The Effect of Electronic Government Procurement on the Availability of Pharmaceuticals: The case of St Peter Specialized Hospital and St Paul Hospital Millennium Medical College

By

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A Thesis Submitted to Addis Ababa University, School of Commerce, Department of Logistics and Supply Chain Management, in Partial Fulfillment of the Requirements for the Degree of Master of Arts in Logistics and Supply Chain Management

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Declaration

Mulugeta Dejene Amare, declare that this study entitled ‘’The Effect of Electronic Government Procurement on the Availability of Pharmaceuticals: The Case of St Peter Specialized Hospital and St Paul Hospital Millennium Medical College’’ is my own work and has not been previously submitted to Addis Ababa University or any other university for any degree or diploma award. All sources of materials used for the study have been properly acknowledged.

Declared by:

Mulugeta Dejene Amare

Signature: _____

Date: _____

Statement of Certification

This is to certify that this study entitled "The Effect of Electronic Government Procurement on the Availability of Pharmaceuticals: The Case of St Peter Specialized Hospital and St Paul Hospital Millennium Medical College", submitted in partial fulfillment of the requirements for the degree of Master of Arts in Logistics and Supply Chain Management to the School of Commerce of Addis Ababa University, completed by Mulugeta Dejene Amare is a genuine work carried by him.

Certified by:

Research Advisor: Shiferaw Mitiku (PhD)

Signature: _____

Date: _____

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List of Acronyms/Abbreviations

CSFs	Critical Success Factors
E-GP	Electronic Government Procurement
EU	European Union
IT	Information Technology
EPPPA	Ethiopian Public Procurement and Property Authority
SPHMMC	St Paul Hospital Millennium Medical College
SPSH	St Peter Specialized Hospital
SPSS	Statistical Package for the Social Sciences
TAM	Technology Acceptance Model
TDT	Technology Diffusion Theory

Abstract

This is a research conducted on to assess the effect of electronic government procurement on the availability of pharmaceutical in St Peter Specialized Hospital and St Paul Hospital Millennium Medical College. The study adopted more the descriptive and explanatory research design in obtaining information about the study topic. The study approach was both quantitative and qualitative research approach. The researcher purposively select only drug and supply management case team from pharmacy directorate and take all the purchasing unit professionals from purchasing unit case team as a study population. A structured questionnaire and interview were used to collect primary data and pharmaceutical supply fill rate report was used to collect secondary data. A total of 58 questionnaires were distributed and a response rate of 96.35% was achieved. Regression model was used to analyze the effect of e-government procurement practices on availability of pharmaceuticals. The result revealed that, e-government procurement practices finding shows that e-supplier selection is highly practiced at the two selected hospitals followed by e-supplier relationship management then e-contract administration, e-contract administration and e-supplier deliverance. E-government procurement practice has a significant and positive effect on availability of pharmaceuticals. The perceived benefit of e-government procurement adoption such as creating value and new business ventures more advantage than lower government expenditure, accountability and competition. Whereas technological and e-procurement process challenges more challenge than internal and external business challenge were found to be at the two selected hospitals. And it was concluded that e-government procurement practice had a significant impact on the availability of pharmaceuticals. Based on this recommended that hospitals to implemented e-government procurement adoption.

Keywords*: E-government Procurement Practice, E-Supplier Selection, E-Contract Management, E-Contract Administration, E-Supplier Deliverance and E-Supplier Relationship Management*

CHAPTER ONE
INTRODUCTION

1.1 Background of the Study

The use of information technology by governments to carry out their procurement operations with suppliers for the acquisition of products, services, and consulting amenities needed by the public sector is known as e-government procurement (e-GP) (World Bank, 2007). The global emergence of e-government procurement has promise for advancing public procurement integrity, fostering competition and driving procurement reform. When properly designed, it can lower expenses significantly, make information more accessible, and lessen the chance of corruption (United Nations, 2013).

The primary goal of the e-government procurement practice is to give the government sector greater transparency, accessibility, and availability of procurement information to the general public. Increased competition in public bidding gives the government access to low-cost, high-quality alternatives, gives all bidding enterprises equal opportunities, and combats corruption (Dash, 2016; World Bank, 2007).

Globally there are multiple studies conducted on e-procurement: United Nation study shows that the main factors propelling e-government procurement include increased competition via online processes, efficiency, transparency, and improved capability for policy making (United Nation, 2011). Other study done in this area reveals that the implementation of e-procurement in the organization show some characteristics include enhanced productivity, decreased paperwork, shortened procurement cycle times, and improved market access and opportunities (Ranki *et al*., 2006). In the European Union (EU), e-procurement has led to both quantifiable and observable influences in the market, including price reductions and other direct or indirect effects on cash flow. The outcomes of successful adoption include lower transaction costs, increased operational effectiveness, and a stronger basis for decision-making (Davila *et al*., 2003). Similarly study by Puschmann and Alt, and Abdallah, both found out that the introduction of new technologies made hospitals and healthcare industries become more competitive. The network of suppliers and healthcare sector has developed a trading relationship that is suitable and adequate for e-procurement hence the implementation of e-GP has resulted in increased local competition among suppliers (Puschmann and Alt, 2005; Abdallah, 2015).

When we come to Africa context countries implemented e-procurement like Ghana studies shows that skills, competencies and training have influence to a large extent e-procurement adoption and implementation (Azanlerigu and Akay, 2015). Rwanda's government has launched a number of measures to modernize its public procurement and align it with the core values of accountability, openness, efficiency, competition, and economy (Mambo, 2015).

In Ethiopia e-GP has been implemented a pilot level since 2021 with 9 public entities taking part. The system was extended to 74 federal agencies in 2023 in the fields of technology, health, education, and agriculture. The Ethiopian Public Procurement and Property Authority (EPPPA) is implementing the e-government procurement rollout with the intention of enhancing efficiency and transparency across the government procurement process (Sima, 2022). This study will look at how e-GP affects pharmaceutical availability in SPSH and SPHMMC.

1.2 Statement of the Problem

The availability of pharmaceutical supplies in hospitals is an integral aspect of ensuring the quality of health care. However, to avail those pharmaceutical supplies from private suppliers is challenging. Sima (2022) and Ernest (2022) has found that hospitals that rely on traditional paper-based procurement face quite particular issues such as increase administrative expenses, long procurement time, lower level of transparency and accountability issue, vulnerable to fraud practice, limited number of suppliers participated, procurement takes place a given place of area, create barrier for cross border supplier participation, poor monitoring of procurement planning and implementing the plans**.** SPSH and SPHMMC as a public organization shares most of the above problems. So, to overcome those challenges, the Ethiopian Public Procurement and Property Authority (PPPA) is implementing e-government procurement as a solution for pharmaceutical procurement in a few governmental hospitals as a pilot level. Since July 2022 procurement of pharmaceutical supplies in SPSH and SPHMMC began to use e-government procurement system as a main procurement method to avail all the medical drugs, supplies, laboratories reagents and equipment’s. Meanwhile, other hospitals and health facility use traditional paper based procurement system.

Regarding this, E-government procurement is used by the Ethiopian government as a solution in SPSH and SPHMMC to reduce those problems. Indeed, e-government procurement is a

relatively new phenomenon in Ethiopia research on this system has not yet been conducted. Based on informal pilot preliminary interview made in both hospitals they faced some technology adoption problems and various challenges during the system began to work, such as delay in system adaption among purchasing unit professionals creates long delays in procurement process, delay in procurement evaluation and contract award process, lack of proper training or orientation while staff transition, system or network interruption while working, poor acceptance and involvement from private suppliers, lack of accountability to private suppliers, difficulty in reduced quantity during awarding selected items from the proforma or tender bid, lack of suppliers understanding and awareness on e-procurement, poor network installation and limited top management supports. In Ethiopia there is similar study conducted by Shiferaw and Yessuf (2019) about e-procurement adoption challenges and critical success factors.

On the contrary a study conducted by Pratik and Shiau (2022) shows the drawbacks of using electronic government procurement systems in organizations. Despite the fact that e-procurement is frequently promoted as a way to cut costs, the results demonstrate that these savings are not always realized, particularly in the short term. Additionally, some organizations find that integrating e-procurement systems with legacy systems and existing enterprise software can be costly and technically challenging. Due to the security and privacy concerns have been raised by the digital nature of e-procurement processes, raising concerns about data security, fraud risk, and safeguarding sensitive procurement information. The study highlights the lack of organizational readiness due to organizational culture, procurement expertise and technological capabilities. A similar study conducted by Kademaunga and Phiri (2019) found that there are several drawbacks to e-government procurement, including decreased negotiation power due to fewer opportunities for buyers to communicate with suppliers directly, which limit their ability to secure the best terms, increased individualized buying by employees, who may continue to make purchases outside of the authorized channels and data quality issues, which compromise the accuracy and reliability of data used in e-government procurement and potentially undermine decision-making. Even though, e-procurement system was theoretically believed to fulfill pharmaceuticals supply needs, there are still unmet service levels. This calls for further investigation for identifying the challenges and benefits of e-procurement adoption within their own premises. Accordingly, this study will assist hospitals successfully implement e-procurement systems.

1.3 Research Questions

The research will answer the following research questions

- To what extent electronic government procurement practices (e-supplier selection, e-contract management, e-contract administration, e-supplier deliverance and e-supplier relationship management) effect on availability of pharmaceuticals?
- What are the relationship between e-government procurement and availability of pharmaceuticals?
- What are the perceived benefits and challenges of e-government procurement of pharmaceuticals?

1.4 Research Objectives

1.4.1 General Objective of the Study

To assess the effect of electronic government procurement practice on availability of pharmaceuticals in St Peter Specialized Hospital (SPSH) and St Paul Hospital Millennium Medical College (SPHMMC).

1.4.2 Specific Objectives of the Study

The specific objectives of the study are:

- To assess electronic government procurement practices such as e-supplier selection, e-contract management, e-contract administration, e-supplier deliverance and e-supplier relationship management.
- To assess the relationship between e-government procurement and availability of pharmaceuticals.
- To examine the perceived benefits and challenges of e-government procurement of pharmaceuticals.

1.5 Significance of the Study

The purpose of this study is to examine the effect of electronic government procurement system and explore perception associated with its adoption in SPSH and SPHMMC. Researchers will find the outcome of this research valuable to their study and the advancement of knowledge. This

research will provide useful contributions to identify the effect of electronic government procurement on availability of pharmaceutical and its benefits and challenges. Moreover, the study will help researchers to build knowledge and set the stage on which future researches could be built in the area of effect of e-government procurement system.

1.6 Scope of the Study

This study will conduct in St Peter Specialized Hospital (SPSH) and St Paul Hospital Millennium Medical College (SPHMMC) which are located in Addis Ababa. The scope of the research is to examine the effect of e-government procurement on availability of pharmaceutical supplies.

The conceptual scope of a study on the effect of electronic government procurement practice such as e-supplier selection, e-contract management, e-contract administration, e-supplier deliverance and e-supplier relationship management on availability of pharmaceuticals. The study will explore the positive outcomes and advantages associated with e-government implementation in the availability of pharmaceuticals. It will also investigate the challenges and barriers, and that may arise during the adoption and utilization of e-government systems within the pharmaceutical sector. The study will provide a clear framework for investigating the benefits and challenges of e-government procurement with a specific focus on the roles of service providers such as pharmacists and purchasing unit professionals in the availability of pharmaceuticals.

A qualitative and quantitative method of research approach that involves retrospective facility based survey will use to assess the effect of e-government procurement on availability of pharmaceuticals in SPSH and SPHMMC. Procurement of pharmaceutical medicines, supplies and laboratories items from private suppliers found in SPSH and SPHMMC is the source of data. All procurement of pharmaceutical medicines, supplies and laboratories items in SPSH and SPHMMC for the years (2022G.C and 2023G.C) will select for study due to this procurement method apply to the hospital since July 2022G.C. In this study, data will collect from pharmacist and purchasing unit professionals in SPSH and SPHMMC.

1.7 Limitation of the Study

In conducting this study, the researcher may face a challenge of lack of well-known studies in Ethiopia regarding electronic government procurement on pharmaceuticals. In this regard, it limits the researcher not to have enough references which helps for starting point to conduct the research.

1.8 Definition of Terms

E-government procurement is the term used to describe the use of electronic methods, typically over the internet to conduct transactions between awarding authorities and suppliers (Ketikidis *et al*., 2010).

Pharmaceuticals are medicine, supplies, laboratory reagents or equipment's items used in healthcare to treat, cure, prevent or diagnose a disease (Latifah *et al*., 2019).

Availability is the quality of being able to be used or obtained (Bhagwan *et al*., 2003).

Challenge is handicapped practices that pharmacist and purchasing unit professionals felt less satisfied (Song *et al*., 2018).

1.9 Organizations of the Study

Chapter one contains the introduction part of the research project. It includes background of the study, statement of the problem, research questions, objectives, scope and limitations of the study and briefly explains about the importance or contribution of the research. Chapter two deals about the review of relevant literature of the study, conceptual framework of the study and research gap to the study. It focuses on the literature review of the issues around E-government procurement. Chapter three is described the research methodology which included research design and approach, population, sample, procedures of data collection and data analysis method. Chapter four is presented the results of the analysis by using the data and discusses the generated data with respective interpretation. Finally, in chapter five summarizes and concludes the overall finding of the study and provides recommendations.

CHAPTER TWO
REVIEW OF RELATED LITERATURE

This chapter entails the literature of other scholars on effects of e-government procurement in availability of pharmaceuticals supplies and identifies its benefits and challenges. The study is to enrich the already existing work on e-government procurement attainable through critical consideration of other scholars work. The researcher tried to express the findings and establish knowledge gap with a view to enhancing the effects use of e-government procurement in health facility.

2.1 Theoretical Literature Review

2.1.1 Dimensions of E-Government Procurement Practice

Electronic government procurement encompasses the use of information and communication technologies to improve the delivery of government services and enhance interactions between the government and its stakeholders, including suppliers. Within the realm of e-government procurement, several practices can be employed to streamline supplier selection, contract management, contract administration, supplier deliverance, and supplier relationship management.

E-Supplier Selection: one of the strategic components of purchase management due to company's ability to maintain its operations and serve its customers is largely dependent on its suppliers. The government can establish online portals where suppliers can register their information, capabilities, and qualifications. This creates a centralized database of potential suppliers to identify, evaluate and select between different suppliers. It can conduct the tendering process electronically, allowing suppliers to submit and manage their bids online. This streamlines the procurement process and increases transparency. Electronic systems can be used to evaluate suppliers based on predefined criteria, such as past performance, financial stability, and compliance with regulations (Rajesh, 2018).

Four key decisions determine the selection of suppliers: deciding on the proper process for defining the criteria, creating their hierarchy, and deciding which criteria will be used to assess the providers. Selecting the most suitable suppliers from those available and obtaining a list of suppliers, the Suppliers Panel, with who orders will be placed. E-procurement platforms were put in place by the government to expedite the contracting and supplier selection process for

pharmaceutical supply. Suppliers need to create an account on the government's e-procurement website and provide comprehensive data about their goods, services, and quality. Following that, the government organizations compile a list of approved vendors by reviewing and prequalifying vendors according to predetermined standards. The government will post electronic tenders or proposals on the e-procurement system in response to specific procurement requirements. After that, prequalified suppliers can electronically submit their bids, providing all supporting documentation, quotes, and other details over safe digital channels. Pre-programmed algorithms are used by the e-procurement system to systematically assess and score supplier bids according to delivery, quality, pricing, and historical performance, among other weighted factors. This contributes to a process of supplier selection that is impartial, open and verifiable. Once a supplier is selected, the e-procurement system facilitates the electronic contract award, generating purchase orders and other documents.It also enables ongoing electronic monitoring of supplier performance, delivery and compliance (Saastamoinen *et al*., 2016).

Choosing electronic providers usually entails the crucial steps such as clearly defining the organization's unique requirements for the electrical items or components required is the first stage in the needs assessment process. This covers elements such as cost, delivery schedules, quantity, quality requirements, and technical specs. Determine which possible vendors can satisfy the needs of the company. Consider factors like product quality, timely delivery, customer service, financial stability, and adherence to pertinent laws and standards while assessing the selected suppliers. Choose the suppliers who, after accounting for variables like price, quality, dependability, and total value, best satisfy the needs of the company. Hospitals may choose pharmaceutical suppliers more efficiently, transparently, and with data integrity and compliance thanks to e-procurement. Additionally, it aids governments in maintaining safe, dependable supply chains for essential medical supplies and managing supplier risks more effectively. Organizations can minimize risks, increase procurement efficiency, guarantee a steady supply of high-quality components, and make sure the supplier can meet the technical requirements and quality standards needed for the electronic products or components by carefully choosing their electronic suppliers (Vaidya *et al*., 2006; Rajesh, 2018).

E-Contract Management: the government can implement electronic contract management systems to create, review, approve, and store contracts digitally. This facilitates efficient document management and reduces paperwork. Electronic systems can be used to track contract

milestones, deliverables, and performance indicators. This enables real-time monitoring and evaluation of contract compliance. The emergence of electronic contract management streamlines the laborious paper-based contract signing procedure and boosts contract management effectiveness. Electronic contracts are technically specified in a way that can be understood by computers. They are defined as a set of obligations that must be met by all parties concerned and can be denied or waived at a later date. E-contracts are emerging as a helpful method for dividing up expected tasks among components in a distributed system that may generate, carry out, and communicate with other parties without the need for human interaction (Rajesh, 2018).

The purpose of an electronic contract management based procurement contract is to ensure that the contract is signed, that the procurement payment is made on schedule, and that the contract can be terminated properly. This electronic contract contains a draft that was made specifically for the commodities buyer, who established the terms of the procurement as well as the specifics of the goods and payments. One or more suppliers are involved in the procurement contract, and the procedure is as follows: all parties sign an electronic contract that contains information about the procurement value, frequency of payments, purchase, and commodity supplier; contract payments are contingent upon the terms and conditions of the procurement agreement (Neupane *et al*., 2012).

E-procurement platforms offer instruments and templates to make the process of creating supplier contracts more efficient. By enforcing approval protocols, the systems guarantee that contracts are examined and approved by the right authorities. Every supplier contract is safely kept on file in the e-procurement platform and is available to authorized staff only. This produces a consolidated, auditable contract document and information repository. E-procurement systems are integrated with other government systems to monitor supplier quality, delivery, and conditions of contract compliance. Procurement teams are alerted to any problems or deviations through automated alerts and dashboards. Over time, the electronic evaluation, negotiation, and approval of contract revisions are made easier by the e-procurement platform. In order to make sure contracts are renewed or renegotiated before they expire, it also oversees the renewal procedure. Secure collaboration portals are offered by many e-procurement platforms, enabling providers to interact with government representatives, submit reports, and view contract papers. This improves openness and simplifies the contract administration procedure. Comprehensive

reporting and analytics on contract performance, pricing trends, and supplier relationships are made possible by the data collected in the e-procurement system. Strategic purchasing choices and supplier development programs are informed by this. Contracts are more likely to comply with applicable laws, rules, and government policies when e-procurement platforms are used. They also make it easier to manage contract risks like disagreements, hold-ups in delivery, or problems with quality. The government can enhance their pharmaceutical supplier partnerships' efficiency, visibility, and control by utilizing electronic contract administration capabilities. This promotes improved procurement results and upholds a dependable, robust supply chain (Corina, 2010; McConnell *et al*, 2007).

E-Contract Administration: the government can implement electronic payment systems to streamline the disbursement of funds to suppliers. This ensures timely payments and reduces administrative burdens. It can maintain electronic records (digital documentation) of contract-related documents, including amendments, correspondence, and reports. This simplifies record-keeping and facilitates information retrieval. Electronic contract administration is the process of monitoring and supervising supplier contracts throughout their entire lifecycle using digital tools and workflows. All contract-related documents, including purchase orders, changes, correspondence, and the original agreement, are centrally stored and securely kept in the e-procurement system. In doing so, a thorough, auditable record of the contract lifecycle is produced. To monitor supplier key performance indicators including on-time delivery, product quality, and contract compliance, the e-procurement platform interfaces with other government systems. Proactive management is made possible by automated alerts and dashboards that inform procurement teams of any problems or deviations (Vaidya *et al*., 2006; Rajesh, 2018).

The e-procurement technology streamlines the safe electronic review, negotiation, and approval process when contract modifications are required. This guarantees that any contract amendments are duly recorded and approved. To handle the process of invoicing and payment with suppliers, the e-procurement system frequently interfaces with financial systems. In compliance with the terms of the contract, this helps guarantee correct and timely payments. Secure online collaboration portals are offered by many e-procurement platforms, enabling suppliers to see contract documents, file reports, and interact with government representatives. This improves openness and simplifies the contract management procedure as a whole. Contracts that comply with applicable laws, rules, and government policies are made sure to do so via the e-

procurement system. It also makes it easier to identify and reduce contract-related risks like disagreements, hold-ups in delivery, or problems with quality. The e-procurement technology alerts procurement teams when contracts are about to expire and helps them with the renewal or closeout procedure. This keeps important pharmaceutical supply agreements from slipping through the cracks (Harelimana, 2018).

E-Supplier Deliverance: the government can utilize electronic ordering systems to communicate requirements and place orders with suppliers. This reduces manual processes and enhances efficiency of deliverance. The government can establish supply chain integration electronically between their systems and suppliers' systems to enable seamless information exchange, including order status updates and delivery notifications. Online ordering and e-commerce are choices for the electronic or digital delivery of goods and services. These platforms and technologies allow for the fulfillment of e-commerce orders while taking secure online payment processing into account (Rajesh, 2018).

E-Supplier Relationship Management: the government can employ electronic systems to evaluate supplier performance based on predefined metrics, such as quality, timeliness, and customer satisfaction. Governments can use online collaboration platforms to facilitate communication and knowledge sharing with suppliers. This strengthens relationships and promotes better collaboration. Electronic supplier relationship management is the use of digital technologies and software solutions to manage the relationship and interactions between a buying organization and its suppliers. Platforms that are securely hosted on the internet that let suppliers communicate with the purchasing organization, submit papers, and access information. This makes it possible to exchange purchase orders, invoices, shipping information, and other vital data quickly and efficiently. In order to track the performance of suppliers, data about them, including lead times, quality metrics, responsiveness, and on-time delivery, must be gathered and analyzed. Dashboards and analytics may then be used to pinpoint the strengths and weaknesses of the suppliers as well as areas for improvement (Rajesh, 2018; McConnell *et al*, 2007).

Reform the submission of documents, audit protocols, and online questionnaires for the onboarding of new suppliers in order to maintaining qualification records and supplier databases in one place. Cooperative planning using digital channels to communicate production plans, inventory levels, and demand projections to suppliers. This makes coordinated planning and timely material replenishment possible. Electronically managing supplier agreements, contracts,

and certificates, followed by the automation of processes for tracking compliance and renewal. Keeping an eye out for operational delays, supplier financial health, and other risk variables by putting early warning systems and backup plans in place. Organizations may boost supplier performance, visibility, and collaboration by putting e-supplier relationship management systems into place. This will increase the supply chain's resilience and efficiency (World Bank, 2008).
It's important to note that the specific implementation of these practices may vary depending on the jurisdiction and the level of technological infrastructure available. Additionally, data security and privacy considerations should be taken into account when implementing electronic government practices involving sensitive information (Asian Development Bank, 2013; Corina, 2010; Weerasinghe *et al*., 2022).

E-procurement is a new approach for businesses to use the internet for online shopping by exchange of goods and services between vendors and consumers. Global usage of e-GP is rising as more governments from all over the world have started using it. Common misunderstandings regarding e-GP are also debunked, such as the idea that it will always result in job losses or rob authorities of their discretionary authority. E-GP can always be used to increase transparency, but it also has additional advantages. First, e-GP produces more easily accessible management information at all levels, which is useful for auditing, planning, and budgeting. Secondly, in certain nations, e-GP can play a significant role in accelerating the adoption of internet technology by enterprises, thereby fostering economic growth (Asian Development Bank, 2013). E-GP system has a good outcome in purchasing of goods such as lower transaction costs, enable quicker ordering and a greater selection of vendors, and provide streamlined procurement processes that are characterized by improved control over procurement spending, increased access to alternative buyers, promote cross-border supplier competition, less paperwork and augment transparency by reducing bureaucracy associated with procurement and standardizing documentation to expedite market entry (Bendoly and Schoenherr, 2005). However, using an e-GP system signifies a significant change in procedure for supplier organizations and purchasing bodies. The government is responsible for making sure vendors and procurement agencies are able to access and utilize the new system appropriately, as well as that they are fully informed about the shift to e-GP. Getting established practitioners to abandon their beliefs and adopt new methods and practices is one of the biggest obstacles to the introduction of a new system (Sima, 2022).

When implemented correctly, e-procurement has a significant role in health sector procurement activities due to reduced paperwork, standardization of procurement procedures, improved transparency, negotiation support, effective change management, improved efficiency, time and life cycle savings, improved contract management, and a decrease in administrative costs (Asare and Prempeh, 2017; Harelimana, 2018). The adoption of an e-procurement platform ensures transparency in the mediation of commercial transactions, which benefits suppliers with larger-scale sales and purchasing hospitals with the potential for expenditure optimization so e-procurement systems must be independent in order to be successful. This implies that they cannot be linked to suppliers or be under the authority of customers (Kovalchuk *et al*., 2019). E-procurement systems and procedures require protection since they include money transactions and may be subject to fraud. They also link the security requirements at the e-tendering stage to authentication in an e-procurement environment (McConnell *et al*, 2007).

E-procurement encompasses the use of intranet, extranet, and internet applications in the purchase process, while excluding traditional methods such as ordering over the phone. Furthermore, e-procurement covers the authorization of the entire process with the overarching goal of cost reduction and encompasses the online acquisition of goods and services for a business's daily operations. A well-executed e-procurement strategy not only improves online shopping but also establishes a direct line of communication between businesses and their suppliers, handling all correspondence between the two parties (Saastamoinen *et al*., 2016).

Government organizations around the country can electronically purchase goods and services from their vendors thanks to the e-procurement system. The technique of manual procurement is changed into an electronic, web-based procedure through e-procurement. The ability for suppliers to display their goods online helps them as well. Through the e-procurement system, suppliers may accept, handle, and process purchase orders from government bodies and private sectors. As a result of the full procurement cycle being automated within an e-procurement framework, suppliers stand to gain a great deal from being able to reach a larger pool of buyers, as well as from lower operating costs, faster turnaround times, more revenue, and happier customers. In addition to boosting competitiveness, a more open and IT-based electronic procurement system may be crucial in reducing these kinds of political interference. First, more bidders may be able to engage in the bidding process with the use of an electronic procurement

system. Due to the cheap cost of participation, winning bids from bidders outside the purchasing district can also be accepted, increasing competition and driving down prices. By allowing a bidder to submit an online bid from the comfort of their office or a remote location rather than having to visit the procuring entity's office in person, additionally, this will lower prices and increase competition (Nawi *et al.*, 2017; Vaidya *et al.*, 2006).

The maturity of the e-GP systems now in use varies. Certain nations, including the Republic of Korea, have put in place sophisticated, completely integrated end-to-end e-GP systems. Others, like Canada, Chile, Indonesia, Malaysia, Mexico, Philippines, Portugal and Chile have been using e-GP systems almost 10 years and significant numbers of procurement entities are currently using them with room to increase. Around 2010, Bangladesh and Georgia started implementing e-GP with the intention of implementing fully functional e-GP systems. Some nations have already prepared but have not yet started the e-GP implementation process and some nations haven't even completed the preparatory processes (Asian Development Bank, 2013).

2.1.2 Availability

Availability is the state or condition of being accessible, usable, and operational when needed or desired and the ability of a business or service to meet the demands and needs of its customers or clients. It measures the extent to which a system or service is up and running and capable of performing its intended functions. Availability is often expressed as a percentage, indicating the amount of time a system is expected to be operational within a given period in the field of business and services. High availability is desirable to ensure that customers can access products, services, or support when required and in terms of physical assets, availability such as machinery, equipment, or infrastructure. It's the degree to which these assets are operational and ready for use. For example, in manufacturing, the availability of machinery is crucial to maintain production schedules and minimize downtime. In general, availability indicates the reliability and readiness of a system, service, or resource to be used or accessed by its intended users or beneficiaries.

The commonly used parameters to measure availability according to Eisner (2022) are:

a) **Uptime** is the amount of time that a system or service is accessible and functional. Usually, it is expressed as a percentage that shows how much of the total time the system is operational, b) **Downtime** is the period of time that a system or service is not operational or unavailable. It could be caused by a variety of factors, such as maintenance processes, network disruptions, and software or hardware faults, c) **Service level agreement** is a formal contract that specifies the terms of termination between a client and a service provider, as well as the expected level of availability and the penalty for noncompliance. It has specific objectives for uptime and response times, d) **Redundancy** is the utilization of backup systems or components ensures ongoing operation in the event of an unforeseen problem. Redundancy can increase availability by reducing the impact of failures and enabling a quick failover or switchover to backup systems, e) **Fault tolerance** is the ability of a system to continue operating properly in the face of mistakes or malfunctions. It means designing systems with resilience built right in, such the ability to recognize and isolate mistakes and carry on even when certain components break, f) **Manufacturing capacity** is the ability of pharmaceutical companies to produce pharmaceuticals impacts their availability. To meet the demand for pharmaceuticals, large-scale production facilities are required. A sufficient amount of manufacturing capacity ensures a steady supply of pharmaceuticals to the market (Eisner, 2022).

g) **Distribution network** is to guarantee that pharmaceutical medicines are available, effective distribution networks are essential. Pharmaceutical businesses work together with wholesalers, distributors, and importers to offer pharmaceuticals to patients and healthcare professionals. The timely transportation of medications to their assigned sites is enabled by a firmly established distribution network; h) **Pricing and affordability** of medications can influence their availability. High medicine costs can pose a challenge for certain individuals seeking medical attention, particularly in countries with limited healthcare resources or for those without health coverage. Governments and groups routinely negotiate pricing arrangements with pharmaceutical manufacturers in order to increase accessibility, i) **Supply chain management** is to ensure the availability of pharmaceuticals requires a strong and well-functioning supply chain. It includes supervising the acquisition of raw materials, manufacturing processes, quality control, packing, and delivery. Drug shortages or delays in delivery can be caused by any disruption in the supply chain, such as natural disasters, manufacturing issues, or concerns about regulations, j) **Health systems and infrastructure** is the availability of pharmaceuticals can be impacted by

the robustness and effectiveness of a nation's health systems and infrastructure. A sufficient number of healthcare facilities, appropriately trained medical professionals, and effective procurement methods are necessary to ensure that pharmaceuticals are supplied to patients on time, and k) **Global trade and export restrictions** is the supply of pharmaceutical items may be impacted by international trade agreements and export limitations. Certain pharmaceuticals may not be readily available in certain places due to trade restrictions, tariffs, or export prohibitions imposed by countries (Eisner, 2022).

It is noteworthy that variances in legislative frameworks, healthcare systems, and economic considerations can lead to discrepancies in the parameters of pharmaceutical availability across different countries and regions. The availability of systems or services is frequently measured and quantified using these characteristics. In order to reduce disruptions, sustain customer happiness, and satisfy corporate objectives, organizations aim to achieve high availability. The government's implementation of comprehensive health policy, which includes pharmaceutical policy, is one of its initiatives to guarantee the best possible healthcare services to the general people (WHO, 2012).

In summary, E-procurement systems increase the availability of goods and services by giving users access to vast catalogs, worldwide reach, and supplier networks. In order to guarantee that customers have access to precise and thorough technical requirements for their purchasing decisions, they also provide full explanations, standardized classification, attachments, and comparison tools (Nurmandi, 2015).

2.2 Empirical Literature Review

When compared to traditional paper-based exchange, electronic exchange can be more secure and offer additional protection. Everybody involved in the process is impacted by the administration of procurement information in an electronic format, and any e-procurement solution must preserve the current degrees of information accessibility (Rankin *et al*., 2006).

2.2.1 Effects of E-Government Procurement on Availability of Pharmaceuticals

Hospitals must have the right pharmaceutical supplies to fulfill their wide range of needs. Large-scale e-procurement health care systems can involve many hospital business activities as well as various trading partners along the healthcare supply chain, which adds complexity to the

integration process (Ketikidis *et al*., 2010). Because it receives a significant amount of funding for healthcare, pharmaceutical supplies is one of the key elements of the healthcare system (WHO, 2010; Bigdeli *et al.*, 2013). The e-procurement method can be used by government hospital to determine whether the lowest-priced goods are also offered by minority-owned companies or are environmentally friendly and swiftly, precisely, and openly gathering the data required for procurement decision-making, e-procurement systems facilitate the management of complicated procurement's (Adebayo and Evans, 2015).

According to scholar e-GP has role in the availability of pharmaceuticals in health facility such as drastically cut costs, make information more easily accessible without going through human channels, lead time control, employee skill improvement and improve transparency, it is a powerful tool in the fight against corruption (United Nations, 2013; Ashrafi *et al.*, 2014; Mutangili, 2019). For management tasks and audits, e-GP provides improved and simpler access to historical and real-time data. Thus, it promotes increased transparency and higher-quality planning and decision-making (Becker, 2018). The availability of pharmaceuticals in health facility will improve time to time due to utilizing e-procurement system, which create greater chance of participation and competition for government spending by fostering commercial benefits for businesses and price and quality gains for the government. This leads to higher quality outcomes for e-procurement through enhanced accessibility and interoperability. In general, availability is the ability of a system or service to be operational and accessible when it is needed (Saussier and Valbonesi, 2018). The availability of medications at the hospital has a direct impact on how satisfied patients are with their healthcare experiences. To increase the drug's availability status, factors influencing its availability should be examined. The type of procurement method used is the main factor influencing improved drug availability, more rational drug use, quality of care, greater cost-effectiveness, and overall health costs. The best possible financial and operational management of hospitals is greatly influenced by the appropriate purchasing of medications. One of the biggest obstacles to access is thought to be the cost of pharmaceutical supplies. Drug purchases account for 50%–90% of non-personal costs, and they make up a considerable portion of the healthcare budget in underdeveloped nations. Comparing multinational corporations' pricing strategies with those of developing countries, studies conducted in developed and developing nations demonstrate that the former can lessen the problem of drug availability in developing nations (Latifah *et al*., 2019).

The essential prerequisite for guaranteeing an effective supply of medications in hospitals is procurement of pharmaceuticals. Hospital medication safety, effectiveness, quality, and availability all have a direct impact on the responsible use of medication. Use an information technology system to handle the hardware and software of the procurement process in order to purchase medications more effectively. Be completely aware of how the location of this hardware and software will assist the e-procurement idea (Borins, 2002).

A comprehensive e-GP system's implementation is a revolutionary endeavor involving the entire government apparatus and supplier community. It takes careful planning and perseverance to transition public procurement from manual to electronic management. Training is consequently required so that government employees and vendors can become proficient with e-GP systems, as their levels of IT system maturity will differ. To support and enable e-GP, the laws now in place controlling public procurement must be appropriately modified. It is necessary to allay stakeholder concerns regarding e-GP through training, workshops, and capacity building programs. It is necessary to fix any gaps in the government offices' IT and network access, and it might be necessary to build facilitation centers so that the supplier community can submit comments online. To put it briefly, e-GP implementation presents a number of technological obstacles that require answers. The nations that are further along in the implementation process have amassed a wealth of experience moving from manual to electronic health records. The learning curve can be minimized by sharing and suitably adopting best practices across countries, even though there may not be a single solution that works for all e-GP challenges (Asian Development Bank, 2013).

E-procurement critical success factors (CSFs) are those organizations that are necessary for the effective adoption and implementation of e-procurement, as stated by Gunasekaran and Ngai (2008). Added the following CSFs: close collaboration with suppliers, communication between participants, step by step transformation, promotion incentives, government support, commitment of top management centralized control and management of procurement initiatives (Gunasekaran and Ngai, 2008). In the other way studies have conducted on difficult condition to implementing e-procurement and they have discovered that some healthcare professionals have connected these difficulties to security and disaster recovery. In the event of a system failure or other security difficulties, they stressed the value of having a backup or alternative e-

procurement system, as well as IT disaster recovery and data security contingency plans (Makau, 2014). E-procurement has positive impact on performance, effectiveness, efficiency, and the overall productivity. However, Technology, knowledge and skills found to be one of the obstacles to implement e-procurement in according to Boateng study conducted in Ghana (Boateng, 2021). A study conducted in Uganda, transactions involving several systems must be exchanged in a secure manner with complete confidence regarding the identities of providers and customers. Both buyers and suppliers must have total faith in the underlying security architecture in order to motivate them to participate in e-procurement (Basheka and Oluka, 2012).

2.2.2 Benefits of E-Government Procurement Adoption

Transparency in public transactions is enhanced by e-GP. Transparency is significantly increased by the possibility of auditing a large number of smaller transactions that were before inefficiently auditable thanks to E-GP and technological advancements. Transparency is a crucial component of the modern public procurement system since it allows the public access to laws, rules, policies, and procedures related to government organization procurement. Fair prequalification procedures, protection against corruption-induced manipulation of the procurement process, openness of the proceedings, and an impartial and transparent selection of the successful tenderer are all necessary for procurement transparency (Kaspar and Puddephatt, 2012).

According to United Nation (2007), Nawi, Roslan, Salleh, Harun (2016), and Dash (2016) studies about the advantages of using electronic procedures for public procurement:

a) **Accountability:** data, information, and decision-making related to public procurement are recorded for audit purposes and made available for consultation. More contract compliance checks and supplier-buyer interactions in the past lessen the likelihood of dishonest and fraudulent behavior, b) **Competition:** transparency in transactions encourages collaboration and competitiveness between buyers and suppliers, as well as the clustering or specialization of small businesses to fulfill growing demand or offer more competitive products, c) **Strategic sourcing creates value**: redirecting the administration's attention to its primary responsibilities and contracting out its peripheral ones helps to expedite and save costs when executing procedures and operations. When performing processes and activities, peripheral ones speed up and reduce costs, d) **E-GP produces new business ventures**: Adoption of e-GP increases demand for new

services both directly and indirectly, which in turn promotes the creation of new endeavors and fields of expertise. In order to specify the administration's requirements, the nature of the change, and the timeline, strategy and management consulting become necessary. Next, in order to carry out the new electronic administrative tasks, such as ensuring the security and privacy of databases and data interchange, technology is needed. The need to convert current paper documents into electronic format gives rise to additional, indirect activity. All of these initiatives help to spread the use of technology among businesses, governments, and the general public, which accelerates economic growth, and e) **E-GP lowers government expenditure**: E-GP saves the administration a significant amount of money. This is brought about by lower transaction costs, as well as lower pricing as a result of enhanced or more efficient competition. Furthermore, contract award results published online serve as a useful instrument for pricing transparency, preventing the signing of exorbitant contracts. The administration will save money by avoiding the possibility of corrupt practices when personal decision-making authority over the procurement process is diminished. Additional savings for society and suppliers are reflected in the provision of goods, accuracy of information, accessibility and time (Dash, G. K, 2016; Nawi *et al*., 2016; World Bank, 2007).

2.2.3 Challenges of Implementing E-Government Procurement

Despite the potential vast advantage e-government procurement has, multiple studies have identified challenges faced while adopting e-government procurement. Categorize these challenges with adoption of e-Procurement as follows:

a) **Internal business challenges**: Employees may resist adopting new e-GP systems and processes leading to slower implementation and reduced efficiency. Users may have limited awareness or understanding of the benefits and functionality of the e-procurement system. Users need ongoing support and resources to effectively adapt and use e-procurement system. Insufficient support, such as lack of user documentation, inadequate helps desk services, limited support from top management in the organizations, or limited availability of technical support, can hinder user adaptation. Users may perceive the implementation of an e-procurement system as a threat to their job security. In addition, there may be unanticipated expenses linked to the implementation of e-procurement, including those related to system integration, system modification, specific operational modifications, training expenses and ongoing e-GP system

maintenance (Gunasekaran and Ngai, 2008; Kinuthia and Kihara, 2019; Kovalchuk *et al*., 2019; Ruzindana and Kalaskar, 2016; Song *et al*., 2018), b) **External business challenges**: For e-procurement technologies to be successful, suppliers need to be reachable online and offer enough catalog options to meet the needs of their clients. This requires financial expenditures in technology as well as incentives for these stakeholders. Suppliers may lack the technological infrastructure, readiness or resources required to participate in e-procurement processes. Suppliers may resist transitioning from manual procurement methods to e-GP system. This resistance can be due to concerns about the complexity of the new system, changes in their business processes or fear of losing personal relationships with procurement personnel. Suppliers may perceive e-procurement systems as costly to implement or maintain (Kinuthia and Kihara, 2019; Kovalchuk *et al*., 2019; Ruzindana and Kalaskar, 2016), c) **Technological challenges**: In order to successfully implement an e-procurement solution, the system must not only carry out the purchasing process but also integrates with the existing information infrastructure. The presence of antiquated IT systems, inadequate IT infrastructure, inadequate power supply and handling technical problems in a setting where verbal communication preferred leading to slower implementation. It's no doubt requires a good internet infrastructure to be built to perform online transactions effectively and ensuring optimal performance of the system, especially during peak usage periods can be challenging. E-GP also involves exchange of sensitive information and data, making it susceptibility to security breaches and privacy concern. Rapid advancements in technology may require continuous upgrades and investment to keep e-government procurements up to date. E-GP systems require regular maintenance. Managing these activities without disrupting ongoing procurement operations can be challenging (Kinuthia and Kihara, 2019; Kovalchuk *et al*., 2019), and d) **E-procurement process challenges**: Choosing the right e-GP vendors and ensuring their reliability, scalability and compatibility with existing systems can be challenging. When investing in e-procurement technologies, for instance, organizations need to be certain that illegal acts won't interfere with manufacturing or other supply chain processes (Ruzindana and Kalaskar, 2016; Song *et al*., 2018).

In summary, acceptance of e-procurement systems, supplier performance and IT reliability, top management's commitment to system adaptation, performance monitoring of e-procurement systems and senior management's support for the e-procurement implementation process plays significant role in adoption of e-GP systems.

2.3 Theoretical Framework of the Study

Managers can begin the process of adopting and implementing e-procurement in their firms by using the theoretical framework. They need to carefully consider what benefits can offer and which type of e-procurement is most appropriate for each stage of the buying process. It is imperative that they consider the primary obstacles they must surmount during the E-procurement implementation process (Corina, 2010). It is recommended that researchers employ at least two theories in a study to produce clarity and consistency due to probable flaws in one theory or model. This will allow researchers to acquire a deeper understanding of technology adoption at an institution. Organizational, environmental, technological and human factors influence the adoption of e-procurement. The results showed that affordable, dependable, and fast internet access was the most crucial success factor for the adoption of e-procurement. Moreover, organizational support for human factors, infrastructure configuration, system features, management, and control impact the adoption of e-procurement (Ernest, 2022).

2.3.1 Technology Acceptance Model (TAM)

Technology Acceptance Model (TAM) is a theory of information systems that explains how organizations adopt and employ technology in their operations. It’s a model designed to simulate consumers' adoption of information systems or technologies. Technology Acceptance Model to conduct a study on technological factors impacting vendors' involvement in the public electronic procurement system in SPSH and SPHMMC. According to this theory, there will be no improvement in organizational 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. IT was found that a number of technological factors, including data security, system integration, data quality and management, information transparency, originality, and innovation, affected vendors' adoption of e-procurement. The study which was based on the technology acceptance

model (TAM), found a favorable association between the adoption of e-procurement and ICT proficiency, employee competence, and managerial decision-making (Ernest, 2022).

E-procurement is a technology that shows promise overall. Many administrative issues in the public sector have been resolved with the use of IT, and e-procurement has been adopted as a means of achieving better and more economical procurement methods. E-procurement results in a more responsible procurement system and improves the general quality of procurement management. Since processing IT-based transactions is significantly simpler, quicker, and less expensive than traditional paper-based procurement, this large volume of low-cost transactions gives a huge potential for deploying e-procurement procedures. In example, governments have radically altered paper-based processes and other traditional management methods by incorporating diverse IT components into hospital administration more likely to adopt e-procurement tools tend to be larger, managerial innovative and to have strong centralized procurement office operations (Moon, 2005; Kademaunga and Phiri, 2019).

2.3.2 Technology Diffusion Theory (TDT)

Diffusion of technology is the outcome of adoption in motion. It describes the gradual accumulation of technology among users that results from their own adoption choices. The diffusion of technology throughout a population is the subject of diffusion theory. Diffusion theory researchers have created analytical models to foresee and explain the dynamics of an innovation's dissemination within a socio-technical system (Aboelmaged, 2010). It takes time for a new technology to acquire economic significance. First, it has to be brought into the economy (innovation). Then, it is gradually adopted by many people (diffusion). Diffusion is as important as innovation: no new technologies have an economic impact until they become widespread in the economy. There is a positive correlation between skill and new technology adoption. They consider the hypothesis that a firm that adopts new technologies demands more skilled workers. Diffusion of new technologies is slow because of informational barriers: it takes time and effort for firms to learn new technologies. Technologies are disembodied, and there is no role for capital goods producers. In this model, the capital goods producer plays a crucial role in both innovation and diffusion (Alaweti *et al*., 2014).

A new technology takes time to become economically significant. Innovation must first be introduced into the economy. Subsequently, a large number of individuals gradually accept it (diffusion). Innovation and diffusion go hand in hand; new technology doesn't affect the economy until widely used. The adoption of new technologies and skill are positively correlated. They take into account the theory that a company using new technology needs more trained labors. Informational barriers cause new technologies to spread slowly as it takes time and effort for businesses to get familiar with them (Alaweti *et al*., 2014). The results obtained using technology show that once fully implemented; e-procurement will be easy to use and very useful in addressing most of the challenges faced by government institutions using paper based on non-automated systems. The positive effects include promoting interdepartmental collaboration, enhancing job and task completion and fostering team work among others (Davila *et al*., 2003).

In this study will adopt the technology diffusion model to identify the benefits and challenges that influence the adoption and diffusion of e-procurement systems within SPSH and SPHMMC. It considers features such as the relative advantage of e-procurement over traditional paper based procurement methods, compatibility with existing systems, complexity, trialability and observability. So by understanding the diffusion process can develop strategies to promote the adoption of electronic government procurement systems, address barriers to adoption and facilitate the spread of the technology in the hospitals (Kademaunga and Phiri, 2019).

2.4 Conceptual Framework of the Study

The researcher can relate the study's variables more easily with the aid of a conceptual framework. In this study, effects of electronic government procurement practices (e-supplier selection, e-contract management, e-contract administration, e-contract deliverance and e-supplier relationship management) are independent variables while availability of pharmaceuticals is dependent variable.

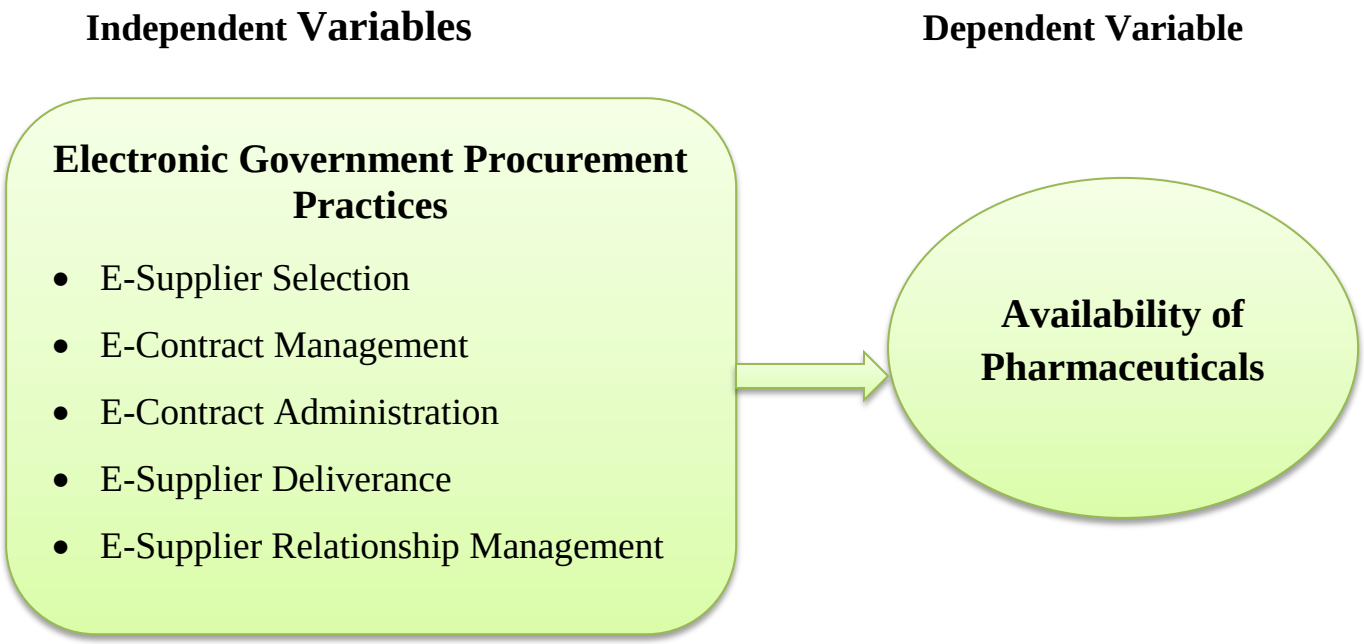

Figure 2. 1: Conceptual Framework of the Study (Source: Self-depicted)

2.5 Identified Literature Gap

The researcher able to examine empirical research from international (globally) researchers work to developing countries research work on the effect e-government procurement in procurement activities and identify the research gap which is most of the researchers work focus on benefits and challenges of e-GP in other economic sectors rather than healthcare facility. The research i conduct will focus on the effects of e-GP on availability of pharmaceuticals and its benefits and challenges. The Federal government and hospital executives will benefit from this study's understanding of the significance of being aware of electronic based procurement of pharmaceuticals.

CHAPTER THREE

METHODS OF THE STUDY

This study is a questionnaire and structured interview questions based cross sectional survey intended to study the effect electronic government procurement practices on availability of pharmaceuticals in St Peter Specialized Hospital (SPSH) and St Paul Hospital Millennium Medical College (SPHMMC). The questionnaire is synthesized by the researchers for this purpose from different sources, literatures, and similar studies outside the country. The questionnaire has five sections; background information of respondent, e-government procurement practices, availability of pharmaceuticals status using e-government procurement system, perceived benefits of e-government procurement adoption and challenges of e-government procurement. It is expected to take 15 minutes per respondent.

Key informant interview is well-structured questions will be used to determine the effect of electronic government procurement practices on availability of pharmaceuticals and elicit the benefits and challenges of electronics government procurement.

3.1 Description of the Study Area

The study will be conducted in St Peter Specialized Hospital (SPSH) and St Paul Hospital Millennium Medical College (SPHMMC) in Addis Ababa, Ethiopia. Saint Peter Specialized Hospital is one of the oldest public hospitals in Addis Ababa, which was established in 1953. The hospital located in Gullele Sub city. It is governed by a board under the Federal Ministry of Health. The hospital has been serving the nation as the only tuberculosis hospital for more than four decades. But for the past few years, the hospital grew from a single disease hospital into multi services health institution for providing comprehensive health care services at outpatient and inpatient levels.

St Paul's Millennium Medical College is one of the largest public hospitals in the country and provides academic, research and medical services. It is referral and teaching hospital found in Addis Ababa, Ethiopia. The hospital located in Gullele Sub city. It is governed by a board under the Federal Ministry of Health. The hospital currently provide medical specialty services to all people who are referred from all over the country and also teach the students in different undergraduate and postgraduate programs.

The study area were chosen due to they are the first hospitals in the country initiated electronic government procurement system thus the researcher was sure of gathering adequate and relevant data about the impact of e-government procurement on the availability of pharmaceuticals.

3.2 Research Design

The study will be conducted using a descriptive and explanatory type research design. Descriptive research will be used to describe the characteristics of pharmacist and purchasing unit professionals in the hospitals and estimate the proportions of professionals that have particular characteristics in the hospitals whereas explanatory research will be conducted to establish cause and effect relationships between e-government procurement practices and availability of pharmaceuticals and this helps to analyses the relationships between dependent and independent variables (Kothari, 2004). This research design was chosen due to the nature of the study aiming to describe, explain, and interpret events from the perspective of the pharmacists and purchasing unit professionals regarding the effect of e-government procurement practices on availability of pharmaceuticals.

3.3 Research Approach

The study is made to apply both quantitative and qualitative approach. Qualitative research is used to evaluate the attitudes, emotions, and motivations of respondents, as these findings cannot be gathered through quantitative analysis. Whereas quantitative research is use numerical measuring and analytical methods to create statistics by employing techniques like structure interviews and questionnaires (Kothari, 2004). So in this research, mixed approach are use in order to study the variables.

3.4 Population and Sample Design

According to SPSH and SPHMMC human resource directorate there are 61 pharmacists and 14 purchasing unit professionals in SPSH and 73 pharmacists and 16 purchasing unit professionals in SPHMMC. Pharmacist working under drug and supply management case team and all purchasing unit professionals working in SPSH and SPHMMC will serve as a source population. Those entire populations may not be relevant for this research. So the researcher purposively select only drug and supply management case team from pharmacy directorate and take all the purchasing unit professionals from purchasing unit case team as a study population they are more

suitable for this research due to they are currently working on e-government procurement activities on purchasing of pharmaceuticals and will provide more information about benefit and challenge of e-government procurement.

The respondents are taking in St Peter Specialized Hospital from the pharmacy department specifically drug and supply management case team (drug procurement officers and store managers) 16 personnel and from the purchasing unit department 14 and in St Paul Hospital Millennium Medical College from the pharmacy department specifically drug and supply management case team (drug procurement officers and store managers) 12 personnel and from the purchasing unit department 16. Totally 58 respondents (28 pharmacist and 30 purchasing unit professionals) will be taken as target population because these professionals will give valuable information and depth understanding regarding with the topic area. In this research, the researcher will be use census method for collection of data from all relevant entities involved in the procurement process.

S. No	Name of Case Team	Study Population
1	Drug and Supply Management Case Team	16
2	Purchasing Unit Case Team	14

Table 3. 1: Study Population Data and Sample Size Determination in SPSH

S. No	Name of Case Team	Study Population
1	Drug and Supply Management Case Team	12
2	Purchasing Unit Case Team	16

Table 3. 2: Study Population Data and Sample Size Determination in SPHMMC

3.5 Data Source and Type

Researcher will collect data from SPSH and SPHMMC by distribute structured questionnaires and interview questions to selected respondents in person. The study will use both primary and secondary data sources to achieve the research objectives. The primary data will collect from the hospital pharmacist and purchasing unit professionals using questionnaire and structured

interview questions. The structured questionnaire contained two parts. The first part is designed to collect respondent's background information. The second part is designed to collect e-government procurement related questions and with the five-point Likert scale. Likert-type scale rate from 1= Strongly Disagree, 2= Disagree, 3= Neutral, 4= Agree and 5= Strongly Agree. This helps to make questions interesting to respondents and thereby, enhance their cooperation and ultimately to ensure maximum response rate.

Additionally the structured interview questions will be made with the two institutions staff specifically pharmacy directorates, drug and supply management case team leaders and purchasing unit case team leaders in both hospitals, a total of six interview will be made.

The secondary sources in the form of books, articles, internet and hospital based pharmaceutical database will use as a source of review of related literature to develop concepts and explain issues related to the problem under study.

3.6 Data Collection Procedure

The structured questionnaire and interview questions will be used as the main data collection instrument. The data will be collected from pharmacist and purchasing unit professionals working in SPSH and SPHMMC through administering structured questionnaire and interview questions in the period of active working time to elicit the major impact of e-government procurement practices on availability of pharmaceuticals. Moreover, structured interview questions will undertake with top pharmacy directorates, case team leader in drug and supply management and procurement unit in both hospitals.

In this research the researcher will use primary and secondary data. The primary data is collect in the field based on the existing and real conditions. This data collection will be conduct by structured questionnaire and interview questions. The secondary data is data which will be collect to support the primary data. The secondary data in this research will be obtained from hospital based pharmaceutical database associated with the research objective. Other sources will be articles and websites.

3.7 Method of Data Analysis and Presentation

In line with the objective of the study, both descriptive and inferential statistical tools will be used to describe, analyze and interpret the data collected and to get answers to research

questions. Data will be first entered in the computer program; after assuring the completeness of the collected data and appropriate clean up works. Data will be analyzed using SPSS (Statistical Package for the Social Sciences) software version 24 and narrated using descriptive statistics tools namely percentage, mean, and frequency. Moreover, inferential statistics specifically multiple linear regression model will be used to establish the relationship between dependent variable and independent variable. The output of the results will be presented using table.

3.7.1 Multiple Linear Regression Model

To achieve the objective of the study which will be to examine the effect of electronic government procurement practices such as e-supplier selection, e-contract management, e-contract administration, e-supplier deliverance and e-supplier relationship management on availability of pharmaceuticals, availability of pharmaceuticals is consider as the dependent variable of the study and effect of electronic government procurement practices are consider as the independent variables. Hence, a multiple linear regression model comprising the dependent and independent variables will be proposed as follows to assess the effect of electronic government procurement practices on availability of pharmaceuticals.

$Y = ß_0 + ß_1X_1 + ß_2X_2 + ß_3X_3 + ß_4X_4 + ß_5X_5 + \varepsilon;$

Where:

- Y represent the dependent variable (availability of pharmaceuticals)
- $X_{1,2,3,4,5}$ are independent variables (electronic government procurement practices) (i.e. X_1 = E-supplier selection, X_2 = E-contract management, X_3 = E-contract administration, X_4 = E-supplier deliverance and X_5 = E-supplier relationship management).
- $ß_0$ and $ß_{1,2,3,4,5}$ are the parameters of the model or regression coefficients. The parameter $ß_0$ is termed as an intercept term and the parameter $ß_{1,2,3,4,5}$ is termed as the slope parameters.
- **ε** represents the unobservable error which is the left-over portion of variability that the model cannot explain.

3.8. Validity and Reliability Test

3.8.1 Validity Test

The degree to which a study accurately reflects the particular idea that the measuring instruments or questionnaire tool will design to measure is known as its validity. So this study content of validity will be thoroughly evaluated by comparing the measuring technique to the conceptual definition of the term and validity will achieve by having objective questions being included in the questionnaire (Kothari, 2004).

The internal and external validity are being supported as the empirical results of this study. Moreover, the validity of the instruments for data collection in this study was done through expert review. Experts provided corrections and the researcher corrected them accordingly.

3.8.2 Reliability Test

The degree of internal consistency and stability in a test's measurement of a certain construct is known as reliability. The researcher structured the questions to ensure that the questionnaires will provide reliable data as evidenced by the consistency of understanding of the questions by the respondents as well as the responses they will make. Since the entire respondents target will be procurement officers so, some consistency of the finding will be perceive.

The questionnaire tool will be evaluated and modified for internal consistency using cronbach's alpha test α. The cronbach coefficient alpha of 0.70 is considered acceptable for the internal reliability of the study and will reflect opinions of all respondents in the target population (Kothari, 2004).

Reliabilities of the scales were checked after coding and entry of data into SPSS version 24.0. Cronbach's alpha coefficients were computed for each scale of variables (e-government procurement practice, availability of pharmaceutical, perceived benefits of e-government procurement and challenges of e-government procurement) to determine the internal consistency reliability of the instruments used in the study. Cronbach's alpha value of 0.70 is considered as in the lower limit of acceptability (Kothari, 2004), and the overall alpha value is 0.866 which shows the highly acceptability of the measurement scales used.

Table 3. 3: Summary of Reliability Analysis

Reliability Statistics

Items	Cronbach's Alpha	Cronbach's Alpha Based on Standardized Items	N of items
E-government Procurement Practices	.827	.833	15
Availability of Pharmaceuticals	.831	.818	11
Perceived Benefits of E-government Procurement Adoption	.731	.742	15
Challenges of E-government Procurement	.879	.881	12

Source: Data Survey Result, 2024

3.9 Ethical Considerations

Considering the relevance of ethics in research work, ethical issues shall be considered. To this ethical clearance will be obtain from the institutional ethical review board of school of Commerce (SOC) and College of Business and Economics (CBE), Addis Ababa University (AAU) before the actual data collection is being carried out. In addition, the questionnaire will be filling based on participant's willingness.

CHAPTER FOUR
DATA ANALYSIS AND DISCUSSION OF RESULTS

4.1 Introduction

This chapter presents the contents of the finding on "To assess the effect of electronic government procurement on availability of pharmaceuticals: the case of SPSH and SPHMMC.'' The study adopted and deployed as per the literature and objective of the study. Structured questionnaire and interview were used to collect data. It used Statistical Package for Social Science (SPSS v. 24) for data analysis and it deployed descriptive statistics and regression model in analyzing the collected data. The demographic profile of the respondent was analyzed and presented in this part using descriptive statistic such as frequency, percentage, mean and standard deviation. To address the research objective, data were collected from St Peter Specialized Hospital and St Paul Hospital Millennium Medical College.

4.2 Response Rate

The researcher distributed 58 questionnaires and out of which 56 questionnaires were gathered that means its response rate represented 96.35%. Then to make the data analysis suitable for SPSS, the information gathered from the questionnaires were coded for each question and fill in to Likert scale questions respondents' format. Then all the gathered questionnaires were screened fortunately all returned questionnaires were completed. On the basis of these 56 completely responded questionnaires were utilized for the analysis of the study.

4.3 Demographic Profiles of the Respondent

In the questionnaire survey, each respondent were asked seven questions regarding their demographic profile including gender, age, educational status, current position level, total years of service in the hospital, name of the case team you work in the hospital and average monthly income. This part provides an analysis of the demographic characteristics of the respondents based on frequency analysis.

Table 4. 1: Demographic Profiles of the Respondents

Demographic Profile	Items	Frequency	Percentage
Gender	Male	36	64.3
	Female	20	35.7
Age	18-25	1	1.8
	26-35	34	60.7
	36-45	20	35.7
	Above 45	1	1.8
Educational Status	Diploma	2	3.6
	Bachelor Degree	39	69.6
	Master and Above	15	26.8
Current Position	Director	3	5.4
	Manager	1	1.8
	Team Leader	13	23.2
	Senior Officer	33	58.9
	Junior Officer	6	10.7
Service Year	1-5	8	14.3
	6-10	32	57.1
	11-15	13	23.2
	16-20	1	1.8
	>20 Years	2	3.6
Case Team Level	Drug and Supply Management	22	39.3
	Purchasing Unit	26	46.4
	Directorate	5	8.9
	Other	3	5.4
Monthly Income	Below 4000	5	8.9

	4001-8000	27	48.2
	8001-12000	18	32.1
	Above 12000	6	10.7

Source: Data generated by SPSS version 24

Gender

Table 4.3 show that the numbers of male respondents are greater than that of female respondents which stood at 64.3% for male while 35.7% for female. In other words, from the 56 respondents, 36 of them are male while the remaining 20 are female. This indicates that there was a dominance of male respondents than female respondents.

Age

Table 4.3 shows that age group of the respondents. The majority of the respondents falls under the age group category of 26 - 35 years old (accounted for 60.7% or 34 respondents), followed by the age group of 36 - 45 years old (accounted for 35.7% or 20 respondents), and age group of 18 - 25 years old (accounted for 1.8% or 1 respondents) and Above 45 years old (accounted for 1.8% or 1 respondents) have equal number of respondents. This indicates that almost all age groups were participated as respondent under this study.

Educational Status

Table 4.3 shows that educational status of the respondents. 39 respondents equivalent to 69.6% who were responded the questionnaire hold bachelor degree, 15 respondent's equivalent to 26.8% who were responded the questionnaire master degree and 2 respondent's equivalent to 3.6% who were responded the questionnaire hold diploma. The analysis revealed that the respondents had attained the necessary education and knowledge to respond the questionnaire with better understands to utilize the system.

Current Position Level

Table 4.6 shows about the current position level of the respondents in the hospital. The majorities of the respondents were senior officers (58.9% or 33 respondents), followed by team leaders (23.2% or 13 respondents), followed by junior Officers (10.7% or 6 respondents) followed by directors (5.4% or 3 respondents) and the rest is manager (1.8% or 1 respondents). This indicates that the questionnaires were spread over almost for all type of position level who

is working in the hospital. This implies also fair distribution of the questionnaires to different position level.

Total Years of Service in the Hospital

Table 4.3 shows that the highest proportion of respondents were with 6-10 years of service in the hospital (57.1% or 32 respondents), followed by 11-15 years of service (23.2% or 13 respondents), followed by 1-5 years of service (14.3% or 8 respondents), followed by 20 years and above years of service (3.6% or 2 respondents) and 16-20 years of service (1.8% or 1 respondents). This indicates that respondents had enough work experience in the hospital that implies they have better opportunity to know more about the topic and also the hospital.

Name of the Case Team you work in the Hospital

Table 4.3 shows that majority of the respondents are working in purchasing unit case team (46.4% or 26 respondents), followed by drug and supply management (39.3% or 22 respondents), followed by directorate (8.9% or 5 respondents) and the rest are other units (5.4% or 3 respondents). This indicates that the questionnaires were spread over almost for all type of case team who are working in the hospital. This implies also fair distribution of the questionnaires to employees.

Average Monthly Income Level in Birr

Table 4.3 shows that majority of the respondents had average monthly income in 4001-8000 birr (48.2% or 27 respondents), followed by 8001-12,000 birr (32.1% or 18 respondents), followed by 12,000 and above birr (10.7% or 6 respondents) and the rest are below 4000 birr (8.9% or 5 respondents). This indicates that the questionnaires were distributed to the diverse sample in terms of socioeconomic status. This implies the data provides a high level overview of the income distribution among the respondents, showing a range from low to high incomes.

4.4 E-Government Procurement Practices: Descriptive Analysis

The scale contains 15 questionnaires to assess the level of the five electronic government procurement practices (e-supplier selection, e-contract management, e-contract administration, e-supplier deliverance and e-supplier relationship management) implemented by the case hospitals. Mean and standard deviation were used to analyze the data. Under this circumstance,

interpretation of mean value as follows mean range between 1 - 1.8 is interpreted as not practiced, mean range between 1.81 - 2.6 is interpreted as poorly practiced, mean range between 2.61 – 3.4 is interpreted as moderately practiced, mean range between 3.41 - 4.2 is interpreted as highly practiced and mean range between 4.21 - 5 is interpreted as extensively practiced. Based on this, the analysis traced here below is outlined according to nomination of mean listed on the table for each question.

Table 4. 2: E-Government Procurement Practice (N = 56)

E-Government Procurement Practices	**Descriptive Analysis**						
A, E-Supplier Selection	**SD**	**D**	**N**	**A**	**SA**	**Mean**	**St.D**
The e-procurement system effectively assists in evaluating supplier qualifications and capabilities	0	7	5	35	9	3.82	0.855
The e-procurement system provides sufficient information for making informed decisions about supplier selection	0	9	5	35	7	3.71	0.889
The e-procurement system allows for fair and transparent supplier evaluation and selection processes	1	2	6	35	12	3.98	0.798
Grand Mean of E-Supplier Selection is 3.83							
B, E-Contract Management	**SD**	**D**	**N**	**A**	**SA**	**Mean**	**St.D**
The e-procurement system helps in streamlining the contract creation and approval process	3	3	14	34	2	3.52	0.874
The e-procurement system provides tools for effectively monitoring and tracking contract performance	4	8	14	28	2	3.29	1.004
The e-procurement system facilitates efficient communication between stakeholders involved in contract management	2	8	14	31	1	3.38	0.885
Grand Mean of E-Contract Management is 3.39							
C, E-Contract Administration	**SD**	**D**	**N**	**A**	**SA**	**Mean**	**St.D**
The e-procurement system supports automated	1	10	19	22	4	3.32	0.917

contract renewal and extension processes							
The e-procurement system allows for easy access to contract-related documents and information	2	9	16	24	5	3.38	0.983
The e-procurement system provides alerts and notifications for important contract milestones and deadlines	2	8	8	31	7	3.59	1.00
Grand Mean of E-Contract Administration is 3.43							
D, E-Supplier Deliverance	**SD**	**D**	**N**	**A**	**SA**	**Mean**	**St.D**
The e-procurement system enables accurate and timely tracking of supplier deliveries	1	7	18	27	3	3.43	0.850
The e-procurement system provides real-time visibility into supplier performance and delivery status	3	6	23	21	3	3.27	0.924
The e-procurement system helps in resolving delivery-related issues promptly and effectively	5	6	23	21	1	3.13	0.955
Grand Mean of E-Supplier Deliverance is 3.27							
E, E-Supplier Relationship Management	**SD**	**D**	**N**	**A**	**SA**	**Mean**	**St.D**
The e-procurement system facilitates collaboration and communication with suppliers	1	1	15	33	6	3.75	0.745
The e-procurement system supports the establishment of long-term relationships with suppliers	4	4	14	31	3	3.45	0.971
The e-procurement system helps in evaluating and improving supplier performance over time	1	6	14	32	3	3.54	0.830
Grand Mean of E-Supplier Relationship Management is 3.58							
Mean of Mean of E-Government Procurement Practices is 3.50							

The E-GP practice in terms of e-supplier selection perspective accounts a grand mean score of 3.83. This show the case hospitals are highly practicing it as it means value fells between 3.41 – 4.20. The E-GP practice in terms of e-contract management perspective accounts a grand mean

score of 3.39. This show the case hospitals are moderately practicing it as it means value fells between 2.61 – 3.40. The E-GP practice in terms of e-contract administration perspective accounts a grand mean score of 3.43. This show the case hospitals are highly practicing it as it means value fells between 3.41 – 4.20. The E-GP practice in terms of e-supplier deliverance perspective accounts a grand mean score of 3.27. This show the case hospitals are moderately practicing it as it means value fells between 2.61 – 3.40 and the E-GP practice in terms of e-supplier relationship management perspective accounts a grand mean score of 3.58. This show the case hospitals are highly practicing it as it means value fells between 3.41 – 4.20.

The overall e-government procurement practice at the selected two hospitals is 3.50. This show the case hospitals are highly practicing it as it means value fells between 3.41 – 4.20.

4.5 Availability of Pharmaceuticals: Descriptive Analysis

Mean and standard deviation were used to analyze the data. Under this circumstance, interpretation of mean value as follows mean range between 1 - 1.8 is interpreted as not available, mean range between 1.81 - 2.6 is interpreted as somewhat available, mean range between 2.61 – 3.4 is interpreted as moderately available, mean range between 3.41 - 4.2 is interpreted as highly available and mean range between 4.21 - 5 is interpreted as very high available. Based on this, the analysis traced here below is outlined according to nomination of mean listed on the table for each question.

Table 4.3: Availability of Pharmaceuticals (N = 56)

Availability of Pharmaceuticals Status	**Descriptive Analysis**						
E-Government System	**SD**	**D**	**N**	**A**	**SA**	**Mean**	**St.D**
The system (e-GP) is always accessible and functional	5	30	13	7	1	2.45	0.893
The system (e-GP) is always available during network disruptions	27	23	6	0	0	1.63	0.676
The system (e-GP) is provide significant role in maintaining the availability of pharmaceutical supplies and response time	1	6	24	24	1	3.32	0.765

The system (e-GP) is utilize backup systems to ensures on going operation	2	21	20	12	1	2.80	0.883
The system (e-GP) is always operating properly	5	29	12	10	0	2.48	0.894
The system (e-GP) is enhance the capacity of pharmaceutical companies	1	7	21	25	2	3.36	0.819
The system (e-GP) is enhance the distribution network between hospital and suppliers	4	8	14	28	2	3.29	1.004
The system (e-GP) of the service is minimize the cost and enhance affordability of medications	1	7	11	33	4	3.57	0.871
The system (e-GP) is enhance the well-functioning of supply chain	0	7	9	35	5	3.68	0.811
The system (e-GP) is robust and effective to avail on time delivery of medication for patients	1	7	20	26	2	3.38	0.822
The system (e-GP) is minimize the impact of global trade and export restrictions	0	6	25	21	4	3.41	0.781
Grand Mean of Availability of Pharmaceutical is 3.03							

The overall availability of pharmaceuticals in terms of e-government system perspective accounts a grand mean score of 3.03. This show the case hospitals are moderately available it as it means value fells between 2.61 – 3.4.

4.6 The Effect of E-Government Procurement on Availability of Pharmaceuticals

4.6.1 Correlation Analysis between E-Government Procurement Practices and Availability of Pharmaceuticals

The Pearson correlation analysis between e-GP practices and availability of pharmaceuticals were performed to determine the relationship between the variable in terms of its direction and strength. Table 4.4 below presents the Pearson correlation analysis results for each e-GP practices and availability of pharmaceuticals.

The analysis results indicate that there was a statistically significant relationship between the e-supplier selection and availability of pharmaceuticals. A moderate and positive correlation of r=0.366 was observed and it was significant (1- tailed). Regarding the relationship between e-contract management and availability of pharmaceuticals, the results show that there was a statistically significant relationship between e-contract management and availability of pharmaceuticals. A positive and strong correlation of r=0.686 was observed and it was significant (1- tailed). Regarding the relationship between e-contract administration and availability of pharmaceuticals, the Pearson correlation analysis results demonstrate that there was a statistically significant relationship between e-contract administration and availability of pharmaceuticals. A positive and moderate correlation of r=0.451 was observed and it was significant (1- tailed). Regarding the relationship between e-supplier deliverance and availability of pharmaceuticals, the results show that there was a statistically significant relationship between e-supplier deliverance and availability of pharmaceuticals. A positive and moderate correlation of r=0.311 was observed and it was significant (1- tailed). Finally, regarding the relationship between e-supplier relationship management and availability of pharmaceuticals, the result shows that e-supplier relationship management had a moderate and positive significant relationship with availability of pharmaceuticals. A positive and moderate correlation of r=0.500 was observed and it was significant (1- tailed).

To summarize, there was a moderate and positive relationship between e-supplier selection, e-contract administration, e-supplier deliverance, e-supplier relationship management and availability of pharmaceuticals, and there was a strong and positive relationship between e-contract management and availability of pharmaceuticals. Thus, statistically significant correlation coefficients that ranged from moderate to strong were found between the e-government procurement practices and availability of pharmaceuticals, implying that there was a significant relationship between the e-government practices covered under the study and availability of pharmaceuticals in the case hospitals.

Table 4.4: Correlation summary analysis e-GP Practices and availability of pharmaceuticals

		availability of pharmaceuticals	E-supplier selection	E-contract management	E-contract administration	E-supplier deliverance	E-supplier relationship management
Availability of Pharmaceuticals	Pearson Correlation	1.000	.366	.686	.451	.311	.500
	Sig. (1-tailed)		.003	.000	.000	.010	.000
	N	56	56	56	56	56	56
E-supplier selection	Pearson Correlation	.366	1.000	.542	.402	.005	.392
	Sig. (1-tailed)	.003		.000	.001	.487	0.001
	N	56	56	56	56	56	56
E-contract management	Pearson Correlation	.686	.542	1.000	.592	.258	.630
	Sig. (1-tailed)	.000	.000		.000	.027	.000
	N	56	56	56	56	56	56
E-contract administration	Pearson Correlation	.451	.402	.592	1.000	.127	.487

	Sig. (1-tailed)	.000	.001	.000		.176	.000
	N	56	56	56	56	56	56
E-supplier deliverance	Pearson Correlation	.311	.005	.258	.127	1.000	.395
	Sig. (1-tailed)	.010	.487	.027	.176		.001
	N	56	56	56	56	56	56
E-supplier relationship management	Pearson Correlation	.500	.392	.630	.487	.395	1.000
	Sig. (1-tailed)	.000	.001	.000	.000	.001	
	N	56	56	56	56	56	56

Source: Data generated by SPSS version 24

4.6.2 Inferential Statistical Analysis

Another method of data analysis used to analyze the collected data was an inferential statistical analysis. Inferential statistical techniques were utilized to make inferences about populations based upon the analysis of the data collected from the samples. Multiple regression analysis and ANOVA analysis were performed to determine the relationship between the variables under the study in terms of the causation effect of the independent variables on the dependent variables. In order to measure the effect of e-government procurement practice on availability of pharmaceuticals is modeled as e-government procurement practices as independent variables while availability of pharmaceuticals as dependent variable. Hence, multiple linear regression analysis is computed as follows.

4.6.2.1 Normality Test

To generating reliable confidence and prediction intervals is made possible by meeting the standardized residuals' normal distribution assumption. To do this, the Q-Q Plot, the histogram, and the scatter (P-P) plots as shown in figure 4.1 - 4.2 were used to perform the normality test of the residuals. As shown in figure 4.1 below, the bell-shaped curve of the histogram showed that the

residuals' frequency distributions were almost normally distributed (Frost, 2019).

In addition, Figure 4.2 shows that the residual distribution on the Q-Q plot graph followed a straight line, suggesting that the residuals were approximately normally distributed.

Furthermore, Figure 4.3 shows that the data points randomly falling around zero indicated that the residuals were approximately normally distributed, and the P-P (scatter plot) showed that the residuals follow a normal distribution.

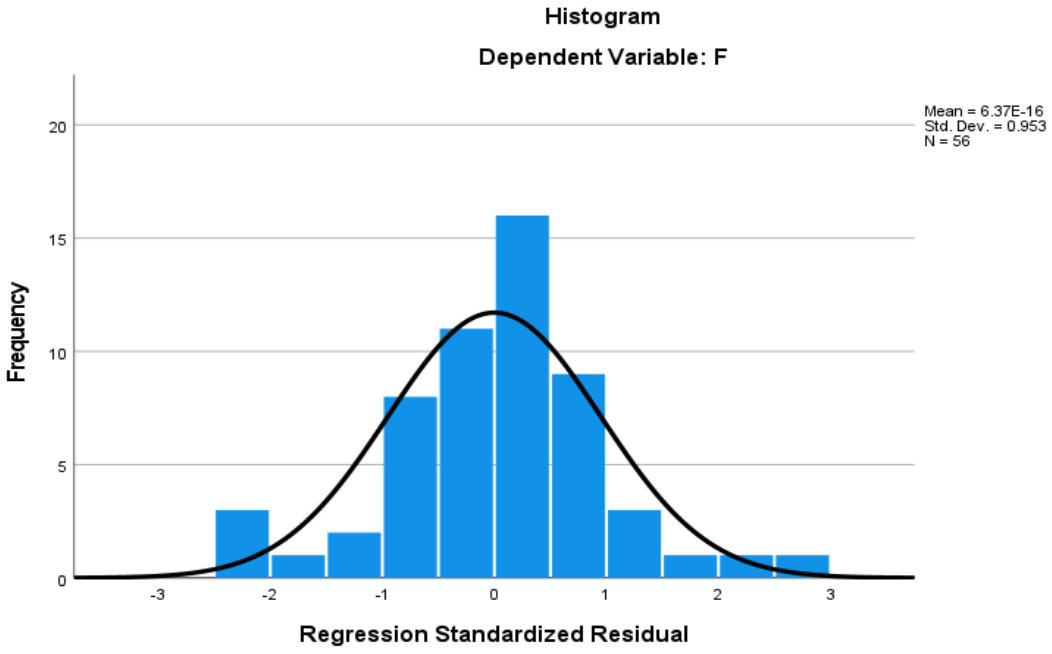

Figure 4. 1 : Frequency Distribution of Residual (Histogram)

Source: Data generated by SPSS version 24

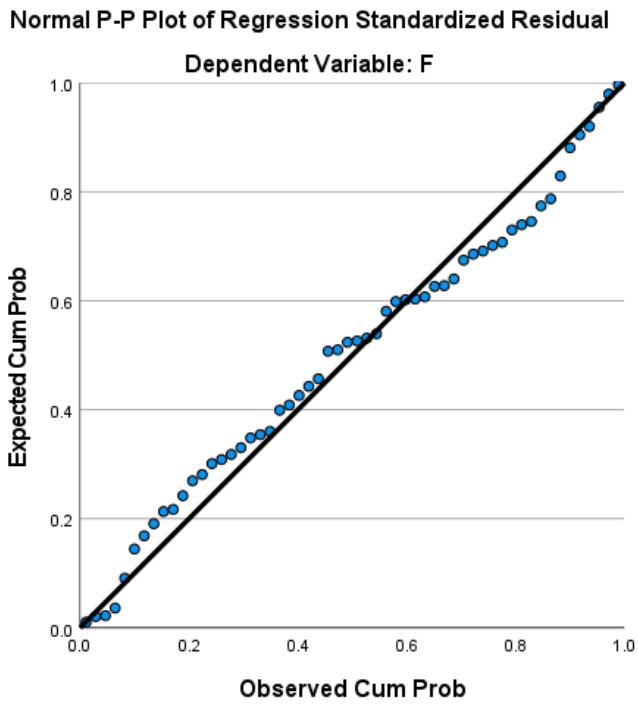

Figure 4. 2: Frequency Distribution of Residual (Q-Q)

Source: Data generated by SPSS version 24

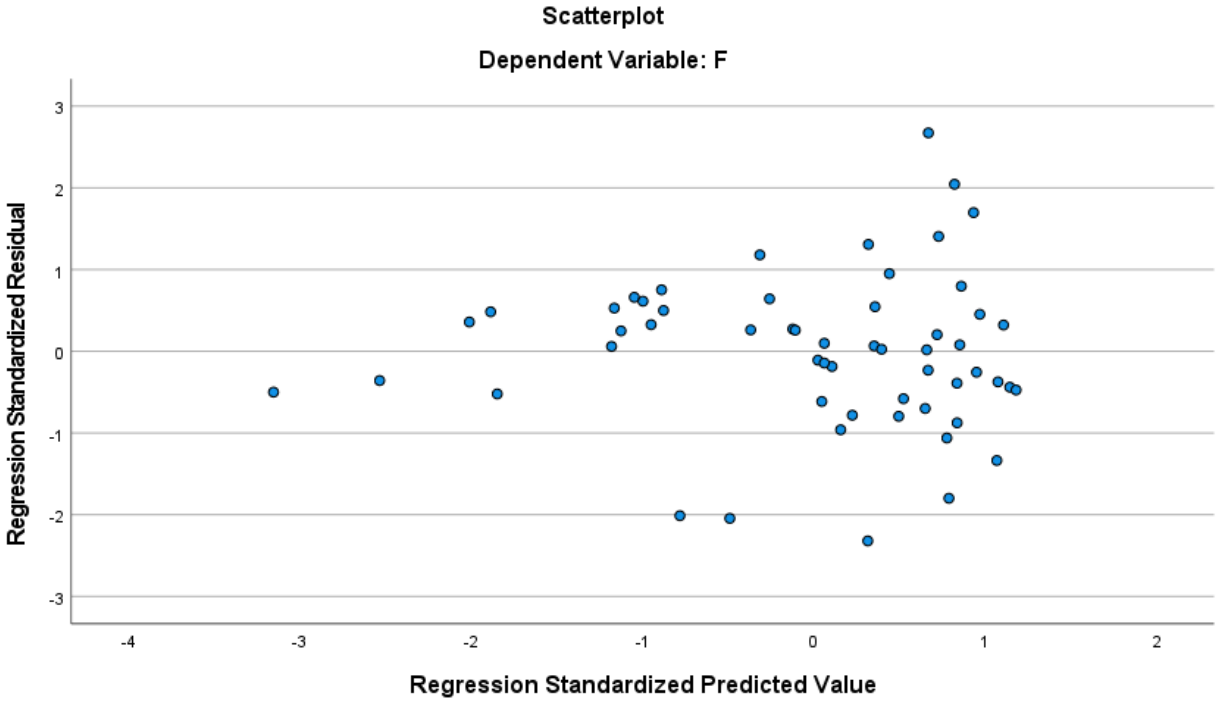

Figure 4. 3: Frequency Distribution of Residual (Scatter P-P Plot)

Source: Data generated by SPSS version 24

4.6.3 Regression Analysis

A statistical method for analyzing a cause and effect relationship between variables is regression analysis. Based on the results of a second variable, we forecast scores on the first variable. We refer to the variable on which we are making our predictions as the predictor variable, and the variable on which we are making our predictions as the criterion variable. Multiple linear regressions are the name given to the prediction technique when there are more than one predictor variables.

In this study, multiple linear regressions were used to estimate the model using ordinary least squares. Based on this multiple linear analysis were conducted to determine the effect of e-supplier selection, e-contract management, e-contract administration, e-supplier deliverance and e-supplier relationship management on availability of pharmaceuticals.

The study adopted multiple linear regressions model comprising using the following regression equation to establish cause effect relationship between variables. $Y = ß_0 + ß_1X_1 + ß_2X_2 + ß_3X_3 + ß_4X_4 + ß_5X_5 + \varepsilon$; where Y is the dependent variable (availability of pharmaceuticals) and $X_{1,2,3,4,5}$ are independent variables (electronic government procurement practices) (i.e. X_1 = E-supplier selection, X_2 = E-contract management, X_3 = E-contract administration, X_4 = E-supplier deliverance and X_5 = E-supplier relationship management). $ß_0$, $ß_{1,2,3,4,5}$ are the parameters of the model or regression coefficients. The parameter $ß_0$ is termed as an intercept term and the parameter $ß_{1,\ 2,3,4,5}$ are termed as the slope parameter and **ε** represents the unobservable error which is the left-over portion of variability that the model cannot explain.

Table 4.5: Model summary of regression between E-supplier selection, E-contract management, E-contract administration, E-supplier deliverance and E-supplier relationship management and availability of pharmaceuticals

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate	Durbin-Watson
1	.704[a]	.495	.445	4.130	2.309

a. Predictors: (Constant), E-supplier selection, E-contract management, E-contract administration, E-supplier deliverance and E-supplier relationship management

b. Dependent Variable: Availability of Pharmaceuticals

Source: Data generated by SPSS version 24

Interpretation of Result

R Square is the measures of the amount of variance in the dependent variable that the independent variables are accounts for as a group.

- The value of Coefficient (R) is 0.704, R Squared is 0.495 and Adjusted R Square 0.445 was found.
- Therefore, the independent variables of e-supplier selection, e-contract management, e-contract administration, e-supplier deliverance and e-supplier relationship management set accounts of 49.5% of the dependent variable availability of pharmaceuticals. It shows there is a moderate strong positive relationship between the variables.
- Scope of the topic limited to e-government procurement only and there are other variables that can affect availability of pharmaceuticals which are explained in challenges categories. Those challenges affecting the availability of pharmaceuticals, however the scope of the study was limited to consider the role of e-government procurement on availability of pharmaceuticals so it accounts 49.5% and 50.5% variations can be explained by factors which are not consider under scope of this study.
- The independency of observation by examining independency of error using Durbin-Watson test which is 2.309. So the assumption of independency of observation has been met.

Table 4.6: ANOVA Model summary of regression between E-supplier selection, E-contract management, E-contract administration, E-supplier deliverance and E-supplier relationship management and availability of pharmaceuticals

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	836.103	5	167.221	9.805	.000[b]
	Residual	852.754	50	17.055		
	Total	1688.857	55			

a. Dependent Variable: Availability of Pharmaceuticals

b. Predictors: (Constant), E-supplier selection, E-contract management, E-contract administration, E-supplier deliverance and E-supplier relationship management

Source: Data generated by SPSS version 24

Result

f(5, 50) = 9.805

R Square is 0.495

The sig. value was found 0.000, $p < 0.001$ and it shows significant effect of e-supplier selection, e -contract management, e-contract administration, e-supplier deliverance and e-supplier relationship management on availability of pharmaceuticals.

The e-government procurement practice statistically predicted availability of pharmaceuticals, F (5, 50) = 9.805, $p < 0.001$, accounting for 49.50% of the variability in availability of pharmaceuticals with adjusted R2 = 44.50%. This is a moderately strong relationship. The correlation between E-supplier selection, E-contract management, E-contract administration, E-supplier deliverance and E-supplier relationship management with availability of pharmaceuticals was statistically significant, r (50) = 0.704, $p < 0.001$.

Table 4.7: Coefficients Model summary of regression in E-supplier selection, E-contract management, E-contract administration, E-supplier deliverance and E-supplier relationship management

Model	Unstandardized Coefficients		Standardized Coefficients	t	Sig.	95.0% Confidence Interval for Availability of Pharmaceuticals	
	Availability of Pharmaceutical	Std. Error	Beta			Lower Bound	Upper Bound
Constant	11.977	4.168		2.874	.006	3.607	20.348
E-Supplier Selection	.015	.321	.006	.046	.964	-.630	.659
E-Contract Management	1.466	.387	.580	3.791	<.001	.689	2.243
E-Contract Administration	.145	.285	.065	.510	.612	-.428	.718
E-Supplier Deliverance	.332	.277	.134	1.199	.236	-.224	.888
E-Supplier Relationship Management	.142	.418	.048	.341	.735	-.698	.892

a. Dependent Variable: Availability of Pharmaceuticals

Source: Data generated by SPSS version 24

Result

The regression coefficient result shows that the e-supplier selection ($\beta = 0.006$, $p < 0.000$), e-contract management ($\beta = 0.580$, $p < 0.000$), e-contract administration ($\beta = 0.065$, $p < 0.000$), e-supplier deliverance ($\beta = 0.134$, $p < 0.000$) and e-supplier relationship management ($\beta = 0.048$, $p < 0.000$) were found to be statistically significant in influencing the overall availability of pharmaceuticals. In every one unit increase in e-supplier selection, holding all other variables constant, the availability of pharmaceuticals increases by 0.015 or 1.5%, in every one unit increase in e-contract management, holding all other variables constant, the availability of pharmaceuticals increases by 1.466 or 146.6%, in every one unit increase in e-contract administration, holding all other variables constant, the availability of pharmaceuticals increases by 0.145 or 14.5%, in every one unit increase in e-supplier deliverance, holding all other variables constant, the availability of pharmaceuticals increases by 0.332 or 33.2% and in every one unit increase in e-supplier relationship management, holding all other variables constant, the availability of pharmaceuticals increases by 0.142 or 14.2%. The residuals were shown to be homoscedasticity and normal via residual plots.

Therefore, based on the multiple linear regression coefficient results, the following regression equation was established for statically significant variables.

$$Y = 11.977 + 0.006X_1 + 0.580X_2 + 0.065X_3 + 0.134X_4 + 0.048X_5 + 0.05\boldsymbol{\varepsilon}$$

Where Y is the dependent variable (availability of pharmaceuticals) and $X_{1,2,3,4,5}$ are independent variables (electronic government procurement practice) (i.e. X_1 = E-supplier selection, X_2 = E-contract management, X_3 = E-contract administration, X_4 = E-supplier deliverance and X_5 = E-supplier relationship management)

The regression equation for predicting the availability of pharmaceuticals from e-government procurement practice was $Y= 11.977 + 0.006X_1 + 0.580X_2 + 0.065X_3 + 0.134X_4 + 0.048X_5$.

The findings show that taking all other independent variables at zero, a unit increase in e-supplier selection will lead to 0.006 or 0.6% ($p = 0.000 < 0.001$), a unit increase in e-contract management will lead to 0.580 or 58% ($p = 0.000 < 0.001$), a unit increase in e-contract administration will lead to 0.065 or 6.5% ($p = 0.000 < 0.001$), a unit increase in e-supplier deliverance will lead to 0.134 or 13.4% ($p = 0.000 < 0.001$) and a unit increase in e-supplier relationship management will lead to 0.048 or 4.8% ($p = 0.000 < 0.001$) increase in the availability of pharmaceuticals, respectively.

The results of the analysis indicate that e-contract management appears to be a statistically significant predictor of the availability of pharmaceuticals, while the other variables (e-supplier selection, e-contract administration, e-supplier deliverance and e-supplier relationship management) do not have a significant impact on the dependent variable.

Table 4.8: Residuals Statistics Model summary of regression in E-supplier selection, E-contract management, E-contract administration, E-supplier deliverance and E-supplier relationship management

	Minimum	Maximum	Mean	Std. Deviation	N
Predicted Value	21.0628	37.9535	33.3571	3.89896	56
Residual	-9.58038	11.04094	.00000	3.93759	56
Std. Predicted Value	-3.153	1.179	.000	1.000	56
Std. Residual	-2.320	2.673	.000	.953	56

a. Dependent Variable: Availability of Pharmaceuticals

Source: Data generated by SPSS version 24

Result

An analysis of standard residuals showed that the data contained no outliers (Std Residual min = -2.320 and Std Residual Max = 2.673). The minimum Std. Residual should not be less than -3.92 and the maximum Std. Residual should not be exceed 3.92 and did not reveal any outliers.

Similarly, interview made with a total of 6 professionals from the two institutions and the finding shows that e-government procurement practice has a positive effect on the availability, accessibility and ensures consistent supply of pharmaceuticals in the hospitals. When a tender is issued, many suppliers will see it and enter the price quickly. It has improved transparency and reduced delays in the procurement process/procurement lead times, leading to more timely delivery of pharmaceuticals to the hospitals. The online system has increased competition among suppliers or diversified the sourcing options, which has helped drive down prices and greater volumes of pharmaceuticals items procured within the same budget. Improved supply chain visibility through e-procurement data has allowed for management of inventory levels, delivery schedules have minimized disruptions in the supply chain this enabled better demand forecasting and procurement planning and helped reduce stock outs (*1,2,3,4,5,6*).

The study results supported similarly by Mutangili (2019) did a research on the influence of e-procurement practice on supply chain performance in Kenya airways. The study showed that e-procurement practices are fundamental to the performance of the supply chain. A study conducted by Adebayo and Evans (2015) also shows how e-procurement system improves the complicated procurement system in healthcare facilities.

The researcher also used secondary data and the data was hospital based pharmaceutical database report such quarterly supply fill rate report.

Hospital based pharmaceutical database such as supply fill rate shows the total number of pharmaceutical products that the hospital requested to private suppliers and the total number of pharmaceutical items that were received by the hospital from the private suppliers. Supply fill rate is the ratio or percentage of the received per requested amount of pharmaceutical items. It provides a measure of how effectively the hospitals suppliers are able to fulfill the pharmaceuticals requested placed by hospital. The report would compare these metrics over time (quarterly), looking at before implementation of e-government procurement (2 year data of 2013E.C and 2014E.C) and after implementation of e-government procurement (2 year data of 2015E.C and 2016E.C).

Table 4.9: Supply Fill Report of St Peter Specialized Hospital and St Paul Hospital Millennium Medical College

E-GP Status	Year	Supplier Fill Rate	Total Requested		Total Received		Total No > 80%	
			SPSH	SPHMMC	SPSH	SPHMMC	SPSH	SPHMMC
Before Implementation of e-GP		Quarter						
	2013E.C	Quarter 1	24	55	20	41	19	36
		Quarter 2	28	68	25	55	23	48
		Quarter 3	84	110	55	92	50	87
		Quarter 4	91	125	40	103	33	98
	2014E.C	Quarter 1	55	63	35	55	33	52
		Quarter 2	37	75	32	71	28	68
		Quarter 3	11	88	11	85	11	82
		Quarter 4	42	76	33	73	29	71
After Implementation of e-GP	**2015E.C**	Quarter 1	25	31	18	22	17	19
		Quarter 2	37	43	37	39	37	38
		Quarter 3	15	62	15	59	15	56
		Quarter 4	20	86	20	82	19	80
	2016E.C	Quarter 1	56	58	56	56	56	54
		Quarter 2	40	43	40	42	40	42
		Quarter 3	34	66	33	64	29	62

Source: SPSH and SPHMMC Supply Fill Rate Report

N.B: Total No > 80% shows total number of items received above 80%

The unpublished report from hospital pharmaceutical database show that the supply fill rate of pharmaceutical items requested and received from private suppliers shown that after

implementation of e-government procurement brought a significant a positive change almost the hospitals acquired the requested quantity of pharmaceuticals items that were from private suppliers despite the data quality problem. Therefore, e-government procurement led to better visibility, coordination and fulfillment of pharmaceutical orders.

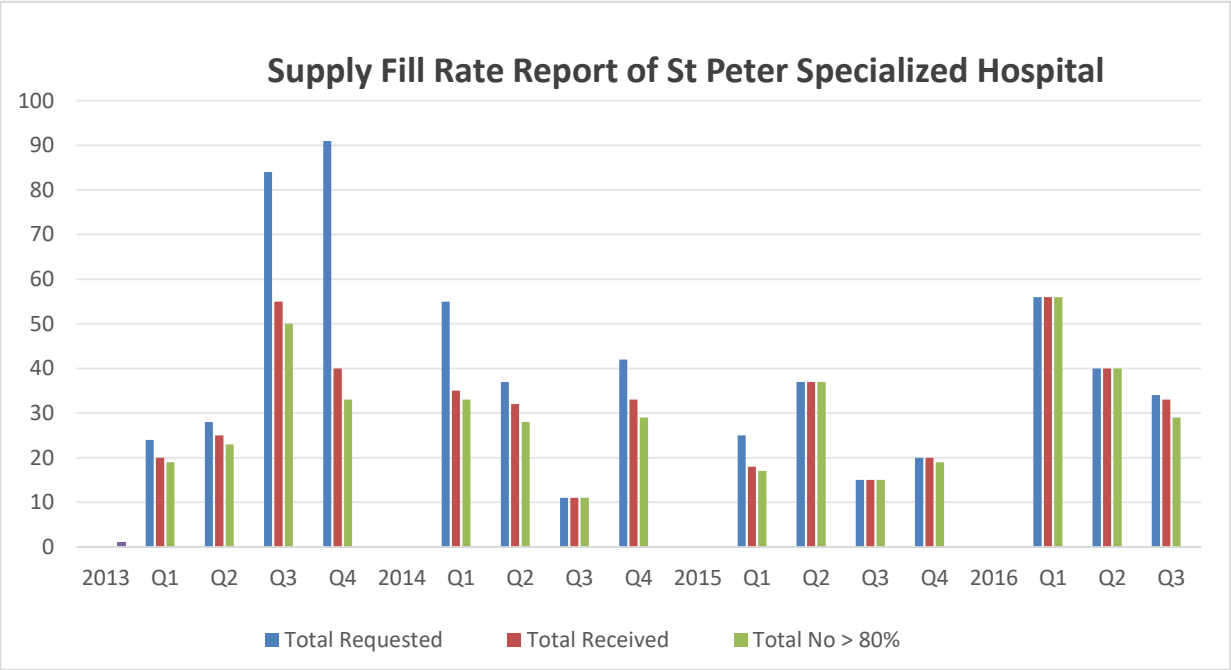

Figure 4. 4: SPSH Supply Fill Rate Report

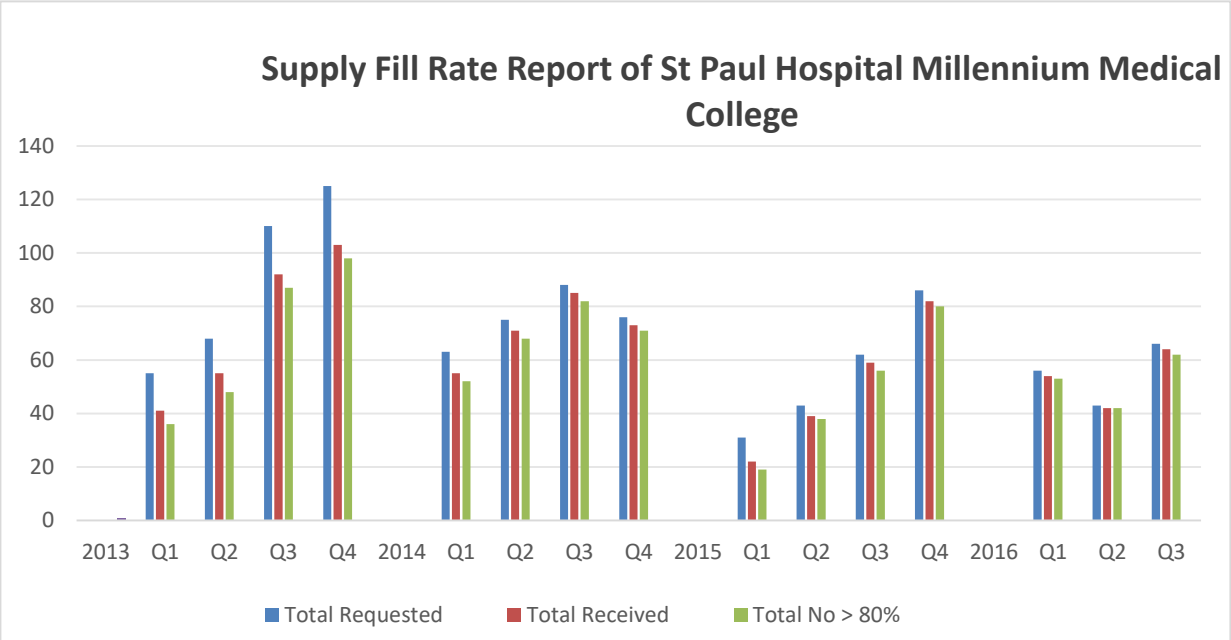

Figure 4. 5: SPHMMC Supply Fill Rate Report

4.7 Perceived Benefits of E-Government Procurement Adoption: Descriptive Analysis

Mean and standard deviation were used to analyze the data. Under this circumstance, interpretation of mean value as follows mean range between 1 - 1.8 is interpreted as not important, mean range between 1.81 - 2.6 is interpreted as somewhat important, mean range between 2.61 – 3.4 is interpreted as moderately important, mean range between 3.41 - 4.2 is interpreted as important and mean range between 4.21 - 5 is interpreted as high important. Based on this, the analysis traced here below is outlined according to nomination of mean listed on the table for each question.

Table 4.10: Perceived Benefits of E-Government Procurement Adoption (N = 56)

Perceived Benefits of E-Government Procurement Adoption	**Descriptive Analysis**						
A, Accountability	**SD**	**D**	**N**	**A**	**SA**	**Mean**	**St.D**
E-GP generates a vast amount of data that can be analyzed to gain insights and drive informed decision	1	5	11	38	1	3.59	0.757
Adoption of e-GP raises the level of efficiency and effectiveness in hospital procurement	0	3	10	41	2	3.75	0.611
Implementing e-GP lessen the likelihood of fraud practices in procurement transactions	1	6	8	32	9	3.75	0.919
Grand Mean of Accountability is 3.70							
B, Competition	**SD**	**D**	**N**	**A**	**SA**	**Mean**	**St.D**
E-GP improved the quality of suppliers product or their services and improve their performance	0	7	13	34	2	3.55	0.761
E-GP can attract a broad range of suppliers	1	6	10	27	12	3.77	0.972
E-GP encourages suppliers innovation leading to introduction of new products, services or delivery models	2	1	12	37	4	3.71	0.780
Grand Mean of Competition is 3.68							
C, Creating Value	**SD**	**D**	**N**	**A**	**SA**	**Mean**	**St.D**
E-GP platforms offer improved supplier	1	3	13	35	4	3.68	0.765

management that help hospitals optimize their supplier relationships							
E-GP contributes to environmental sustainability by reducing paper usage and the carbon footprint associated with transportation and logistics	0	4	6	34	12	3.96	0.785
E-GP minimizes the chances of errors such as transcription mistake and data inconsistencies	0	6	8	34	7	3.77	0.809
Grand Mean of Creating Value is 3 80							
D, New Business Ventures	**SD**	**D**	**N**	**A**	**SA**	**Mean**	**St.D**
E-GP improved market access and opportunities to pharmaceuticals suppliers	1	0	10	39	6	3.88	0.662
E-GP help businesses ensure compliance with internal policies, industry regulations and legal requirements	1	1	11	37	6	3.82	0.716
E-GP platforms are highly scalable, allowing businesses to adapt and grow and offer flexibility to accommodate changing requirements, handle increased transaction volumes and incorporate additional functionalities as the business expands	2	4	12	38	0	3.54	0.785
Grand Mean of New Business Ventures is 3.75							
E, Lowers Government Expenditure	**SD**	**D**	**N**	**A**	**SA**	**Mean**	**St.D**
E-GP lower operational expenses	0	4	5	40	7	3.89	0.705
E-GP can be integrated with other government systems, such as finance and inventory management systems	1	6	15	31	2	3.46	0.830
E-GP allows easier vendor evaluation, performance tracking and contract management leading to better value for money	0	5	7	41	3	3.75	0.694
Grand Mean of Lowers Government Expenditure is 3.70							

The perceived benefits of e-government procurement adoption in terms of accountability

perspective accounts a grand mean score of 3.70. This show the case hospitals are important it as it means value fells between 3.41 – 4.20. The perceived benefits of e-government procurement adoption in terms of competition perspective accounts a grand mean score of 3.68. This show the case hospitals are important it as it means value fells between 3.41 – 4.20. The perceived benefits of e-government procurement adoption in terms of creating value perspective accounts a grand mean score of 3.80. This show the case hospitals are important it as it means value fells between 3.41 – 4.20. The perceived benefits of e-government procurement adoption in terms of new business ventures perspective accounts a grand mean score of 3.75. This show the case hospitals are important it as it means value fells between 3.41 – 4.20 and the perceived benefits of e-government procurement adoption in terms of lowers government expenditure perspective accounts a grand mean score of 3.75. This show the case hospitals are important it as it means value fells between 3.41 – 4.20.

The overall perceived benefit of e-government procurement adoption shows that creating value and new business ventures more than lower government expenditure, accountability and competition. Therefore, the case hospitals maximize their effort in order to e-procurement implementation become more successful.

Similarly, interview made with a total of 6 professionals from the two institutions and the finding shows the benefits of e-government procurement includes reduce procurement cycle time, cost savings, reduction in procurement administrative costs, reduces human power cost and simplify the process of audit. The pharmaceuticals items arrive quickly and all suppliers can view and compete from anywhere, and reduce paper consumption. It has greater transparency and accountability in the procurement process, reducing opportunities for corruption and mismanagement. The streamlined, automated procurement workflows those are faster and more efficient than manual paper-based systems. It has enhanced competition among suppliers driving down prices and improving value for money. It has better supply chain visibility and data-driven decision making to ensure adequate stock levels. It has reduced administrative burdens on procurement staff, allowing them to focus more on strategic sourcing and supplier management (*1,2,3,4,5,6*). The finding is consistent with a study conducted by Nawi, Roslan, Salleh, Harun (2016) in the benefits and challenges of e-procurement implementation in Malaysian shows that cost reductions and improved efficiency in government sector. A similar study conducted by Dash

(2016) shows that e-government procurement bring that greater transparency, increase the accessibility and availability of procurement information, increased competition, reduces fraud practices and gives equal chances to private suppliers.

4.8 Challenges of E-Government Procurement: Descriptive Analysis

Mean and standard deviation were used to analyze the data. Under this circumstance, interpretation of mean value as follows mean range between 1 - 1.8 is interpreted as uninfluencial challenge, mean range between 1.81 - 2.6 is interpreted as somewhat challenge, mean range between 2.61 - 3.4 is interpreted as moderately influential challenge, mean range between 3.41 - 4.2 is interpreted as influential challenge and mean range between 4.21 - 5 is interpreted as very influential challenge. Based on this, the analysis traced here below is outlined according to nomination of mean listed on the table for each question.

Table 4.11: Challenges of E-Government Procurement (N = 56)

Challenges of E-Government Procurement	**Descriptive Analysis**						
A, Internal Business Challenges	**SD**	**D**	**N**	**A**	**SA**	**Mean**	**St.D**
Employees resist adopting new e-GP systems and processes leading to slower implementation and reduced efficiency	2	12	15	25	2	3.23	0.953
Users have limited awareness or understanding of the benefits and functionality of the e-procurement system	1	14	8	27	6	3.41	1.041
Users perceive the implementation of an e-procurement system as a threat to their job security	1	20	15	18	2	3.00	0.953
Grand Mean of Internal Business Challenges is 3.21							
B, External Business Challenges	**SD**	**D**	**N**	**A**	**SA**	**Mean**	**St.D**
Suppliers lack the technological infrastructure or resources required to participate in e-procurement processes	3	18	14	21	0	2.95	0.961
Choosing the right e-GP vendors and ensuring their reliability, scalability and compatibility with existing	2	17	14	23	0	3.04	0.934

systems can be challenging							
Suppliers resist transitioning from manual procurement methods to e-GP system. This resistance can be due to concerns about the complexity of the new system, changes in their business processes or fear of losing personal relationships with procurement personnel	3	12	16	21	4	3.20	1.034
Grand Mean of External Business Challenges is 3.06							
C, Technological Challenges	**SD**	**D**	**N**	**A**	**SA**	**Mean**	**St.D**
Inadequate IT infrastructure result in limited or unreliable internet connectivity, making it difficult to access e-GP platforms and perform online transactions effectively	3	5	8	32	8	3.66	1.014
Lack of robust security measures, making e-GP systems more vulnerable to cyber threats, data breaches and unauthorized access	2	5	10	35	4	3.61	0.888
Inadequate technology compatibility with modern e-GP software, leading to challenges in integrating and implementing new systems	1	6	10	35	4	3.63	0.843
Grand Mean of Technological Challenges is 3.63							
D, E-Procurement Process Challenges	**SD**	**D**	**N**	**A**	**SA**	**Mean**	**St.D**
E-GP systems need to handle large volumes of data and support multiple users concurrently. Ensuring optimal performance of the system, especially during peak usage periods can be challenging	2	9	15	26	4	3.38	0.964
E-GP involves exchange of sensitive information and data, making it susceptibility to security breaches and privacy concern	1	15	19	18	3	3.13	0.935
E-GP systems require regular maintenance and continuous upgrades and investment to keep E-GP up to date. Managing these activities without disrupting on going procurement operations can be challenging	2	6	9	34	5	3.61	0.928

Grand Mean of E-Procurement Process Challenges is 3.37

The challenges of e-government procurement in terms of internal business challenge perspective accounts a grand mean score of 3.21. This show the case hospitals are moderately influential challenge it as it means value fells between 2.61 – 3.40. The challenges of e-government procurement in terms of external business challenge perspective accounts a grand mean score of 3.06. This show the case hospitals are moderately influential challenge it as it means value fells between 2.61 – 3.40. The challenges of e-government procurement in terms of technological challenge perspective accounts a grand mean score of 3.63. This show the case hospitals are influential challenge it as it means value fells between 3.41 – 4.20 and the challenges of e-government procurement in terms of e-procurement process challenge perspective accounts a grand mean score of 3.37. This show the case hospitals are moderately influential challenge it as it means value fells between 2.61 – 3.40.

Technological and e-procurement process challenges are the more serious issues that require more immediate intervention, compared to the internal and external business challenge that may need ongoing follow up to resolve. Technological and e-procurement process challenge require more urgent attention and action. These challenges can have a more direct and significant impact on availability of pharmaceuticals.

Similarly, interview made with a total of 6 professionals from the two institutions and the finding shows that the professionals working in procurement of pharmaceutical items not trained, so **e**nsuring all health professionals and procurement staffs are adequately trained and comfortable using the e-procurement system. Everyone can see the request when they are published, so they submitted their bid evaluation without seeing the specification which means that the input is not what was requested, and when asked, they say they did not see this. If its network interruption or system update and upgrade in Ethiopian Public Procurement and Property Authority (PPPA) the system will not be functional. The hospitals used old IT materials. The system sometimes doubles the requested quantity in the process of preparing lot this lead to reject the purchasing process according to the law. The phone number registered in business license or Ethiopian food and drug authority license, some of them their phone will not work and this lead to the required information is not received on time. The system perform evaluation by financially if the supplier enter by mistake 0 birr the system will give award to them or it account them as a winner. Many

smaller and local pharmaceutical suppliers have faced difficulties in registering and adapting to the new e-procurement requirements, limited digital capabilities, lack of internet access, poor acceptance from private suppliers and unfamiliarity with online bidding processes have been barriers for some suppliers, cyber security and data privacy also a concern (*1,2,3,4,5,6*).

A study conducted by by Nawi, Roslan, Salleh, Harun (2016) support this study and claimed that, availability of infrastructure such as information technology is a critical factor for successful e-procurement implementation. Similarly, the finding is consistent with a study conducted by Shiferaw and Yessuf (2019) on challenges and critical success factors for e-procurement adoption in Ethiopia and found that poor in infrastructure, lack of internet access and commitment of employees leads to e-government procurement failures. Another study conducted by Boateng (2021) in Ghana identifies that technology adoption, knowledge and skills found to be one of the obstacles to implement e-procurement.

CHAPTER FIVE
SUMMARY, CONCLUSION AND RECOMMENDATION

5.1 Summary of Major Findings

The main objective of this study was to assess the effect of electronic government procurement on availability of pharmaceuticals in St Peter Specialized Hospital (SPSH) and St Paul Hospital Millennium Medical College (SPHMMC). Data for the study were gathered from SPSH and SPHMMC. A descriptive and explanatory type research design was adopted. A structured questionnaire and interview were used to gather data on the effect of electronic government procurement on availability of pharmaceuticals and its benefits and challenges. A total of 58 structured questionnaires were distributed and among 58 questionnaires the respondents fill and returned 56 (96.35%) for data analyses and a total of 6 structured interview made with the institutions. Descriptive and inferential analysis was used to analyze the collected data, and then to examine the cause and effect relationship between the e-government procurement practices and availability of pharmaceuticals. This chapter presents summary of the findings, conclusion, followed by recommendations. Finally, Suggestions for further studies are presented.

E-government procurement practice finding shows that e-supplier selection is highly practiced at the two selected hospitals followed by e-supplier relationship then e-contract administration, e-contract administration and e-supplier deliverance. The availability of pharmaceuticals in terms of e-government procurement system shows at the two selected moderately available and e-government procurement has a significant effect on availability of pharmaceuticals. E-government procurement and availability of pharmaceuticals has a moderate strong positive relationship.

The perceived benefit of e-government procurement adoption at the two selected hospitals shows that creating value and new business ventures more than lower government expenditure, accountability and competition. The challenges of e-government procurement shows technological and e-procurement process more challenging than internal and external business challenge at the two selected hospitals.

5.2 Conclusions

The study concluded that e-government procurement practice at the two selected hospitals found to be highly practiced. There is a moderate strong positive relationship between the independent and dependent variables. E-contract management was the only variable that had a statistically significant positive effect on the availability of pharmaceutical whereas the other variables (e-supplier selection, e-contract administration, e-supplier deliverance, and e-supplier relationship management) did not have a significant impact on the availability of pharmaceuticals based on the provided data. Among the different benefits of e-government procurement adoption creating value, new business ventures, lower government expenditure, accountability and competition found to be the most important benefit that the two hospitals derive out of implementing e-government procurement. Among the different challenges of e-government procurement technological and e-procurement process challenges found to be the serious challenge and internal and external business challenge found to be insignificant challenge.

5.3 Recommendations

Depending on the findings and conclusions made, the researcher forwards four main recommendations. These are;

1. The e-government procurement practice as good as, e-supplier deliverance found account to be weak practiced. So, Hospitals should work practically on e-supplier deliverance.
2. In this study the effect of e-government procurement on availability of pharmaceuticals has 70.4%. This shows implementation of e-government procurement on pharmaceuticals availability has a significant role and positive effect. Therefore, hospitals implemented e-government procurement adoption i recommend to continue to strengthen.
3. E-government procurement would derive creating value and new business ventures importance towards those hospitals. In order to benefit out of this hospitals should strive towards enhances operational efficiency.
4. Technological and e-procurement process challenges found to be the most serious and that could affect the availability of pharmaceuticals and adoption of e-government procurement practice. Therefore, the hospitals as well as Ethiopian Public Procurement and Property Authority (PPPA) act work immediately and addressing on technological and e-

procurement process issue. So the adoption of e-government procurement would be more successful.

5.4 Suggestion for Future Studies

1. This study examined only in St Peter Specialized Hospital and St Paul Hospital Millennium Medical College. Therefore, researchers in the future conduct a larger scale study that includes a representative hospital across different regions or states within the country.
2. This study conducted only the benefits and challenges in government hospital. Therefore, researchers in the future conduct from the private supplier's side.
3. Implement a longitudinal research design to track the changes in pharmaceutical availability, supply chain efficiency and procurement costs over an extended period.
4. Finally, examine the sustainability of the improvements achieved through e-government procurement.

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Appendix I

Section One: Structured Questionnaire

Addis Ababa University

Master of Logistics and Supply Chain Management

Dear Respondents,

My name is Mulugeta Dejene, and I am also a final-year postgraduate student of a master of logistics and supply chain management from Addis Ababa University School of Commerce.
This questionnaire is designed to collect information for the research entitled "To assess the effect of electronic government procurement on availability of pharmaceuticals in St Peter Specialized Hospital (SPSH) and St Paul Hospital Millennium Medical College (SPHMMC)'' as a research subject for the partial fulfillment of the requirements of Master in logistics and supply chain management (LSCM). Your response would have been used only for academic purpose and kept confidential. The survey may take about 15 minutes to complete, your cooperation in responding to this questionnaire will be highly appreciated and thank you in advance.

If you have any doubt or clarification you can contact me at any time (Phone 0912281701 and Email: mulemantom12@gmail.com)

Notice: - please do not write your name on the questionnaire.

Part One: Background Information of the Respondent

Please respond your answer by placing a check mark "✓" in the answer box that corresponds to your response.

1. Gender:

Male ☐ Female ☐

2. Age (in years):

18 - 25 ☐ 26 – 35 ☐ 36 - 45 ☐ 46 - 55 ☐ Above 56 ☐

3. Educational Status:

Certificate ☐ Diploma ☐ Bachelor Degree ☐ Master ☐ Above ☐

4. Current Position Level:

Director ☐ Manager ☐ Team Leader ☐ Senior Officer ☐ Junior Officer ☐

5. Total Years of Service in the Hospital (in years):

1 - 5 ☐ 6 - 10 ☐ 11 - 15 ☐ 16 - 20 ☐ Above 20 years ☐

6. Name of the Case Team you work in the Hospital:

Drug and Supply Management ☐ Purchasing Unit ☐ Director ☐ Other ☐

7. **Average Monthly Income Level in Birr:**

Below 4000 ☐ 4001 - 8000 ☐ 8001 - 12000 ☐ Above 12000 ☐

Part Two: E-Government Procurement related Questions

Please place a check mark "✓" in under the corresponding number to show how much you agree or disagree with each of the following factors.

Where 1= Strongly Disagree, 2= Disagree, 3= Neutral, 4= Agree and 5= Strongly Agree

S. No	E-Government Procurement Practices	1	2	3	4	5
	E-Supplier Selection					
1	The e-procurement system effectively assists in evaluating supplier qualifications and capabilities					
2	The e-procurement system provides sufficient information for making informed decisions about supplier selection					
3	The e-procurement system allows for fair and transparent supplier evaluation and selection processes					
	E-Contract Management					
4	The e-procurement system helps in streamlining the contract creation and approval process					
5	The e-procurement system provides tools for effectively monitoring and tracking contract performance					
6	The e-procurement system facilitates efficient communication between stakeholders involved in contract management					
	E-Contract Administration					
7	The e-procurement system supports automated contract renewal and extension processes					
8	The e-procurement system allows for easy access to contract-related documents and information					
9	The e-procurement system provides alerts and notifications for important contract milestones and deadlines					
	E-Supplier Deliverance					

10	The e-procurement system enables accurate and timely tracking of supplier deliveries					
11	The e-procurement system provides real-time visibility into supplier performance and delivery status					
12	The e-procurement system helps in resolving delivery-related issues promptly and effectively					
	E-Supplier Relationship Management					
13	The e-procurement system facilitates collaboration and communication with suppliers					
14	The e-procurement system supports the establishment of long-term relationships with suppliers					
15	The e-procurement system helps in evaluating and improving supplier performance over time					
	Availability of Pharmaceuticals Status using e-GP					
16	The system (e-GP) is always accessible and functional					
17	The system (e-GP) is always available during network disruptions					
18	The system (e-GP) is provide significant role in maintaining the availability of pharmaceutical supplies and response time					
19	The system (e-GP) is utilize backup systems to ensures ongoing operation					
20	The system (e-GP) is always operating properly					
21	The system (e-GP) is enhance the capacity of pharmaceutical companies					
22	The system (e-GP) is enhance the distribution network between hospital and suppliers					
23	The system (e-GP) of the service is minimize the cost and enhance affordability of medications					
24	The system (e-GP) is enhance the well-functioning of supply chain					
25	The system (e-GP) is robust and effective to avail on time delivery of medication for patients					
26	The system (e-GP) is minimize the impact of global trade and export restrictions					
	Perceived Benefits of E-Government Procurement Adoption	1	2	3	4	5
	Accountability					

27	E-GP generates a vast amount of data that can be analyzed to gain insights and drive informed decision					
28	Adoption of e-GP raises the level of efficiency and effectiveness in hospital procurement					
29	Implementing e-GP lessen the likelihood of fraud practices in procurement transactions					
	Competition					
30	E-GP improved the quality of suppliers product or their services and improve their performance					
31	E-GP can attract a broad range of suppliers					
32	E-GP encourages suppliers innovation leading to introduction of new products, services or delivery models					
	Creating Value					
33	E-GP platforms offer improved supplier management that help hospitals optimize their supplier relationships					
34	E-GP contributes to environmental sustainability by reducing paper usage and the carbon footprint associated with transportation and logistics					
35	E-GP minimizes the chances of errors such as transcription mistakes and data inconsistencies					
	New Business Ventures					
36	E-GP improved market access and opportunities to pharmaceuticals suppliers					
37	E-GP help businesses ensure compliance with internal policies, industry regulations and legal requirements					
38	E-GP platforms are highly scalable, allowing businesses to adapt and grow and offer flexibility to accommodate changing requirements, handle increased transaction volumes and incorporate additional functionalities as the business expands					

	Lowers Government Expenditure					
39	E-GP lower operational expenses					
40	E-GP can be integrated with other government systems, such as finance and inventory management systems					
41	E-GP allows easier vendor evaluation, performance tracking and contract management leading to better value for money					
	Challenges of E-Government Procurement	1	2	3	4	5
	Internal Business Challenges					
42	Employees resist adopting new e-GP systems and processes leading to slower implementation and reduced efficiency					
43	Users have limited awareness or understanding of the benefits and functionality of the e-procurement system					
44	Users perceive the implementation of an e-procurement system as a threat to their job security					
	External Business Challenges					
45	Suppliers lack the technological infrastructure or resources required to participate in e-procurement processes					
46	Choosing the right e-GP vendors and ensuring their reliability, scalability and compatibility with existing systems can be challenging					
47	Suppliers resist transitioning from manual procurement methods to e-GP system. This resistance can be due to concerns about the complexity of the new system, changes in their business processes or fear of losing personal relationships with procurement personnel					
	Technological Challenges					
48	Inadequate IT infrastructure result in limited or unreliable internet connectivity, making it difficult to access e-GP platforms and perform online transactions effectively					
49	Lack of robust security measures, making e-GP systems more vulnerable to cyber threats, data breaches and unauthorized access					

50	Inadequate technology compatibility with modern e-GP software, leading to challenges in integrating and implementing new systems					
	E-Procurement Process Challenges					
51	E-GP systems need to handle large volumes of data and support multiple users concurrently. Ensuring optimal performance of the system, especially during peak usage periods can be challenging					
52	E-GP involves exchange of sensitive information and data, making it susceptibility to security breaches and privacy concern					
53	E-GP systems require regular maintenance and continuous upgrades and investment to keep E-GP up to date. Managing these activities without disrupting ongoing procurement operations can be challenging					

Section Two: Structured Interview Questions

1. What are the effects of e-government procurement practices on availability of pharmaceuticals?
2. What are the perceived benefits of e-government procurement of pharmaceuticals?
3. What are the challenges of e-government procurement of pharmaceuticals?

Appendix II

Questionnaire Response Rate

Name of the Hospital	Respondents Category	Questionnaire Distributed	Questionnaire Received	Percentage Collected	Valid Response	Valid Response Rate
SPSH	Drug and Supply Management Case Team	16	16	100	16	100%
	Purchasing Unit Case Team	14	14	100	14	100%
SPHMMC	Drug and Supply Management Case Team	12	11	91.66%	11	100%
	Purchasing Unit Case Team	16	15	93.75%	15	100%
	Total	58	56	96.35	56	100%

Appendix III

Structured Interview Code

1. Pharmacy Director in SPSH
2. Drug and Supply Management Case Team in SPSH
3. Purchasing unit case Team Leader in SPSH
4. Pharmacy Director in SPHMMC
5. Drug and Supply Management Case Team in SPHMMC
6. Purchasing unit case Team Leader in SPHMMC