THE EFFECTS OF E-PROCUREMENT PRACTICES ON SUPPLY CHAIN PERFORMANCE: THE MODERATING ROLE OF SUPPLIER INTEGRATION.

BY

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

MASTER OF SCIENCE (PROCUREMENT AND SUPPLY CHAIN MANAGEMENT)

APRIL, 2022
DECLARATION
I hereby declare that this thesis is the result of my original work towards the MSc. in Procurement and Supply Chain Management, and that to the best of my knowledge, it neither contains material published by another person nor materials which have been accepted for the award of any other degree of the University, except where due acknowledgments have been made in the text.

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

Certified by:
Prof. David Asamoah (HOD, SCIS) Signature Date
DEDICATION

I dedicate this thesis to the glory of God through his undeserved kindness and strength I was able to complete this work. I also dedicate it to my family for their unwavering support throughout my entire education.
ACKNOWLEDGEMENT

My profound gratitude first of all, goes to the Almighty God for his strength and mercy throughout this work. Special appreciation also goes to my supervisor Dr. Dorcas Nuertey for her excellent supervision, guidance and motivations which helped me to successfully complete this thesis. May God continue to bless and keep her. I would like to acknowledge the support enjoyed from all my lecturers, Jabuni Banabas and all my friends who in diverse ways have contributed to the fulfillment of this work, May God richly bless you all.
ABSTRACT

The study purpose was to find out the effects of e-procurement on procurement performance and the moderating role of supplier integration at the Ghana Health Service. The objectives were; to determine the effect of e-procurement on the organisation Supply Chain Performance, to ascertain the effect of supplier integration on the organisations supply chain performance and to determine the moderating role of supplier integration in the relationship between e-procurement practices and supply chain performance. The study was guided by technology acceptance model and innovation diffusion theory. Descriptive Survey research method was used in this study and the study collected data from top level managers from procurement and supply chain departments in Ghana Health Service. For the purpose of getting a representative sample, the researcher used stratified sampling method to sample the procurement manager and supply chain manager, using simple random sampling. Questionnaires were used as research tools for the study. The data was analyzed using regression models and presented in tables. The study findings indicated that e-procurement practices and supplier integration positively and significantly influence the organisations supply chain performance. It is also recommended that further studies should be conducted on the effects of e-procurement on Ghana Health Service supply chain performance to further address the challenges that are hampering the implementation. Supplier integration should be ensured such that automated procurement process will specific with requisition, tendering, contract awarding and payment, such that all suppliers can use with ease which will improve their internal processes to reduce bureaucracy and increase efficiency. Lastly it is recommended that a similar study can be done in other state corporations in Ghana to find out the moderating role of supplier integration in the relationship between electronic procurement practices and supply chain performance and whether similar results would be realized. This would facilitate comparison and comprehensive results on the findings hence increase the validity of the results.
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<tbody>
<tr>
<td>GHS</td>
<td>Ghana Health Service</td>
</tr>
<tr>
<td>E-PROCUREMENT</td>
<td>Electronic Procurement</td>
</tr>
<tr>
<td>SCP</td>
<td>Supply Chain Performance</td>
</tr>
<tr>
<td>Abbreviation</td>
<td>Full Form</td>
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<tr>
<td>--------------</td>
<td>-----------</td>
</tr>
<tr>
<td>SCM</td>
<td>Supply Chain Management</td>
</tr>
<tr>
<td>ANOVA</td>
<td>Analysis of Variation</td>
</tr>
<tr>
<td>ICT</td>
<td>Information Communication Technology</td>
</tr>
<tr>
<td>CIPS</td>
<td>Chartered Institute of Purchasing and Supply</td>
</tr>
<tr>
<td>MRP</td>
<td>Material Requirement Planning</td>
</tr>
<tr>
<td>ERP</td>
<td>Enterprise Resource Planning</td>
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<tr>
<td>PPA</td>
<td>Public Procurement Authority</td>
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CHAPTER ONE
INTRODUCTION

1.1 Background of the Study

In the world of challenging and competitive business ecosystem, the use of technological tools and services to drive innovation is no longer a minor matter; Rather, a key and necessary for public and private organisations adoption. It is relevant in today’s world for businesses to provide clients with a cost-effective overall solution and good clients satisfaction using innovation and new technology. The advent of Information and Communication Technology (ICT), industries were compelled in switching business operations from the old-style to the philosophy of electronic business, electronic procurement and electronic supply chain to ensure sustainability. The private and public sectors have used Information Technology (IT) over the past decade to enhance and improve purchasing and some business processes (Koorn & Mueller, 2001).

In automating the process of supply chain, electronic procurement offers diverse advantages that almost all competitive company have to consider to ensure efficiency. In the 2000s, the Internet has substantially made feasible and supported a key resource for the automation of the purchase process, with the added benefit of improving the processing capabilities of audiovisual aids. Supply chain (SC) practices by themselves will not deliver efficiency; efficiency can only be obtained by combining various supply chain practices.

To imply, Dawe (2004) stated that in order to improve the supply chain's performance, extensive efforts should be made to improve all supply chain functions in an organisation, and by focusing on supply chain practices, moving away from a functional and independent system and toward a more enhanced and integrative system that is passed over to system. The result is that the effectiveness of every supply chain practice should be evaluated in terms of how the process impacts the efficient integration of the whole supply chain. Supply chain integration success may be accomplished by combining various supply chain methods and centralized organisational structures in a well-defined manner.

Various business transactions are used to automate the supply chain, including e-business, e-SCP (e-Supply Chain Performance) and e-commerce. Electronic commerce basically means business transactions or the trading of goods and services using the Internet. Another definition also refers to an online shop of a website with catalog and a provision for
e-ordering process. Electronic business is a system which includes large production number, client and internal processes which is only indirectly related to transactions that are commercial.

Since the inception of COVID-19, transactions by companies and organisations have come to a standstill, with most of them collapsing due to a lack of logistics to support their day-to-day operations. The strength of most organisations depends on their sourcing activities and the strength of the supply chain. Recently, companies are not competing with each other, but rather the supply chain performance of operations the customization of e-procurement, it provides information access on a daily basis, information aggregation of multiple bases, accurate audit trails for transactions, and enables companies know areas that are most efficient, improving and potential costs are offered by the discount. It also enables personalization and customization of information. Electronic Supply Chain Management is concerned with the internal systems' reorganisation and optimization of the complete supply chain in order to ensure full sales growth at the lowest feasible cost. It entails developing an online purchasing system, linking an industry-wide e-marketplace, and implementing e-SCM throughout the value chain.

Electronic procurement is an important way of doing business to lower purchase prices and increase process efficiency. Collection management, e-tendering, e-auction, e-information, supplier management, order integration, catalog management, order status, dispatch notification, electronic bill, electronic payment of goods and management of contract constitute e-procurement value chain. Efficient performance of the supply chain is vital to companies to stay in business. This efficiency maybe achieved through ensuring that all actions along the supply chain system, from one end customer to supplier, are properly synchronized and coordinated. When functions like procurement are lagged behind, an important determinant of the company's relationship with suppliers becomes very important.

Electronic procurement is becoming more popular in a variety of businesses throughout the world, with yearly transactions estimated to approach $4 trillion by 2020, up from $75 billion in 2002. Venkatesh (2010, Venkatesh, Venkatesh, Venkatesh, Venkatesh Increased efficiency, improved transparency, improved risk management, higher levels of integrity, greater and better access to government procurement for small and medium-sized businesses, corruption avoidance, and cost savings are all advantages of e-procurement optimization over traditional
manual procurement. E-procurement is a wide term that refers to an end-to-end solution that combines and simplifies a company's procurement procedures. Despite the widespread use of the phrase "end-to-end" e-procurement, industry and academic experts believe that this ideal model is seldom realized, and that most e-procurement systems integrate various models (Xu et al., 2016)

Global purchasing has shifted its focus away from day-to-day sourcing and toward long-term, value-added purchasing and supply chain initiatives. The COVID-19 pandemic crisis is the biggest threat to the global economy since the economic crisis in 2019, electronic procurement has obtained much attention especially with the emergence of new technology. Simultaneously, it is responding to the problems and opportunities of electronic procurement by using the Internet to trade for products and services.

Over the last few decades, purchasing responsibilities have shifted dramatically, with purchasing primarily focusing on aspects of transactional for purchasing processes. Purchasing have been acknowledged as support function that considers the sourcing requirements of other departments. The advancement of management of materials and the emergence of new manufacturing technologies have brought processes preceding and following manufacturing closely together, strengthening the boundary between production and purchasing, so that the purchasing cycle must be tailored to the production requirements.

It is considered that e-procurement, enabled by technological advancements, improves buying efficiency and competitiveness in changing businesses by modernizing procedures and lowering costs. E-Purchasing uses various devices such as the telephone, Fax, email, web portal, and ERP in procurement processes such as procurement planning, sourcing, requesting, sending, and receiving offers, analysis of offers / offers, order processing and transmission to suppliers, incoming goods and services, comparison of orders with invoices, electronic supplier payment, and supplier evaluation. Automated procurement processes are becoming more efficient and effective, resulting in added value and shorter order cycles, as well as fewer errors, standardized processes, and faster payments to suppliers, as well as improved internal and external customer relationships and supplier-buyer relationships.

The ability to profoundly streamline the purchasing of goods offered by digital technologies becomes indispensable in inter-company competition as it takes into account the positive
cost-cutting effects of companies that have adopted electronic procurement. Automating purchasing processes with e-procurement technology enables companies to achieve cost savings of 8-12 percent of total purchasing, as various case studies show. As a result, web-based models are becoming increasingly important in companies, especially in the development of value chain value (Piera et al., 2014). The entire procurement process is completed online with e-procurement. As a result, the business has chosen to make various types of purchases, ranging among different raw materials to services, through B2B systems: these tools enable companies to reduce procurement costs and time, improve inventory and warehouse management, and this is reflected in a conclusive improvement in the control of many business processes.

This is a largely important technical solution because large companies as it makes managing the entire purchasing and delivery network process easier and more effective; On the other hand, it is a technical and vital solution for smaller businesses as the introduction of e-procurement solutions can make them globally part of a company with many growth opportunities. (Piera et al., 2014) Historically, procurement has been done by visiting a store and then following the ordering procedures, or by going through catalogs and calling. Procurement used to be a manual process, and transactions were completed through slower systematic procedures at one point (Hawking et al. 2004).

The conventional procurement process lays the groundwork for integrating electronic procurement into the system in a methodical and professional manner. When the Internet first became available, companies began to shift their procurement activities to the Internet, believing that they would gain greatly if every purchase procedure was executed flawlessly. E-procurement is a driver of supply chain network expansion as well as a key factor in the value chain (Hawking et al. 2004). From procurement strategy through supplier assessment, a complete e-procurement system should incorporate all of the features that allow buyers and sellers to efficiently engage. In order for e-procurement to run properly, both buyers and sellers must have access to information about themselves.

While the private and government companies have used information technology (IT) systems to restructure and program their purchasing and other processes for about 40 years now, electronic procurement systems only gained traction in the last decade. There has recently been some discussion about how e-procurement came to be.
According to Alrubaiie et al. (2012); Koorn & Mueller (2001), the doubt about Internet usage in e-procurement offers numerous returns over previous cross-organisational instruments does not exist. Since its inception in the 1960s, Electronic Data Interchange (EDI) has enabled automated purchasing transactions between buyers and their suppliers.

Many improvements have been made on the electronic information side: collecting and distributing purchasing information via internet technology from and to internal and external parties, and using internet powered devices to purchase products and services from a variety of known and unknown vendors has improved sales processes. E-Market-Sites: Creates value chains by extending web-based ERP. According to Jessop, (2006) buying communities may link to suppliers' supply chains and buyers' financial systems to acquire commodities and services from preferred vendors, add shopping carts, make enquiries and receive permissions, accept orders, and process electronic invoicing.

E-procurement solutions have arisen during the previous two decades. Despite the technology industry's exponential expansion, we estimate that organisations will only employ around 25% of their solution capacity, partially owing to a lack of technical expertise or financial resources, but also because solutions are likely misaligned with expanding purchasing demands. Regardless of the listed limitations, electronic procurement has apparent prospective benefits that may be used to make a business case for financial support, increasing usage, or new alternatives investment. In Africa, e-procurement is gaining popularity, especially in the public sector. To address concerns of accountability and transparency in public procurement, most African nations have turned to legal changes and the adoption of procurement legislation. Tanzania, for example, has implemented electronic procurement systems that enable electronic sharing, electronic advertising, electronic filing, electronic valuation, electronic contacting, electronic payment, electronic communication, and electronic control and monitoring to ensure that all public procurement activities are conducted online, and Ghana recently hosted a lunch for the e-procurement systems (GHANEPS).

1.2 Statement of the Problem
One of the most important departments in an organisation is the procurement function. It largely enormous to institution efficiency and effectiveness. Manual systems have resulted in
significant improvidence in the directive and operation of the procurement function in Ghana. As a result, the implementation of ICT is required to ensure the smooth operation of the procurement system. To tackle today's operational problems, institutions employ ICT to enhance service to suppliers and other customers, decrease operating costs, and increase performance. The execution of procurement functions is influenced by online communication, online bidding, and automated bidding procedures in the supply chain. IT enables smooth and fast processes, effective information distribution, task and decision decentralization, increased transparency, and improved control with suppliers and organization to improve supply chain performance.

Every department head is supposed to introduce electronic procurement and integrate suppliers into the system which will enhance the purchase goods/services/work at the right time, price, location, quantity, and quality for all users in the business so that the organisation benefits immensely and customers are better serviced (both internally and externally). E-procurement and supplier integration has made it easier for organisations to purchase, and dispose of items. Most parastatal government officials/agents, however, are hesitant to embrace the concept of e-procurement and supplier integration which will improve the organisations supply chain performance. Local and international studies on e-procurement have been conducted.

Madzimure et al. (2020) investigated e-procurement, supplier integration, and supply chain performance in small and medium-sized firms in South Africa. Many small and medium-sized firms (SMEs) in developing nations, according to the report, confront a variety of problems that impede their growth and performance. The effects of technology, globalization, and liberalization, as well as poor networking among the most important market participants and stiff competition from established companies, are examples of such challenges. The coronavirus disease (COVID-19) outbreak has hit national and global economies hard. Different companies face different problems with some loss in their procurement and supply chain activities. Companies in particular are faced with a wide variety of problems, such as: B. Fall in demand, interruptions in the supply chain, cancellation of export orders, scarcity of raw materials and interruptions in transport (Shafi et al., 2020)

Orori (2011) looked at the factors that influence e-procurement adoption in retail, conducting a study of supermarkets managed by retail chains in Kenya, and discovered that change is met with a lot of opposition. Batenburg (2007) conducted research on the use of e-procurement by
European businesses. The study found that there are country-specific differences in the adoption of e-procurement, with companies in countries with low uncertainty avoidance, such as Germany and the United Kingdom, using it earlier on, while countries with lower change resistance, such as France and Spain, have lower adoption rates.

In seven tea companies in Kisii, Omai (2013) explored the determinants of e-procurement in supply chain management. He observed that supply chain management was aided by information interchange, partnerships with partners, and facilitated supply chain integration. E-procurement, according to his research, can help with information exchange and supply chain integration. This affects the pricing and quality of the goods at the plants. He advised that ERP software be upgraded in order to promote confidence between tea plants and their suppliers, especially in a government service company. The research focuses on e-procurement for supply chain performance and supplier integration, with a special focus on the Ghana Health Service, to address the research vacuum. The study's purpose was to address concerns concerning GHS procurement procedures, the usage of e-procurement, supplier integration, and the obstacles of establishing the GHS e-procurement system.

1.3 Objectives of the Study
The broader purpose this research work is to identify the impact of e-Procurement on Supply Chain Performance: the moderating role of supplier integration at GHS. The specific objectives are;

i. To determine the effect of e-procurement on the organisation Supply Chain Performance.
ii. To ascertain the effect of supplier integration on the organisation supply chain performance
iii. To determine the moderating role of supplier integration in the relationship between e-procurement practices and supply chain performance.

1.4 Research Questions
i. What is the effect of e-procurement on the organisation Supply Chain Performance?
ii. What is the effect of supplier integration on the organisation supply chain performance?
iii. What is the moderating role of supplier integration in the relationship between e-procurement practices and supply chain performance?
1.5 Justification of the Study

There are various empirical and practical contributions in this study work. With a collaborative understanding of e-procurement methods, supply chain performance, and supplier integration, the study is beneficial for academics, policymakers, and industry experts. This study will aid e-procurement researchers by serving as a reference for researchers conducting studies on this and other related topics. Given the high level of professional, academic, and scientific interest in procurement, this paper may be referenced to advance the academic and scientific contribution to understand this body of knowledge. This paper will contribute to the validation of theoretical assumptions about the effects of e-procurement on supply chain performance. Based on the study's findings, political decision-makers will be able to develop e-procurement strategies. Understanding the Ghana Health Service's supply chain practices would aid the government in policymaking across various ministries. They'd help with the creation of specific plans and programs that actively promote the growth and sustainability of government institutions, as well as policymakers' support, encouragement, and promotion of acceptable guidelines for organisations. The findings of the study will assist the Ghanaian Health Service's management and personnel, who will learn how to successfully handle e-procurement in order to improve supply chain performance. This paper explains the benefits of developing efficient procurement strategies as well as the obstacles of successfully utilizing resources. The findings will aid in resolving the highlighted factors in order to enhance e-procurement adoption and improve supply chain performance among the target population. The data will aid in the diagnosis of financial difficulties, and the government will produce recommendations to encourage the use of e-procurement to improve supply chain performance. The findings of the study can also be used as a model for other companies looking to implement e-procurement. It would allow them to see how e-procurement affects supply chain performance.

1.6 Research Methodology

In this study, quantitative data was used using questionnaires. This research design was chosen because the research hypotheses can best be answered by quantitative data. In this study, primary data were collected using questionnaires and the study took both an explanatory and a descriptive approach. Deductive reasoning analysis was used to measure the data collected in order to be processed into meaningful information to allow for a comprehensive review of the entire dissertation. The approach was used to explain the points in e-procurement practices and supply chain performance, as well as the moderating role of
supplier integration. In addition, questionnaires were taken from health services to determine their supply chain performance, which is relevant to the efficiency of the organisation. SPSS was used to process valuable analysis and information in decision making. The study was based on 120 selected health services.

1.7 Scope of the Study
The study covered the health sectors that are both publicly and privately owned in the country. The study was particularly focused on e-procurement and supply chain performance as well as the moderating role of supplier integration in the health sector in Ghana, as the scope facilitates data collection and thus represents an ideal context for the study.

1.8 Limitation of the Study
A cross-sectional survey was used in this study and this was one of the main limitations of the study as the researcher was unable to confirm the cross-sectional results and was able to examine performance before and after the introduction of e-procurement practices at different times to provide: Insights into refinement of the relevant items. A longitudinal study that examines performance development over a longer period of time should therefore be considered in future research.

One of the challenges was that some of the respondents did or did not complete the questionnaires. Some questions were misunderstood and therefore inadequate responses to questionnaires. Some of the questionnaires were canceled due to unexpected occurrences, such as B. Leave of absence before filling in, not filled out. This was mitigated by constant reminders of respondents during the period they were given the questionnaires. Future research should therefore consider multiple industries or sectors to improve understanding of the contributions of e-procurement practices to supply chain performance with supplier integration.

1.9 Organisation of the Study
There are five chapters in this research. The first chapter detailed background of the study, statement of the problem, objectives the study, justification of the study, research methodology, scope of the study, limitation of the study and organisation of the study. Chapter two outlines the literature review, conceptual review, theoretical review, empirical review and
conceptual and/theoretical framework. Chapter three discusses the research method, study population, sample size and sampling technique, types and sources of data, data collection method, validity and reliability tests, data analysis method, research ethic and profile of Ghana Health Service. Chapter four talks about data presentation, analysis and discussion. This includes; demographic characteristics of the respondents, reliability and validity test, descriptive analysis, statistical test and discussion of results. The fifth chapter contains a summary of the findings, conclusions and recommendations for future studies.

CHAPTER TWO
LITERATURE REVIEW

2.0 Introduction
This chapter's content is drawn from journal articles and other publications that address issues relevant to the study topic. It looks at what different scientists and authors have claimed about how electronic procurement techniques affect supply chain performance. Published research on e-procurement, e-procurement practices, supplier integration, supply chain performance, the impact of e-procurement practices on supply chain performance, the impact of supplier integration on supply chain performance, and the moderating role of supplier integration on supply chain performance are all discussed in this chapter. At the end of the chapter, there is an executive summary as well as a conceptual framework.

2.1 Conceptual Review
In this section the conceptual review of the examined variables is presented. It looked at the definition and concepts of e-procurement and the definitions of supply chain performance.

2.1.1 Definitions and Dimensions of Electronic Procurement
There is no universally agreed definition of e-procurement. In this study, e-procurement is defined as an online shop system that includes four (4) components: electronic planning, electronic resources, electronic negotiation, and electronic assessment (Bahambari & Kelidbari, 2015). Croom and Brandon-Jones (2005) define e-procurement as using an internet-based system to fulfill one or more components of the procurement process, such as search, ordering, procurement, negotiation, receipt, and verification of postal transactions. E-procurement is a method of doing business with other businesses that involves using the internet to identify new suppliers, make purchases, make payments, and communicate with vendors. (Pattanayak & Punyatoya, 2020; Giunipero, 2008). The use of information
technology to ease business-to-business activities for goods and services is known as e-procurement (Madzimure et al. 2020). The Chartered Institute of Purchase and Supplies (CIPS) describes e-Procurement as the electronic use of information and communication technology to improve external and internal purchasing and procurement management procedures, according to Lysons & Gilligham (2003). Electronic procurement, on the other hand, is an online function that combines the use of information technology with purchasing resources to process orders, connect with contractors, and make purchase choices. Electronic bidding, electronic marketplaces, electronic auctions/reverse auctions, and electronic catalogs are examples of electronic procurement that concentrate on one or more phases in the procurement process. The e-procurement application, in a broader sense, may be regarded of as an end-to-end solution that combines and simplifies multiple procurement tasks across the business. E-sourcing, e-negotiation, e-design, and e-evaluation are the four functions of the electronic procurement system (Kim & Hunk, 2004; Presutti, 2003). Introduction of electronic procurement systems has its own goals that the organisation has such main goals of electronic procurement are to improve transaction between suppliers and buyers, reduce personal needs, save time and money, receive more offers from a wider range of potential bidders, improve coordination, the shortening of the procurement cycle, the elimination of weak points clarification during the tendering period, improvement of the audit trails and transparency and achievement of the best price-performance ratio (Naoum & Egbu, 2016). Attractive relationship between buyer and seller has a positive effect on innovation and supply chain performance in organisations (Patrucco et al., 2019).

E-procurement doesn't work without an enabler. Baily et al. (2008) highlighted the pioneers in electronic procurement. The advent of information technology has resulted in a globalization of businesses, with many of them having websites. Different companies might participate in a variety of activities in different supply chains thanks to the websites. When it comes to implementing electronic procurement, security methods are crucial. Companies interested in implementing e-procurement believe system security to be a must-have before moving forward with the implementation. The ability to integrate e-procurement with other organisational systems is critical. Payment gateways, supplier systems (SS), material resource planning (MRP), and enterprise resource planning (ERP) are examples of such systems (ERP). A verification procedure should be possible with electronic procurement. This enables third parties to audit supply chain operations, providing participants confidence that they are being carried out correctly. Every sort of notification between the participants in a supply
chain should be possible with the notification functionalities of an e-procurement system. Such notifications include receipts, surcharges, and payments, to name a few (Baily et al. 2008).

You will need a safe and verified website to reach a large number of target clients all around the world. This information system should assist both customers and businesspeople. This allows for the provision of trustworthy, accurate, and authentic information about items and services. Many effective electronic procurement initiatives are those in which the e-procurement function is completely integrated into business operations and the system is flexible enough to keep up with projected technical advancements. Koorn & Mueller (2001) points out three different forms of E-procurement. Procurement systems that is electronic procurement systems for buyer;

Electronic procurement systems for sellers; and online mediators. e-Sourcing, which is used for contract processes and includes tools like e-Tendering RFQs (Request for Quotes), and e-Procurement, which is used for transactional processes and includes tools like the electronic one Catalog, are the three-primary e-Procurement processes identified by Baily et al. (2008).

The last option is e-payment, which employs the usage of virtual computers as tools (procurement cards). E-sourcing is the process of using the internet to make decisions and establish strategies about where and how services or goods should be bought. E-procurement is divided into three phases in this model: e-sourcing, e-inquiry, and e-intelligence. This method allows the procurement model to be modified, removing the time-consuming and expensive transaction activity and resulting in shorter cycle times. This results in massive efficiency gains for businesses. Improved business connections with suppliers are enabled by changes in the flow of information, particularly the improved exchange of sensitive information. Traditional procurement techniques provided little openness and less satisfaction in supplier agreements in the past. Improved transparency, a broader geographic reach, and faster transaction times, as well as better pricing, are all advantages of e-procurement. It entails utilizing electronic technologies to automate and streamline a company's procurement operations, hence increasing efficiency and transparency while lowering costs.

Interacting with suppliers is done through a buy-side exchange, whereas dealing with customers is done through a sell-side exchange. A marketplace is a website where buyers can
shop with a range of different suppliers. In an e-market, the buyer has power since he can analyze most potential providers for a certain product or service and make informed decisions about what to buy and where to acquire it. This informs the consumer about the various products available on the market as well as the current status of product specs. By making numerous comparisons, the customer has information access about similar/ same product and services which include added value so that buyers can determine the correct cost of the product (Eng, 2004).

E-catalogs are websites that provide information about a vendor's products and services as well as the ability to order and pay for them online. They allow for two-way real-time communication between the customer and the supplier, as well as informing the buyer about products they may not be aware of, thanks to the fact that permission may be done online. Email can be used to send notifications and confirmations. It's also a way of reacting fast to market conditions and needs by adjusting prices and repackaging products. This can only be accomplished if all parts of a supply chain work together. A huge number of representatives from buyer and seller groups communicate in these partnerships. Each person offers a unique set of personal traits, experiences, and knowledge to the partnership (Mangan & Christopher, 2005).

In this research, we describe e-procurement as an electronic procurement system with five functions: e-sourcing, e-design, e-evaluation, e-negotiation, and e-information (Presutti, 2003; Tatsis et al. 2006). The process of developing the purchasing criteria for an e-procurement system is referred to as "e-design." E-sourcing is the method by which a company selects its suppliers using an electronic procurement system; E-negotiation is the method by which a company negotiates a contract using technology; and E-evaluation is the phase in which detailed information about suppliers is gathered in preparation for evaluations and transactions.

**2.1.1.1 Definitions of E-Design**

This has to do with defining the specifications for an online procurement system (Chang et al., 2013). E-design makes it easy for suppliers to participate in the product/service specification development process. Effective digital design allows the user to easily navigate a website or find the information they need as quickly and easily as possible while the appropriate news is being delivered. With E-Design, the business department can
electronically request the specifications of their needs without having to meet the purchasing department in the organisation to discuss the requirement. Introducing e-design into e-procurement practices helps the organisation and suppliers improve the effectiveness of their supply chain performance. When e-design is introduced, it shortens the specification request process, resulting in supply chain efficiency in the organisation.

2.1.1.2 Definitions E-Sourcing
This is the process of employing internet technology to find potential providers with the goal of lowering search expenses (Madzimure et al. 2020; Ombat, 2015). All phases in the procurement process, including expenditure analysis, needs summary, supplier identification, requirements definition, negotiation (request for move-in, offer or offer), reverse auctions, offer evaluations, and contract management, are supported by a web-based platform. According to a study by (Bialas et al. 2016) Hamilton, the operational benefits of e-sourcing include: (a) Streamlining procedures through easier / faster product/service ordering, less paperwork, easier online assessment, less human errors, and lower cost of storage. (b) Increasing bargaining strength through expenditure transparency, purchasing aggregation, improved compliance, less non-contractual individual purchases, comparability and competition, efficient market and price processes, information for strategic procurement, and e-purchasing organisations. Just a few of the benefits include a 5 to 20% decrease in material prices, a 25 to 30% reduction in procurement cycle times, and a 10 to 15% reduction in time to market (Presutti, 2003).

However, e-sourcing poses significant challenges to a company, such as the required change management, the resulting new organisational roles, the expected implementation speed, the management of existing suppliers, the definition of a good content management implementation plan, and integration with back office systems (Bialas et al. 2016)

2.1.1.3 Definitions E-Negotiation
This is a term used to describe the electronic negotiating process between business partners (Madzimure et al. 2020). E-negotiation allows for huge cost reductions when acquiring products and services through the Internet (Madzimure et al. 2020). Negotiations necessitate a healthy balance of give and take. You should strive for a mutually beneficial relationship that is courteous and positive. In order to negotiate well, you must be able to make little concessions on your own side while providing something valuable to the other party.
Regardless of the aims of the various parties, your approach should promote goodwill. Both sides are happy and willing to do business again after a successful discussion. This tutorial discusses why bargaining is required and provides methods and techniques for negotiating.

2.1.1.4 Definitions E-Evaluation
E-Evaluation: A lot of information about suppliers is acquired in this step-in order to conduct subsequent assessments and transactions through the Internet (Madzimure et al. 2020). According to Presutti (2003), a corporation must assess and enhance its purchasing process in order to effectively utilize the benefits of e-procurement solutions. With the arrival of the World Wide Web, several industries, particularly government organisations, have transformed tremendously. Since then, numerous businesses have implemented their own e-rating system. The JISC (Joint Information System Committee) published principles and recommendations for e-evaluation in England, Wales, and Northern Ireland to clarify the numerous regulators in the UK. The IMS Question and Test Interoperability Specification was produced by the IMS Global Learning Consortium in 2009. It is critical to build a supplier evaluation system that considers organisational goals and assists suppliers in developing abilities that will benefit society in the long run.

2.1.1.5 Definitions E-Information
E-Information: Using internet technology to acquire and disseminate purchasing data from and to internal and external parties, such as purchasing management data on an extranet that can be accessed by internal customers and suppliers, is referred to as e-Information (Sharma, 2012). To put it another way, e-information is the collection, dissemination, and purchasing of data through the internet (Madzimure et al. 2020; Ombat, 2015).

2.1.2 Definitions of Supplier integration
Supplier integration is the process of a corporation engaging and cooperating with its suppliers to guarantee an appropriate supply flow (Flynn et al. 2010; Madzimure et al. 2020; Zhao et al., 2011). A long-term relationship between a corporation and its suppliers is formed (Li et al. 2006; Madzimure et al. 2020). One of the most crucial building elements of SCM is collaboration or integration (Madzimure et al., 2020). A business partner might engage in the early stages of product development or consulting by integrating with a supplier. Partnering is a shift from the customary pressures that bigger customers apply on small and medium-sized businesses that have previously been dismissed as irrelevant. The collaboration aims to
transform short-term adversarial customer-supplier relationships that focus on purchasing, procurement, lower prices, and improved deliveries into long-term collaborations with lower LAC, a smaller supplier base, shorter product lifecycles, and a focus on the core business and printing on a limited range. In order to be successful, suppliers must be brought on board for every new product launch. To increase supply chain performance, this necessitates a higher level of integration. Most organisations, for example, deal with the issue of on-time delivery on a regular basis (Zhao et al. 2015). Integrating with suppliers, on the other hand, enables companies to share order and inventory data with their vendors.

Supplier integration, which entails effective communication, information sharing, and cooperation with suppliers, can also assist to reduce upstream complexity (Madzimure et al. 2020; Zhao et al. 2015). Increased responsiveness, flexibility, and time savings are just a few of the benefits of integrating suppliers (Madzimure et al. 2020) Supplier integration can also assist reduce transaction costs by cutting manufacturing costs and reducing uncertainty (Flynn et al. 2010), resulting in improved operational performance (Yu et al. 2014). When suppliers are brought together, opportunistic behavior is drastically reduced in favor of shared visions and cooperative goals (Madzimure et al. 2020; Prajogo et al. 2015).

Suppliers, on the other hand, can be integrated with and exchange order and inventory data with companies. Supplier integration, which entails good communication, information sharing, and collaboration with suppliers, may also aid in reducing upstream complexity (Madzimure et al. 2020; Zhao et al. 2015). Increased responsiveness, flexibility, and time savings are all advantages of supplier integration (Madzimure et al. 2020). Supplier integration also reduces transaction costs by decreasing uncertainty and cutting production expenses (Flynn et al. 2010; Madzimure et al. 2020), resulting in improved operational performance.

2.1.3 Definitions of Supply Chain Performance.

The phrase "supply chain performance" means the tangible (cost and quality) and intangible (capacity and resource utilization) outcomes that can be achieved via effective Supply Chain Management. Pattanayak and Punyatoya, 2020; Presutti, 2003).

The evaluation of supply chain management and the evaluation of supply chain operations expenses as a tangible component and the utilization of supply chain capacity as an intangible aspect, are all examples of supply chain performance. Faheem and Siddiqui, 2020; Eng 2004).
Electronic procurement is a form of systematic electronic procurement where supplies, materials, and other organisational purchases are obtained via electronic means.

Madzimure et al. (2020); Srinivasan et al. (2011) defined supply chain performance as the performance of several processes inside a company's supply chain function. Cooperation and shared decision-making among trading partners are critical components of a successful supply chain (George et al. 2011; Madzimure et al. 2020).

Costs, delays, adaptability, diversity, and traceability are all factors that companies strive to improve. As they contribute to performance, collaborative practices and information sharing between partners become vital in any supply chain. An effective performance evaluation is crucial to SCP because it lays the groundwork for understanding the system and communicating the impact of systematic efforts to supply chain partners. Madzimure et al. (2020; Bhagwat & Sharma 2007). Because SCP is a multidimensional notion, many strategies for defining these limitations have been offered. Madzimure et al., (2020) defined three measures as crucial aspects in measuring an organisation's SCP: resources, output, and adaptability. Madzimure and colleagues (2020) suggested an approach based on three SCP measurement levels, as proposed by Gunasekara and colleagues (2001). (strategic, tactical and operational). Another SCP model proposed by Madzimure et al. (2020) divides measurement into two phases: quantitative and qualitative. Nonetheless, the Supply Chain Council developed the Supply Chain Operations Reference (SCOR) model, which bases all supply chain activities on planning, sourcing, manufacturing, delivery, and return procedures.

Overall, supply chain effectiveness is seen as a critical aspect in gaining a competitive edge (Hsin Chang et al. 2013; Madzimure et al., 2020). Strategic purchasing is responsible for duties such as supplier management, purchase requisition bundling, and procurement-oriented product creation. Companies can use e-procurement to decentralize operational procurement procedures while centralizing strategic procurement. Through e-procurement platforms, this leads to better supply chain transparency. In terms of strategy, e-procurement will aid in the consolidation of purchasing methods, resulting in bigger discounts and better supplier service. It also minimizes administration times and frees up personnel to do other work by speeding up the transfer of crucial information between the buyer and supplier. This enables the company to respond quickly to highly competitive new entrants and expand its commercial opportunities.

2.2 Theoretical Review
This chapter explores the analytical frameworks emerging to support current research: Technology Acceptance Model (TAM) and Innovation Diffusion Theory (IDT).

### 2.2.1 Technology Acceptance Model (TAM)

The Technology Acceptance Model (TAM) is a theory of information systems that explains how organisations adopt and employ technology in their operations. The model was developed by Davis et al. (1989) and suggests that when a new technology is presented to users, several factors influence their decision about using it, such as technology fatigue, level of flexibility, technological complexity, altering user-base and switching cost and loss (Davis et al. 1989). According to this notion, without employees or users accept technology, there would be no gain in organisational effectiveness. Investments in computer-aided tools to help decision-making and communication planning are required for the acceptance of innovations, particularly those based on information technology. These systems, however, can be dangerous. As a result, it's critical that the systems are designed in accordance with organisational needs and rationale. It's equally important to recognize that humans are capable of resisting technological development.

According to this theory, there will be no improvement in organisational performance until employees and users accept technology. For innovations to be accepted, particularly those based on information technology, investments in computer-aided tools to enhance decision-making and communication planning are essential. These systems, on the other hand, can be hazardous. As a result, it's vital that the systems be built to meet the demands and reasons of the company and stakeholders. It's also critical to acknowledge that people are capable of rejecting technological progress. This theory is useful for the study because the uptake and use of e-procurement is a function of users' feelings about the system and its perceived benefits, such as ensuring staff efficiency and effectiveness, effective delivery of goods and services, Tender accuracy, and effective inventory management control (Benbasat & Barki, 2007).

TAM, on the other hand, has been critical of vendors' attempts to redefine it, despite its importance to procurement performance in businesses. It is said that technology acceptance theory has dubious heuristic value, poor explanatory and predictive ability, triviality, and no practical utility (Chuttur, 2009). TAM, according to Benbasat & Barki (2007), has diverted academics' attention away from other significant study issues and produced the illusion of
knowledge accumulation. Furthermore, various scholars' independent attempts to broaden TAM in order to adapt it to rapid technological advances have caused misunderstanding (Benbasat & Barki, 2007). TAM's main flaw is that it concentrates solely on the individual user of technology, with the goal of incorporating elements that explain how a user sees the advantage, while completely ignoring the essentially social procedures and implementation (Bagozzi et al., 1992).

2.2.2 Innovation Diffusion Theory (IDT)

The concept of invention dissemination, which was initially introduced in 1962, has since been refined (Rogers, 1995). The purpose of innovation diffusion theory is to understand how, why, and how rapidly new ideas and technologies spread in a social system (Rogers, 1962b). In comparison to other change theories, innovation diffusion theory offers a different approach to understanding change. Change is mostly about updating or reinventing products and behaviors so that they are better matched to the requirements of individuals and communities, rather than focused on getting individuals to change. When innovations are disseminated, it is the inventions that change, not the individuals (Robinson, 2009).

Diffusion, on the other hand, is the gradual spread of an invention among members of a social system in specialized ways (Rogers, 2003). Diffusion, according to Fichman (2000), is the process through which a technology spreads among a group of companies. The term "diffusion of invention" refers to the transmission of ideas from one civilization to another, or from one society's focal point or institution to other sectors of that society (Rogers, 1962). The theory of invention dissemination can be broken down into four major parts (Sahin, 2006). An innovation is a new concept, activity, or thing that is seen as novel by an individual or other adopting entity (Rogers, 1995). It encompasses all forms of new and old products and services that bring unrivaled value to the user when used or just perceived to be useful by the user.

Communication systems provide a way for people to exchange information with one another. It is a medium that facilitates the exchange of data between users. The faster and better a communication system is, the faster innovations spread. Rogers distinguished between mass media and interpersonal channels when it came to communication systems. Despite the fact that mass media can distribute information more quickly, Rogers feels that the interpersonal channel is more crucial for the diffusion of new ideas or technology. Diffusion, on the other hand, is a highly social process including interpersonal communication ties (Rogers, 2003).
The patterned communication process was defined by Tarde (1903) as a social imitation or duplication of anything new by members of a community, for example, B. one witnesses hand washing and copies the action.

The rate of assumptions and the categorization of consumers are captured by the temporal aspect of the innovation diffusion process. It keeps track of time from the moment an innovation is born until it is no longer an innovation. It measures the rate at which innovation spreads throughout a society and is embraced by various users. The social system is made up of interrelated units that work together to solve problems and attain a common objective (Rogers, 2003). A social system must accept an innovation in order for it to be useful. A civilization ceases to be an innovation if it does not recognize it. Only when a social system recognises an innovation as an innovation and then distributes information about it inside the system and with other systems does it spread. Rogers (2003) classified people into five categories based on ability to innovate when studying social systems. The degree to which a person embraces new ideas relatively sooner than other members of a system is known as innovativeness (Rogers, 2003). When half of the target population has embraced an innovation, these categories show the variability around the mean.

2.3 Empirical Review
The empirical literature study on e-procurement and supply chain performance was the emphasis of this part. Electronic procurement has risen in popularity across the world as a result of technological advancements. In the United States, for example, a fast development in electronic procurement was recorded in early 2000, right before the recession. All government services were reported to be up and running at some stage throughout their procurement process by the end of the year, with some even engaging in online bids (Waithaka & Kimani, 2021). Vice President Dr. Mahamudu Bawumia announced the opening of Ghana's electronic procurement system, GHANEPS, on Tuesday, April 30th, 2019. Ghana was the first country in the West African sub-region to deploy an electronic procurement system for the public sector. The findings suggest that electronic procurement is gaining traction in Ghana, with most private and governmental institutions using technology to improve electronic procurement.

Madzimure et al. for example, conducted several researches on e-procurement and supply chain performance in various enterprises and nations (2020). E-procurement is the use of
information technology to ease business-to-business transactions for goods and services. According to a recent study, owing to fast technological development and market globalization, businesses, particularly small and medium-sized firms (SMEs), require assistance in adapting to technology and implementing e-procurement functions in order to establish competitive advantages. Information technologies like electronic procurement have been more tightly connected with other business operations like supply chain integration to help SMEs expand (Madzimure et al. 2020). All e-procurement tools (e-design, e-sourcing, e-negotiation, e-evaluation, and e-invoicing) were considered in the study (Madzimure et al. 2020).

According to a study by Chegugu & Yusuf (2017) entitled The Effect of Electronic Procurement Practices on Organisational Performance in Public Hospitals in the Country, infrastructure costs per transaction increase with increasing transaction volume, based on a literature review of previous studies on the effects of e-procurement on business performance. Companies must build this critical mass through a value-added network of alliance partners and technological solution providers, according to Wanjera (2014), who also emphasized the construction of a financially viable e-invoicing solution. The use of an internet-based system to accomplish any or all of the processes in the procurement process, such as search, procurement, negotiating, ordering, receiving, and post-purchase verification, is referred to as e-procurement (Madzimure et al. 2020).

The acquisition and sale of supplies, works, and services over the Internet and other information and network systems, including electronic data exchange and planning, is referred to as company-to-company, company-to-customer, and company-to-government electronic procurement. Muhia and Afande (2015) E-procurement, according to Croom and Brandon-Jones (2005), is the use of internet-based integrated information and communication technology (ICT) to complete any or all steps of the procurement process, including search, procurement, negotiation, ordering, reception, and post-purchase verification. There are several types of e-procurement, each focusing on one or more parts of the procurement process, such as B. a Z-to-end system that integrates and simplifies multiple procurement activities across the organisation (Muhia & Afande, 2015). E-procurement is a lot more than just an online shopping cart. It's a complete platform that makes it easier, faster, and more cost-effective for businesses to identify their needs in a timely and cost-effective manner, in line with their goals and objectives.
E-procurement helps organisations streamline their whole purchasing process so they can focus on their core business operations and boost profitability in today's climate, which is defined by a focus on important strategic goals, quicker time-to-market, and more global competition. Internet technology is increasingly being used to purchase goods and services from a variety of known and unknown vendors, conduct e-learning where purchasing data is collected and distributed by internal and external parties, and e-market sites Enterprise Resource Planning (ERP) is being expanded to be web-based in order to open up value chains. With connectivity with suppliers' supply chains and buyers' financial systems, buyers may access items and services from preferred suppliers, add shopping carts, generate requests and approvals, accept orders, and process bills (Jessop, 2006).

Websites that offer e-procurement allow qualified and registered users to search for buyers and sellers of products and services, as well as conduct transactions. Buyers and sellers can input expenses or make bids depending on the method. It is possible to start and finish transactions. Customers who make regular purchases may be eligible for volume discounts or special offers. Purchases and sales can be automated with e-procurement software. The participating firms anticipate better inventory control, buyer relief, and shorter manufacturing cycles. With the trend toward computerized supply chain management, e-procurement is likely to be incorporated into the larger purchase-to-pay (P2P) value chain.

The Ghanaian government and the Public Procurement Act (PPA) recently published a statement urging all vendors to adopt the e-procurement system. The Vice President also mentioned that Ghana's public sector is fast evolving, especially in terms of technology use. The government will have to implement e-governance and, in particular, e-procurement. The national governments of Italy, New Zealand, Scotland, New South Wales, and Western Australia, according to a 2005 Commonwealth of Australia evaluation, are already employing an electronic procurement system for public procurement.

Waithaka and Kimani (2021) investigated the influence of e-procurement techniques on Kakamega county governments' efficiency frontier. The key results were that electronic procurement facilities were few within the Kakamega County Government, which might have an impact on procurement efficiency. In addition, the Kakamega County Government received a modest number of online orders for deliveries. Within the Kakamega county government, the availability and use of the e-procurement platform and e-ordering processes
has also been limited, which has harmed the procurement function's efficiency. The report suggests that procurement departments in local governments build a user-friendly information system that all suppliers, whether tech-savvy or not, can utilize. This will decrease prejudice in the use of e-procurement, and everyone will be able to contribute to procurement staff skills.

Wanianiet al. (2016) concluded that the Nzoia Sugar Company's existing technical infrastructure was adequate. A substantial majority of respondents (66.9%) agreed that the company's technical infrastructure is competent to facilitate e-procurement. Hardware and software, the Internet, and technological know-how were all covered. The technological infrastructure for e-procurement, according to 33.1% of those polled, is insufficient. They put it down to the unreliable internet and a scarcity of scanners. The findings support Lysons & Gilligham's (2003) contention that corporations have realized large profits by using an electronic integration system. Internet connectivity, insufficient network coverage, and system failures are the problems that the Nzoia Sugar Company faces when implementing e-procurement, according to the respondents, who also agreed that the company has already invested in the necessary ICT infrastructure to support e-procurement. They opposed using technologies other than e-mail for internal electronic communication in procurement matters, such as instant messaging and video conferencing, as well as suppliers having direct access to internal systems, such as ERP systems, and the technological integration of the e-procurement system with other internal systems. The respondents ranked data and information security as the most critical factor in procurement. The technical infrastructure accounted for 11.38 percent of e-procurement utilization at the Nzoia Sugar Company.

In an essay on the influence of e-procurement on company performance, Barasa et al. (2017) concluded that the government's provision of e-procurement support websites was inadequate, which may have hampered procurement efficiency. Furthermore, the government's ability to arrange delivery orders online has been limited. Furthermore, within the government, the availability and adoption of platforms and procedures for electronic procurement has been limited, lowering their efficiency in performing procurement tasks. The study indicated that there was a positive association between e-ordering and public administration efficiency after utilizing regression analysis to examine the influence of e-ordering on public administration efficiency.
Role of Sustainable Sourcing Practices on Manufacturing Sector Supply Chain Performance: A Study by Nyile and Shale (2016) According to a case study done by a Portland-based East African cement firm, the majority of respondents believed that the deployment of e-procurement systems helped suppliers pay quickly, with 34.7 percent considerably agreeing and 26.5 percent strongly agreeing. Suppliers and EAPCC have a healthy connection since one of the qualities that divides an organisation from its suppliers has been removed. Using e-procurement technology to reduce order costs is another phrase for it. Kioko and Mwangangi (2017) investigated the influence of e-procurement on the performance of semi-public companies. The primary purpose of this study was to investigate the influence of e-procurement on the performance of semi-public companies. The research' precise goals were to see if e-sourcing, e-information, e-payments, and e-procurement have a positive association with semi-public institution performance. As a result, 3 percent said strongly, 12 percent said strongly, 37 percent said moderately, 27 percent said little, and 21 percent said not at all. The majority of respondents stated that e-bidding had a considerable influence on market share, according to the findings. Furthermore, 69% of respondents said that the e-evaluation had a significant influence on market share. The online availability of tender papers has a major impact on market share, according to 47% of those polled. All of the respondents agreed that e-bidding has a substantial impact on profitability. According to the findings, 96 percent of those polled approved of the performance.

Chegugu and Yusuf (2017) investigated the impact of computerized procurement methods on public hospital organisational performance. The majority of respondents (186/321) strongly agreed that the procurement process in hospitals has grown more competitive, according to the poll. Apart from the major result, 6% (19/321) of respondents agreed with the statement, 8% (26/321) were indecisive, 18% (58/321) disagreed, and another 10% (32/321) disagreed. Access to medications and health services has increased for another 52% of respondents (167/321). Other replies to the statement were 8% (26/321) of those who agreed, 16% (51/321) of those who were unsure, 20% (64/321) of those who disagreed, and 4% (13/321) of those who did not. The number of those who were adamantly opposed. Finally, 50 percent (161/321) of the 63 respondents said that the method decreased burden by speeding up the selection of the best supplier and so cutting tendering expenses. In addition to the study's findings, 16 percent (51/321) of respondents agreed, 6 percent (19/321) were unsure, 14 percent (45/321) disapproved, and 14 percent (45/321) spoke out against it.
Waithaka and Kimani (2021) used a desktop literature review process in their investigation of the influence of electronic procurement strategies on supply chain performance. The adequacy of the object of research was tested using three processing phases of the object of study. This was the first stage in identifying all things that had an influence on supply chain efficiency as a result of electronic sourcing. A second search turned up everything on e-procurement and supply chain efficiency that was available. The final stage was gathering publicly accessible journals. The researcher discovered 12 publications related to the review on competitively buying and acquiring high quality items that give the company's products or services a competitive advantage in the marketplace after carefully examining the key concepts of e-procurement processes, supply chain management, and performance.

According to the findings of an investigation of the influence of e-procurement on the fulfillment of government procurement functions, e-procurement is positively connected to the company's supply chain function performance. As a result, the research suggests that the government establish guidelines for implementing e-procurement processes while also offering important tools and support. For the best value for money, management should reinforce the electronic system and insist that all orders be completed electronically, resulting in faster order processing, reduced costs, fewer human mistakes, and improved delivery. Finally, the inquiry recommended that government agencies employ e-procurement methods to improve their performance, and that more research be conducted in other government agencies to determine whether the same or comparable outcomes can be reached.

2.4 Conceptual/Theoretical framework
This section shows the conceptual and theoretical framework. It describes the framework variables in the provided model, followed by the conceptual / theoretical framework of e-procurement, the moderating role of supplier integration, and supply chain performance in order to bring out an actual understanding of the disturbing study phenomenon. The study shows the dependent variable performance of the Ghanaian health care system, measured by the efficiency and effectiveness of the employees, the on-time delivery of goods and services, the control of the warehouse management and the accuracy of the tenders, which largely depend on independent variables, the procurement of the Supply chain performance, such as procurement, e-procurement applications, and e-procurement tools.

2.4.1 Descriptions of variables in the model
E-procurement, according to Nandankar & Sachan (2020), is the use of modern IT systems for procurement processes such as planning, negotiating, ordering, receiving items, and post-purchase assessment. The e-marketplace and e-procurement are both commonly utilized to promote government collaboration and corporate transactions. Electronic procurement is being implemented by sectors all over the world due to the potential benefits. Electronic procurement is becoming more widely acknowledged as a useful tool for cutting costs and optimizing operations. The notion of e-procurement has become vital in order to remain permanently successful in the market, especially for SMEs, as competition no longer takes place just between enterprises, but also between supply chains. The reduction of order processing times is another benefit of e-procurement for a business (Zhao et al. 2011).

Madzimure et al. (2020) observed that successful organisations or firms that use e-procurement systems effectively have superior supply chain performance. Supply chain performance refers to how well certain procedures within a company's supply chain function execute (Madzimure et al., 2020). One of the most crucial aspects of successful supply chain performance is collaboration and collaborative decision-making among trade partners (George et al. 2011; Madzimure et al. 2020). Companies strive to reduce cost, delay, flexibility, variety, and traceability in their manufacturing processes. Collaboration and information exchange among partners have become essential elements of every supply chain, as they improve performance (Madzimure et al. 2020).

Effective supply chain performance assessment is critical because it provides the framework for understanding the system as well as data on the results of systematic efforts to discover supply chain partners (Bhagwat & Sharma, 2007). The efficacy of a company's supply chain is widely recognized as a key factor in attaining a competitive advantage (Madzimure et al. 2020).

**Figure 2.1 Conceptual framework**
The diagrammatic representation below shows a conceptual framework of the interrelationship between the factors that contribute to the success of electronic procurement practices in supply chain performance at Ghana Health Service.

**E-PROCUREMENT PRACTICES**
2.4.2 E-PROCUREMENT PRACTICES AND SUPPLY CHAIN PERFORMANCE.

Recently, e-procurement is becoming an important department in any organisation. The rise of electronic procurement worldwide has enhanced procurement processes with so many benefits in the organisation, including effective and efficient supply chain performance. In order for a company to have a competitive advantage over other competitors, it must have a very effective and reliable supply chain, as competition between companies is between supply chain performance rather than cost reduction. These are activities or processes that are carried out by an organisation to ensure that all procurement processes within the organisation and its suppliers are carried out smoothly and successfully. E-tenders, e-procurement, e-negotiation, e-valuation, e-auctions, e-catalogs, and e-invoices are some of the most common e-procurement instruments in the public sector (McCue & Roma, 2012).

**H1:** E-procurement positively and significantly influence supply chain performance in health sector.
2.4.2.1 E-design and Supply Chain Performance

E-design: This refers to the definition of purchasing requirements for an online procurement system (Chang et al. 2013). E-design makes it easier for the supplier to be involved in a product's specification development process. Effective digital design allows the user to easily navigate a website or find the information they need as quickly and easily as possible while the appropriate news is being delivered. Aside from a website, for most businesses, digital design output includes: Sales presentations. With E-Design, the business department can electronically request the specifications of their needs without having to meet the purchasing department in the organisation to discuss the requirement. Introducing e-design into e-procurement practices helps the organisation and suppliers improve the effectiveness of their supply chain performance. When e-design is introduced, it shortens the specification request process, resulting in supply chain efficiency in the organisation. Hence, the following hypotheses are presented:

H1a: E-design positively significantly influences supply chain performance in health sector.

2.4.2.2 E-sourcing and Supply Chain Performance

This is the process of identifying new potential suppliers using the internet in order to shorten the time it takes to discover them. It makes use of internet technology to find new suppliers for a certain category of purchasing needs beyond geographical borders. Increased decision-making flexibility and cheaper costs are two benefits of e-major sourcing. (Ombat, 2015) Electronic sourcing is the process of selecting suppliers through electronic procurement. the year 2015 (Bahambari & Kelidbari). A web-based platform supports every step of the procurement process, including spending analysis, requirements summaries, requirements formulation, supplier search, negotiations (request for move-in, offer, or offer), auctions, offer assessments, and contract administration. In recent years, the definition of e-sourcing has evolved significantly, from a narrow focus on e-auctions to what is now widely recognized as e-sourcing, namely the sourcing process associated with web-based, collaborative technology in order to facilitate the entire procurement lifecycle for both buyers and suppliers (Bialas et al., 2016) e-Sourcing is the strategic activity of a procurement expert in designing, maintaining, and managing a compliance contract. All parts of the purchasing process should be monitored and covered, including specs, e-RFx, e-tender, e-auction, tracking, forecasting, and savings tracking.
Companies may use basic e-sourcing technologies to benefit from strategic sourcing in a scalable manner in areas that have historically been handled via buying. While e-sourcing offers a high return on investment, it should be used as part of a larger plan to enhance the purchasing function by addressing all areas of change, including strategy, structure, systems, processes, and people. As a result, because it automates and simplifies strategic sourcing procedures like RFxs and reverse auctions, e-Sourcing is recognized as the backbone of contemporary strategic sourcing. It also increases supply chain efficiency inside the company, as well as the buyer-seller relationship's flexibility and openness.

The operational benefits of e-sourcing, according to a research by (Bialas et al. 2016) Hamilton, include: (a) Streamlining procedures through easier / faster ordering, less paperwork, easier online comparison, less human mistakes, and cheaper storage costs. (b) Purchasing expenses are decreased as a result of enhanced transparency, purchasing aggregation, improved compliance, less non-contractual individual purchases, comparability and competition, efficient market and pricing processes, data for strategic purchasing, and virtual purchasing organisations. Just a few of the advantages include a 5 to 20% decrease in material prices, a 25 to 30% reduction in procurement cycle times, and a 10 to 15% reduction in time to market (Presutti, 2003). Buyers are increasingly asking that vendors utilize online negotiating and trading applications, such as e-RFx and e-auction systems, because of these anticipated benefits (Ivarg & Sorensen, 2005).

However, e-sourcing poses significant challenges to a company, including the required change management, the resulting new organisational roles, the expected implementation speed, the management of existing suppliers, the definition of the right content management strategy, and integration with back office systems. (Bialas et al., Bialas et al., Bialas et al., Bialas et al., Bialas et al., Bialas et al., Bi Furthermore, suppliers' reluctance to e-sourcing can be a key cause of failure since they feel it is dependent on their established links with their partners of personal contact and communication, which weakens when compared to rivals only on the basis of price (White & Daniel, 2004) - Is procurement suitable for the various products to be procured, and if so, what instrument should be used? 2005 (Puschmann & Alt). Hence, the following hypotheses are proposed:

**H1b:** E-sourcing positively and significantly influences supply chain performance in health sector.
2.4.2.3 *E-negotiation and Supply Chain Performance*

This is the process of conducting commercial discussions amongst company partners utilizing electronic technologies. As a result, while purchasing products and services through the internet, e-negotiation is employed to save money. Madzimure et al., Different methods of negotiation and contract preparation employing electronic technology are referred to as electronic negotiation (Bahambari & Kelidbari, 2015). produce long-term, high-quality solutions rather than shoddy short-term fixes that don't suit the demands of either party, and assist you in avoiding future difficulties and conflicts Negotiation necessitates a balance of give and take. You should strive for a respectful and positive connection that benefits both sides. In a successful negotiation, you should be able to make compromises that are little to you while providing the other side something significant to them. Regardless of various party goals, your approach should encourage goodwill. Both sides are happy and ready after a successful negotiation. This tutorial discusses why negotiation is necessary and describes negotiating methods and tactics. Electronic discussions in the organisation make it easier for suppliers to save money since they won’t be required travel or face-to-face meetings to make payment choices. Hence, the following hypotheses are presented:

**H1c:** *E-negotiation positively and significantly influences supply chain performance in health sector.*

2.4.2.4 *E-evaluation and Supply Chain Performance*

It refers to the process of gathering detailed information about suppliers in order to conduct additional assessments and transactions through the Internet (Madzimure et al. 2020). According to Presutti (2003), in order to reap the full benefits of e-procurement technologies, a company must assess and enhance its purchasing process. The electronic evaluation is the final phase in the process of gathering a large amount of information on suppliers, which should be examined more accurately (Omai, 2013) Many industries, particularly government agencies, underwent significant changes as a result of the arrival of the World Wide Web. Since then, numerous businesses have implemented their own e-rating system. The JISC (Joint Information System Committee) published principles and recommendations for e-evaluation in England, Wales, and Northern Ireland to explain the numerous regulators in the UK. The IMS Question and Test Interoperability Specification was produced by the IMS Global Learning Consortium in 2009.
Transforming Education: Assessment and Teaching 21st Century Skills was published in 2009 by Cisco, Intel, and Microsoft. The supplier assessment procedure has evolved with the advent of e-evaluation. E-evaluation has increased the measurement of quality outcomes while also allowing for immediate and direct feedback. It is critical to build a supplier assessment system that considers corporate objectives and assists suppliers in developing skills that will benefit society in the long run. This program aids the purchasing process by assisting organisations and suppliers in reaching an agreement that will allow the supply chain to be shortened.

**H1d:** *E-evaluation positively and significantly influences supply chain performance in health sector.*

### 2.4.2.5 E-information and Supply Chain Performance

This is when Internet technology is used to collect and distribute purchase information from and to internal and external parties, such as: B. Information about purchasing management on an extranet that internal customers and suppliers can access. Madzimur and his colleagues (2020). To put it another way, e-informing entails obtaining, sharing, and purchasing information (Ombat, 2015). E-information facilitates communication between organisations, as information is transmitted at any time without delay and can be called up for the necessary measures and corrections. If information is exchanged frequently between companies and their suppliers, this improves the supply chain process and products/services are delivered on time with the correct specifications. Communication and information sharing are very important in any relationship building, and in order to achieve the desired goals with suppliers, e-information is the best form of communication and should be used to make supply chain performance efficient and effective. Hence, the following hypotheses are proposed:

**H1e:** *E-information positively and significantly influences supply chain performance in health sector.*

### 2.4.4 Supplier Integration and Supply Chain Performance

Supplier integration refers to a company's interaction and collaboration with its suppliers in order to maintain a consistent flow of supplies (Madzimure et al. 2020). The beneficial business performance as a consequence of business integration may be strengthened by sharing risks and business information such as demand forecasts, inventory and production
planning choices, and synchronizing business operations (So & Sun, 2010). Integration and SME performance have been extensively researched (Kristal et al. 2010), with the findings indicating that integration may be converted into competitiveness, which leads to a positive SCP. Furthermore, various research (Flynn et al., 2010; Madzimure et al., 2020; Zhao et al. 2011) have validated the positive association between supplier integration and SCP and have provided solid empirical support.

The goal of this research was to confirm or contradict the findings of a prior study. The development of e-procurement is tied to the early engagement of suppliers. This entails significant changes, issues, and concerns, such as different ways to create and maintain supplier catalogs (Birks et al. 2001). This engagement allows suppliers to submit feedback, allowing the public procurement department to identify areas for improvement and, if required, make changes to processes. Many vendors are hesitant to conduct business with government organisations online because they are unaware of the benefits. E-procurement may be seen of as a technique for government bodies to simply save money. As a result, suppliers must be educated on the benefits of e-procurement.

As a result, the management of the Ghanaian health service should link the organisation's goals and objectives with those of its customers and suppliers. The e-procurement system would be easy to adopt as a result. Because of the sensitivity of government data and the legal nature of orders and payments, data security in e-procurement systems is crucial. The system must allow suppliers to identify and authenticate the person who places an order so that they may be certain that it will be completed safely. Hence, the following hypotheses is presented:

**H2:** Supplier integration positively and significantly influences Supply Chain Performance in the health sector.

### 2.4.5 Moderating Role of Supplier Integration.

The process of contact and collaboration between a corporation and its suppliers to guarantee a sufficient supply flow is known as supplier integration (Madzimure et al. 2020). Supplier integration may also be defined as the establishment of a long-term partnership between a company and its suppliers (Li et al., 2006). This collaboration or integration is one of the SCM's most important building pieces (Madzimure et al. 2020).
The advantages of supplier integration in firms have been identified by a number of researchers. For example, most businesses experience the issue of on-time delivery on a regular basis (Zhao et al. 2015). Integrating with suppliers, on the other hand, enables companies to share order and inventory data with their vendors. Supplier integration, which entails effective communication, information sharing, and cooperation with suppliers, can also assist to reduce upstream complexity (Zhao et al. 2015).

Increased responsiveness, flexibility, and time savings are all advantages of supplier integration (Chen et al. 2018; Madzimure et al. 2020). Supplier integration also reduces transaction costs by cutting manufacturing expenses and reducing uncertainty (Flynn et al., 2010), resulting in improved operational performance. As a result of supplier integration in firms, the communication of risks and business information, such as demand forecasts, inventory and production planning choices, and the synchronization of business operations, is meant to enhance supply chain performance (So & Sun, 2010).

Supplier integration and supply chain performance have been comprehensively investigated (Kristal et al., 2010), and the findings show that supplier integration can lead to increased competitiveness and a positive SCP. Other research, such as those by Flynn et al. (2010) and Madzimur et al. (2020), verified the positive association between supplier integration and SCP and offered compelling empirical evidence for it. The goal of this inquiry was to confirm or disprove the findings of a prior study. Hence, the following hypotheses are presented:

**H3:** Supplier integration positively and significantly influences Supply Chain Performance in the health sector.

### CHAPTER THREE

**RESEARCH METHODOLOGY AND PROFILE OF ORGANISATION**

#### 3.0 Introduction

This session will look at the study's methodology, such as the design, study population, sample size and technique, data kinds and sources, data analysis method, and ethical considerations. In addition, the research quality was clarified in terms of validity and reliability.

#### 3.1 Research Method

33
Research method is the conceptual structure within which research is conducted. It constitutes a blue print for the collection, measurement and analysis of data (Kothari, 2003). Research method is the conceptual framework through which research is carried out. It lays out a strategy for gathering, analyzing, and interpreting data (Kothari, 2004). It acts as a guide for data collection, measurement, and analysis. 2004. Kothari et al. E-Procurement Methods' Impact on Supply Chain Performance: This study, which employs a descriptive research technique, examines the moderating influence of supplier integration in healthcare. Questionnaires are commonly used as a data collecting technique in surveys (Robson, 2002). As was the case in this study, the survey technique allows quantitative data to be gathered and evaluated quantitatively using descriptive and inferential statistics (Saunders et al. 2009). The technique assesses how well a company uses e-procurement and how well its supply chain performs: the moderating influence of supplier integration in healthcare. The data was obtained, measured, categorized, analyzed, compared, and then interpreted.

3.2 Study Population
The study population is the wider group from which a sample is selected; it comprises all examples of people or organisations who exhibit particular characteristics (Mugenda & Mugenda, 2003). The research was conducted using Ghanaian health-care organisations. There are several directorates in the GHS. The data for this study came from two directorates or units: procurement managers and supply chain managers at the top. These directorates have over 600 personnel, from which a sample was chosen.

3.3 Sample Size and Sampling Technique
The sample was chosen based on a quota mechanism. When the strata were the two directorates, a stratified random sample approach was applied. The organisations are made up of different departments, which are classified according to their capabilities. Therefore, a stratified random sample was used to determine the sample size. According to Cooper et al., (2006), this ensures that relevant subsectors of the organisation are represented. Only the top managers from the two units were considered when the population was stratified. A sample of 120 employees from the two directorates was chosen. These personnel had access to the system and were familiar with e-procurement procedures. They were thus capable of dealing with e-procurement applications and possess the necessary e-procurement skills. The sample size was suitable because only top executives from the organisation's core departments were chosen.
A sample size of 10-30% of a target population, according to Mugenda & Mugenda (2003), is adequate to form a generalization. As a result, the sample size was sufficient to make generalizations about the population. Questionnaires were given to senior executives in a regular manner until the requisite number was attained.

Table 3.1 Sample used for the study.

<table>
<thead>
<tr>
<th>No.</th>
<th>Sample Population</th>
<th>Sample Size</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Procurement Manager</td>
<td>70</td>
</tr>
<tr>
<td>2</td>
<td>Supply Chain Manager</td>
<td>50</td>
</tr>
<tr>
<td></td>
<td><strong>TOTAL</strong></td>
<td><strong>120</strong></td>
</tr>
</tbody>
</table>

Source: Madzimure, 2020

3.4 Types and Sources of Data

Data is all information obtained during the study process or a research study (Polit & Hungler, 1994). In this study, primary data were used to collect the information. Primary data is all information that the researcher collects as information from first hand, such as surveys, observations, experiments, questionnaires, focus groups, interviews (Rabianski, 2003). The study used primary data collected using the questionnaire as a research tool. Primary data was used in the study as it has not yet been published and is very reliable, authentic and objective.

3.5 Data Collection Method.

The data was gathered via a questionnaire. It was made up of open-ended and closed-ended questions. Mugenda & Mugenda (Mugenda & Mugenda) (Mugenda & Mugenda) (Mugenda & Mugenda) (Mugenda (2003). In open or unstructured questions, responders can express themselves more fully, yet closed or organised questions are typically simpler to assess. The researcher picked the questionnaire because it allowed her to collect a great quantity of data in a short amount of time. By providing a more standard approach to the question, a questionnaire provides greater compatibility while answering questions. The questionnaire's Section A has questions on a Likert scale that answer questions about e-procurement procedures, and Section B contains questions on a Likert scale that answer questions about e-procurement practices. Section C included questions about supply chain performance and Section D answered questions about supplier integration. The questionnaire was hosted online.
with the links being emailed to the management of the organisation. The respondents were given sufficient time to fill out the questionnaire.

Table 3.2 Summary of Measurement Items

<table>
<thead>
<tr>
<th>Variable</th>
<th>Number of items</th>
</tr>
</thead>
<tbody>
<tr>
<td>E-Procurement Practice</td>
<td>6</td>
</tr>
<tr>
<td>Supply Chain Performance</td>
<td>6</td>
</tr>
<tr>
<td>Supplier Integration</td>
<td>6</td>
</tr>
</tbody>
</table>

(Madzimure et al. 2020)

3.6 Validity and Reliability Tests

Validity relates to how well-founded and accurate a notion conclusion or measurement is in contrast to the real world. "Valid" is derived from the Latin word validus, which meaning "strong." The degree to which a measuring tool (for example, a test in the health care) measures what it promises to measure is characterized as validity; in this situation, validity is equivalent with accuracy (Brains et al. 2011). Validity is a need for all sorts of investigations, according to Oliver (2010).

The consistency with which a research instrument generates the same results over time is referred to as its reliability. Multiple measurements on the same people are used to validate it. The precision of a single measurement and the capacity to follow changes in measurement over the course of a research are both harmed by low dependability. First, the researcher made sure that the right data sources were selected. Because the study looked at e-procurement practices in health organisations, top managers from the procurement and supply chain departments were selected. This ensured that the right data was being collected from the right sources, which was very insightful.

Second, the researcher made sure that participants answered the questionnaire as they see fit. This is explained by the fact that participants tend to give quick answers when asked for convenience. The questionnaire was hosted online and respondents were asked to fill it out when they were less busy. Finally, SPSS was utilized to conduct the analysis in order to determine the internal consistency of the study's observed items.
The researcher engaged department leaders and specialists to verify the validity and reliability of the study tools. For the instrument's internal reliability, a Cronbach coefficient alpha of 0.70 was regarded acceptable, and all variables had a Cronbach alpha of 0.70 or above. This was done for all of the study's variables (constructs), such as H. E-procurement, supply chain performance, and supplier integration. Tables 4.2 provide the findings. This establishes the study's validity and reliability.

3.7 Data Analysis Method
The acquired data was evaluated using descriptive statistical techniques and quantitative analysis. The information was given numerical values. Calculating the mean and doing a regression analysis were part of the quantitative data analysis. The mean value was determined using the Likert scale values. On a Likert scale, the average score of each component demonstrating GHS supply chain practices, the amount of e-procurement application at GHS, and the influence of e-procurement on supply chain performance at Ghana Health Service was computed. A mean of 3.0 or above for each element indicated satisfaction with the supply chain's performance. The regression equation was of this form:

Regression analysis was used. The regression equation was of this form:

\[ Y = \beta_0 + \beta_1X_1 + \beta_2X_2 + \beta_3X_3 + \epsilon \]

The estimated regression model is of the form:

\[ Y = b_0 + b_1X_1 + b_2X_2 + b_3X_3 \]

Where:

- \( Y \) = Supply Chain Performance
- \( X_1 \) = E-Procurement Practices
- \( X_2 \) = Supplier Integration

- \( \beta_i (i = 0 \text{ to } 3) = \) Actual regression coefficient
- \( b_i (i = 0 \text{ to } 3) = \) Estimated regression coefficient
- \( \epsilon = \) Error term

The regression equation helps in predicting in Supply Chain Performance at GHS at given level of e-Procurement Practices and Supplier Integration.

3.7 Research Ethics
Ethics is a discipline of philosophy concerned with how individuals should act, judgements about these acts (e.g., right vs wrong, good versus evil), and the development of laws and regulations to justify behaviors (Aguinis & Henle, 2002). Right and incorrect concepts based
on principles or norms. Ethics are moral principles, norms, or standards of conduct that assist us in making moral judgments about our behavior and interactions with others. First, the researchers' main role was to ensure that everyone involved in the study process had equal opportunities. In this case, the participants' task was to fill out a questionnaire and there was an equal chance that different people would be selected from the sample. Participants did not have to provide any data or do anything other than fill out the questionnaire.

Second, the subjects and the researcher were all protected as no indirect or direct harm was caused to them by the study. Participation was entirely voluntary and informed consent was required. All data was anonymized in order to protect the privacy of the participants. The participants came from different cultural backgrounds and were given complete autonomy in their behavior. Third, there was no obligation for a participant to take the survey and it was clear that after reading the information page they did not want to take part they could always contact the researcher by email or phone with questions about the partnership to obtain. The researcher treated each participant with respect at all times and made sure that all questions were answered to the best of his knowledge and belief.

3.8 Profile of Ghana Health Service

The Ghana Health Service (GHS) was founded by Law 525 of 1996, which was adopted in conformity with the 1992 Constitution. It is a self-governing executive agency that is governed by the Ghanaian Minister of Health through the Ghana Health Service Council and is responsible for the execution of national policy. The government continues to support the GHS; therefore, it remains in the public sector. Managers at GHS, on the other hand, are no longer bound by all public service norms and procedures because their employees are no longer employed by the government. The GHS's independence is meant to offer its employees greater freedom in carrying out its duties than if they were still employed by the government. The GHS's independence is meant to offer its employees greater freedom in carrying out its duties than if they were still employed by the government. The Ghanaian Health Service was founded as part of the Ghanaian health sector's reform process, as outlined in the Medium-Term Health Strategy (MTHS), which calls for attempts to develop a more equitable, efficient, accessible, and responsive health system. The changes build on the Ministry of Health's restructuring, which began in 1993, and are designed to set the groundwork for the development of the Ghana Health Service. The reforms also lay a solid organisational framework for counties and hospitals, which have already been handed more administrative
responsibility. Resource management, clear lines of authority and control, decentralization, and performance-based accountability rather than input-based accountability were all important topics in the 1993 restructuring, and they are still important for the Ghana Health Service today.

3.8.1 Ghana Health Service Mandate and Objectivity
GHS is meant to offer and properly manage comprehensive and accessible health services with a specific focus on primary health care at the regional, district, and sub-district levels in Ghana, according to established national standards. The service's objectives are to implement established national health-care principles across Ghana. Increase access to high-quality health care while simultaneously controlling the resources available to provide it.

3.8.2 Ghana Health Service Functions
In order to achieve its goals, the GHS fulfills the following functions, among others: Provision of comprehensive health services at all levels in Ghana directly and by commissioning other Ghanaian authorities.

As part of this function, the GHS is:

- Develop suitable strategies and establish technical guidelines to achieve Ghana's national political goals / objectives.
- Manage and manage all of Ghana's health resources within the service.
- Promotion of healthy lifestyles and good health habits by people in Ghana.
- Establish an effective disease surveillance, prevention and control mechanism in Ghana. Set fees for Ghanaian health services with the approval of the Ghanaian Minister of Health.
- Provision of in-service training and further education in Ghana promoting, protecting and restoring health in Ghana.
Source: www.moh.gov.gh/ghana-health-service
CHAPTER FOUR
DATA PRESENTATION, ANALYSIS AND DISCUSSION

4.0 Introduction

The influence of e-procurement on supply chain performance in the Ghanaian healthcare sector: the moderating function of supplier integration is examined in this chapter. The data was gathered using questionnaires that were tailored to the study's goals. The research included a total of 130 participants, with 120 of them providing responses, resulting in a 92.3 percent response rate. This response was outstanding and representative of the population, and it meets the condition (Mugenda & Mugenda, 2003) that a response rate of 50% is appropriate for analysis and reporting; a rate of 60% is acceptable, and a rate of 70% or higher is exceptional. The data was also analyzed using SPSS version 23.

4.1 Demographic characteristics of the respondents.

This section discusses the demographics of respondents based on gender, age, qualification, job title, performance level, years in the organisation and level of ICT skills. The study uses descriptive statistics that include frequencies and percentages to examine respondents' response rates. All of these were recorded in questionnaire section A and are listed in the table below.

Table 4.1: Demographics Characteristics

<table>
<thead>
<tr>
<th>Variables</th>
<th>Frequency</th>
<th>Percentage (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Gender</td>
<td>120</td>
<td>100</td>
</tr>
<tr>
<td>Male</td>
<td>73</td>
<td>60.8</td>
</tr>
<tr>
<td>Female</td>
<td>47</td>
<td>39.2</td>
</tr>
<tr>
<td>Age</td>
<td>120</td>
<td>100</td>
</tr>
<tr>
<td>18-26 years</td>
<td>19</td>
<td>15.8</td>
</tr>
<tr>
<td>27-35 years</td>
<td>30</td>
<td>25.0</td>
</tr>
<tr>
<td>36-44 years</td>
<td>38</td>
<td>31.7</td>
</tr>
<tr>
<td>Qualification</td>
<td>Count</td>
<td>Percentage</td>
</tr>
<tr>
<td>---------------------</td>
<td>-------</td>
<td>------------</td>
</tr>
<tr>
<td>Diploma/HND</td>
<td>13</td>
<td>10.8</td>
</tr>
<tr>
<td>Bachelor’s Degree</td>
<td>32</td>
<td>26.7</td>
</tr>
<tr>
<td>Master’s Degree</td>
<td>41</td>
<td>34.2</td>
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<tr>
<td>PhD</td>
<td>34</td>
<td>28.3</td>
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<table>
<thead>
<tr>
<th>Job Designation</th>
<th>Count</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>Procurement manager</td>
<td>70</td>
<td>58.3</td>
</tr>
<tr>
<td>Supply Chain Manager</td>
<td>50</td>
<td>41.7</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Performance Level</th>
<th>Count</th>
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</tr>
</thead>
<tbody>
<tr>
<td>Top</td>
<td>108</td>
<td>90</td>
</tr>
<tr>
<td>Middle</td>
<td>12</td>
<td>10.0</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Years in Organisation</th>
<th>Count</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>Below 5 years</td>
<td>42</td>
<td>35.0</td>
</tr>
<tr>
<td>6-10 years</td>
<td>43</td>
<td>35.8</td>
</tr>
<tr>
<td>11-15 years</td>
<td>19</td>
<td>15.8</td>
</tr>
<tr>
<td>16 and above</td>
<td>16</td>
<td>13.3</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>ICT Expertise</th>
<th>Count</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>Very High</td>
<td>69</td>
<td>57</td>
</tr>
<tr>
<td>Moderate</td>
<td>39</td>
<td>32.5</td>
</tr>
<tr>
<td>Very Low</td>
<td>10</td>
<td>8.3</td>
</tr>
<tr>
<td>No Expertise</td>
<td>2</td>
<td>1.7</td>
</tr>
</tbody>
</table>

Source: Field Study (2021)

According to the table above, the study attempted to determine the gender representation in the study sample in order to determine whether there was gender-specific disparities in the
data collection and also to balance the views of both sexes based on the study objectives. When responding to the gender distribution, the majority of respondents 73, representing 60.8%, were male while 47, representing 39.2%, were female, indicating that the research responses were gender-targeted. Respondents were asked to indicate their age range and 19 of them, representing 15.8% of the total, were between 18 and 26 years old. 30 of the respondents, who accounted for 25.0% of the total, were between 27 and 35 years old, 38 of the respondents (31.7% of the total) were between 36 and 44 years old, and 33 of the respondents (27.5% of the Total number) were between 45 and older. This implied that the majority of respondents were middle-aged and willing to respond to the study. The age of the respondents was also relevant for the study, as opinions were obtained from people of different age categories.

The educational level of the respondents shows that 13 of the respondents have a qualification Diploma/HND, which corresponds to 10.8% of the total. 32 of the respondents have a bachelor's degree, which is 26.7%, while 41 of the respondents, who make up 34.2% of the respondents, have a master's degree and finally 34 of the respondents have a doctorate, which is 34.2% of the respondents is equivalent to. Hence, from the above data it can be inferred that the majority of respondents have the minimum qualifications to understand the nature of the study problem. Respondents were asked to provide their job title within their organisation and 70 of the respondents, who made up 58.3% of respondents, were procurement managers at their workplace and 50 of the respondents, who made up 41.7% of all respondents, were supply chain managers. Manager. Based on their level of performance in the organisation, 108 of the respondents, who represented 90%, were top managers and 12 of the respondents, who represented 10.0%, were middle-level. This means that the majority of the respondents were top-level managers with a great deal of knowledge in the field.

Respondents were also asked to indicate how long they had worked with the organisation. 42 respondents, representing 35.0%, have worked with the organisation for less than 5 years, 43 respondents, representing 35.8% of respondents, said they have worked with the organisation between 6 and 10 years, while 19 of those questioned 15.8% of the respondents said they had worked with the organisation between 11 and 15 years and 16 of the respondents, who made up 13.3% of the respondents, said they had worked for the organisation for 16 years or more. It also shows that most respondents have worked with the organisation long enough to understand the implications of variables in the organisation and provide adequate responses to
the elements of measurement. Finally, respondents were asked to indicate their ICT skills. 69 of the respondents, who represent 57% of the respondents, have very high ICT skills, 39 of the respondents, who represent 32.5% of the respondents, have moderate ICT skills, 10 of the respondents, who represent 8.3% of the respondents, have very little ICT skills and 2 of the respondents, who make up 1.7%, have no ICT skills.

4.2 Reliability and Validity Test

This section contains information about the reliability and validity test, which relates to the level of trustworthiness and which gives the same and accurate results on repeated attempts. She is qualified by taking several measurements on the same subjects. Validity relates to how well-founded and accurate a notion conclusion or measurement is in contrast to the real world. "Valid" is derived from the Latin word validus, which meaning "strong". Validity is a need for all sorts of investigations, according to Oliver (2010). Reliability and validity assess how effectively a method, test or construct measure what is to be measured. Poor reliability degrades the precision of a single measurement and reduces the ability to track changes in the measurement in a study. Cronbach alpha was chosen as the method for the reliability and validity test. Under Cronbach alpha, the Cronbach coefficient alpha of 0.70 was considered acceptable for the internal reliability and validity of the construct. Any construct with a value less than 0.70 is considered unreliable, and therefore an element or two measuring the construct must be removed from the construct in order to make the construct valid and reliable. The results of the reliability and validity tests are shown below.

Table 4.2: Reliability Analysis.

<table>
<thead>
<tr>
<th>Construct</th>
<th>No. of items</th>
<th>Cronbach’s Alpha</th>
</tr>
</thead>
<tbody>
<tr>
<td>E-procurement practices</td>
<td>6</td>
<td>0.96</td>
</tr>
<tr>
<td>Supply chain performance</td>
<td>6</td>
<td>0.95</td>
</tr>
<tr>
<td>Supplier Integration</td>
<td>6</td>
<td>0.91</td>
</tr>
</tbody>
</table>

Source: Field Study (2021)

In the table above, the E-Procurement Practices construct has a Cronbach Alpha Score of 0.96, the supply chain performance has a Cronbach Alpha Score of 0.95, and Supplier Integration has a Cronbach Alpha Score of 0.91. In total, the Cronbach alpha test was
performed on 3 constructs within the study, and all of them had values greater than 0.70, which indicates that they are all reliable, valid and can be relied on to give the same result if the study is carried out again under the same circumstances.

4.3 Descriptive Analysis

Descriptive statistics were used to describe the variables from the conceptual framework is presented in the study. They provided simple summaries which is used to analyze respondents view on items concerning e-procurement practices, supply chain performance and supplier integration in detail. It gives a composite interpretation to the responses from respondents. Respondents were given questionnaires on a 5-point Likert scale ranging from 1 to 5, with 1 indicating Strongly Disagree, 2 indicating Disagree, 3 indicating Neutral, 4 indicating Agree and 5 indicating Strongly Agree. In order to establish the magnitude of agreement of the study variables, the mean scores are utilized together with the standard deviation. The interpretation of the mean scores were ranged in order to give a more accurate reflection of the magnitude of agreement. Strongly Disagree is 1.00 - 1.44; Disagree is 1.45 - 2.44; Neutral is 2.45 - 3.44; Agree is 3.45 - 4.44; Strongly Agree is 4.45 – 5.00. The data from the questionnaires is summarized in the table below.

Table 4.3: E-procurement practices

<table>
<thead>
<tr>
<th>E-procurement practices</th>
<th>Min</th>
<th>Max</th>
<th>Mean</th>
<th>Std. Dev.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Our organisation sets purchase requirements/specifications online</td>
<td>1.00</td>
<td>5.00</td>
<td>3.72</td>
<td>1.07</td>
</tr>
<tr>
<td>Our organisation identifies new/potential suppliers using internet technology</td>
<td>1.00</td>
<td>5.00</td>
<td>4.15</td>
<td>0.96</td>
</tr>
<tr>
<td>Our organisation makes negotiations or gets into agreement electronically</td>
<td>1.00</td>
<td>5.00</td>
<td>3.67</td>
<td>1.06</td>
</tr>
<tr>
<td>Our organisation gathers and distributes purchasing information both from and to</td>
<td>1.00</td>
<td>5.00</td>
<td>4.02</td>
<td>0.85</td>
</tr>
</tbody>
</table>
The first construct measured was electronic procurement practices. Under electronic procurement practices, the first measurement item was “Our organisation sets purchase requirements/specifications online” and the item recorded a Mean of 3.72; Standard Deviation is 1.07. The mean for this item falls within the range Agree which is 3.45 - 4.44, which indicates that majority of the respondents agreed that their organisation is able to sets purchase requirements/specifications online.

The second item within the e-procurement practices was “Our organisation identifies new/potential suppliers using internet technology”, which recorded Mean of 4.15 and Standard Deviation of 0.96. The mean score falls within the range of Agree which is 3.45 - 4.44, which indicates that majority of the respondents agreed that their organisation is able to identifies new/potential suppliers using internet technology.

The next item was “Our organisation makes negotiations or gets into agreement electronically” and this recorded Mean of 3.67 and Standard Deviation is 1.06. The mean score for this item falls within the range of Agree of 3.45 - 4.44, and this also indicates that majority of the respondents agreed that their organisation makes negotiations or gets into agreement electronically.

The next item measuring electronic procurement was “Our organisation gathers and distributes purchasing information both from and to internal and external parties using internet technology” and recorded Mean of 4.02 and Standard Deviation of 0.85. The composite response falls within the range of Agree which is 3.45 - 4.44, which indicates that
majority of the respondents agree that their organisation gathers and distributes purchasing information both from and to internal and external parties using internet technology.

The next item was “Our organisation procures its products from suppliers online” and this recorded Mean of 3.75 and Standard Deviation of 1.00. The mean score for this item falls within the range of Agree which is 3.45 - 4.44, and this also indicates that majority of the respondents agreed that their organisation procures its products from suppliers online.

The last item within the e-procurement was “Our organisation serves procurement function to its customers online”, which recorded Mean of 3.86; Standard Deviation of 0.90. The mean score falls within the range of Agree which is 3.45 - 4.44, which indicates that majority of the respondents agreed that their organisation serves procurement function to its customers online. The composite scores for e-procurement practices were Mean of 3.86 and Standard Deviation of 0.97. The mean score falls within the range of Agree which is 3.45 - 4.44 indicating that majority of the respondents agreed that their organisations e-procurement practices was good. The e-procurement practices construct had a standard deviation of 0.97 also indicating that the average deviation from the mean was at an acceptable value.

Table 4.4: Supply chain performance

<table>
<thead>
<tr>
<th>Supply chain performance</th>
<th>Min</th>
<th>Max</th>
<th>Mean</th>
<th>Std. Dev.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Our supply chain has been able to reduce cost across the whole supply chain</td>
<td>1.00</td>
<td>5.00</td>
<td>4.28</td>
<td>0.80</td>
</tr>
<tr>
<td>Our supply chain is able to improve efficiency and time taken to complete procurement process</td>
<td>1.00</td>
<td>5.00</td>
<td>4.22</td>
<td>0.82</td>
</tr>
<tr>
<td>Our supply chain is able to reduce administrative cost with better effectiveness</td>
<td>1.00</td>
<td>5.00</td>
<td>4.21</td>
<td>0.75</td>
</tr>
<tr>
<td>The effectiveness of our supply chain processes (standard process) has improved across the entire supply chain</td>
<td>1.00</td>
<td>5.00</td>
<td>4.19</td>
<td>0.78</td>
</tr>
</tbody>
</table>
There is a reduction in errors of order transmission across our supply chain
1.00 5.00 4.31 0.79

There is a reduction in inventory lead time across our supply chain
1.00 5.00 4.43 0.76

Overall
1.00 5.00 4.27 0.66

Source: Field Study (2021)

To measure supply chain performance, the first point measured below was Our supply chain was able to reduce costs across the supply chain, recording a mean of 4.28 and a standard deviation of 0.80.11 The average score is in the range of agreement between 3.45 and 4.44, which indicates that the majority of respondents agreed that their supply chain was able to reduce costs across the supply chain. The next point measured was Our supply chain is able to improve the efficiency and time it takes to complete the procurement process, which averaged 4.22; Standard deviation of 0.82. The average score is in the range of Agree which is 3.45 4.44. This mean indicates that the majority of respondents agree that the supply chain is able to improve the efficiency and the time it takes to complete the procurement process. The next measured point was Our supply chain is able to reduce administrative costs more effectively, averaging 4.21; Standard deviation of 0.75. The average score is in the range of "Agree" from 3.45 to 4.44, indicating that the majority of respondents agree that their supply chain is able to reduce administrative costs with greater effectiveness in the organisation.

The next measured point was the effectiveness of our supply chain processes (standard process) has improved across the entire supply chain, reaching a mean value of 4.19; Standard deviation of 0.78. The average score, which falls in the range of 3.45-4.44, indicates that the majority of respondents agreed that the effectiveness of the supply chain processes (standard process) has improved across the supply chain in the organisation. The next measured point was There is a reduction in order submission errors in our supply chain and the recorded mean of 4.31 and the standard deviation of 0.79. The average score, which falls in the range of 3.45-4.44, indicates that the majority of respondents agree that errors in submitting orders are decreasing throughout our supply chain in the organisation. The last point measured under Supply Chain Performance was There is a decrease in inventory lead time across our supply chain, recording a mean of 4.43 and a standard deviation of 0.76. The average score for this point is in the Agree range, which is 3.45 4.44, which suggests that the majority of
respondents agreed that warehouse lead time is reduced across our entire supply chain in the organisation. The composite score for supply chain performance was a mean of 4.27 and a standard deviation of 0.66, the mean of which is in the range of agreeing from 3.45 to 4.44, indicating that the majority of respondents agree that it is in gave their organisation a commitment from top management.

Table 4.5: Supplier integration

<table>
<thead>
<tr>
<th>Supplier Integration</th>
<th>Min</th>
<th>Max</th>
<th>Mean</th>
<th>Std. Dev.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Our organisation is able to maintain a strong buyer-vendor relationship with its suppliers</td>
<td>1.00</td>
<td>5.0</td>
<td>4.23</td>
<td>0.71</td>
</tr>
<tr>
<td>Our organisation develops a single shared forecast of demand and a plan of supply with its suppliers</td>
<td>1.00</td>
<td>5.0</td>
<td>3.66</td>
<td>1.00</td>
</tr>
<tr>
<td>Our organisation shares information concerning our operations with suppliers</td>
<td>1.00</td>
<td>5.0</td>
<td>3.66</td>
<td>0.94</td>
</tr>
<tr>
<td>Our organisation has well established communication channels with its suppliers</td>
<td>1.00</td>
<td>5.0</td>
<td>4.38</td>
<td>0.76</td>
</tr>
<tr>
<td>Our organisation constantly improves relations with its suppliers</td>
<td>1.00</td>
<td>5.0</td>
<td>4.48</td>
<td>0.74</td>
</tr>
<tr>
<td>Our organisation involves its suppliers in new product development</td>
<td>1.00</td>
<td>5.0</td>
<td>3.55</td>
<td>1.14</td>
</tr>
<tr>
<td><strong>Overall</strong></td>
<td>1.00</td>
<td>5.00</td>
<td>3.99</td>
<td>0.88</td>
</tr>
</tbody>
</table>

**Source:** Field Study (2021)

The last construct measured as part of the study was supplier integration. The first measurement point was Our company is able to maintain a strong buyer-seller relationship
with its suppliers, recording mean of 4.23 and a standard deviation of 0.71. The average score for this point is in the range of agreement between 3.45 and 4.44, suggesting that the most of the participants agreed that organisation maintains a strong buyer-seller relationship with its suppliers.

The next measured point was Our organisation developed a single joint demand forecast and supply plan with its suppliers and recorded a mean which is 3.66 with a standard deviation representing 1.00, which falls within range of agree of 3.45-4.44 and also indicates many of the participants agreed organisation should develop a single common demand forecast and delivery schedule with its suppliers. The next measured point was: Our organisation shares information about our business with the suppliers that has been recorded. Mean 3.66 and standard deviation 0.94. The average score is in the "Agree" range of 3.45 to 4.44, which indicates that the majority of respondents agree that the organisation shares information about our business with suppliers.

The next point measured under Delivery Integration was Our organisation has well-established communication channels with its suppliers which averaged 4.38; Standard deviation of 0.76. The average score here is in the range of agreement between 3.45 and 4.44, indicating that the majority of respondents believe that their organisation has well-established communication channels with suppliers, which recorded mean of 4.48 with standard deviation of 0.74. The average score is in the range of 4.45 5.00 totally agree, which suggests most of the research participants agreed strongly that the organisation is constantly improving relationships with its suppliers.

The last point measured under supplier integration was Our organisation involves its suppliers in the development of new products and recorded a mean representing 3.55 with standard deviation of 1.14. The average score, which falls in the range of 3.45-4.44, indicates that the majority of respondents agree that the organisation involves its suppliers in the development of new products. The composite score for supplier integration was a mean of 3.99 with a standard deviation of 0.88, falling within the range of Agree of 3.45 to 4.44. This average value indicates that the majority of respondents agree that there is supplier integration in their organisation. The standard deviation of 0.88 indicates that the mean deviation from mean response is acceptable for the purposes of this study.
4.4  **Statistical Test**

This section deals with correlation and regression analysis for determining the effect of research independent variables (supply chain performance) on e-procurement performance and also to determine the moderating influence of supplier integration on relationship between e-procurement practices and performance of supply chain. To achieve this, multiple regression analysis should be performed to determine the relationships mentioned above.

4.4.1  **Correlation Analysis**

This section looks at how the variables within the study are correlated, and the extent of the relationship among the research variables. The results are indicated in the table below.

**Table 4.6: Correlation Analysis**

<table>
<thead>
<tr>
<th>Correlations</th>
<th>E-Procurement Practices</th>
<th>Supply Chain Performance</th>
<th>Supplier Integration</th>
</tr>
</thead>
<tbody>
<tr>
<td>E-Procurement Practices</td>
<td>Person Correlation 1</td>
<td>0.823**</td>
<td>0.867**</td>
</tr>
<tr>
<td>Sig (2-tailed)</td>
<td></td>
<td>0.000</td>
<td>0.000</td>
</tr>
<tr>
<td>N</td>
<td>120</td>
<td>120</td>
<td>120</td>
</tr>
<tr>
<td>Supply chain performance</td>
<td>Person Correlation 0.823**</td>
<td>1</td>
<td>0.873**</td>
</tr>
<tr>
<td>Sig (2-tailed)</td>
<td>0.000</td>
<td></td>
<td>0.000</td>
</tr>
<tr>
<td>N</td>
<td>120</td>
<td>120</td>
<td>120</td>
</tr>
<tr>
<td>Supplier Integration</td>
<td>Person Correlation 0.867**</td>
<td>0.873**</td>
<td>1</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
Table 4.6 above gives the correlation score to examine the strength the relationship among the various research variables. The table shows a positive correlation of 82.3% between electronic procurement practices and performance of supply chain, and the correlation is also significant at p <0.05. There is also a positive correlation of 86.7% between e-procurement practices and supplier integration. The correlation is also significant with p <0.05. Finally, the association between performance of supply chain and supplier integration is positive 87.3%, and the relationship is also significant at p <0.05. All relationships between the variables were positively and significantly related, suggesting that as one variable increases, so do the other variables. In addition, the correlation between the variables was high, suggesting that the rate of increase in one variable due to another is also quite high.

4.4.2 Regression Analysis

This section presents the result from the data analysis. It presents a multiple regression concerning the relationship between the variables in the study, and how they relate and affect each other.

4.4.2.1 E-Procurement Practices and Supply Chain Performance

This section presents the regression analysis of Electronic procurement practices and Performance of supply chain.

Table 4.7: Model Summary

<table>
<thead>
<tr>
<th>Model</th>
<th>R</th>
<th>R Square</th>
<th>Adjusted R Square</th>
<th>Std. Error</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>.823</td>
<td>.677</td>
<td>.675</td>
<td>.40106</td>
</tr>
</tbody>
</table>

Source: Field Study (2021)
The table above presents the regression model summary of Electronic Procurement Practices and performance of supply chain. The R square from the table is 0.677. This indicates that 67.7% of the variations in supply chain performance is caused by variations in e-procurement practices.

Table 4.8: Analysis of Variation

<table>
<thead>
<tr>
<th>Model</th>
<th>Sum of Squares</th>
<th>df</th>
<th>Mean Square</th>
<th>F</th>
<th>Sig.</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Regression</td>
<td>39.833</td>
<td>1</td>
<td>39.833</td>
<td>247.642</td>
</tr>
<tr>
<td></td>
<td>Residual</td>
<td>18.980</td>
<td>118</td>
<td>.161</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Total</td>
<td>58.813</td>
<td>119</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

a. Dependent Variable: Supply Chain Performance
b. Predictors: (Constant), E-Procurement Practices

From the table above, the total sum of squares for supply chain performance is 58.813. The sum of squares implies the variation in the dependent variable.
The sum of squares for the regression model is 39.833, implying that 39.833 of the variations in performance of supply chain is due to E-procurement practices. The regression model is also significant as p < 0.01.

**Table 4.9: Co-efficient of Variation**

<table>
<thead>
<tr>
<th>Model</th>
<th>Unstandardized Coefficients</th>
<th>Standardized Coefficients</th>
<th>t</th>
<th>Sig.</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>(Constant)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>1.782</td>
<td>.162</td>
<td>10.979</td>
<td>.000</td>
</tr>
<tr>
<td></td>
<td>E-Procurement Practices</td>
<td>.645</td>
<td>.041</td>
<td>.823</td>
</tr>
</tbody>
</table>

a. Dependent Variable: Supply Chain Performance

**Source: Field Study (2021)**

The co-efficient of variation for the impact of Electronic Procurement Practices on performance of supply chain is presented in this section. Per the table, on average, increasing e-procurement by 1-unit results in a 0.645 increase in supply chain performance. The model is also significant as p < 0.01.

**4.4.2.2 Supply Integration and Supply Chain Performance**

This section presents the regression analysis for E-Procurement Practices and Supplier Integration.

**Table 4.10: Model Summary**

<table>
<thead>
<tr>
<th>Model Summary</th>
</tr>
</thead>
<tbody>
<tr>
<td>54</td>
</tr>
</tbody>
</table>
Table 4.10 provides the model summary for Supplier Integration and supply chain performance. The table shows, R square is 0.761. This implies that 76.1% of the variations in supplier integration is caused by variations in supplier integration.

Table 4.11: Analysis of Variation

<table>
<thead>
<tr>
<th>Model</th>
<th>Sum of Squares</th>
<th>df</th>
<th>Mean Square</th>
<th>F</th>
<th>Sig.</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Regression</td>
<td>44.780</td>
<td>1</td>
<td>44.780</td>
<td>376.549</td>
</tr>
<tr>
<td></td>
<td>Residual</td>
<td>14.033</td>
<td>118</td>
<td>.119</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Total</td>
<td>58.813</td>
<td>119</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

a. Dependent Variable: Supply Chain Performance

b. Predictors: (Constant), Supplier integration

Source: Field Study (2021)
supply chain performance is 58.813. Of this deviation, however, 44.780 are caused by supply chain performance. The model is also significant since p < 0.01.

Table 4.12: Co-efficient of Variation

<table>
<thead>
<tr>
<th>Model</th>
<th>Coefficientsa</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Unstandardized Coefficients</td>
</tr>
<tr>
<td></td>
<td>B</td>
</tr>
<tr>
<td>1</td>
<td>(Constant)</td>
</tr>
<tr>
<td></td>
<td>Supplier Integration</td>
</tr>
</tbody>
</table>

a. Dependent Variable: Supply Chain Performance

Source: Field Study (2021)

The table above gives a coefficient of variation for Supplier Integration of 0.822, which means that an increase in Supplier Integration by 1-unit results in an increase in supply chain performance of 0.822 on average. The effect of Supplier Integration on supplier integration is also significant, as p < 0.01.

4.4.2.3 E-Procurement Practices, Supplier Integration and Performance of the supply chain.

This table presents regression analysis of effects of Electronic Procurement Practices and Supplier Integration on Performance of supply chain.

Table 4.13: Model Summary

<table>
<thead>
<tr>
<th>Model Summary</th>
</tr>
</thead>
</table>

56
<table>
<thead>
<tr>
<th>Model</th>
<th>R</th>
<th>R Square</th>
<th>Adjusted R Square</th>
<th>Std. Error Estimate</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>.883(^a)</td>
<td>.779</td>
<td>.775</td>
<td>.33327</td>
</tr>
</tbody>
</table>

a. Predictors: (Constant), E-Procurement Practices, Supplier Integration

**Source: Field Study (2021)**

According to the table, 77.9% of the variations in supply chain Performance is caused by variations in E-Procurement Practices and Supplier Integration. This figure is seen in the R square which is 0.779.

**Table 4.14: Analysis of Variation**

<table>
<thead>
<tr>
<th>ANOVA(^a)</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Model</strong></td>
</tr>
<tr>
<td>Regression</td>
</tr>
<tr>
<td>Residual</td>
</tr>
<tr>
<td>Total</td>
</tr>
</tbody>
</table>

a. Dependent Variable: Supply Chain Performance

b. Predictors: (Constant), E-Procurement Practices, Supplier Integration

**Source: Field Study (2021)**

This section provides an analysis of the variation in supply chain performance. According to the table above, the total variance in supply chain performance is 58.813. Of the 58.813 variances in supply chain performance, 45.818 of these are caused by variances in e-procurement practices and supplier integration. The regression model is also significant with p <0.01.
Table 4.15: Co-efficient of Variation

<table>
<thead>
<tr>
<th>Model</th>
<th>Unstandardized Coefficients</th>
<th>Standardized Coefficients</th>
<th>t</th>
<th>Sig.</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>B</td>
<td>Std. Error</td>
<td>Beta</td>
<td></td>
</tr>
<tr>
<td>1</td>
<td>(Constant)</td>
<td>1.026</td>
<td>.170</td>
<td>6.045</td>
</tr>
<tr>
<td></td>
<td>E-Procurement Practices</td>
<td>209</td>
<td>.68</td>
<td>.267</td>
</tr>
<tr>
<td></td>
<td>Supplier Integration</td>
<td>.604</td>
<td>.082</td>
<td>.641</td>
</tr>
</tbody>
</table>

a. Dependent Variable: Supply Chain Performance

Source: Field Study (2021)

The coefficient of variation for e-procurement practices is 0.209, indicating that constant supplier integration and an increase in e-procurement practices by a unit resulted in an average increase in performance of supply chain by 0.209. The coefficient of variation for supplier integration is 0.604, which also indicates that if e-procurement practices are held constant and supplier integration is increased by one unit, the effect on performance of supply chain increases by 0.604 on average. The effect of two variables on performance of supply chain is also significant, as their p-values were less than 1%.

4.5 Discussion of Results.

The section explains the findings obtained from results analysis and from the literature review. The discussion is broken into sections based on the study.

4.5.1 Electronic Procurement Practices and Performance of Supply Chain
The first research objective was to assess impact of e-procurement practices and performance of the supply chain. The results of the study indicate electronic procurement practices have positive and significant impact on performance of supply chain. The study’s results indicated 67.7% of fluctuations in supply chain performance are caused by e-procurement practices. The study also found that increasing e-procurement practices by a unit resulted in a positive and significant increase in performance of supply chain by 0.645. This is significant, as they all had p-values less than 1%. The results of the study suggested that e-procurement practices have a positive and significant effect on performance of supply chain as in Waithaka et al. (2021), the influence of electronic procurement on organisational supply chain performance.

### 4.5.2 Supplier Integration and Supply Chain Performance

The next aim of this study was to examine the effect of Supplier Integration and Supply Chain Performance. The study performed a regression analysis on Supplier Integration and Supply Chain Performance. The results of the analysis revealed supplier integration had positive and significant effect on supply chain performance. This study findings correspond to the finding of Madzimure et al. (2020). Cranfield, 2000; states that, the purpose of supply integration on supply chain performance is to allow organisations and suppliers to focus on more value adding activities such as serving customers rather than on operational issues. According to the results of this study, 76.1% of the variations in supply chain performance are caused by supplier integration. The study also found that increasing supplier integration by one unit resulted in a 0.822 increase in supply chain performance. The results of the study on Supplier Integration and its effect on Supply Chain Performance are significant with p <0.01.

### 4.5.3 Supplier Integration and Supply Chain Performance.

This research tried to find out an impact of supplier integration on performance of supply chain. The regression analysis showed that supplier integration has a significant effect and a positive relationship on performance of the supply chain. Accordingly, 77.9% of fluctuations in supply chain performance are caused by supplier integration. According to the results of the study, increasing supplier integration by unit resulted in a positive and significant increase of 0.604 in performance of supply chain. The impact of supplier integration on supply chain performance was also significant because p-value was less than 1%. Accordingly, the findings therefore confirm previous finding of Nandankar et al. (2020, Chegugu et al. (2017) that the moderating role of supplier integration on e-procurement and supply chain performance is
very important and significant. The research also showed the impact of supplier integration on performance of supply chain was in line with original hypothesis of the study, and also in line with the finding of Madzimure et al. (2020) on the effects of e-procurement on supply chain performance.

**4.5.4 Moderating Role of Supplier Integration on E-Procurement and Supply Chain Performance.**

The final part of the research was to examine the moderating role of supplier integration in relation to the association between electronic procurement practices and performance of supply chain. The study found that electronic procurement practices could predict 67.7% of the variability in supplier integration, and this could also predict an increase in performance of supply chain by 0.604. The results were also significant as the p-values for the relationships were all below 1%. This suggests that supplier integration can play a significant and positive moderating role between electronic procurement and performance of the supply chain. These findings therefore confirm previous finding of Nandankar et al. (2020, Chegugu et al. (2017 and Madzimure et al. (2020) that the moderating role of supplier integration on e-procurement and supply chain performance is very important and significant.

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**CHAPTER FIVE**

**SUMMARY OF FINDINGS, CONCLUSION AND RECOMMENDATION.**

**5.1 Introduction**

This chapter highlights results summaries from previous chapters, conclusions from the research findings, suggested recommendations to managers, policy makers, and suggestions for further research gaps.

**5.2 Summary of Findings**
The purpose of the research was to assess the effects electronic procurement had on the performance of supply chain in the Ghanaian healthcare system: the moderating role of supplier integration. The study was aimed at the top managers in purchasing and supply chain. This section therefore summarizes the outcomes from literature review and data collected as part of the study. The results are shown below.

5.2.1 E-Procurement Practices and Supply Chain Performance.
This paper was designed to investigate the impact of e-procurement practices and supply chain performance. After performing the correlation and regression analysis, the study found an 82.3% correlation between electronic procurement practices and supply chain performance. The findings indicated that 67.7% of the variability in supply chain performance is predicted by e-procurement practices. In addition, the study also found that increasing e-procurement practices by one-unit improved supply chain performance by 0.645. The results regarding the effect of electronic procurement practices on performance of the supply chain are also significant, as p <0.01.

5.2.2 E-Procurement Practices and Supplier Integration.
The next aim of the research was to assess the effect of electronic procurement practices on supply integration. The correlation analysis showed, there is a correlation of 86.7% between electronic procurement practices and supplier integration. A regression analysis performed indicated that e-procurement practices and supplier integration was also performed and the results showed that 75.2% of the variations in supplier integration can be explained by e-procurement practices. The study also found that the coefficient of variation of supplier integration through e-procurement practices is 0.722. The study also indicated that the p-value is significant this is because the p-value was below 0.01.

5.2.3 Supplier Integration and Supply Chain Performance.
Next, this study demonstrated the impact of supplier integration on the performance of supply chain. Per test conducted, the hypothesis was carried out through correlation and regression of data from the respondents. The data showed an 87.3% correlation between supplier integration and supply chain performance. This correlation suggests strong association between supply integration and supply chain performance. Next, the study performed a regression analysis on supplier integration and the performance of the supply chain. The findings of the research showed an increasing supplier integration by a unit results in increase of the performance of the supply chain by 0.822. This suggests positive effect on the
5.2.4 The moderating effect of Supplier Integration.

The study’s final objective was to achieve and determine the moderating effect of supplier integration relating to electronic procurement practices and performance of the supply chain. The study conducted further literature research to see what the existing research had to say about the impact of supplier integration on e-procurement practices and supply chain performance in the organisation. Supplier integration had a significant positive impact on the e-procurement practices and supply chain performance, per review from different literatures.

Next, the research tested hypothesis by collecting and testing data from multiple respondents. The study found that e-procurement practices and supplier integration are positively and significantly linked, and that this positive and significant link which also extends to supply chain performance in the Ghanaian healthcare sector.

5.3 Conclusion

From the study relating to e-procurement practices in Ghana healthcare system with introduction of e-procurement, organisations were able to set purchasing requirements/specifications online, identify new/potential suppliers via the Internet, negotiate or make agreements electronically, collect and distribute purchasing information to and from internal and external parties via the internet), procure its products online from suppliers and serves its customers online as a procurement function, which has positively and significantly improved supply chain performance.

This study also proved that e-procurement adoption has resulted in the improvement of supply chain performance through reducing costs across the supply chain, improving the time and efficiency it takes to successfully make the procurement process complete, reducing administrative costs by greater effectiveness, and eliminating the errors of transferring orders across the entire supply chain and reducing warehouse lead times in our supply chain. Additionally, on the impact of supplier integration and e-procurement practices, it was concluded that supplier integration needs to be able to connect directly or affect supply chain performance because the organisation is able to provide a maintain strong buyer-seller relationships with their suppliers, develop a single common demand forecast and delivery
schedule with their suppliers, exchange information about our business with suppliers, and continuously improve purchasing with suppliers.

Finally, the research work also established e-procurement practices as having positive effect on supplier integration, which also had positive effect on the performance of the supply chain. Based on these results, the study therefore comes to the conclusion that e-procurement practices and supplier integration had positive and significant impact on supply chain performance.

5.4 Recommendation

This section provides recommendations for various stakeholders based the research findings. The suggested recommendations are beneficial to management and future studies.

5.4.1 Recommendation for Management

In relation to the study, findings show that the relationship between e-procurement practices and supply chain performance should be eliminated, security measures related to the e-procurement system should be improved, and management should take the lead in the implementation of electronic procurement. This will improve the reduction of supply chain risks and make supply chain performance more beneficial for healthcare.

This study also found that supplier integration had a positive and a more significant impact on supply chain performance. As a result, this study recommends management to actively involve suppliers in the organisation's procurement process, as this is also likely to improve their supply chain performance and result in higher profit levels for the organisation. This research also suggest that institutions implement a user-friendly technology system where most vendors can easily use. In effect, minimize bias in using electronic procurement and everyone will accept it. Finally, the Ghanaian health service should often improve its internal processes to reduce red tape and stress the need for management to integrate suppliers into their electronic procurement systems in the organisation's supply chain performance effectively.

5.4.2 Recommendation for Future Studies
This research study examined effects of electronic-procurement on supply chain performance in Ghana healthcare sector with the moderating role of supplier integration. Other research can be conducted in different organisations in Ghana to see if similar results are obtained. This would make the comparison easier and provide inclusive results on the findings and thus add-up to the informative value in relation to findings obtained. Furthermore, similar research work should be carried out in different economic sectors in Ghana, without necessarily limited to the health sector, for comparison of findings. It is therefore difficult to transfer the results to other industries. It is therefore recommended that future studies examine the impact of electronic procurement on supply chain performance in other industries or countries as well.

REFERENCE:


Approaches.” Acts Press.


Venkatesh, V. (2010). Determinants of perceived ease of use: integrating control, intrinsic motivation, and emotion into the technology acceptance model. *Information Systems*


**QUESTIONNAIRE**

I am a Postgraduate student at the Kwame Nkrumah University of Science and Technology, Department of supply Chain and information system, Kumasi. This survey has been designed to enable me carry out a research on the topic; “THE EFFECTS OF E-PROCUREMENT PRACTICES ON SUPPLY CHAIN PERFORMANCE IN GHANA HEALTH SERVICE: THE MODERATING ROLE OF SUPPLIER INTEGRATION”. Any
information provided will ONLY be used for academic purpose, and it will be treated as HIGHLY CONFIDENTIAL.

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

SECTION A: DEMOGRAPHICS OF RESPONDENTS
1. Indicate your Gender.
   Male [ ] Female [ ]

2. Indicate your Age.
   Below 18 years [ ] 18-26 years [ ] 27-35 years [ ] 36-44 years [ ] 45 years and above

3. Indicate your qualification.
   Diploma [ ] Bachelor’s Degree [ ] Master’s Degree [ ] PhD [ ] Other………………

4. Indicate your job designation?
   Procurement Manager [ ] Supply Chain Manager [ ]

5. Which is your performance level?
   Top [ ] Middle [ ]

6. Number of years in the Organisation?
   Below 5 years [ ]. 6-10 years [ ]. 11-15 years [ ]. 16 and above [ ].

7. What is the level of your ICT expertise?
   Very high [ ]. Moderate [ ]. Very low [ ]. No expertise [ ].

SECTION B: E-PROCUREMENT PRACTICES

In the following questionnaire, indicate the extent to which each indicator is applicable to e-Procurement at the organisation.

Use the scale of 1-5 Where:
1= Strongly Disagree; 2= Disagree; 3= Neutral; 4= Agree; 5= Strongly Agree
<table>
<thead>
<tr>
<th>No.</th>
<th>E-PROCUREMENT PRACTICES</th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>5</th>
</tr>
</thead>
<tbody>
<tr>
<td>8.</td>
<td>Our organisation sets purchase requirements/specifications online.</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>10.</td>
<td>Our organisation makes negotiations or gets into agreement electronically.</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>11.</td>
<td>Our organisation gathers and distributes purchasing information both from and to internal and external parties using internet technology.</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>12.</td>
<td>Our organisation procures its products from suppliers online.</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>13.</td>
<td>Our organisation serves procurement function to its customers online.</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**SECTION C: SUPPLY CHAIN PERFORMANCE**

In your opinion, to what extent do you agree with the statements relating to supply chain performance.

Using the scale of 1-5 Where:

1= Strongly Disagree; 2= Disagree; 3= Neutral; 4= Agree; 5= Strongly Agree

<table>
<thead>
<tr>
<th>No.</th>
<th>SUPPLY CHAIN PERFORMANCE</th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>5</th>
</tr>
</thead>
<tbody>
<tr>
<td>14.</td>
<td>Our supply chain has been able to reduce cost across the whole supply chain.</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>15.</td>
<td>Our supply chain is able to improve efficiency and time taken to complete procurement process.</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>16.</td>
<td>Our supply chain is able to reduce administrative cost with better effectiveness.</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>17.</td>
<td>The effectiveness of our supply chain processes (standard process) has improved across the entire supply chain.</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
18. There is a reduction in errors of order transmission across our supply chain.

19. There is a reduction in inventory lead time across our supply chain.

SECTION D: SUPPLIER INTEGRATION

Indicate to what extent you agree to the following statement on supplier integration.

Using the scale of 1-5 Where:

1 = Strongly Disagree; 2 = Disagree; 3 = Neutral; 4 = Agree; 5 = Strongly Agree

<table>
<thead>
<tr>
<th>No.</th>
<th>SUPPLIER INTEGRATION</th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>5</th>
</tr>
</thead>
<tbody>
<tr>
<td>20.</td>
<td>Our organisation is able to maintain a strong buyer-vendor relationship with its suppliers.</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>21.</td>
<td>Our organisation develops a single shared forecast of demand and a plan of supply with its suppliers.</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>22.</td>
<td>Our organisation shares information concerning our operations with suppliers.</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>23.</td>
<td>Our organisation has well established communication channels with its suppliers.</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>24.</td>
<td>Our organisation constantly improves relations with its suppliers.</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>25.</td>
<td>Our organisation involves its suppliers in new product development.</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

THANK YOU.