure that all individuals involved are properly trained and aware of these policies. Additionally, it may be necessary to implement security measures to protect sensitive information, such as encryption, access controls, or monitoring and auditing.

2.2.3 Supply Chain Performance

In today's highly competitive business environment, every company must remain vigilant about the level of competition it faces (Addison, 2016). According to Yachtman and Seashore (2017), performance is the capacity to successfully carry out the primary responsibilities of the organisation within the constraints of its environment and available resources. They suggested using the following metrics to evaluate performance: key management, growth, productivity, turnover, and production costs. Friedlander and Pickle (2018), in contrast, employed indicators such as profitability, employee satisfaction, and the company's overall value to assess performance. Within the context of the present study, supply chain performance is conceptualized.

Supply chain performance refers to the measurement of how effectively a supply chain operates in terms of meeting customer requirements and achieving business objectives. The performance of a supply chain can significantly impact a company's success, profitability, and competitive position.

One of the most critical aspects of supply chain performance is the ability to fulfill customer demands promptly and efficiently (Mwangi and Nzemu, 2016). This entails ensuring that products or services are available when customers need them and that they are delivered on time, to the correct location, and in the right condition. Late deliveries,

stock-outs, and other disruptions in the supply chain can lead to lost sales and harm customer relationships.

Another important aspect of supply chain performance is managing costs effectively (Wang et al., 2019). This involves finding ways to reduce the cost of producing and delivering products or services while maintaining quality and meeting customer expectations. Cost reduction strategies may include optimising inventory levels, improving supplier relationships, reducing waste and inefficiencies, and leveraging technology and automation. Supply chain performance can also be measured in terms of agility and flexibility (Wu and Chen, 2018). In today's fast-paced business environment, it is imperative that companies respond quickly to changes in demand, supply chain disruptions, and other external factors. This requires a flexible and agile supply chain that can adapt to changing conditions and provide the necessary resources and capabilities to meet changing customer needs. To improve supply chain performance, companies need to adopt a continuous improvement approach (Wu and Chen, 2018). This involves regularly monitoring and reviewing performance metrics, identifying areas for improvement, and implementing strategies to address them. Strategies may include process improvements, technology investments, supplier development programs, and employee training and development.

Supply chain performance includes actions taken by the extended supply chain to meet end-customer demands for things like product availability, on-time delivery, and all required inventory and capacity in the supply chain to meet those demands (Zhang and Yang, 2020). Again, Etzioni (2019) posits that supply chain performance refers to a company's ability to satisfy both market and financial-oriented goals. Price (2018) claims that the effectiveness of the supply chain is crucially assessed in connection to productivity, compliance, quality, shortened lead times, and customer happiness. Performance standards including productivity, adaptability, and flexibility are highly regarded (Moh, 2017). In addition to these factors, Duncan (2017) considers productivity, efficiency, satisfaction, suppleness, development, and survival when assessing the success of the supply chain. Additionally, Child (2018) suggests that profitability and growth are the two primary components of supply chain performance.

Shepherd and Günter (2016) highlight that supply chain performance extends beyond organisational boundaries as it encompasses the utilization of raw materials,

components, subassemblies, and finished goods, along with their distribution to customers through various channels (Vital et al., 2018). Mwangi and Nzemu (2016) concur that organisations require performance metrics that facilitate improvements in global supply chain performance rather than metrics limited to specific company or functional areas, which can impede chain-wide enhancements needed for continuous improvement. The aim is to maximize revenue from operations by implementing effective and efficient supply chain management practices (Katz and Kahn, 2016).

In summary, supply chain performance is a critical factor in the success of any business that relies on a complex network of suppliers, distributors, and other partners to deliver products or services to customers. Effective supply chain performance requires a focus on meeting customer needs, managing costs, and being flexible and responsive to changing conditions. By adopting a continuous improvement approach, companies can achieve a more efficient and effective supply chain that drives business success.

2.2.4 Digitisation

Digitisation refers to the process of transforming analog data into a digital format, making it accessible for storage, processing and transmission via electronic devices and computer networks (Wu and Chen, 2018). Digitisation has transformed the way we create, store, and access information, and it has had a profound impact on many aspects of our daily lives, including communication, entertainment, education, and business. In the context of business, digitisation involves the use of digital technologies to transform traditional business processes, products, and services (Zailani et al., 2012). This can include automating manual processes, creating digital products and services, and using data analytics to make better business decisions. Some examples of digitisation in business include:

- Digital marketing: Businesses can use digital channels such as social media, email, and search engines to promote their products and services (Xu et al., 2020).
- E-commerce: Digital platforms such as online marketplaces and mobile apps allow businesses to sell products and services to customers around the world (Yadav and Varshney, 2018).

- Cloud computing: Cloud-based services enable businesses to store and access data and software applications via the internet, thereby reducing the need for physical infrastructure and IT staff (Zailani et al., 2012)
- Big data analytics: Digital technologies allow businesses to collect and analyze large amounts of data to gain insights into customer behaviour, market trends, and operational efficiency (Yadav et al., 2018).

Organisations are increasingly functioning within "hybrid supply chain networks," according to Porter and Heppelmann (2014). These networks are significantly impacted by cutting-edge technologies like the Internet of Things (IoT), big data, and artificial intelligence. This transformation is driven by the rapidly evolving business landscape spanning multiple borders and continents. On one hand, it's shaped by changing customer behaviours and demands, and on the other hand, it's fueled by mounting competitive pressures. In recent years, global connectivity and real-time data exchange have brought about profound changes in organisations. This shift empowers them to explore new business models and concepts within their domains, but it also necessitates an enhancement of their innovation capabilities to stay competitive in these evolving business models (Downes and Nunes, 2014). According to Bucy et al. (2016) and Zhong et al. (2016), big data is propelling a genuine global digital transformation of organisations, elevating their profitability and competitiveness to new heights. Consequently, businesses are leveraging artificial intelligence within their supply chain ecosystems. When combined with human behaviour, this integration results in new levels of intelligence, innovation, and collaboration. Organisations are navigating a relatively new landscape of concepts, methodologies, challenges, and opportunities in the realm of digitisation, procurement, and supply chain operations (Brabazon, 2019).

In pursuit of the overarching organisational and supply chain goals of long-term growth, profitability, and competitive advantage, digitisation can play a pivotal role in shaping and optimising sourcing strategies, both existing and novel ones. The significance of this objective is closely tied to the role that procurement departments hold within organisations and the substantial influence they can wield across the entire supply chain. Businesses are becoming more conscious of the need to adapt their operations, strategies, and routines to the challenges posed by the "new normal" (Loureiro et al., 2021). To maintain business continuity, businesses have started to streamline and improve the efficiency of their processes using digital tools. Thus, digital capabilities

are increasing due to a changing and turbulent environment (Zhen et al., 2021). According to some studies, having digital capabilities makes a company more flexible and saves money (Drnevich and Croson, 2013). A company is more likely to establish a more complicated and favourable strategy the more resources it has and the more effectively it can employ them (Wang, 2017). Evidence suggests that the performance of businesses and their competitive advantage are linked to digital capabilities (Drnevich and Croson, 2013). Usai et al. (2021) contend that creativity and persistent efforts in research and development activities, rather than digital capabilities, are what lead to a firm's innovative performance. According to current research, there is "hard-pressed" evidence supporting a link between digitisation and improved company performance (Tan et al., 2010). Tan et al. (2010) further argue that relying solely on digitisation, however, needs to be complimented with other resources for a successful inventive performance.

2.3 Theoretical Review

The study is grounded in two main theoretical frameworks: the Resource-Based View (RBV) theory and the Relational View Theory.

2.3.1 Resourced-Based View Theory

The Resource-Based View (RBV) theory, as applied in this study, emphasizes the importance of an organisation's internal resources, capabilities, and competencies in achieving and sustaining a competitive advantage. It suggests that a firm's unique and valuable resources can enable it to outperform competitors by effectively leveraging these resources to capitalize on opportunities and overcome challenges. In the context of assessing supply chain management practices and their impact on supply chain performance with the moderating role of digitisation, RBV theory highlights the significance of internal assets and capabilities in shaping competitive outcomes.

RBV theory posits that organisations should focus on their internal environment as a potential source of competitive advantage. It suggests that organisations must develop distinctive, firm-specific core competencies and resources to excel in their respective markets. This theory argues that resources should be diverse and immobile, and supply chain management practices are one such resource that influences supply chain performance.

RBV theory aligns with the current study by emphasizing the heterogeneity of a firm's resources, which can encompass tangible and intangible assets. Therefore, RBV theory can be applied to investigate how a company's unique resources, including its supply chain management practices and digital capabilities, contribute to improved supply chain performance. It suggests that a firm's specific supply chain management practices, when aligned with its capabilities and enhanced through digitisation, can lead to a competitive advantage.

For example, a company with efficient inventory management practices that leverages digital technologies to optimize inventory levels and demand forecasting may experience improved supply chain performance, cost reduction, and increased customer satisfaction. This illustrates how RBV theory can provide insights into the relationship between supply chain management practices, digitisation, and supply chain performance in the context of this study.

2.3.2 Relational View

The relational view theory, also known as the resource dependence theory, emphasizes the significance of inter-organisational relationships, partnerships, and networks for a firm's success (Lee et al., 2016). It posits that, organisations are not stand-alone entities but are interconnected with suppliers, customers, and other stakeholders (Lyson and Farrington, 2016). In the context of assessing supply chain management practices and their impact on supply chain performance with the moderating role of digitisation, the relational view theory offers insights into how collaborations and relationships influence these dynamics (Beugre and Acar, 2018). The theory therefore underscores the importance of fostering strong relationships and partnerships across the supply chain to enhance performance and gain competitive advantage. The relational view theory, as applied in this study, underscores the importance of collaborative relationships with various supply chain stakeholders, including suppliers, distributors, and other partners, in achieving enhanced supply chain performance. This theory suggests that effective supply chain management practices are not solely dependent on internal processes but are strongly influenced by the quality and strength of relationships with external partners.

In the context of this study, the relational view theory implies that strong collaborative relationships with supply chain partners are crucial for achieving improved supply

chain performance. Effective supply chain management practices, when coupled with robust relationships built on trust, cooperation, and open communication, can lead to positive performance outcomes. These relationships enable better coordination, information sharing, and problem-solving across the supply chain network (Mehta, 2018; Mourison, 2019; Lam et al., 2019).

Furthermore, the integration of digitisation into the supply chain can act as a facilitator for these collaborative efforts. Digitisation can streamline information sharing processes, provide real-time data visibility, and enhance communication channels among supply chain partners. This, in turn, can contribute to smoother collaboration, quicker responses to changes or disruptions, and overall improved supply chain performance.

2.4 Empirical Review

To achieve success, businesses must prioritize operational efficiency and implement effective strategies to streamline processes both internally and across their operations. Previous research has explored topics related to supply chain management practices, company performance, and the integration of digital technologies.

Agyeman-Mensah and Tang's (2021) research aimed to explore the influence of supply chain management practices on the financial and social performance of manufacturing companies in Ghana. Their findings revealed that proficiently executed supply chain management practices had a positive and statistically significant effect on the financial outcomes of these firms. To put it simply, companies that effectively managed their supply chains tended to achieve superior financial results. Furthermore, the study recommended that future research efforts should prioritize investigating the role of information technology in the realm of supply chain management. This implies that forthcoming studies should focus on how technological advancements, such as software systems and digital tools, can enhance or impact supply chain practices and, subsequently, their effect on performance.

A study conducted by Amin and Shahwan (2020) aimed to evaluate the correlation between supply chain management and the performance of companies operating in the Swiss manufacturing sector. The study specifically concentrated on the significance of information technology in this context. The findings of the research revealed that

information technology plays a crucial role in this connection. It not only supports but also substantially moderates the association between supply chain management practices and organisational efficiency. To put it more simply, information technology enhances and shapes how effectively supply chain management practices contribute to a company's overall effectiveness within the Swiss manufacturing industry. Furthermore, the study put forward a recommendation for prospective researchers. It suggested that forthcoming studies should delve deeper into the role of information technology in the domain of supply chain performance. This implies that future research should investigate how information technology impacts various aspects of supply chain management and its subsequent influence on overall performance.

Bagshaw et al. (2017) conducted a study with the objective of assessing the impact of proficient supply chain management on two crucial aspects: punctual delivery and sales growth in manufacturing companies located in Belgium. The study aimed to comprehend how efficiently managed supply chains affect these significant performance indicators. The study's analysis yielded favorable results, indicating that proficient supply chain management indeed has a positive influence on both punctual delivery and sales growth within manufacturing firms in Belgium. In simpler terms, companies that implement efficient supply chain management practices are more likely to meet delivery schedules and achieve sales growth. However, it is important to note that the study had a limitation. It did not take into account or investigate the role of information technology in the day-to-day operations of these manufacturing firms. Consequently, while the study emphasized the importance of effective supply chain management, it did not explore how the utilization of information technology could potentially enhance or streamline these management practices.

Barczak et al. (2019) conducted a study to acquire a more profound understanding of the importance of supply chain management practices within the German oil and gas industry. Their primary objective was to clarify the connection between these practices, competitive advantage, and the overall industry performance. The study's analysis yielded positive findings, demonstrating that competitive advantage serves as an intermediary factor. To put it simply, effective supply chain management practices positively affect competitive advantage, subsequently bolstering the overall performance of the German oil and gas sector. In essence, companies that excel in their supply chain procedures tend to gain a competitive edge, leading to an enhanced

industry performance. Additionally, the report advocated for further exploration in the realm of research. It sparked an interest in delving deeper into the impact of information technology on both supply chain practices and performance. This suggests that researchers should investigate how the adoption of information technology can either enhance or fundamentally transform the relationship between supply chain operations and efficiency within the oil and gas industry.

In a research conducted by Gunasekaran et al. (2018), the primary objective was to examine the impact of supply chain management strategies on attaining a competitive edge within the framework of telecommunications firms in Portugal. Their specific focus was on understanding the moderating role of information technology in this relationship. The study's findings confirmed that information technology indeed plays a moderating role. In simpler terms, it influences or shapes the connection between supply chain management and logistics strategies when it comes to gaining a competitive advantage. This indicates that the utilization of information technology may have the potential to enhance or impact the effectiveness of logistics and supply chain management approaches in providing Portuguese telecommunication firms with a competitive edge. However, it's worth noting that the study had a limitation. It did not explore how achieving a competitive advantage might subsequently affect the overall performance of these telecommunications companies. In essence, while the study examined the interplay between supply chain management techniques, competitive advantage, and the moderating influence of information technology, it did not delve into how possessing a competitive edge might lead to improved company performance.

Lai and Wong (2019) delved into the correlation between supply chain management strategies and the performance of Chinese manufacturers engaged in exporting their products. The study's outcomes revealed that the application of efficient supply chain management strategies had a significant and positive impact on two facets of performance: operational and environmental. In simpler terms, companies that embraced effective supply chain management techniques witnessed enhancements in both their operational and environmental performance. Additionally, the research unveiled that regulatory pressures played a role in amplifying the connection between supply chain management strategies and performance. This implies that when companies encountered regulatory requirements related to their operations, the influence of these practices on performance became even more pronounced. However,

it's crucial to acknowledge a limitation in the study. It did not explore or take into account how management commitment could influence or shape the adoption and effectiveness of supply chain management strategies. Consequently, the research did not investigate how management involvement and dedication might impact the implementation and effectiveness of these strategies.

Mason (2019) aimed to investigate the relationship between supply chain management practices and a firm's financial performance. The study sought to understand how a company's financial performance was influenced by the management of its supply chains. The findings of the study revealed a positive correlation. In other words, it identified a connection between improved financial performance in the studied organisations and the adoption of efficient supply chain management strategies. This suggests that companies that effectively manage their supply networks tend to achieve more favorable financial outcomes. However, it's worth noting that Mason's research had a limitation. It did not explore or examine the mediating effect of competitive advantage. In simpler terms, the study did not investigate how the competitive advantage gained through efficient supply chain management practices might explain or influence the impact of these practices on overall procurement performance, which encompasses various aspects of sourcing, purchasing, and supply management.

Mwangangi (2019) conducted a study with the primary objective of investigating how supply chain management strategies impact the performance of Japanese manufacturing companies. The central goal was to gain insight into how various aspects of supply chain management within this context are associated with the success of these firms. The study's findings pinpointed specific supply chain management practices that had a noteworthy influence on firm performance. These practices encompassed transport management, inventory management, order processing management, and information flow management. In essence, the performance of Japanese manufacturing companies was directly shaped by the effectiveness of these particular components of supply chain management. Furthermore, the research put forth a recommendation for future studies. It suggested that forthcoming research endeavours should consider the inclusion of a moderating or mediating variable in the research model. This implies that researchers should investigate whether there are additional variables or factors that may either moderate (influence the strength of) or mediate (explain the process of) the

relationship between supply chain management practices and firm performance within this context.

In a study conducted by Takwi and Mavis (2020), the objective was to examine how logistics management practices influenced the operation of gas terminals in the USA. The primary aim was to understand how efficient logistics management techniques impacted various aspects of business performance in this specific context. The study's findings revealed several positive effects of logistics management on business performance. It was found that effective logistics management was crucial for meeting customer demand effectively. Additionally, the study indicated that efficient logistics management was associated with reduced operational costs. Furthermore, the study provided evidence that effective logistics management practices enhanced customer satisfaction. However, the study had a limitation. It did not explore or discuss the role of digitisation or digital technology in logistics management. The study did not address the significant role that technology and digitisation now play in enhancing logistical efficiency and effectiveness.

Ghoumrassi and Tigu (2017) conducted a study with the goal of examining the impact of supply chain management practices on supply chain performance within the Romanian oil and gas industry. What made their study distinctive was their exploration of the mediating role of digitisation in this relationship. The study's findings revealed a positive and significant correlation, indicating that improved supply chain performance in the Romanian oil and gas sector was linked to effective supply chain management strategies. The study also investigated whether digital technology acted as a mediator in this relationship. However, it was discovered that digitisation did not effectively mediate the connection between supply chain practices and performance. In simpler terms, digitisation did not appear to explain or influence how these supply chain practices directly affected performance in this specific context. Despite the findings regarding digitisation as a mediator, the study proposed an intriguing avenue for further research. It suggested that future studies could consider using digitisation as a moderator to assess how supply chain practices impact supply chain performance. This implies that researchers could explore how digitisation might enhance or influence the relationship between supply chain management methods and performance in the oil and gas industry.

Tiang et al. (2020) conducted research focused on understanding the contributions of logistics eco-centricity, supply chain traceability, and logistics management practices to the sustainability performance of Chinese distribution companies. The primary objective was to explore how these factors relate to social and environmental performance within the context of Chinese distribution companies. The study's findings indicated positive effects. Specifically, it was revealed that these practices had a beneficial impact on the social and environmental performance of Chinese distribution firms. This suggests that improved social and environmental sustainability outcomes were associated with effective supply chain management practices. However, the study had a limitation. It did not assess or investigate how supply chain practices might impact the overall performance of the entire supply chain. In essence, while it focused on the social and environmental dimensions of sustainability within distribution firms, it did not explore how these practices might influence the broader performance of the entire supply chain.

The study conducted by Bienhaus and Haddud (2018) explored the factors that influenced the digitisation of procurement and supply chains within the context of Industry 4.0. The authors acknowledged the varied approaches organizations adopted in response to digitisation, emphasizing the necessity for a comprehensive understanding of the opportunities and challenges associated with digital transformation. The primary objective of the paper was to ascertain the impact of digitisation on procurement and its role in the broader spectrum of supply chain management. The researchers also aimed to investigate potential barriers to digitising procurement and supply chains, proposing strategies for overcoming these obstacles. Additionally, the study sought to examine the significance of enabling technologies in facilitating the digitisation process. Methodologically, the authors employed a quantitative approach, utilizing an online survey as the primary method of data collection. The sample comprised 414 participants directly involved in procurement or related business functions across various industries. Likert five-point scales were incorporated in the survey to gauge participants' perceptions and attitudes. Empirical findings suggested that the digitisation of the procurement process offered several benefits. These included support for daily business and administrative tasks, assistance in complex decision-making processes, a shift towards strategic decision-making in procurement, the transformation of procurement into a strategic interface enhancing

organizational efficiency, effectiveness, and profitability, and support for the creation of new business models, products, and services. Furthermore, the study confirmed the existence of barriers to the digitisation of procurement processes and supply chains, identifying these barriers within existing procedures, processes, as well as organizational capacities and capabilities. The research concluded by highlighting the significance of various enabling technologies in the digitisation process, emphasizing their role in shaping and enhancing procurement procedures and processes.

Mishrif and Khan (2023) conducted a study investigating the design and implementation of digitisation policies in the logistics and supply chain sector during the Covid-19 pandemic. The unprecedented disruptions caused by the pandemic, such as border closures and lockdowns, led to the partial closure of industrial and commercial complexes, impacting key sectors like logistics and supply chains and causing disruptions in global value chains. Despite these challenges, the authors argue that the necessity for survival prompted companies to innovate and leverage digitisation to overcome the adverse effects of the pandemic. The paper aimed to assess both the success and challenges faced by companies in designing, adopting, and implementing digitisation policies and their consequential effects on operational performance, overall outputs, and customer bases during the Covid-19 crisis. The authors conducted a survey of 61 companies between January 10 and April 30, 2021, analyzing the data using statistical tests like the Kruskal-Wallis test and Independent-Samples Mann–Whitney U test to uncover relationships between variables such as operation, overall output, customer base, digitisation policy, technology use, and implementation costs. Key findings indicated a positive impact of digitisation on operations and overall outputs, although no significant effect was observed on the customer base. Only a small percentage (1.8%) of companies were able to fully implement digitisation, and the cost of technology emerged as a major barrier, hindering most companies from adopting emerging technologies or executing their digitisation policies. While the research had practical implications, the study acknowledged certain limitations. Conducted in the Sultanate of Oman, a developing country in the Middle East, the outcomes may not be directly applicable to developed countries where the population is more accustomed to advanced technologies. The study highlighted the need for separate investigations tailored to the logistics and supply chain sectors of developed countries. The implications of the study extend to both supply chain companies and technology providers. The authors recommended that supply chain companies should invest in

technology infrastructure, integrating technology as a pivotal component in their business models. Technology providers could consider the implementation costs and adoption challenges faced by supply chain companies, tailoring their solutions accordingly. Overall, the findings underscored the evolving role of digitisation in the logistics and supply chain sector, especially in the context of unprecedented disruptions such as the Covid-19 pandemic.

Gong (2023) delved into the digital transformation of supply chain management (SCM) within the realm of retail and e-commerce. The primary aim was to understand how digital technologies and processes reshaped the operational dynamics of supply chains, with a focus on identifying both the opportunities and challenges inherent in this transformation. The study contributed to the broader understanding of best practices in SCM systems, ultimately fostering improved supply chain performance. The research particularly emphasized the outcomes of digital inclusiveness in SCM for the growth of retail and e-commerce platforms. To achieve a comprehensive understanding of SCM issues, the research employed both descriptive and explanatory research designs. The study revealed that businesses were inclined to adapt their supply chain strategies in the post-competitive era to enhance robustness, sustainability, and collaboration with suppliers, customers, and stakeholders. This adaptation involved increased investments in SCM technology, including blockchain, AI, analytics, robotic process automation, and data control centers. The research evaluated the impact of digitisation on supply chain systems, assessing benefits and identifying factors contributing to successful implementation. Emphasis was placed on the role of data analytics in SCM, exploring how it could improve efficiency, reduce costs, and increase transparency. The study underscored the importance of adopting digitisation to enhance supply chain robustness, sustainability, and collaboration. It presented an opportunity for businesses to leverage data analytics in SCM for data-driven decision-making, ultimately leading to improved overall supply chain performance. However, the study acknowledged potential limitations, notably the potential oversight of factors like organizational culture, human resources, and supply chain governance that also contributed to successful SCM. While the focus on SCM technology and data analytics is valuable, a more holistic consideration of these additional factors could provide a more comprehensive understanding of successful supply chain management.

Plomp and Batenburg (2010) undertook the development of a validated measurement model and typology for chain digitisation maturity, which they defined as the extent of interorganizational collaboration facilitated by information and communication technology (ICT). The research involved a comprehensive literature (meta) study, analyzing 22 existing maturity models. From this analysis, the researchers constructed an integrated framework, which was then applied to assess interorganizational collaboration within the Dutch retail sector. This sector encompasses retailers, wholesalers, manufacturers, customers, and trade organizations. The measurement model was put to the test by determining the chain digitisation level across 24 distinct retail sub-sectors (branches). The data collection process involved desk research, interviews, and surveys, primarily conducted at the branch level through representatives of trade organizations. The results indicated that the framework, or measurement model, effectively described the Dutch retail sector and enabled meaningful comparisons between its various branches, offering both anticipated and novel insights. The typology generated from the study supports a two-dimensional perspective, combining the levels of technology and organization. Through empirical application, the research provided an extended view of the current state of chain digitisation within the Dutch retail sector. This newfound understanding served as the foundation for deriving a roadmap to facilitate the adoption and implementation of chain digitisation practices among retail organizations. The study contributed not only to the theoretical understanding of chain digitisation maturity but also offered practical insights to guide strategic decisions and initiatives within the retail sector.

Gao et al. (2023) conducted a study on the inhibitory influence of supply chain digital transformation on the bullwhip effect feedback difference. This research breaks away from the traditional focus on the bullwhip effect in the context of the conventional supply chain and extends the investigation into the digital supply chain. The study researched into the diminishing impact of digital supply chain practices on the bullwhip effect by comparing the overall performance of traditional and digital supply chains. The paper began by exploring the mechanisms through which supply chain digitisation weakens the bullwhip effect. Bullwhip effect models were constructed for both traditional and digital supply chains, and simulations were carried out using Matlab software to assess the impact of supply chain digitisation transformation on the bullwhip effect. The study also analyzed the causes of the bullwhip effect in a supply chain led by a hypothetical company (referred to as T company) and its digitisation

process. Key findings of the study include; digitisation can reduce the bullwhip effect in a multi-level supply chain by minimizing information feedback deviation, digital transformation is beneficial for enhancing the overall performance of the supply chain, government incentives can play a role in promoting the digital transformation of the supply chain and inhibiting the bullwhip effect. However, the study had some limitations. It did not consider the influence of the end node in the supply chain, namely the consumer. Additionally, the analysis focused on the bullwhip effect's impact on the amplification of demand, without considering scenarios where market contraction led to a reduction in demand. Overall, the study demonstrated that digital transformation could mitigate the bullwhip effect in a multi-layer supply chain by reducing information feedback deviation, contributing to improved supply chain performance. Moreover, government support could accelerate the digital transformation of the supply chain to some extent.

Shi et al. (2022) conducted a study investigating the impact of digitisation on supply chain resilience (SCR) in Chinese manufacturing firms operating in turbulent environments. Recognizing the challenges posed by unpredictable conditions, the firms aimed to enhance SCR by leveraging the resources and knowledge of supply chain members. While both SCR and supply chain integration (SCI) demand digitisation in the supply chain, their empirical interrelationships have not been extensively studied. Their research sought to unveil the influence of digital technology (DT) on both SCR and SCI, with a specific focus on examining the mediating role of SCI between DT and SCR. The research involved a survey of Chinese manufacturing enterprises conducted through a web-based questionnaire, resulting in 96 responses. Structural equation modeling was employed to test the conceptual model. The study provided insights into the intricate relationships between digital technology, supply chain integration, and supply chain resilience in the context of Chinese manufacturing firms. Their findings highlighted the crucial role of supply chain integration as a mediator between digital technology adoption and the overall resilience of the supply chain. This research contributes to understanding the dynamics of digitisation in supply chains, especially in the context of enhancing resilience in turbulent business environments.

2.5 Conceptual Framework

According to the model outlined in the study, there exists a direct and positive association between the efficacy of supply chain management practices and supply

chain effectiveness. Moreover, the model posits a direct and advantageous link between supply chain effectiveness and digitisation. Additionally, it contends that digitisation assumes a moderating role in shaping the relationship between supply chain management strategies and performance. Figure 2.1 visually represents these relationships, including their direct and indirect impacts on the study variables.

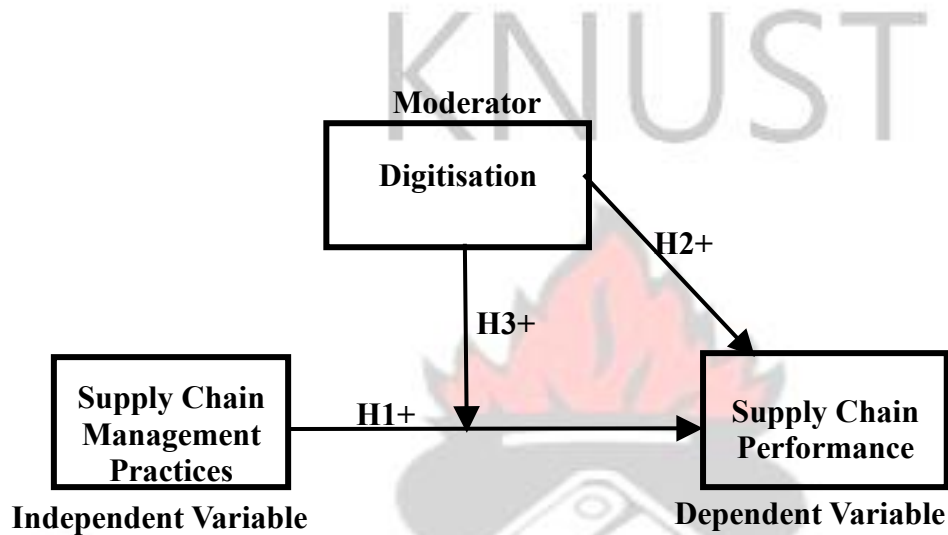


Figure 2.1: Conceptual Framework Source: Author's construct 2023

2.5.1 Hypothesis Development

2.5.1.1 Supply Chain Management Practices and Supply Chain Performance

Supply chain management (SCM) strategies encompass a range of techniques and procedures aimed at fostering productive collaboration among suppliers, customers, manufacturers, and distributors with the goal of enhancing the long-term performance of companies and their supply chains (Chopra and Meindl, 2017; Tseng, 2020). Conversely, SCM practices refer to the specific actions and initiatives undertaken by a business to support effective supply chain management (Donlon, 2018). Donlon (2018) also provides an overview of recent changes in SCM practices, including elements such as supplier relationships, outsourcing, cycle time reduction, and supplier interactions. These practices are integral to the successful management of supply chains in contemporary business environments. Furthermore, Tan et al.'s factor analysis of SCM practices in 2019 identified six additional dimensions, which include supply chain integration, information sharing, supply chain characteristics, customer service management, geographic proximity, and just-in-time (JIT) capabilities. These

dimensions provide a more comprehensive and nuanced understanding of the various components that constitute effective supply chain management techniques. They highlight the multifaceted nature of modern supply chain practices and the diverse factors that contribute to their success.

Chen and Paulraj (2017) also consider supplier engagement, cross-functional teams, communication, and supplier base reduction as crucial dimensions of supply chain management practices. The findings of this study (Li et al., 2017; Wong et al., 2018) suggest that supply chain management practices encompass a spectrum of managerial activities intended to enhance supply chain performance. As noted by Storey et al. (2016), successful coordination among supply chain partners can help address problems related to inaccurate data and information, ultimately resulting in improved supply chain performance. Based on the existing literature, the study puts forth a hypothesis that;

H1: Supply chain management practices relate positively and significantly with supply chain performance.

2.5.1.2 Digitisation and Supply Chain Performance

Businesses are increasingly adopting digital tools to streamline and enhance the efficiency of their operations, aiming to ensure business continuity in an unpredictable and evolving environment (Zhen et al., 2021). In light of this, digital skills are gaining greater significance. Certain studies assert that possessing digital skills can enhance a company's adaptability and cost-saving capabilities (Drnevich and Croson, 2013). The greater an organisation's resources and its adeptness in utilising them, the higher the likelihood of developing a robust and competitive strategy (Wang, 2017).

There is compelling evidence linking digital competencies to corporate performance and gaining a competitive edge (Zhen et al., 2021). However, Usai et al. (2021) argue that a company's creative performance relies more on creativity and persistent efforts in research and development activities rather than solely on digital skills. Recent studies have found limited and inconclusive evidence regarding the direct impact of digitisation on overall business performance (Tan et al., 2010). Nonetheless, Usai et al. (2021) suggest that businesses can enhance their supply chain performance by implementing

information technology and digitisation as part of their supply chain and procurement practices. The study, therefore, hypothesizes that;

H2: Digitisation positively and significantly relates with supply chain performance.

2.5.1.3 Moderation Role of Digitisation

In today's rapidly evolving business landscape, effective supply chain management (SCM) strategies have become essential for gaining a competitive advantage and improving organisational performance (Li et al., 2017). Concurrently, supply chains have undergone a transformation due to the integration of digital technologies, commonly referred to as digitisation, which has introduced unprecedented opportunities for efficiency, transparency, and innovation (Wong et al., 2018). Rahman et al. (2017) conducted an empirical analysis examining the influence of supply chain management practices on firm performance, concentrating on companies in Pakistan. While the study doesn't explicitly address digitalization as a moderator, its findings indicate the possibility of a positive moderating influence. The introduction of digitisation could be expected to enhance the positive outcomes as SCM practices enhance firm performance. Also, Tan et al. (2010) underscores the importance of leveraging SCM practices for improved performance, providing a foundation for further exploring how digitisation interacts with these practices to enhance their effects. RBV theory asserts that a firm's unique and valuable resources, including SCM practices and digital capabilities, may result in competitive advantage and enhanced performance. Storey et al. (2016) posit that, the integration of digitisation can be seen as a valuable resource that amplifies the impact of effective SCM practices, aligning with the core tenets of RBV theory. The study therefore hypothesizes that;

H3: Digitisation moderates positively supply chain management practices-supply chain performance relationship.

CHAPTER THREE

RESEARCH METHODOLOGY AND PROFILE OF STUDY AREA

3.0 Introduction

This chapter provides a thorough overview of the essential elements of the research design and methodology. These components include the research methodology, the specific study population under investigation, the determination of the sample size and the approach to sampling, the instruments utilized for data collection, the techniques applied for data analysis, and the ethical considerations guiding the research process.

3.1 Research Strategy

The researcher has at their disposal three fundamental research methodologies: mixed methods, qualitative methods, and quantitative methods. To begin, quantitative research methods involve the measurement of data using numerical values. This approach entails gathering numerical data related to a social issue and subsequently applying statistical techniques for analysis (Aliaga and Gunderson, 2002). Another critical facet of the quantitative research approach involves the use of precise measurements and the application of statistical, mathematical, or numerical analyses to data gathered through methods such as surveys and questionnaires. Additionally, computational tools are often employed to manipulate previously collected statistical data (Bryman, 2019). Within the quantitative approach, the study examined the relationships and correlations between the research variables.

Creswell (2012) argues that qualitative research is a method used to explore the significance that individuals or groups attribute to a particular social human situation. In simple terms, qualitative and quantitative research involve gathering different types of data and using distinct data collection methods. Qualitative studies, for instance, focus on personal experiences or narratives that offer in-depth insights into how people interact within society. In contrast, quantitative studies typically rely on data that can be quantified or expressed in numerical terms.

Therefore, the current study adopted a quantitative research methodology for data collection and analysis. By employing a quantitative approach, the study was able to

assess the extent to which digitisation moderates the relationship between variables. The choice of the quantitative study allowed the study to quantify the extent of the moderating effect of digitisation. This involved the assessment of interaction effects, regression analyses, and evaluating how the inclusion of digitisation enhances the impact of SCM practices on supply chain performance.

3.2 Research Design

A researcher can select from a range of surveys, experiments, and case study alternatives (Yin, 2003). A case study is a type of research that may concentrate on a particular individual, family, or circumstance. Contrarily, a survey is a type of research approach which gathers information from a substantial sample of participants or the entire population to better understand their perspectives on a study subject. This increases the generality of the reactions even more. The current study used a survey methodology to investigate Ghana's manufacturing industry. There are numerous ways to conduct a given study, including exploratory, explanatory, and descriptive techniques.

The scope and depth of the research variables, such as supply chain management practices, supply chain performance and digitisation was determined using a descriptive study approach. According to Bryman (2019), descriptive statistics are used to guide the study's analysis of the responses' means and standard deviations, which also reveals the degree of and extent of adoption and achievement of the study's variables. Additionally, it is believed that an explanatory design is the best way to assess the relationship between the variables and their causes and effects in a particular study. In other words, the explanatory design examines the relationships between the constructs. This study consequently deployed both descriptive and explanatory research designs to gather and analyze data.

3.3 Population of the Study

Polit and Hungler (1999) define the population as the entire collection of things, individuals, or entities that meet specific criteria. Furthermore, Polit and Beck (2014) explain that a population includes all the objects, subjects, or individuals being studied, whereas a sample is a portion or subgroup of the population chosen to represent it. Therefore, the target population for this study consists of manufacturing companies situated in Kumasi and Accra.

3.4 Sample Size and Sampling Technique

Sampling is a technique used to select individuals or a subgroup of the population to estimate population characteristics and draw statistical inferences (Bryman, 2019). Saunders et al. (2009) offer an extensive classification of probability and nonprobability sampling methods. In probability sampling methods, there is a known probability associated with selecting each sample from the population, and these probabilities are usually equal for all members of the population. Conversely, in nonprobability sampling methods, it is challenging to calculate the likelihood of selecting a specific member from the entire target population.

For this study, 115 manufacturing enterprises in the Greater Accra and Kumasi regions were chosen as a sample using a convenience sampling technique, a non-probability sampling technique. It is important to note that the study's focus on supply chain management practices limited the respondents to top and middle-level managers from each organisation, as the study primarily aimed at firm-level analysis.

3.5 Types and Sources of Data

Data, according to Polit and Hungler (1999), is any information obtained during the research investigation or study technique. Secondary data refers to data that has been previously collected, processed, and published for purposes other than the current research study (Saunders et al., 2009). In other words, it is information that has already been gathered and analyzed by someone else or for another purpose, and it's being used by researchers for a new investigation. Secondary data can come from various sources, and it can be both quantitative and qualitative in nature. For this study, data was collected from primary sources. According to McRiam et al. (2009), primary data is information that is obtained through sources like careful observation, archived data, questions and their answers, in-depth interviews, and a case study that was assembled. According to some studies, primary data refers to material that was received by the researcher directly from a source and is distinct and original. To gather primary data, a variety of techniques and methods can be utilized, including testing, experimentation, observation, surveys, questionnaires, and interviews. Hence, the current study deployed questionnaires to gather data from the study respondents.

3.6 Data Collection Method

The process of gathering, measuring and analysing precise insights for a study using recognized and established procedures is known as data collection. The primary subjects of this section are the procedures and resources used to collect the data. According to Saunders et al. (2009), data-collecting instruments are the devices utilized to gather data for a certain research study. There are many various types of data collection tools, including surveys, questionnaires, interviews, observations, and experiments. Data for the study was gathered via questionnaires. Each respondent in a question-and-answer session responded to the same set of questions in a specified order (Saunders et al., 2009). Also, Google Forms was used to administer the questionnaires. The questionnaire was structured into four distinct sections. Section A contained information on the respondents' details, while Section B addressed Supply Chain Management Practices. Section C also focused on Digitisation and finally, Section D delved into Supply Chain Performance.

Table 3.1: Summary of Measurement Items

Constructs	Number of Measurement Items	Source
1. Supply Chain Management Practices		Amin and Shahwa (2020)
Strategic Supplier Partnership	6	
Customer Relationships	6	
Information Sharing	5	
2. Supply Chain Performance		Bartlett et al. (2018)
Delivery Performance	4	
Quality Performance	3	
Financial Performance	3	
3. Digitisation	7	Liu and Chiu (2021)

Source: Author's Construct 2023

3.7 Data Analysis Method

Indeed, effective data analysis is vital for revealing relevant insights, forming conclusions, and aiding decision-making. This process involves various steps, including data cleansing, transformation, and modeling (Bryman, 2017). In the context of this study, a combination of methods was used, including structural equation modeling and both descriptive and inferential analytical techniques. Descriptive statistics helped in understanding the characteristics and significance of the variables employed in the research. Furthermore, the study's objectives and hypotheses were assessed using a structural equation model. The data analysis was carried out using PLS4, version 23.

3.8 Data Validity and Reliability

Validity and dependability are the core traits of quantitative research that demonstrate quality and rigour in design (Saunders et al., 2009). A well-written research paper will make it clear how validity and reliability have been evaluated. The term "validity" in quantitative research refers to the veracity and accuracy of the data and conclusions. Additionally, it discusses the ideas being investigated, the subjects being examined, the methods used to gather the data, and the conclusions drawn (Saunders et al., 2009). Each sort of validity, which there are many kinds of, adds to the overall credibility of the research.

Reliability, as defined by Saunders et al. (2009), pertains to the consistency and stability of a measurement tool, indicating how consistently it yields the same results over time, among similar groups, and regardless of who administers it. It's worth emphasizing that, in this study, a minimum criterion for evaluating the reliability of measurement instruments was set at a Cronbach's alpha value of 0.70.

On the other hand, validity ensures that the metrics employed in a study accurately measure the intended concepts. In this study, a validity threshold was established at a value of 0.5.

It is important to note that the study assessed reliability using Cronbach's Alpha and composite reliability, while validity was evaluated through the Average Variance Extracted (AVE) and Confirmatory Factor Analysis (CFA) methods.

3.9 Research Ethics

No matter where they are or what they are doing, a person should always uphold the moral standards known as ethics (Macchiarini, 2019). Another part of ethical action is making choices considering the situation. The moral standards that researchers in different disciplines must observe are the core focus of research ethics.

Before commencing the research, the researcher obtained permission from the selected companies. Additionally, in line with ethical considerations, respondents were not subjected to any form of coercion to participate in the study. Clear assurances regarding the privacy and anonymity of the information provided were communicated to the respondents and other participants. Furthermore, proper referencing was employed to ensure the integrity of the information, adhering to ethical standards that prohibit plagiarism.

3.10 Profile of the Study Area

3.10.1 Manufacturing firms in Accra

Accra, as the capital city of Ghana, is a thriving economic center that hosts a diverse array of manufacturing industries. These industries encompass food processing, textiles, beverages, chemicals, pharmaceuticals, plastics, electronics, and more. This diversity reflects Accra's role as a hub for various sectors, catering to both domestic and international demands. The manufacturing landscape in Accra spans a wide range of scales. While larger corporations have a presence, small and medium-sized enterprises (SMEs) are prominent contributors. This mixture of scales creates a dynamic ecosystem where both established firms and emerging entrepreneurs coexist. Accra's strategic location and economic prominence grants manufacturing firms advantageous access to essential resources. The city's well-connected transportation infrastructure, including ports and airport, facilitates the movement of goods, materials, and products. Additionally, Accra's status as the capital city contributes to a larger pool of skilled labor and support services. Manufacturing firms in Accra benefit from easy access to both domestic and international markets due to the city's connectivity. Proximity to ports and well-established trade routes enables efficient distribution of goods beyond national borders. Accra's status as the capital city furthermore ensures access to modern infrastructure, including reliable electricity, communication networks, and transportation facilities. This infrastructure is crucial for supporting advanced manufacturing processes and global supply chain integration.

3.10.2 Manufacturing Firms in Kumasi

Kumasi, located in the Ashanti Region, is recognized for its contributions to specific manufacturing industries. The city's focus areas include textiles, wood processing, metal fabrication, agro-processing, and craft industries. Kumasi's manufacturing landscape is often characterized by a higher prevalence of small and medium-sized enterprises (SMEs). These enterprises contribute to the city's economic vibrancy, often specializing in traditional crafts and localized manufacturing activities. The proximity of Kumasi to agricultural regions provides manufacturing firms with access to raw materials for agro-processing industries. This includes activities like food and beverage processing, fruit and vegetable canning, and other value-added agricultural products. Kumasi's manufacturing sector benefits from a pool of skilled and semi-skilled labor, particularly in traditional craft industries like woodwork, textiles, and metalwork. The preservation of traditional expertise enhances the uniqueness of products and contributes to cultural heritage. Manufacturing firms in both Accra and Kumasi play a crucial role in generating employment opportunities, driving economic growth, and contributing to national GDP. Their activities span value chains, from raw material procurement to production and distribution. While both cities offer opportunities for manufacturing growth, challenges persist. These challenges can include infrastructural limitations, access to finance for small enterprises, and supply chain disruptions. However, firms also have the chance to leverage technological advancements and innovative practices to overcome these challenges. Manufacturing firms in both cities are increasingly adopting digital technologies and innovative practices to remain competitive. The integration of digital tools, such as IoT devices and data analytics, allows firms to optimize planning and production processes, enhance quality control, and respond to changing consumer preferences more effectively.

CHAPTER FOUR

DATA PRESENTATION, ANALYSIS AND DISCUSSION OF RESULTS

4.0 Introduction

This research chapter presents the findings of the data analysis and provides insights into their relevance to the study. The evaluation commences with an examination of the responses in relation to the demographic information of the respondents and the

response rate. Subsequently, descriptive statistics are presented, including measures such as the mean, standard deviation, skewness, and kurtosis. The measurement model is subjected to testing, which involves the assessment of Cronbach's alpha, composite reliability, average variance extracted (AVE), and cross-loadings. Model testing encompasses various statistical analyses, including correlation analysis, linear regression, and moderated hierarchical regression. The Discussion of Results section interprets the research findings in the context of the existing literature. For data analysis, this study utilized SmartPLS4 and IBM SPSS version 23.

4.1 Response Rate

The response rate for this study was 100%, with all 115 surveys distributed being completed and returned. Mugenda and Mugenda (2013) suggest that a response rate of 50% can be considered reasonable, 60% is deemed good or acceptable, and anything exceeding 70% is classified as exceptionally high. Consequently, the response rate achieved in the study is not only considered valid but also falls into the category of unusually high and high response rates.

4.2 Demographics of the Respondents and Background of Firms

This section of the study, present a comprehensive overview of the demographic profile of the research participants, aiming to offer a deeper understanding of their characteristics. The data collected from the respondents encompasses factors such as gender, age, managerial rank, years of work experience, educational history, and their specific roles within the organisation. It is crucial to emphasize that, the characteristics of the study's respondents can exert a substantial influence on the outcomes of the questionnaire (Hitka and Baláková's 2015). Consequently, the researcher must carefully consider the qualitative attributes of the respondents and evaluate their potential impact on the study's results.

Table 4.1: Demographics of Responses

Variables		Frequency	Valid Percentage
Gender	Male	60	52.2
	Female	55	47.8
			14.8
Age	20 to 30	17	

	31 to 40	28	24.3
	41 to 50	59	51.3
	50 or more	11	9.6
Work Experience	0-5 years	21	18.3
	6-10 years	37	32.2
	above 10 years	57	49.6
Educational Background	HND/Degree	53	46.1
	Masters	39	33.9
	Professional	17	14.8
	Others	6	5.3
Managerial Level	Top management	53	46.1
	Line Manager	27	23.5
	Supervisor	35	30.4
Position	Supply Chain Manager	56	48.7
	Logistics Manager	37	32.2
	Operations Manager	22	19.1
Total		115	100 Source:
Field data, 2023			

4.2.1 Gender of Respondents

The data in Table 4.1 reveals that the study attracted a balanced representation of respondents in terms of gender. Among the participants, 52.2% identified as male, while 47.8% identified as female. This distribution suggests that the study made deliberate efforts to capture perspectives from both genders, fostering a more inclusive and comprehensive understanding of the research topic. The relatively equal gender distribution contributes to the study's credibility and the applicability of its findings across diverse groups.

4.2.2 Age of Respondents

Analysing the age distribution of respondents reveals that the study reached professionals across different stages of their careers. The age group with the highest representation was 41 to 50, constituting 51.3% of the total respondents. This might

indicate that the study attracted professionals in their prime working years, potentially reflecting the age distribution of the industries or sectors under investigation. Notably, the distribution across age groups demonstrates that the study engaged participants ranging from early career professionals (20 to 30) to those with more experience (50 or more), allowing for insights from various career stages.

4.2.3 Work Experience

The work experience distribution highlights the diverse background of the respondents. Almost half of the participants (49.6%) possessed work experience exceeding 10 years, showcasing a significant proportion of experienced professionals. This could be particularly valuable in analysing the impact of supply chain management practices and digitisation on supply chain performance, as experienced professionals might offer insights into the long-term effects of these practices. Moreover, the participation of respondents with 6-10 years (32.2%) and 0-5 years (18.3%) of experience further enriches the study with perspectives from different career phases.

4.2.4 Educational Background

The educational background of the respondents demonstrates a varied mix of qualifications. The majority of participants (46.1%) held an HND/Degree, indicating a strong representation of professionals with foundational academic credentials. Additionally, respondents with a master's degree accounted for 33.9% of the total, indicating a substantial presence of individuals with advanced academic training. The inclusion of professionals (14.8%) holding specialized or professional qualifications suggests a well-rounded pool of expertise contributing to the study.

4.2.5 Managerial Level

The breakdown of managerial levels within respondents' organisations sheds light on the hierarchy and roles of the participants. Line managers are the most represented, constituting 46.1% of respondents, showcasing their integral role in supply chain management and operations. Top management, though comprising a smaller percentage (5.3%), represents key decision-makers with strategic insights. The presence of other managerial roles, such as supervisors and various managers (supply chain, logistics, operations), further enhances the diversity of perspectives encompassed by the study.

In conclusion, Table 4.1's demographic breakdown underscores the comprehensive approach taken by the study in engaging a diverse range of participants. The study successfully captured insights from professionals with different gender, age, work experience, educational backgrounds, and managerial positions. This diversity enriches the study's findings, as it provides a well-rounded understanding of how the relationship between supply chain management practices and supply chain performance is moderated by digitisation across a wide spectrum of professionals.

4.3 Reliability and Validity Test

The objective of the reliability analysis is to ascertain the stability and consistency of the variables, whereas the validity analysis was conducted to evaluate the precision of the variables in gauging the underlying constructs. The reliability of these constructs was evaluated through the utilization of both the Cronbach alpha coefficient and composite reliability. These metrics gauge how consistently the measures capture the variables. According to Hair et al. (2013), a threshold of 0.7 is considered appropriate for measuring variables. In this study, there were twenty-two (22) measurement items used to assess supply chain management techniques. Additionally, fourteen (14) measurement items were employed to evaluate supply chain performance, and seven (7) measurement items were used to assess digitisation.

To validate the gathered data, the research started the process by conducting a confirmatory factor analysis, aiming to establish the factor loadings of each question with its respective latent variable. In order to be deemed valid, it was necessary for each item to exhibit a loading of no less than 0.50. Furthermore, to assess convergent validity, the study employed the average variance extracted value (AVE), with the expectation that the AVE values would surpass the established threshold of 0.5 (Hair et al., 2013).

The Fornell-Larcker criterion is a widely utilized statistical evaluation method in structural equation modeling (SEM) and confirmatory factor analysis (CFA). Its primary purpose is to assess the discriminant validity of latent constructs or factors within a measurement model. This criterion aids in ascertaining whether the various constructs in the model are distinct enough from each other, ensuring that they measure different aspects or concepts effectively. In essence, the Fornell-Larcker criterion serves the purpose of confirming that the indicators (measured variables) associated with a specific construct primarily capture and reflect that construct, without being strongly

influenced by or associated with other constructs in the model. This helps ensure the distinctiveness and reliability of each construct in the analysis.

Table 4.2 Cronbach Alpha, Composite Reliability, and Average Variance Extracted

Construct	Number of items	Cronbach Alpha (CA)	Composite Reliability (CR)	AVE
Supply Chain Management Practices	22	0.880	0.897	0.501
Digitisation	7	0.702	0.791	0.542
Supply Chain Performance	14	0.829	0.861	0.556
Total	43			

Source: Field data, 2023

The data in Table 4.2 outlines the evaluation scores pertaining to Cronbach Alpha, Composite Reliability, and AVE (Average Variance Extracted) for the variables under consideration. Specifically, the Cronbach Alpha for supply chain management practices registered at 0.880, along with a corresponding composite reliability of 0.897 and an AVE of 0.501. In the context of digitisation, the Cronbach Alpha yielded a value of 0.702, complemented by a composite reliability of 0.791 and an AVE of 0.542. In the case of supply chain performance, the analysis revealed a Cronbach Alpha score of 0.829, accompanied by a composite reliability of 0.861, and an AVE of 0.556. These statistics collectively indicate that all three variables exhibit a high level of internal consistency, surpassing the 0.70 threshold. Consequently, the data gathered for the study can be deemed reliable. Furthermore, all three variables exceed the 0.50 threshold for AVE, signifying that the measurement items effectively capture the intended latent variables. Thus, the study's data demonstrate convergent validity.

Table 4.3: Fornell - Larcker Criterion

Construct	D	SCMP	SCP
Digitisation	0.827		
Supply Chain Management Practices	0.657	0.859	
Supply Chain Performance	0.772	0.771	0.874

Source: Field data, 2023

Discriminant validity was assessed through the application of the Fornell-Larcker Criterion, a method designed to verify that latent factors predominantly gauge their own associated variables rather than being strongly influenced by variables from other constructs. Convergent validity, on the other hand, assesses how accurately latent variables measure the primary variable. According to this criterion, each variable's Average Variance Extracted (AVE) should exhibit stronger correlations with itself than with any other latent variables.

As indicated in the presented Table 4.3, digitisation exhibited a self-correlation coefficient of 0.827 and displayed correlations of 0.657 and 0.772 with supply chain management practices and supply chain performance, respectively. Supply chain management, on the other hand, showed a self-correlation coefficient of 0.859 and had correlation values of 0.771 and 0.634 with supply chain and supply chain performance, respectively. Lastly, supply chain performance demonstrated the highest selfcorrelation coefficient of 0.874, indicating a stronger internal relationship compared to its correlations with other variables. This analysis confirms the discriminant validity of each variable since they all displayed stronger correlations with themselves than with other variables.

Table 4.4: Cross-Factor Loadings

Code	Variables	DIG	SCMP	SCP
D1	The company engages in a high volume of transactions with suppliers using digital technologies	0.660	0.394	0.413
D2	In general, company always applies digital technologies within your own company	0.528	0.307	0.372
D3	Company transacts with a high proportion of suppliers through digital technologies	0.731	0.434	0.581
D4	In general, company always applies digital technologies to transact with suppliers	0.451	0.312	0.373
D5	Company transacts with a high proportion of customers through digital technologies	0.732	0.482	0.626
D6	Company conducts high transactional volume with customers through digital technologies	0.608	0.511	0.461
D7	In general, company always applies digital technologies to transact with customers	0.621	0.512	0.521

SCMP1	We consider quality as our number one criterion in selecting suppliers	0.432	0.576	0.401
SCMP2	We regularly solve problems jointly with our suppliers	0.238	0.450	0.311
SCMP3	We have helped our suppliers improve their product quality	0.337	0.521	0.430
SCMP4	We have continuous improvement programs that include our key suppliers.	0.378	0.615	0.439
SCMP5	We include our key suppliers in our planning and goal-setting activities	0.343	0.603	0.477
SCMP6	We actively involve our key suppliers in new product development processes	0.238	0.267	0.258
SCMP7	We frequently measure and evaluate customer satisfaction	0.374	0.607	0.395
SCMP8	We frequently determine future customer expectations	0.33	0.485	0.386
SCMP9	We facilitate customers' ability to seek assistance from us	0.347	0.542	0.482
SCMP10	We regularly evaluate suppliers' internal management for environmental compliance.	0.321	0.533	0.341
SCMP11	We frequently interact with customers to set reliability, responsiveness and other standards	0.359	0.441	0.322
SCMP12	We periodically evaluate the importance of our relationship with our customers	0.453	0.611	0.511
SCMP13	We inform trading partners in advance of changing needs	0.299	0.515	0.293
SCMP14	Our trading partners share proprietary information with us	0.297	0.467	0.370
SCMP15	Our trading partners keep us fully informed about issues that affect our business	0.198	0.370	0.222
SCMP16	Our trading partners share business knowledge of core business processes with us	0.406	0.510	0.400
SCMP17	We and our trading partners keep each other informed about events or changes that may affect processes	0.468	0.601	0.419
SCMP18	Information exchange between our trading partners and us is reliable	0.325	0.556	0.320
SCMP19	Information exchange between our partners and us is adequate	0.344	0.601	0.406
SCMP20	Information exchange between our partners and us is complete	0.488	0.625	0.519

SCMP21	Information exchange between our trading partners and us is accurate.	0.373	0.552	0.412
SCMP22	Information exchange between our trading partners and us timely	0.297	0.654	0.438
SCP1	Our firm delivers the goods and materials at the right time	0.446	0.317	0.449
SCP2	Our firm delivers the goods and materials to the right place	0.376	0.322	0.470
SCP3	Our firm delivers the goods and materials in the right quantity	0.435	0.345	0.563
SCP4	Our firm uses the right channel to receive and deliver goods	0.257	0.228	0.397
SCP5	The products produced by our firm are free from defect	0.392	0.303	0.507
SCP6	The products sold to customers are not returned	0.427	0.375	0.533
SCP7	Our suppliers are ISO 9001 certified	0.500	0.407	0.637
SCP8	Our firm is able to achieve lower operational and production cost	0.418	0.409	0.613
SCP9	Our company is able to reduce the cost of transportation	0.310	0.273	0.462
SCP10	Our company reduces the cost of information and communication	0.433	0.401	0.591
SCP11	Our firm is able to reduce the cost of quality failure	0.389	0.352	0.548
SCP12	Our organisation is able to achieve a high market share.	0.503	0.462	0.620
SCP13	Our organisation achieves a high return on investment	0.435	0.590	0.650
SCP14	High-profit margin on sales.	0.326	0.465	0.570

Source: Field data, 2023

Discriminant validity was assessed through the application of the Fornell-Larcker Criterion, which serves to confirm that latent factors predominantly capture the variance within their own variables and not those of others. In contrast, convergent validity examines how effectively latent variables measure the primary construct of interest. According to this criterion, each variable's Average Variance Extracted (AVE) should demonstrate stronger correlations with itself than with any other latent variables, reaffirming their convergent validity.

As presented in Table 4.4, digitisation exhibited a self-correlation coefficient of 0.827 and showed correlations of 0.657 and 0.772 with supply chain management practices and supply chain performance, respectively. Supply chain management, on the other hand, displayed a self-correlation coefficient of 0.859 and demonstrated correlations of 0.771 and 0.634 with supply chain and supply chain performance, respectively. Lastly, supply chain performance displayed the highest self-correlation coefficient of 0.874, indicating a stronger internal relationship compared to its correlations with other variables. This analysis confirms the discriminant validity of each variable since they all displayed stronger correlations with themselves than with other variables.

4.3.1 Confirmatory Factor Analysis

Confirmatory factor analysis (CFA) is a statistical technique employed to investigate and validate the factor structure of a given set of observed variables. It enables researchers to evaluate whether there exists a meaningful association between the observed variables and the underlying latent constructs they are designed to represent or measure. In essence, CFA helps confirm whether the observed variables align with the theoretical framework and construct definitions.

As depicted in Figure 4.1, the loadings of each construct are visually presented. Based on the information provided in Figure 4.1, it is evident that five measurement items (SCMP10, SCMP14, SCMP16, SCMP19, and SCMP20) related to supply chain management practices displayed loadings below the threshold of 0.5. Consequently, these items were excluded from the analysis. Again, 2 (D4 and D7) measurement items loaded below 0.5 thereby were excluded from the analysis. Also, only 5 (SCMP3, SCMP4, SCMP8, SCMP11 and SCMP16) measurement items loaded above 0.5, hence, were included in the analysis.

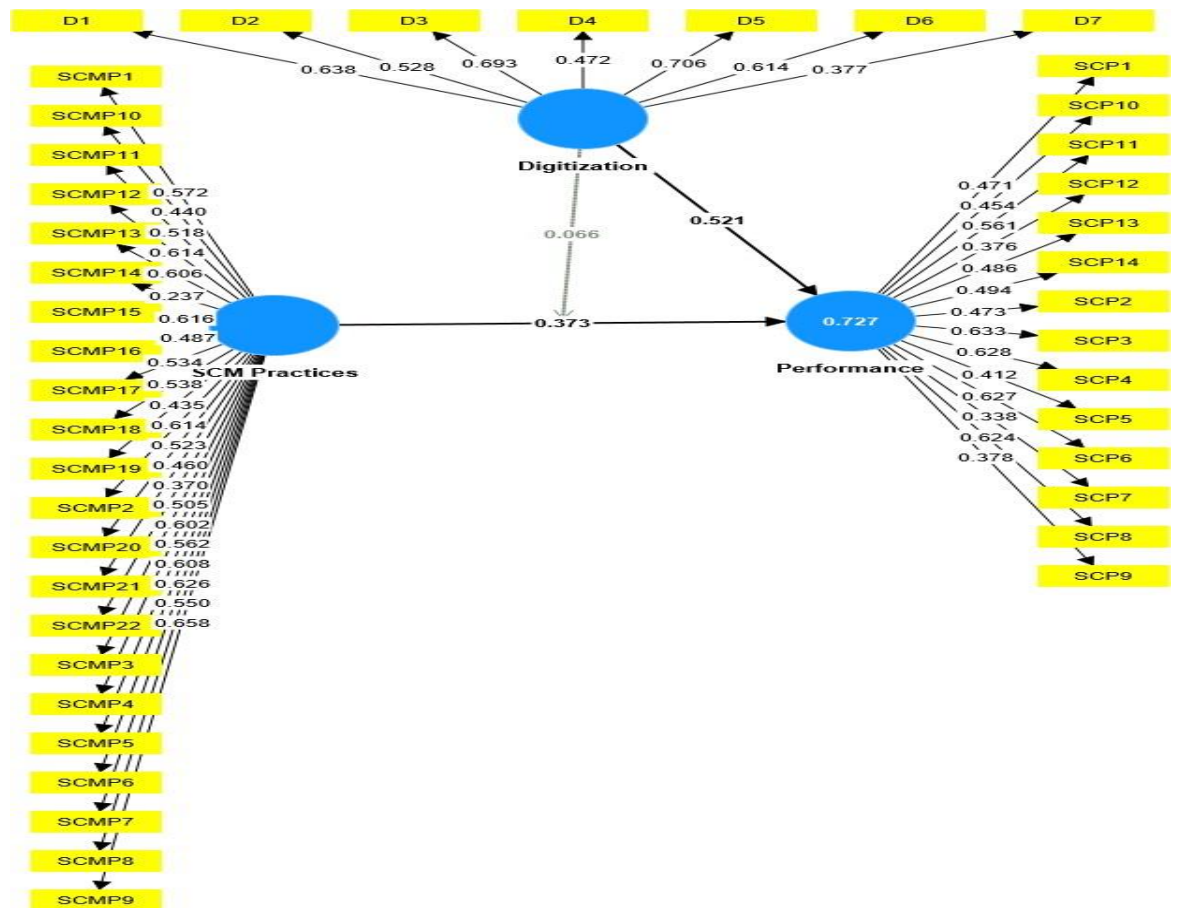


Figure 4.1: Confirmatory Factor Analysis

4.4 Descriptive Statistics

The score of each variable used to measure the three primary study constructs is reported using descriptive statistics. The Likert scale, which ranges from 1 to 7, was used to gauge how much agreement there was, and the score is compared to the scale to determine how frequently the indicators of the variables occur in the manufacturing sector. Note that on a scale of 1 to 7, 1 is strongly disagree, 2 is disagree, 2.5 is somewhat disagree, 3 is not sure, 4 is somewhat agree, 5 is agree, and 6 is definitely agree. The following sections provide extensive explanations of each concept:

4.4.1 Digitisation

To maintain business continuity, businesses have started to streamline and improve the efficiency of their processes using digital tools. Thus, digital capabilities are increasing appeal due to a changing and turbulent environment (Zhen et al., 2021). Five (5) items are used to measure the extent and nature of the digitisation implemented by firms.

Table 4.5: Descriptive Statistics Results for Digitisation

Items	Mean	S.D	Kurtosis	Skewness
D1	5.061	1.675	-0.694	-0.728
D2	4.991	1.417	-0.303	-0.504
D3	4.730	1.649	-0.874	-0.432
D4	5.035	1.344	0.169	-0.673
D5	4.557	1.741	-0.939	-0.317
Composite Score	4.875	1.565	-0.521	-0.421

Source: Field data, 2023

The descriptive statistics for digitisation are outlined in Table 4.5. The composite mean for digitisation is calculated to be 4.875, with a standard deviation of 1.565. These statistics suggest that, on average, the firms that took part in the study exhibit a moderate level of adoption of digitisation, as measured on the 7-point Likert scale.

4.4.2 Supply Chain Management Practices

In this research, supply chain management practices encompass a variety of managerial strategies designed to improve supply chain performance. These strategies encompass elements such as strategic supplier partnerships, customer relationship management, information sharing, and the quality of information. These components are consistent with prior studies conducted by Li et al. in 2017 and Wong et al. in 2018. To gauge the level to which companies have put these supply chain management practices into practice, a total of 17 measurement items were utilized in the assessment.

Table 4.6: Descriptive Statistics Results for Supply Chain Management Practices

Items	Mean	S.D	Kurtosis	Skewness
SCMP 1	5.070	1.941	-0.357	-0.923
SCMP 2	4.687	1.696	-0.525	-0.560
SCMP 3	4.948	1.548	0.275	-0.923
SCMP 4	4.635	1.857	-0.735	-0.608
SCMP 5	4.713	1.723	-0.577	-0.569
SCMP 6	4.435	1.765	-0.781	-0.434
SCMP 7	4.443	1.799	-0.752	-0.460

SCMP 8	4.296	1.969	-1.068	-0.434
SCMP 9	4.565	1.974	-1.057	-0.469
SCMP 10	4.887	1.603	0.439	-0.891
SCMP 11	4.739	1.674	-0.236	-0.729
SCMP 12	4.617	1.825	-0.547	-0.660
SCMP 13	4.930	1.661	0.017	-0.764
SCMP 14	4.730	1.617	-0.271	-0.641
SCMP 15	4.913	1.602	-0.816	-0.499
SCMP 16	4.730	1.805	-0.463	-0.641
SCMP 17	4.565	1.799	-0.714	-0.552
Composite Score	4.986	1.711	-0.621	-0.613

Source: Field data, 2023

Table 4.6 displays the descriptive data regarding supply chain management practices. The findings indicate that, within this industry, supply chain management practices have a composite mean of 4.986 and a standard deviation of 1.711. This suggests that, based on the 7-point Likert scale, the typical participating firm in this sector implements supply chain management practices to some extent.

4.4.3 Supply Chain Performance

Etzioni (2019) suggests that supply chain performance encompasses a company's capacity to meet both market-related and financial objectives. This concept aligns with the perspective of Shepherd and Günter (2016), who emphasize that supply chain performance extends beyond organisational boundaries, involving the management of raw materials, components, subassemblies, and finished products, as well as their distribution to customers through various channels, as also noted by Vital et al. (2018). In this study, the measurement of supply chain performance relies on the use of five specific items to assess its extent.

Table 4.7: Descriptive Statistics for Supply Chain Performance

Items	Mean	S.D	Kurtosis	Skewness
SCP 1	5.235	1.441	-0.118	-0.685
SCP 2	4.757	1.762	-0.656	-0.559
SCP 3	4.704	1.684	-0.895	-0.443

SCP 4	4.600	1.807	-0.776	-0.549
SCP 5	4.530	1.654	-0.720	-0.387
Composite Score	4.765	1.562	-0.562	-0.453

Source: Field data, 2023

The descriptive statistics presented in Table 4.7 reveal the results related to supply chain performance. According to the analysis, the average firm participating in the study demonstrates a high level of performance within their supply chains. This conclusion is drawn from the composite mean of 4.765 and a standard deviation of 1.562, both measured on a 7-point Likert scale. These statistics suggest that, on average, the firms in the study perform well in managing their supply chains.

4.5 Structural Equation Modeling

In the study, Structural Equation Modeling (SEM) was employed, specifically the Partial Least Squares (PLS) approach, to examine the path coefficients. These coefficients signify the direct and moderating impacts of supply chain management practices, digitisation, and supply chain performance. To derive these path coefficients, the analysis incorporated bootstrapping with 5000 resamples as a critical part of the methodology.

Table 4.8: Structural Equation Modelling (SEM) Results

Path	Coefficient	Mean	t-value	p-value
SCMP--->SCP	0.490	0.501	6.544	0.000
D---->SCP	0.327	0.334	4.049	0.000
SCMP×D--->SCP	0.018	0.009	0.335	0.738

Source: Field data, 2023 Note: SCMP=Supply Chain Management Practices; SCP=Supply Chain Performance; D=Digitisation

Table 4.8 presents the outcomes of the structural equation model, examining both the direct and moderating connections between the variables.

First and foremost, the table illustrates a notable and positive association between supply chain management practices and supply chain performance, as evidenced by the path coefficient ($\beta = 0.490$, $t = 6.544$, $p < 0.01$). This signifies that for every unit of

supply chain management practice implemented, there was a corresponding increase of 0.490 units in supply chain performance. This discovery lends strong support to H1, which postulated that supply chain management practices exert a positive and significant influence on supply chain performance.

Furthermore, the table unveils a significant and positive correlation between digitisation and supply chain performance ($\beta = 0.327$, $t = 4.049$, $p < 0.01$). This implies that for every unit of digitisation adopted, there is an associated increase of 0.327 units in supply chain performance. This result strongly corroborates H2, which proposed that digitisation is positively and significantly linked to supply chain performance.

Lastly, the study delved into the potential moderating role of digitisation in the connection between supply chain management practices and supply chain performance. The SEM analysis reveals a positive moderation effect of digitisation ($\beta = 0.018$, $t = 0.335$, $p < 0.05$). However, given the p-value of 0.738, it can be concluded that digitisation does not significantly moderate the relationship between supply chain management practices and supply chain performance. Consequently, H3 is not supported, indicating that digitisation does not have a statistically significant moderating impact on this relationship.

These findings offer valuable insights into the influence of supply chain management practices and digitisation on supply chain performance. Still, they do not provide evidence for the assertion that digitisation plays a significant moderating role in this relationship.

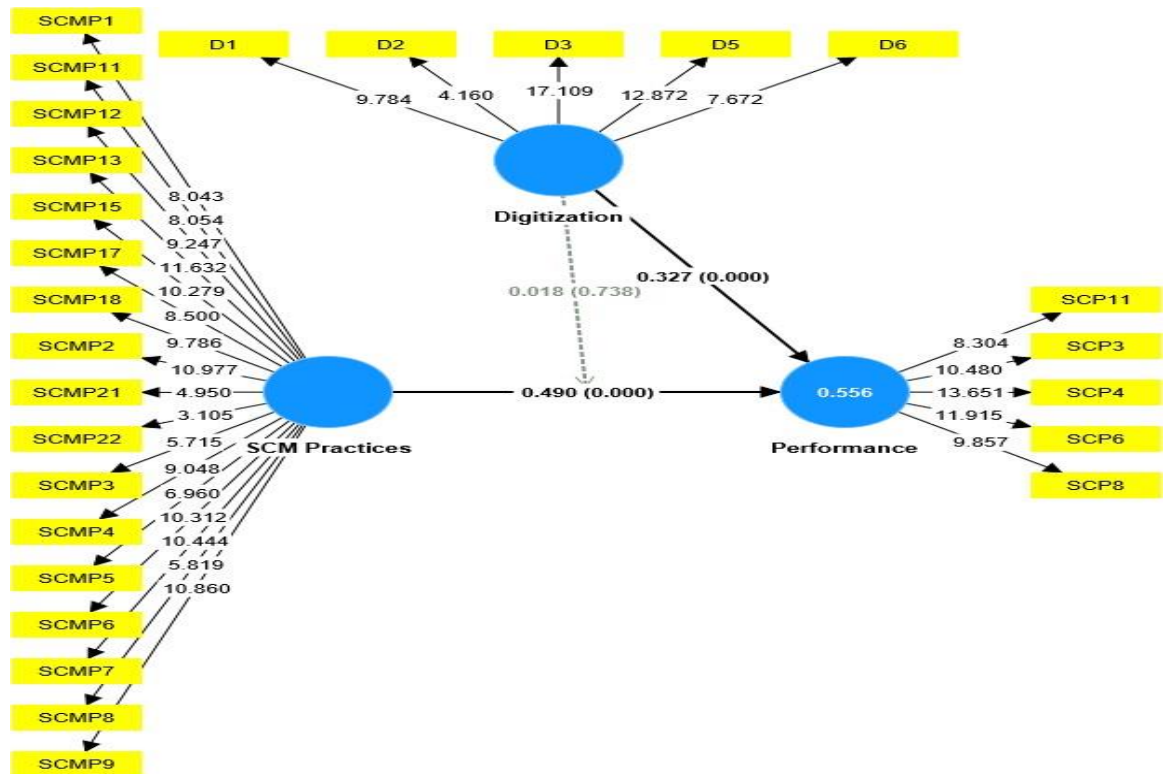


Figure 4.2: Structural Equation Model

4.6 Hypotheses Confirmation

Three hypotheses were formulated in this study based on a review of the existing literature. The collected data were analyzed to assess whether these hypotheses were confirmed or refuted. The results showed that all the hypotheses were supported, except for the moderation effect of digitisation. The summary of the confirmation of the hypotheses is presented in Table 4.9 below.

Table 4.9: Hypotheses' Confirmation

Hypothesis	Path	t-value	Coefficient (p-value)	Decision
H1	SCMP-->SCP	6.544	0.490 (p<0.01)	Supported
H2	D--->SCP	4.049	0.327 (p<0.001)	Supported
H3	SCMP×D-->SCP	0.037	0.018 (p >0.738)	Not Supported

Source: Field data, 2023 Note: SCMP=Supply Chain Management Practices; SCP=Supply Chain Performance; D=Digitisation

4.7 Discussion of Findings

The study's results have been rigorously examined within the framework of the hypotheses put forth and the extensive literature review. Below, we present a comprehensive analysis of these findings in alignment with the study's objectives.

4.7.1 Supply Chain Management Practices and Supply Chain Performance

The primary aim of the study was to explore the connection between supply chain management practices and supply chain performance. The results reveal a positive and noteworthy correlation between supply chain management practices and supply chain performance. This outcome lends strong support to H1, which postulated that supply chain management practices exert a significant and positive impact on supply chain performance. More specifically, for each instance of implementing a supply chain management practice, there was a corresponding increase of 0.490 units in supply chain performance. These findings are in line with earlier research conducted by Storey et al. (2016) and Li et al. (2017), both of which underscore the crucial role of effective supply chain management practices in enhancing overall supply chain performance.

In essence, the results suggest that companies that embrace efficient supply chain management practices are likely to witness improvements in their supply chain performance. This underscores the importance of strategic supply chain management initiatives in achieving superior performance outcomes within the realm of supply chain operations.

4.7.2 Digitisation and Supply Chain Performance

The second aim of this study was to examine the association between digitisation and supply chain performance. The study's results reveal a significant and positive correlation between digitisation and supply chain performance. The path coefficient findings are particularly noteworthy, indicating $\beta = 0.327$, $t = 4.049$, and $p < .01$. In practical terms, this means that for each unit of digitisation implemented, there was a corresponding increase of 0.327 units in supply chain performance. These outcomes strongly endorse H2, which proposed that digitisation is positively and significantly linked to supply chain performance.

These findings align with prior research, which suggests that possessing and effectively implementing digital capabilities can enhance a company's flexibility and cost-saving efforts (Drnevich and Croson, 2013). There is also evidence indicating that a firm's performance and competitive advantage are intricately tied to its digital capabilities (Usai et al., 2021). Moreover, Usai et al. (2021) provide further support by asserting that companies enhance their supply chain performance through the adoption of information technology and digitisation as part of their procurement and supply chain practices.

4.7.3 Moderating role of Digitisation on SCM Practices and Supply chain Performance

Finally, the study delved into the potential moderating role of digitisation in the relationship between supply chain management practices and supply chain performance. The results from the structural equation model (SEM) indicate a positive moderation effect of digitisation on the link between supply chain management practices and supply chain performance, as demonstrated by the path coefficient outcomes ($\beta = 0.018$, $t = 0.335$, $p < .05$). However, the p-value ($p = 0.738$) suggests that digitisation exerts an insignificant moderating impact on the relationship between supply chain management practices and supply chain performance. Consequently, H3 is not supported.

In contrast, Tan et al. (2010) argue that while the effective adoption of supply chain management practices can enhance performance, the incorporation of information technology and digitisation can further amplify performance to a greater degree. While the present study's findings suggest an insignificant moderation effect of digitisation, the existing body of literature suggests that digitisation does indeed significantly moderate the relationship between supply chain management practices and supply chain performance.

These results provide insights into the role of digitisation as a potential moderator in the context of supply chain management practices and performance, but they do not align with the viewpoint that digitisation has a significant moderating effect, as indicated in some prior research. Further exploration may be needed to understand the nuanced dynamics of this relationship in different organisational contexts.

The logo of Kenyatta University of Science and Technology (KNUST) is centered in the background. It features a red flame above a black shield with a white open book. Below the shield are yellow wings. At the bottom is a yellow banner with the Swahili motto 'WUJASANE NO' in black capital letters.

CHAPTER FIVE SUMMARY OF FINDINGS, CONCLUSION AND RECOMMENDATIONS

5.1 Introduction

This chapter presents a brief summary of the study's findings, discusses conclusions made from the data, and makes recommendations in light of the findings.

5.2 Summary of Findings

The primary objective of this research was to examine how digitisation influenced the link between performance and supply chain management strategies. The study concentrated on three distinct and targeted objectives in order to accomplish this main objective. The results that are reported here are in line with the study's objectives.

5.2.1 Relationship between supply chain management and supply chain performance

The first objective of this study aimed to investigate the relationship between supply chain management practices and supply chain performance. The analysis unveiled a substantial and positive correlation between these variables, represented by a path

coefficient (β) of 0.490, a t-value of 6.544, and a significance level (p) of less than 0.01. This implies that for every unit of supply chain management practice implemented, there was a corresponding increase of 0.490 units in supply chain performance. These findings offer robust support for H1, which proposed that supply chain management practices exert a significant and positive influence on supply chain performance. These results are consistent with prior research, including studies by Storey et al. (2016) and Li et al. (2017), which underscore the pivotal role of effective supply chain management practices in enhancing overall supply chain performance.

5.2.2 Relationship between Digitisation and Supply Chain Performance

The second objective of this study sought to explore the relationship between digitisation and supply chain performance. The analysis uncovered a positive and substantial correlation between digitisation and supply chain performance, as demonstrated by a path coefficient (β) of 0.327, a t-value of 4.049, and a significance level (p) of less than 0.01. This indicates that for each unit of digitisation adopted, there was a corresponding increase of 0.327 units in supply chain performance. These findings provide robust support for H2, which postulated that digitisation has a positive and significant association with supply chain performance. This alignment with prior research, including studies by Drnevich and Croson (2013) and Usai et al. (2021), underscores the advantages of digital capabilities in enhancing a company's flexibility, cost-effectiveness, and overall supply chain performance.

5.2.3 Moderating role of digitisation on SCM practice and supply chain performance

The third objective of this study aimed to explore the moderating role of digitisation in the connection between supply chain management practices and supply chain performance. The results indicated a positive moderation effect of digitisation on the relationship between supply chain management practices and supply chain performance, reflected by a path coefficient (β) of 0.018, a t-value of 0.335, and a significance level (p) of less than 0.05. However, the p-value (p = 0.738) suggests that digitisation exerts an insignificant moderating influence on the relationship between supply chain management practices and supply chain performance. Consequently, H3, which proposed that digitisation moderates this relationship, is not supported.

This finding contrasts with the perspective put forth by Tan et al. (2010), who argue that while the adoption of supply chain management practices can enhance performance, the integration of information technology and digitisation can further elevate performance. The results of the current study suggest that digitisation's moderating effect on the relationship between supply chain management practices and supply chain performance is not statistically significant. This implies that other factors or contextual variations may be at play within the specific context examined in this study.

5.3 Conclusion

Considering the comprehensive analysis conducted in this study, several significant conclusions emerge. The research objectives were met, and the conclusions drawn from the study's findings contribute to the understanding of how these variables interplay to shape supply chain outcomes.

The research findings confirm that within the Ghanaian manufacturing sector, supply chain management practices exert a significant and positive influence on supply chain performance. The statistical analysis of the data demonstrates a significant relationship between these two variables. Manufacturing companies that adopt and execute effective supply chain management practices tend to see enhancements in their overall supply chain performance. This alignment of findings with prior research underscores the pivotal role of supply chain management practices in improving operational efficiency, cost reduction, and the attainment of competitive advantages.

The results revealed a meaningful relationship between digitisation and supply chain performance. Manufacturing firms that integrate digital technologies into their supply chain processes witness enhanced outcomes in supply chain performance. This underscores the transformative role of digitisation in modernizing supply chain operations, enabling real-time insights, facilitating data-driven decision-making, and fostering improved collaboration with supply chain partners.

When it comes to the moderating role of digitisation in the relationship between supply chain management practices and supply chain performance, the findings were somewhat inconclusive. In contrast to some previous studies that reported a significant moderating effect of digitisation, this study indicates that the interaction between

digitisation and supply chain management practices had a limited moderating impact on supply chain performance. This suggests that while digitisation can independently enhance supply chain performance, its combined effect with supply chain management practices may not significantly amplify the benefits derived from these practices.

5.4 Recommendations

Drawing from the study's findings and conclusion, the subsequent recommendations are proposed.

5.4.1 Recommendations for Management

The study's findings underscore the importance of continuous efforts to enhance supply chain management practices within manufacturing firms. This could involve reviewing and optimising processes related to inventory management, production scheduling, and distribution. Regularly evaluating the effectiveness of these practices and adapting them to changing market conditions can lead to increased efficiency and overall supply chain performance.

Management should recognize the transformative potential of digitisation in modernizing supply chain operations. Embracing digital technologies such as data analytics, Internet devices, and cloud-based platforms can result in real-time visibility, improved decision-making, and enhanced communication among supply chain partners. This proactive approach can position companies for competitiveness in the digital age.

Leveraging the synergies between supply chain management practices and digitisation is recommended. Organisations should consider using digital tools to augment their supply chain management efforts. For instance, deploying digital platforms for demand forecasting, predictive maintenance, and supplier collaboration can amplify the influence of traditional supply chain practices, leading to higher supply chain performance.

To sustain the benefits derived from effective supply chain management practices and digitisation, it is imperative for management to establish a system of continuous monitoring and improvement. Regularly analysing key performance indicators (KPIs), customer feedback, and market trends can provide insights for refining existing processes and identifying areas for innovation.

Recognizing the significance of human capital in implementing supply chain management practices and digitisation suggests that management should invest in training programs. Equipping employees with the necessary skills to use digital tools and understand supply chain dynamics will empower them to contribute effectively to process improvement and innovation.

5.4.2 Recommendations for Future Studies

While this study focused on the manufacturing sector, future research could delve into the dynamics of supply chain management practices and digitisation in different industries. Investigating sectors such as healthcare, retail, and services will offer insights into the applicability and customization of these practices across various contexts.

To comprehend the long-term impact of supply chain management practices and digitisation, longitudinal studies over extended periods are warranted. Such research would provide a deeper understanding of how these factors evolve, adapt, and contribute to sustained supply chain performance.

The impact of culture on supply chain practices and digitisation remains an intriguing area for research. Conducting cross-cultural studies can shed light on how cultural nuances shape the adoption and effectiveness of these practices, contributing to a more comprehensive understanding.

Future studies can explore the mediating variables that mediate the relationship between supply chain management practices, digitisation, and supply chain performance. Investigating factors like competitive advantage or innovation can help unravel the mechanisms through which these practices exert their influence.

Again, expanding the scope of research to include various stakeholders in the supply chain network can provide a holistic view of the moderating effect of digitisation. Assessing how digitisation impacts relationships, collaborations, and overall supply chain dynamics is an avenue for exploration.

Comparing the moderating effect of digitisation across different geographical regions or countries can reveal regional variations in the correlation between supply chain

management practices and supply chain performance. This approach can uncover region-specific strategies and challenges.

By heeding these recommendations, organisations can optimize their supply chain operations, capitalize on the potential of digitisation, and position themselves for sustained success in an increasingly dynamic business landscape. Similarly, future researchers can contribute to the body of knowledge by exploring uncharted territories and shedding light on the evolving relationship between supply chain management practices, digitisation, and supply chain performance.

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APPENDIX A

SURVEY QUESTIONNAIRE

Dear Sir/Madam,

I am a final year student at Kwame Nkrumah University of Science and Technology (KNUST), MSc Logistics and Supply Chain Management. I am currently researching on the topic **“Assessing Supply Chain Management Practices and their impact on Supply Chain Performance: The Moderating Role of Digitisation”** as part of my final work towards my graduation. You have therefore been selected as a key respondent by reason of your great experience in the field of practice. I wish to state that, the research work is purely for academic purpose, and all information so collected will be treated with strict confidentiality.

SECTION A: RESPONDENT’S PROFILE

For the following questions, kindly select by checking (✓) all that apply.

1. Gender: Male ☐ Female ☐
2. Age (years) of Respondents: 29 and below ☐ 30 to 39 ☐ 40 to 49 ☐ 50 or more ☐
3. Level of Education: Secondary school or related Certificate ☐ Diploma/HND ☐ 1st Degree ☐ 2nd Degree or more ☐
4. Working of experience: 0-5years ☐ 6-10years ☐ 11-15years ☐ above 15years ☐
5. Managerial level: Supervisor ☐ line manager ☐ Top level ☐
6. Position within the organisation: Supply chain manager ☐ logistics managers ☐ operations manager ☐

SECTION B: SUPPLY CHAIN MANAGEMENT PRACTICES

Please evaluate your firm's supply chain management practices on the following criteria on a scale of 1 to 7 (strongly disagree to strongly agree):

Strongly agree	Disagree	Somehow disagree	Indifferent/Not sure	Somehow agree	Agree	Strongly agree	
1	2	3	4	5	6	7	
Strategic Supplier Partnership							
(1) We consider quality as our number one criterion in selecting suppliers	1	2	3	4	5	6	7
(2) We regularly solve problems jointly with our suppliers	1	2	3	4	5	6	7
(3) We have helped our suppliers to improve their product quality	1	2	3	4	5	6	7

(4) We have continuous improvement programs that include our key suppliers.	1	2	3	4	5	6	7
(5) We include our key suppliers in our planning and goalsetting activities	1	2	3	4	5	6	7
(6) We actively involve our key suppliers in new product development processes							
Customer Relationship							
(1) We frequently measure and evaluate customer satisfaction	1	2	3	4	5	6	7
(2) We frequently determine future customer expectations	1	2	3	4	5	6	7
(3) We facilitate customers' ability to seek assistance from us	1	2	3	4	5	6	7
(4) We regularly evaluate suppliers' internal management for environmental compliance.	1	2	3	4	5	6	7
(5) We frequently interact with customers to set reliability, responsiveness and other standards	1	2	3	4	5	6	7
(6) We periodically evaluate the importance of our relationship with our customers							
Level of Information Sharing							
(1) We inform trading partners in advance of changing needs	1	2	3	4	5	6	7
(2) Our trading partners share proprietary information with us	1	2	3	4	5	6	7
(3) Our trading partners keep us fully informed about issues that affect our business	1	2	3	4	5	6	7
(4) Our trading partners share business knowledge of core business processes with us	1	2	3	4	5	6	7
(5) We and our trading partners keep each other informed about events or changes that may affect processes	1	2	3	4	5	6	7
Quality of Information							
(1) Information exchange between our trading partners and us is reliable	1	2	3	4	5	6	7
(2) Information exchange between our partners and us is adequate	1	2	3	4	5	6	7
(3) Information exchange between our partners and us is complete	1	2	3	4	5	6	7
(4) Information exchange between our trading partners and us is accurate.	1	2	3	4	5	6	7
(5) Information exchange between our trading partners and us timely	1	2	3	4	5	6	7

Source: Li et al. (2017)

SECTION C: DIGITISATION

On a scale of **1 to 7**, where **1=to a very small extent**, **7=to a very great extent**; Please, rate your present level of digitisation adopted in your processes according to following statements

Strongly agree 1	Disagree 2	Somehow disagree 3	Indifferent/Not sure 4	Somehow agree 5	Agree 6	Strongly agree 7	
(1) Our firm has up-to-date IT systems throughout the supply chain	1	2	3	4	5	6	7
(2) Our firm has a high-level of IT-based automated for receiving orders from customers	1	2	3	4	5	6	7
(3) Our firm has a high-level IT-based automated ordering to suppliers	1	2	3	4	5	6	7
(4) Our firm sources for suppliers electronically	1	2	3	4	5	6	7
(5) Tendering procedure is conducted online	1	2	3	4	5	6	7
(6) Our firm electronic supply chain map to monitor activities	1	2	3	4	5	6	7
(7) My firm uses ERP to handle cash, raw supplies, production capacity, shipments, business responsibilities, and human resources.	1	2	3	4	5	6	7
(8) Radio frequency identification technology is used by my business to track individual components and subassemblies	1	2	3	4	5	6	7
(9) Barcoding is used in my business to manage inventory levels and track shipments.	1	2	3	4	5	6	7

Source: Tripathy et al. (2018)

SECTION D: SUPPLY CHAIN PERFORMANCE

On a scale of **1 to 7**, where **1=to a very small extent**, **7=to a very great extent**; Please, rate your present level of supply chain performance from the following statements

Strongly agree 1	Disagree 2	Somehow disagree 3	Indifferent/Not sure 4	Somehow agree 5	Agree 6	Strongly agree 7	
Delivery Performance							
(1) Our firm delivers the goods and materials at the right time	1	2	3	4	5	6	7
(2) Our firm delivers the goods and materials to the right place	1	2	3	4	5	6	7
(3) Our firm delivers the goods and materials in its right quantity	1	2	3	4	5	6	7
(4) Our firm uses the right channel to receive and deliver goods	1	2	3	4	5	6	7
Quality Performance							
(1) The products produced by our firm are free from defect	1	2	3	4	5	6	7
(2). The products sold to customers are not returned	1	2	3	4	5	6	7
(3) Our suppliers are ISO 9001 certified	1	2	3	4	5	6	7
(4) Higher level of quality improvement	1	2	3	4	5	6	7
(5) Our firm is able to control production errors	1	2	3	4	5	6	7
Cost Performance							
(1) Our firm is able to achieve lower operational and production cost	1	2	3	4	5	6	7

(2) Our company is able o reduce cost of transportation	1	2	3	4	5	6	7
(3) Our company reduces cost of information and communication	1	2	3	4	5	6	7
(4) Our firm is able to reduce cost of quality failure	1	2	3	4	5	6	7
Financial Performance							
Our organisation is able to achieve high market share.	1	2	3	4	5	6	7
Our organisation achieves high return on investment	1	2	3	4	5	6	7
There is a high growth of sales.	1	2	3	4	5	6	7
Higher growth in return on investment.	1	2	3	4	5	6	7
High profit margin on sales.	1	2	3	4	5	6	7

Source : (Li et al., 2017 ; Kazancoglu et al., 2018)

