PROCUREMENT GOVERNANCE, INTEGRATIVE SUPPLY CHAIN TECHNOLOGY, PROCUREMENT PERFORMANCE AND SERVICE DELIVERY AT STATE MINISTRIES, DEPARTMENTS AND AGENCIES IN KENYA

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A THESIS SUBMITTED IN PARTIAL FULFILMENT OF THE REQUIREMENTS OF THE DEGREE OF DOCTOR OF PHILOSOPHY IN BUSINESS ADMINISTRATION, FACULTY OF BUSINESS AND MANAGEMENT SCIENCES, UNIVERSITY OF NAIROBI

NOVEMBER, 2022

DECLARATION

I declare that this thesis is my original work and has not been submitted for a degree in this or any other university.

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ACKNOWLEDGEMENTS

I wish to express my heartfelt gratitude to very special and instrumental individuals who participated in the completion of this study. I and foremost grateful to God for His unlimited grace. First, I am indebted to my supervisors Dr. Stephen Odock, Senior Lecturer in the Department of Management Science and Project Planning; Prof. Kate Litondo, Associate Professor, Department of Management Science and Project Planning; and also Prof. Mary Kinoti, Associate Professor Department of Business Administration, Faculty of Business and Management Sciences, University of Nairobi who rendered valuable judgment at the adequacy of the study. I appreciate their wise guidance, corrections, and encouragement; which made the study a worthy journey.

My heartfelt appreciation also goes out to the responders who took the time to complete the surveys and supplied me with pertinent information that helped me accomplish my study objectives. Many thanks to the University of Nairobi for providing library resources that aided in the quest for information throughout the study; with today's technology, research has been made even easier, more pleasurable, and lighter. I am grateful to them for their insightful counsel, corrections, and encouragement, which made the study a worthwhile endeavor. My sincere appreciation to my father and mother-in-law for their wise wisdom, counsel, and prayers. To conclude, I thank our Almighty God for his unending kindness, supply of love, and protection throughout the process; certainly, knowledge and understanding originate with him.

DEDICATION

I thank the almighty God for His providence. I wish to dedicate this study to my wife Joyce Bosibori for spiritual and moral support during the entire period of my doctoral studies. Special dedication too goes to my daughter Patience for sacrificing a lot to keep me awake till late for my assignments and this project too. God bless you all.

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ABBREVIATIONS AND ACRONYMS

CoK: Constitution of Kenya, 2010

CSV: Comma Separated Values

CB-SEM: Covariance based Structural Equation Modeling

ERP: Enterprise Resource Planning

EU: European Union

GoK: Government of Kenya

IFMIS: Integrated Financial Management Information System

ISCT: Integrative Supply Chain Technology

KEMSA: Kenya Medical Supplies Agency

KENAO: Kenya National Audit Office

KIPPRA: Kenya Institute for Public Policy Research and Analysis

KLRC: Kenya Law Reform Commission

KNCHR: Kenya National Commission of Human Rights

KRA: Kenya Revenue Authority

MDA: Ministries, Departments and Agencies

NEMA: National Environment Management Authority

OECD: The Organization for Economic Co-operation and Development

PPADA: Public Procurement and Asset Disposal Act

PPDA: Public Procurement and Disposal Act

PPOA: Public Procurement Oversight Authority

PPRA: Public Procurement Regulatory Authority

PLS-SEM: Partial Least Squares Structural Equation Modeling

SEM: Structural Equation Modeling

RoK: Republic of Kenya

VMI: Vendor Managed Inventory

UNDP: United Nations Development Program

ABSTRACT

Corruption and financial impropriety have been a topical issue in Kenya for the last two decades. There have been several reports by the Ethics and Anti-Corruption Commission and the Public Procurement Regulatory Authority that have identified procurement procedures as a possible channel for impropriety in administration of public funds. Procurement fraud is a topic under examination by the Directorate of Criminal Investigations, Public Prosecutions, Ethics and Anti-Corruption Commission. Government procurement governance changes and procurement performance measures have been implemented as part of the Cabinet Secretary for the National Treasury's reform process to address this issue. This has helped to enhance service delivery in the public sector. The major issue is whether or not implementing these procedures would lead to improved service delivery. Procurement governance, integrative supply chain technology, procurement performance, and service delivery are all examined in this research. Specifically, the study sought to determine the effect of procurement governance on service delivery in Kenyan MDAs, examine the influence of procurement performance on the relationship between procurement governance and service delivery in Kenyan MDAs, establish the effect of integrative supply chain technology on the relationship between procurement governance and service delivery in Kenyan MDAs, and finally examine the combined effect of procurement governance and supply chain integration technology in Kenyan MDAs. Through a semi-structured questionnaire, the researcher conducted a descriptive cross-sectional study in Kenya, involving representatives of Kenyan government departments and agencies involved in public procurement. Component based Structural Equation Modeling using PLS-SEM was used to analyze data to achieve these objectives. The results of the PLS-SEM analysis showed a statistically significant link between procurement governance and service delivery. Secondly, procurement performance had a significant mediating effect on the relationship between procurement governance and service delivery. Third, integrative supply chain technology was found to insignificantly moderate the relationship between procurement governance and service delivery. Finally, the combined effect on service delivery of procurement governance, integrative supply chain technology, and procurement performance was much stronger, according to the results. The study recommends incorporating procurement ethical and best practices through integrative systems for improved service delivery, training and courses for ISCT should be enhanced to cultivate ISCT skills as should be practiced. Stakeholders can use the study findings to improve the legislative framework and procurement policies as these were found to impact the readiness of ISCT adoption in public sector. The study findings also provide researchers' with a useful conceptual and methodological reference to pursue further studies in other procurement sector especially moderating role of ISCT

CHAPTER ONE: INTRODUCTION

1.1 Background of the Study

Providing adequate, affordable, and high-quality fundamental services via public administration has been a major public concern during the last decade. A procurement framework governs the supply of products and services, creating a rigorous procedure (Leenders, Johnson, Flynn, & Fearon, 2010; DeWitt et al., 2001). In public procurement, new supply chain technologies have been used to improve transparency, efficiency, and competitiveness for shared purchases (Baily, Farmer, Crocker, Jessop, & Jones, 2015). Business ethics in the process and structure of procurement governance expectations are putting procuring entities under pressure from the public for control and probity in service delivery (Knight, Harland, Telgen, Thai, Callender, & McKen, 2007). As a result, purchasing organizations are instituting procurement performance as a way to monitor how well they are meeting their operational goals (Njoki & Kimiti, 2018; van Weele, 2010). To achieve these objectives, governments have enforced regulatory compliance by entrenching accountability and competitiveness on use of integrative technology (Graham, Amos, & Plumptre, 2003). There is growing interest on the relationship between procurement governance, use of integrative technologies, procurement performance and service delivery (Ibrahim, Ahmad, Shahad & Asif, 2015; Van, 2010).

This study was anchored on the theories of governance, network theory and agency theory. The theories of governance reiterate that public administration is pivotal in ensuring that human behaviour is directed to deliver service for public consumption (Stoker, 1998). The theories of governance are inclusive of transaction cost economics

theory which propagates for the hierarchal structure as central in running contractual relationships (Achim & Borlea, 2013); Stakeholders' theory which emphasizes that the interests of all stakeholders must be taken care of in service delivery; and the stewardship theory which argues that the shareholder interests are maximized when incumbent directors play an autonomous role to deliver service (Donaldson & Davis, 1991). The network theory has its assumptions on bounded rationality and trust. The theory proposes that the linkage among players in the supply chain enhances performance and competitiveness (Harland, 1996; Chang, Chiang, & Pai, 2012). The agency theory focuses on the impact of service delivery when the principal's interest, employers, agents and employee are in conflicts (Trevor, Potoski, & Slyke, 2006). The procurement legal framework provides for segregation of responsibilities in procurement processes to ensure ethical practices in procurement (Burt, Dobler, & Starling, 2013).

According to Sheng (2018), good governance is equitable and inclusive, participatory, responsible, transparent, consensus-oriented, effective and efficient, and founded on the rule of law. Based on her research on the Social and Economic Commission of the UN for Pacific and Asia, she came to this conclusion. As per the World Bank's 2009 study, public procurement in South Asia depended heavily on value for money procurement procedures. Regulations and integration improve procurement governance and service delivery (Anane, Adoma & Awuah, 2019); promoting transparency and accountability along the supply chain (Benjamin & Wigand, 1995). Integrative supply chain systems link customers to a network of suppliers in order to provide demand information that reduce service delivery lead times (Fawcett, Ellram, & Ogden, 2014).

Consequently, the public procurement legal framework in Kenya introduced use of integrative technologies in procurement to improve on transparency and accountability and service delivery (RoK, 2016). The enactment of the laws ought to help improve on information sharing in public entities (Transparency International Kenya, 2016). Transparency through visibility of information can curb unethical behaviour in public service and avert loss of public funds (Mokogi, Mairura, & Ombui, 2015; Cherop, 2016). The study was motivated twofold: first, as an academic requirement to add to knowledge, and second, to provide basis for government policy in relation with the provisions of 227(1) of the constitution which embeds the procurement governance principles of fair, competitive, cost-effective system and transparency.

1.1.1 Procurement Governance

Procurement governance involves interactions among processes, traditions and structures that determine the way responsibilities and powers are shared and exercised in acquiring and delivery of services and goods (Knight et al., 2007). It extends to the way decisions are made and the way citizens and other stakeholders in public domain interact in service and good delivery. Governance is concerning itself with accountability, relationships and power in terms of who makes the decisions or influences the decision-making processes (Edgar, 2006). To efficiently provide goods and services to the public, procuring entities are applying regulated principles such as competitiveness, accountability, efficiency, fairness, transparency, value for money and equity (Rege, 1998). The application of procurement governance may be as a result of zeal to legal compliance or public pressure for accountability of public expenditure (Lysons & Farrington, 2012). Keuleers (2014) in

a UNDP report describes governance from the concept of public procurement as the tools and principles used in collaborative decision making to efficiently deliver service to the public.

The concept of governance therefore has basis in several renown references. Flinders (2004) explains procurement governance as the relationships between public procurement and the multiple policy makers to implement best practices. Strategic decisions in governance require legal frameworks that enforce competitiveness, transparency, efficiency, fairness, accountability, value for money and equity for efficiency. Compliance can be complete only if the staff involved in the tender preparations, evaluation committees, the head of procuring entity and the accounting officer have proper orientation of the governing laws and understand the reinforcement implications (Odero & Shitseswa, 2017). Seven sources of procurement governance as identified by Sople (2011); Handfield (2013); Aquilano (2010); and Shileswa (2017) include value for money, integrity, equity, fairness, accountability, transparency and competition.

Appraisal of relevant costs and benefits as well as an assessment of non-price features, risks, and/or total cost of ownership are necessities in getting value for money from a given resource. Ethics and moral principles such as justice, professionalism, non-discrimination, and righteousness are the foundation of assuring justice, compliance and honesty in process of procurement publicly (OECD, 2016). Equity as a requisite for impartial treatment of suppliers assures being just and reasonable in contract awards. Fairness involves indiscriminatory payment of supplier, not favoring one supplier over

another and being reasonable in procurement proceedings. Accountability involves reporting on processes, taking responsibility for decisions and being liable for procurement processes. Transparency includes openness with all procurement proceedings, involving all stakeholders and making all process accessible by tenderers (Karanja & Mugo, 2010). Competition includes the open tendering, objective tender documents and being responsiveness to bidders (Okinyi & Muturi, 2016).

1.1.2 Integrative Supply Chain Technology

Supply chain integration avers to collaborative utilization, practices process, coordinated practices and structures, and practices in conjunction with a connected infrastructure to facilitate the implementation of supply chain integration (Kim, 2009). An integrated technology is described by Ogden (2014) as having universally networked operational functions. Laudon and Guercio (2011) define integrative system as enhancement of real time tracking of goods and processes between the procuring entities and vendors. Integrative supply chain technology systems such as Enterprise Resource Planning enhance collaborative capacities through its modular integration (Benton, 2015; Love, 1996). The upstream processes for goods through channel partners are creating random demand that can be satisfied using integrative supply chain technology (Harrison, van Hoek, & Skipworth, 2014). Gunasekaran and Ngai (2008) studied integrative technology responsiveness in a supply chain environment and posited that customer service management requires technology integration. Integrative supply chain technology helps in the coordination of activities among functions, sharing of information among partners and visibility of processes (Sople, 2011; Lucey, 2002).

Robust integrative supply chain systems, according to Diamond and Khemani (2005), are aimed at providing modules such as accounts payable, general ledger, procurement module and budgetary accounting. Baily et al. (2015) posit that integrative systems are used in financial transactions and budget controls in e-procurement process for fast tracking proceedings. Integrative supply chain technology is essential in electronic procurement for mistake proofing to eliminate errors in administration therefore enhancing productivity (Leenders et al., 2010). Information systems are enhancing visibility that promote transparency and information sharing in organizations' operations. Use of the enterprise resource planning (ERP) as an integrative supply chain technology enhance vendor payment planning, delivery forecasting and vendor information sharing (Schroeder, Goldstein & Rungtusanatham, 2013). Three measures of ISCT as identified by Lysons (2012); van Weele (2010); Baily (2015); and Wanyonyi and Muturi (2015) include ERP System, E-procurement and procurement portal. ERP System includes functional integration, audit trail, accountability and information sharing. E-procurement include online data sharing, internet banking and traceability of data. Procurement portal indicators include online open tender publishing, ubiquity, visibility and information sharing with tenderers.

1.1.3 Procurement Performance

Acquisition and management of goods and services optimally to achieve objectives establishes procurement performance measure. This measure depends on management support for the legal system (Mertus, 1999; Garg & Van, 2012). Compliance with procurement legal framework is intrinsic management discipline for procurement process

function (Raymond, 2008). External and legislative pressure are enforcing adherence to governing law, annual procurement planning and relevant regulatory compliance leading to procurement performance (Kivuva, 2011; Salim & Kitheka, 2019). Regulatory compliance represents leadership and law enforcement in procuring entities with regard to tender evaluation criteria, awards and disposal procedures (KIPPRA, 2006; World Bank, 2002). The performance of public procurement system is enhancing national values (Badenhorst, 1994; Wittig, 2003), through regulatory compliance, timely submission of mandatory reports and inventory record keeping.

To meet public expectations, procuring entities improve on efficiency in their systems procurement publicly leading to value for money (Bruel, 2017). A well-organized and responsive public procurement system is a reflection of their national values, adherence to set procurement procedures (Kihara, 2009). These strategies include sound evaluation criteria to test compliance with set specifications. Firms maintain high standards of goods and services through internally trained inspection and acceptance officers who ensure compliance with performance of contracts (Heizer & Render, 2014). The output on these measures is leading to consumers getting quality goods and services and value for money. The training of staff to support the procurement processes is a step in ensuring that governance is given priority in management.

1.1.4 Service Delivery

Goldstein, Johnston, Duffy and Rao (2002) define service delivery as management of seamless processes within organization until customers' needs are fulfilled. Leenders et

al. (2010) view service delivery in regard to a framework that manages speed, service quality, materials as well as data for customers' consumption. Creating an effective service delivery within the procuring entity involves recognition of competitive pressure as well as internal governance with good alignment with the needs to be met (Krajewski, Malotra, & Ritzman, 2016). Organization's functions are taking collaborative positions to ensure operations strategy and competitive priorities guide the supply chain choices. Benton (2014) posits that the procurement outcome is service delivery in form of right quality, delivered on timely manner on determined delivery dates and with negotiated payment dates. User specifications, evaluation criteria usually consider the quality of goods and services, effectiveness and timely deliveries (Grant, Trautrims, & Wong, 2017).

According to Heizer and Render (2014), an effective supply chain helps coordinate activities within the supply chain to maximize competitive advantage and benefit the ultimate consumer (Weber & Kantamneni, 2002). According to Fawcett et al. (2014), entities are also members of a supply chain and should be well versed with best practices in order to remain competitive. Kovacs (2014) views service delivery in the organization and its sustainability in the form of maximizing value for procuring entities, embracing opportunities while at the same time minimizing risks in the procurement processes. In goods and service delivery, procuring entities regularly review speed of delivery, efficiency, quality of the goods, works and services, information sharing and payments to the suppliers (Bruel, 2017).

1.1.5 State Ministries, Departments and Agencies in Kenya

Fundamental unit of Kenyan National Government are government ministries (Akicho, Oloko, & Kihoro, 2016). The role of the ministries is to provide and monitor implementation of government policies necessary for public administration. The state departments are responsible for implementing policies developed by the ministries. The government officials are expected to adhere to varying levels of regulations necessary for running the specific functions of the State Department (RoK, 2020). The government agencies are permanent or semi-permanent organizations established through legislation or executive powers to undertake certain functions on behalf of the government. The Ministries, Departments and Agencies (MDAs) are defined as public entities that procure or dispose assets in line with public procuring practices. The entities are governed by the Public Procurement and Asset Disposal Act, 2015, prevailing relevant regulations and legislature. In Kenya, there is a capping of 22 ministries, which are headed by Cabinet secretaries appointed by president (CoK, 2010).

The MDAs in Kenya are bestowed with responsibilities to deliver among other services; healthcare, infrastructure, education, security, information communication technology and energy. They also provide land, housing and buildings, healthcare equipment, medicine, social amenities (RoK, 2020). The Public Procurement Oversight Authority implemented the tenders' portal to link procuring entities with suppliers. Through various legislative frameworks, MDAs have employed procedures and standards to improve public confidence during procurement proceedings; and deliver goods and service to the public (Ondiek & Ochieng, 2013). With public procurement estimated at 10% of Kenya's

GDP, the service and goods' quality considered by procuring entities should meet user specifications to serve the purpose for which they were intended (OECD, 2003).

Despite reforms in the public procurement systems, especially use of integrative technologies, there are reported cases of procurement governance irregularities such as secret procurement activities, inefficiency, corruption and conflict of interest leading to huge wastage of public resources affecting service delivery (Odhiambo & Kamau, 2013). The motivation behind this study therefore was to provide practical guidelines that can be used for policy development and the sub-constructs being measured in this study will have a great impact in legislative review of procurement laws and requirements by the government agencies to improve procurement processes.

1.2 Research Problem

The general public is the consumer of most services and goods procured through the systems of the public procurement (Leenders et al., 2010). Service delivery is attainable when procurement capacities and compliance with procurement legal framework are institutionalized (OECD, 2005). Robust governance protocols become evident through social and economic reforms when transparency and competitive processes are enhanced (Knight et al., 2007). Integrative supply chain technology leads to transformation of electronic government policies (Yator et al., 2014). Use of electronic procurement systems in procuring entities are efforts to satisfy their external customers through the internal customers (Slack et al., 2010). Procurement performance in public procuring entities are measured through regulatory compliance, procurement planning, evaluation

criteria, record keeping, contract management, goods receipt and inspection and asset disposal programs (PPADA, 2015).

A study carried out by Odhiambo and Kamau (2013) and a report by Institute of Economic Affairs (2018) reveal that, despite the constitutional and legislative provisions, past reports by the Auditor General have continued to reveal rampant irregularities, corruption, and misappropriation of funds because of poor financial systems and inadequate ethical practices in Ministries, Departments and Agencies. This continues making the MDAs in Kenya vulnerable to poor service delivery (Kiprop, 2014). Procurement performance in public institutions was influenced by procurement planning and political interference (Okong'o & Muturi, 2017). Studies by Odero and Shitseswa (2017) and Salim and Kitheka (2019) concur that procurement planning, regulatory compliance and staff competency led to Kenyan publicly procuring entity performance. The regulatory policies, governance values and principles are becoming difficult to achieve due to traditional practices among professionals (Lysons et al., 2012). Execution of public procurement policy requires conformity with the public procurement law without bureaucratic procedures in order to achieve efficient service delivery (Kusi, Aggrey, & Nyarku, 2014).

Studies have established that procuring entities with good procurement governance and policies had efficient service delivery (Rehmatulla, Smith & Tibbles, 2017). Similarly, Karanja and Mugo (2010) asserted that enhancing procurement governance in public procuring entities require transparency and accountability practices to improve service

delivery. The study established transparency, accountability, openness as governance issues leading to quality service delivery. However, in Kenya, public procuring entities are losing billions of shillings through corruption (Kioko & Were, 2014); implying lack of governance values in procurement practices negatively affect service delivery. According to the literature, a system of governance is competitive, egalitarian, transparent, fair and efficient in its use of resources. A study was valuable in establishing if indeed there is a relationship between procurement governance and service delivery.

Procurement performance is an output of procurement governance procedures that promote economy, fairness, transparency, accountability, and competition in service delivery (Okinyi & Muturi, 2016; Karanja & Mugo, 2010; Njoki & Kimiti, 2018). Despite this, evidence prove that there are increased incidences of unethical behaviour and corruption in public offices hindering procurement efficiency (Hellman, Jones, Kaufmann, & Schankerman, 2000; Wanyonyi & Muturi, 2015; Mburu & Njeru, 2014). Studies reveal procurement planning, specification formulation and contract performance as procurement performance processes leading to improved service delivery (Okinyi & Muturi, 2016; Muya, Wanjiru & Datche, 2019; Mutinda & Nyang'au, 2016). An investigation into procurement governance and performance was carried out by Mwikali (2016), who operationalized the concept of procurement governance by defining it as the process of procuring, disposing of, and keeping records, as well as a code of ethics and a complaints review mechanism. Regulations compliance and procurement planning and assessment criteria, record keeping, contract administration and goods reception and inspection and asset disposal procedures are all prescribed in procurement literature. A

study was necessary in determining the influence of procurement performance in line with reviewed literature in establishing if indeed procurement performance has any influence in the relationship between procurement governance and service delivery.

Implementing integrative supply chain technology in an organization enhances transparency through innovation, competition in procurement proceedings and improves service delivery (Bruel, 2017; Wawuda & Mwangangi, 2018). However, studies have proven that integrated financial management systems take long to implement and pointed to a fall in service delivery in the public sector despite use of technology (Leni, Victoria, Maia, & Dan, 2012; Knight et al., 2007). Studies have operationalized integrative supply chain technology in line with use of e-government systems, e-procurement and internet transactions; and established service delivery sub constructs as customer satisfaction and feedback (Ndung'u & Ochiri, 2018; Yator & Shale, 2014). A survey was proposed to add value in investigating if use of integrative supply chain technology influence the relationship between procurement governance and service delivery.

Past studies have incorporated local and global contexts. For example, Mwikali (2016) carried a study in the small and medium enterprises in Nairobi County. Ndung'u and Ochiri (2018) carried out their studies at Safaricom which is in the private sector. Njoki and Kimiti (2018) carried out a study on public hospitals in Nakuru County. Rehmatulla, Smith, and Tibbles (2017) carried out their study in the European Union and in the marine industry. Kusi, Aggrey, and Nyarku (2014) carried out their study in the education sector in Ghana. Okong'o and Muturi (2017) carried out a study on public institutions in

Kisii County. Salim and Kitheka (2019) carried out a study in state corporations in Mombasa County. From these studies, none of them is addressing the integrative procurement governance, supply chain technology, procurement performance and service delivery in MDAs in Kenya. This study therefore sought to assess and determine the possible relationship among those variables.

To establish path relationships and predictive outcome, a superior analytical technique such as structural equation modeling is crucial. Wanyonyi and Muturi (2015) sampled 30 respondents and used regression analysis technique while saturated sampling technique was used and the studies generalized the findings. Onyimbo and Moronge (2018) sampled 86 respondents in case study, then utilized regression analysis yet the dependent variable was defined on an ordinal scale. There are limitations in such approach due to external validity. With high data variations, the researcher could have improved on the samples size or check for content validity. A census study was thus valuable using Partial Least Squares as structural equation modeling method if participants are limited to technical knowledge (Wong, 2011). The census approach enabled the researcher in this study to collect data from large samples of technically qualified procurement professionals who understand the content of the questionnaire.

Procurement efficiency promotes good relationships with suppliers which encourages important feedback to serve the user more effectively (Magawa & Karanja, 2019); however earlier studies had posited that procurement performance was negatively affected by inability to use e-procurement platforms (Barsemoi, Mwangangi, & Asienyo,

2014). Use of integrative supply chain technology promotes procurement governance leading to procurement efficiency and thus enhancing service delivery (Power, 2003; Lysons & Farrington, 2012; Murphy &Wood, 2010). However, evidence proves that lack of effective information systems policies in the procurement processes affect accountability which renders service delivery unreliable (Mousavi, Pimenidis, & Jahankhani, 2008). Linking integrative supply chain technology to procurement processes improves visibility and transparency enhancing service delivery (Shileswa, 2017; Angeles et al., 1998). A study was crucial to establish the combined effect of integrative supply chain technology, procurement governance, and procurement performance for Kenyan MDAs. This study thus sought to address the following study question: how does procurement governance, integrative supply chain technology, and procurement performance affect service delivery in Kenyan MDAs?

1.3 Research Objectives

The research's primary objective was to establish the effect of procurement governance, integrative supply chain technology, and procurement performance on service delivery at State Ministries, Departments and Agencies in the Kenya. Its specific objectives were to:

i) Establish the effect of procurement governance on service delivery at State Ministries, Departments and Agencies in Kenya.

ii) Assess the mediating influence of procurement performance on the relationship between procurement governance and service delivery at State Ministries, Departments and Agencies in Kenya.

iii) Assess the moderating effect of integrative supply chain technology on the relationship between procurement governance and service delivery at State Ministries, Departments and Agencies in Kenya.

iv) Examine the combined effect of procurement governance, integrative supply chain technology and procurement performance on service delivery at State Ministries, Departments and Agencies in Kenya.

1.4 Value of the Study

In the recent past, the Cabinet Secretary for the National Treasury has been resolute in the use of integrative supply chain technology to enhance public sector service delivery. Public procurement has been badly impacted by governance difficulties in the recent past. The Directorate of Criminal Investigations, The Director of Public Prosecution, The Director of the Ethics and Anti-Corruption Commission have been engaged in investigations into suspected irregularities in the processes of procuring goods and services in the country. This study therefore provided practical guidelines that can be used for policy development by the government agencies. From the Public Procurement and Asset Disposal Act, 2015, and literature, theories on governance will be developed to inform the areas of ethical principles and probity at workplace. Subsequent studies borrowing from this study, an empirical review can be used to build the theory.

With scarcity of resources from the exchequer and from suppliers, the theory of governance will be practical in rationalization of procurement planning. Procuring entities have been faced by administrative governance issues in the management of their

procurement processes. The theory application will assist the National Treasury in ensuring the common good of the citizens in the way public administration will be overseen on service delivery. Policy formulation on governance in procurement can be borrowed from this theory. The government and especially The National Treasury will use insights of the study in formulating sound policies on implementation of integrative e-procurement. The government will also use the study in enforcing transparency and accountability in the application of governance principles by the application of the principles of the theory of governance. The theory is instrumental to procuring entities in adopting practical implementation of regulatory compliance and ensures service delivery. The study will lead to collaborative solutions between procuring entities and vendors.

There is value to legislators related to procurement governance, integrative supply chain technology, procurement performance and service delivery at State MDAs in Kenya. The sub-constructs being measured in this study have great impact in legislative review of procurement laws and requirements. Government agencies purely rely on public money to procure and deliver services. It is on this premise that policies governing how transparently these monies are spent and placing accountability to officers are key in driving performance in the procurement processes and ensuring service delivery. Private practitioners will benefit greatly from the study's findings, which may be used to build standard operating procedures.

CHAPTER TWO: LITERATURE REVIEW

2.1 Introduction

This chapter reviews literature on procurement governance, integrative supply chain technology, procurement performance and service delivery. It starts by looking at the theoretical foundation; then followed by conceptual phenomenon to make the reader internalize the literature in line with the constructs provided. The empirical summary that revealed study gaps from various past studies and how this study addressed the gaps. The chapter ends with a conceptual framework presenting a conceptual view on the hypothetical relationships based on reviewed literature.

2.2 Theoretical Foundation of the Study

This section covers theories relevant to procurement governance, integrative supply chain technology, procurement performance and service delivery. The study has reviewed three theories found to be relevant to concepts established. These theories are: the theories of governance, network theory and agency theory. The anchoring theory is the theories of governance which draw specific relationships drawn in relation to between the latent and measured variables of the study.

2.2.1 Theories of Governance

These theories have developed from the concept of common good for the society in the 4th BC as an Indian treatise on public administration. The theories of governance include: Transaction cost economics theory, stakeholders' theory and stewardship theory. Stoker (1998) propagates that service delivery issues are achieved through public administration.

Medieval theories of governance, the methodology of governing the society has over the years transformed into the exercising control over the human actions into delivering the expected common good. Writing on Theory of Wealth of Nations (1776) and Moral Sentiments (1759), Adam Smith advocated to influence economic thought aligned to governance theory. Transaction cost economics theory propagates for the hierarchal structure as central in running contractual relationships (Nicolae, Achim, & Violeta, 2013). The stakeholders' theory emphasizes that the interests of all stakeholders must be taken care of during service delivery. The stewardship theory argues that the shareholder interests are maximized when incumbent directors play an autonomous role to deliver service (Donaldson, 1991).

These theories are very vital in the study because they relate to the utilization of public funds in the process of procuring services and goods necessary for the common good of the consumers of public services. The society today is governed by leaders who are expected to be democratic yet responsible on service delivery to the citizens (Ostrom, 1973). The theories relate enforcement of governance to regulations, assuming that this leads to desired control by the public administrators to deliver services (Mathiasen, 1996). There is a pervasive universal belief that governance is a new process that has led to a new condition of order to govern the society (Stoker, 1998). However, the proponents of the theories failed to acknowledge that behaviours such as fairness and integrity cannot be regulated (Peters & Pierre, 1998; Provan & Milward, 1995). This study is of the view that conflicts between the reality of need in critical lifesaving

situation requires set policies and working systems to hedge against overriding governance principles and adopt methods compliant to regulations.

2.2.2 Network Theory

The theory was introduced for the first time in 1970s and 1980s (Harland, 1996). It has been applied to the supplies practice to describe the relationship between suppliers and organizations and other parties. Network is considered to be the link between various parties and activities (Harland, 1996; Chang, Chiang, & Pai, 2012). The theory guides on the applicability of integrative supply chain technology and its influence in processes decision support. It acknowledges the fact that service delivery is a complicated network of people and events. One of the underlying assumptions of this theory is that firms may get a competitive edge over their rivals by sharing information with their network partners.

The network theory is largely applicable to efficient allocation of resources so that relationships can be developed and presumes that procuring entities are able to choose suppliers independently to their own benefits (Jones, Hesterly, & Borgatti, 1997; Powell, 1990). Relationships between various parties are regarded as trustworthy; value adding and simplifying decision making. However, in the most dynamic procurement situations, the theory may not suffice because new and temporary networks are built at intermittent rates inspiring conformity into certain actions (Galaskiewicz, 1991). Demand forecasting, use of specifications, goods and service availability cause severe and several changes in the procurement process and at times lead to termination of the processes. The existing

networks rarely help during the times of social crisis (Mizruchi, 1992); this is because especially in the public procurement, the processes are highly structured and must follow a certain laid down procedure. This study strongly proposes working networks between user departments, supply chain professionals and suppliers for information sharing and service delivery planning.

2.2.3 Agency Theory

This theory dates back to the first time that people started doing business with a view to maximizing their interests. However, with changes that have occurred with time, agency problems have taken different forms and shapes as literature review demonstrates. This theory revolves around problems related to agencies and solutions thereof (Jensen & Meckling, 1976; Ross, 1973). The organization relationship is an agreement, under which the principal agrees with the specialist or any other worker to perform explicit tasks for its sake. On administration issues, the specialist completes the acquisition procedure in the interest of the principal. The substance is by having restricted or boundless legally binding relationship between two parties and having to deliver goods and services to the consumers without bias (Alchian & Demsetz, 1972). These two parties have separate motives because the principal wants to utilize the agent and save money, but the agent wants to satisfy his own needs first while satisfying the operational needs of the firm. This theory however does not address the issues of checks and balances in an organization from the view point of an independent authority void of the principal and the agent.

Understanding the agency theory helps identify relationship and implication between the principal and the agent. The accounting officers of procuring entities find themselves in principal–agent relationship with staff within committees. Parties have different understanding and interests on their relationship in the process of corporate governance. Relationship is developed when the principal contracts the agent to act on their behalf (Trevor, Potoski, & Slyke, 2006). Even with effective procurement laws and regulations, conflicts between the principal and the agent have been addressed through the national constitution and also through the PPADA 2015. The procurement is regulated; this makes the head of procurement as an agent be instructed through the Act on the procedures to follow. Theory does not take into account that conflicts between principals and agents may actually be beneficial in terms of reducing procurement collusion. This study took the view that supply chain and accounting officers should be governed by current regulations to prevent conflicts of interest in procurement matters.

2.3 Procurement Governance and Service Delivery

Procurement governance is a framework designed to promote transparency, accountability, inclusiveness, rule of law, participation, empowerment and equity (Schroeder, Goldstein, & Rungtusanatham, 2013). A study conducted on governance and service delivery by Kusi, Aggrey, and Nyarku (2014) established that execution of public procurement policy in the educational sector required conforming with the public procurement law with transparent and accountable procedures in order to achieve efficient service delivery. Public procurement legal framework addresses how to adopt governance practices to ensure compliance with procurement proceedings for service

delivery. A study by Okinyi and Muturi (2016) revealed that legislative provisions were prerequisite in maximizing economy and efficiency, promoting competition and ensuring fair competition. Nevertheless, the study accepted the significance of the model whereas p-values exceeded 1.

Today, procuring entities focus on improving the service delivery by coordinating activities effectively and simplifying processes involved in those chains (Lysons & Farrington, 2012). The main emphasis in governance is on sourcing strategy for value of money; bidding process for fairness and accountability; supplier evaluations for transparency, supplier award programs for delivery efficiency which are the variables of a vibrant service delivery mechanism (Slack et al., 2010). A study by Odhiambo and Kamau (2013) established that public officials misrepresent legal interpretation to use certain procurement methods to fix the participation of targeted firms in procurement. Further operationalization of sub-constructs in governance and service delivery would have addressed how to measure good governance and how to enhance the interpretive capacity in order to relate directly with service delivery. This study proposed that procurement governance including its identified principles has a significant effect on service delivery. PLS-SEM analysis using SmartPLS was utilized to achieve this objective.

2.4 Procurement Governance, Procurement Performance and Service Delivery

Governance has laid the foundation for the administration of public entities through propagating for equity, competition, transparency and accountability of all transactions

undertaken (Fearon et al., 2012; Langley et al., 2009). Procurement performance through regulations compliance mediates transparent and corruption free process in the delivery of services and goods to consumers (Ombaka, 2003). There has been deliberate move by stakeholders for collaboration starting from users, technical team and suppliers in assuring the public of service delivery (Newman, 2004). Transition from the principles of governance into best practices as outlined in the existing laws and regulations (Carter & Rogers, 2008); has placed public procurement centrally as a key pillar of good governance vital to service delivery and efficiency (Davy, 2003). However, in 2010 Kenya was ranked in position 139 out of possible 176 countries on corruption index (Kioko & Were, 2014).

Communication between vendors and procuring entities is essential in planning usage and enhancing supplier delivery speed (Lysons & Farrington, 2012). Delivery schedules are provided for in the contracts service level agreements between the parties to ensure efficient service delivery (Simpson, Siguaw & White, 2003). A study by Mburu and Njeru (2014) revealed challenges faced by public procurement entities because procurement processes were not transparent and lacked competition. However, according to Muturi and Okinyi (2016), compliance with procurement regulations may build a method for public procurement that promotes economic, justice, openness, accountability, and competitiveness in service delivery.

This study proposed that procurement performance mediates the relationship between procurement governance and service delivery. The Kenny and Baron (1986) method may

be used to investigate the relationship and mediation between variables. Results demonstrated that procurement performance affects the connection between procurement governance and service delivery, according to the study.

2.4.1 Procurement Governance and Procurement Performance

The public procurement process is highly procedural and has in essence brought about social and economic reforms through the strict procedures (Leenders et al., 2010). Procurement performance is measured through rule of law, the regulations and executive directives. Organizations reap the benefits of procurement performance by performing sound evaluation criteria, meeting regulated reporting timelines and compliance to the governing regulations (CoK, 2010; PPADA, 2015). Identifying and eliminating corruption can be effective through regulatory compliance by enforcing transparency, value for money and accountability in procurement proceedings (Karanja & Mugo, 2010; Kiruja 2014). Reforms in the public procurement especially regulating and enforcing governance principles, have the potential of creating benefits and procurement performance (OECD, 2004). However, the public procurement faces challenges because transparency demands from the public and pressure from suppliers for equality and payments are putting procurement officers on a balance for efficient procurement processes (Knight, Harland, Telgen, & Thai, 2007).

Success in public procurement is necessary to enhance public confidence and a shared sense of value across organizations because of the increasing need for improved public sector services (Davis, 2008). Even in developing nations, the issue has not been

addressed. Consequently, there is a lack of understanding of how governance approach might enhance procurement. A supply chain management system was put in place in 2003 by government of South Africa so as to improve procurement methods, according to Barden (2012). The system was approved by the relevant institutions and has been in place ever since to correct prior discriminatory rules and practices; however, there were challenges highlighted such as training, seminars, and strategic sourcing used (Aleri (2012). This study proposed that there is an influence of procurement governance on procurement performance.

2.4.2 Procurement Performance and Service Delivery

In order to reduce delivery lead times, the annual procurement planning provides procurement schedules; creating process value in absorption of resources and cost savings (Sople, 2011; Sue, 1998). Competitive procurement process encompasses aligning procurement activities with demand for efficient service delivery (Handfield et al., 2013). However, Public Procurement Oversight Authority (2007) reported that most of the procurement entities in the country faced challenges applying frameworks in practice and complying with laws and regulations. A study by Kipchilat (2006) evaluated the impact that public procurement regulation had on national public universities and established that public procuring entities needed to conform to regulations in place for them to enhance service delivery. However, Salim (2013) concluded that inadequacy of staff, late goods deliveries, ambiguous specifications and sub-standard goods and services resulted to disputes that affected efficiency within service delivery processes. This study proposed procurement performance is a determinant of service delivery.

Sustainable procurement and service delivery have in the past been featured in relation to the fact that procurement performance significantly influenced service delivery (Husseni & Shale, 2014). According to the study, a company's reputation depends on its ability to provide high-quality products while prioritizing social responsibility. A study by David and Muthini (2019) found that Kenyan private health institutions' procurement performance might be improved by using green supply chain management practices. Research shows that healthcare service delivery may be improved by using green sustainable buying practices.

The degree of procurement capabilities determines the quality of service provided in this context. Sustainability in procurement was examined by Aila and Ototo (2018) in relation to service delivery. Sustainable procurement is cited in the study as a factor that contributes to an organization's ability to expand. In the poll, it was found that procurement sustainability as a requisite for performance is essential in a corporation. This study therefore proposed that procurement performance has significant influence on service delivery.

2.4.3 Mediating Effect of Procurement Performance in the Relationship between Procurement Governance and Service Delivery

Service delivery indicators are necessary benchmarks to ensure that there is accountability and transparency in the access and acquisition of materials and equipment (Gayle & Obert, 2013). For the procurement system to optimally perform, institutions and their governance structures and processes must function in tandem. According to

KIPPRA (2006), sound procurement policies are essential in procurement performance, and are a foundation to procurement governance. Willy and Njeru (2014), in their study on the effects of procurement planning on procurement performance: a case study of agricultural development corporation, found out that effective procurement portfolio influenced service delivery. According to Basheka and Bisangabasaija (2010), procurement governance in terms of accountability and transparency is a driver for procurement performance as a necessity for service delivery due to the amount of resources involved.

With an enlightened public, there is increased demand for accountability, transparency and fairness to improve on procurement performance. Compliance to these requirements has led to better service delivery (Mahmood, 2010). Proper planning and budget absorption is an indication of robust procurement processes (Ogwel, Iravo & Lagat, 2016) . With this trio effect, it will therefore be prudent to deduce that procurement governance through its processes will influence compliance thus procurement performance and therefore ultimately enhanced service delivery. This is what informed the study in proposing that procurement performance significantly mediates the relationship between procurement governance and service delivery.

2.5 Procurement Governance, Integrative Supply Chain Technology and Service Delivery

Ellinger et al. (2006) and Van Weele (2010) describe the objectives of service delivery from use of structured integrative technologies to enhance transparency and

accountability in the procurement systems. According to Baily, Farmer, Crocker, Jessop, and Jones (2015), integrative supply chain technology philosophies have a favorable impact on the public good. When it comes to service delivery, Yator and Shale (2014) found that empowering employees, innovativeness, and the availability of integrative systems boosted service delivery via visibility of processes. A lack of suitable infrastructure and management support as well as technical help is cited by Malela (2010) as to why integrative supply chain systems are not being used. It's easy for managers to collaborate with each other and identify market demands for their clients thanks to the integrated services (Callender & Schapper, 2003; Soi, 2017).

Functional integration such as use of ERP, e-procurement portals and reverse auction systems eliminate operational wastage; which leads to improved service delivery (Vijayasarathy & Tyler, 1997). Integrative supply chain functions lead to efficient operations in organizations (Murphy & Wood, 2008). Supply chain technologies integrate people and functions making proceedings efficient and translating to effective service delivery (Mburu & Njeru, 2014). However, Baily et al. (2015) posit that integrative supply chain technologies cannot enhance service delivery without the participation of the user departments. Input of realistic specifications into the ISCT will lead to equity, fairness and competition. Therefore, incorporating procurement ethical and best practices through integrative systems is crucial to the quality-of-service delivery (Van, 2010). Integrative supply chain technology, according to the findings, has a substantial effect on the interaction between procurement governance and service delivery in purchasing

organizations. It's reasonable to use the Baron and Kenny (1986) technique to examine the variables' relationships and moderations.

In order to achieve the benefits of governance, integrity, accountability and transparency must be practiced at all levels in the organization (Wittig, 2003). Technologies that make it easier to work with manual and conventional methods are used in the procurement process. Procuring entities are implementing ERP systems such as Oracle in the running of the IFMIS for procurement and transactional processing. IFMIS system is enhancing traceability, transparency and accountability (RoK, 2020). However, non-compliance in procurement processes is affecting performance of the supply chains at an early stage (Carter & Rogers, 2008). In the procurement proceeding, ethical practices such as transparency are supported by integrative supply chain technologies (Lysons & Farrington, 2012). However, Barsemoi, Mwangangi, and Asienyo (2014), found out that traditional procurement processes and staff incompetence were hindering the achievement of procurement governance output despite integrative supply chain technologies.

Integration of internal functions is paramount in offering robust quality service and good delivery from the end to end users perspective (Murphy & Wood, 2008). Implementing integrative supply chain technologies promotes the linkage between functions and people to ensure efficiency in service delivery. However, Baily et al. (2015) and Van (2010) posit that information technology integration require the intervention of user departments to formulate specifications that translate to quality of the service delivery. In meeting

consumer and user needs, supply chain operations become agile when they are integrated (Callender & Schapper, 2003; Soi, 2017). This study therefore made the proposition that integrative supply chain technology significantly moderates the relationship between procurement governance and service delivery in the procuring entities.

2.6 Procurement Governance, Integrative Supply Chain Technology, Procurement Performance and Service Delivery

Good governance is premised on integrity, accountability and transparency which in procurement process can be supported by integrative supply chain technology to simplify firms' operations (Christopher et al., 2004; Wittig, 2003). However, studies reveal that some procurement proceedings do not follow regulations, because some members are not motivated to complete some processes; there are coordination issues; there is imminent bureaucracy and a lack of open tendering (Mburu & Njeru, 2014). Integrated technologies in e-procurement enhance transparency and accountability collectively between the procuring entity and the suppliers, leading to satisfactory service levels (Croxton, Garcia-Dastugue, Lambert, & Rogers, 2001). Electronic procurement agendas enforce compliance as drivers of procurement performance due to visibility of procurement processes (Knight et al., 2007).

Procuring entities in Kenya have implemented integrative supply chain technologies in procurement and transactional processing. Throughout the procurement proceeding, compliance with the procurement regulations, adherence to the procurement plan, formulating sound evaluation criteria and good record keeping are sustained in order to

achieve performance in procurement (Lysons & Farrington, 2012). Nyakundi et al. (2012) identify procurement as a central operation in every institution that needs to be scrutinized thoroughly. Kioko and Were (2014) found out that staff capacity, compliance with legal framework, integrative technology and institutional culture lead to organizational efficiency in service delivery. Matunga, Nyanamba and Okibo (2013) however established that e-procurement processes faced inadequate funding, inability to adopt dynamic strategies for change management and lack of trained resources to apply integrative technologies.

In the practice of procurement governance, non-compliance in procurement processes can be identified at an early stage (Carter & Rogers, 2008). A well performing procurement function, will in return ensure that all the networking activities implemented through a framework of integrated technology application lead to governance practices and promote equity and fairness among partners (O'Brien et al., 2006). Procurement governance encompasses procurement planning, evaluation processes, inspection and acceptance, procedures, record management. The information technology in itself plays a key role in enhancing the processes integration and sharing information (Baily et al., 2015). From literature this study made the proposition that there is a significant combined effect of procurement governance, integrative supply chain technology and procurement performance on service delivery.

2.7 Summary of Past Studies and Knowledge Gaps

This part contains observed data and previous studies related to issue under investigation. The review relates to the research question, findings, objectives, and methodologies, but in particular relevance to this study.

Table 2.1: Summary of Key Previous Studies Showing Major Findings, Contributions and Research Gaps

Author	**Focus of the Study**	**Research Methodology**	**Major Findings**	**Research Gap**	**How Current Study addresses the Gap**
Onyimbo & Moronge (2018)	The study evaluated the effect that single procuring source had on performance of public entities in the country	The methodology was a descriptive survey Sample size was 86, Regression analysis was used	Competitive evaluation and supplier selection impact on lead times for delivery of goods and services	**Conceptual Gap** – Study did not show how market surveys were done to ensure money value. **Contextual Gap** – The study was a case study on Kenya Railways; replication and generalization may not apply. **Methodological Gap** – There were high variation of data evidenced by the standard deviation, and low	**Conceptual**: Study incorporated market survey which is a key component of money value. **Contextual:** study surveyed a number of corporations outside Kenya Railways in the public sector **Methodological:** study employed a

Author	Focus of the Study	Research Methodology	Major Findings	Research Gap	How Current Study addresses the Gap
				means; there was need to improve on the sample size to moderate the variations.	survey instead of a case study and hence has high external validity. Study also employs PLS-SEM which is a much more powerful analysis tool compared to regression analysis especially where ordinal scale is used to define the response variable

Author	Focus of the Study	Research Methodology	Major Findings	Research Gap	How Current Study addresses the Gap
Okinyi & Muturi (2016)	The study focused its attention on factors that affected the effectiveness of procurement processes within public institutions in the country	The study used descriptive survey The sample size was 100 Multiple regression analysis was used.	Enactment of sound procurement laws was critical in maximization of economy and efficiency; therefore, promoting process competition, and ensuring fairness	**Methodological Gap** –There was a Type II error. The p-values exceeded 1 whereas the researcher accepted the significance of the model. The study did not distinctively separate population from sample.	**Methodological**: study began by carrying out pilot testing to understand the market and the respondents well

Author	**Focus of the Study**	**Research Methodology**	**Major Findings**	**Research Gap**	**How Current Study addresses the Gap**
Kusi, Aggrey & Nyarku, (2014)	The study evaluated Assessment of Public Procurement Policy Implementation in the Educational Sector in Ghana	Descriptive survey was used. The population was 80; with a sample of 66. Regression analysis was used in the study	Compliance with procurement laws and use of integrative technologies enhance transparency, information sharing; reducing unethical behaviour in procurement processes	**Methodological Gap** – A census was apt for the study because the sample size was too small. **Conceptual Gap** – the study did not link use of integrative technologies and regulatory compliance to value for money	**Methodological**: study used stratified sufficient sample size of 157 professionals for better results. **Conceptual**: Study sought to establish relationship between procurement governance, the integrative supply chain technology, procurement

Author	Focus of the Study	Research Methodology	Major Findings	Research Gap	How Current Study addresses the Gap
					performance and service delivery on MDAs in Kenya
Yator & Shale (2014).	The study focused its attention on the role of ICT on service delivery within the national Ministry of Interior and Coordination of National Government in the country	The study utilized descriptive research design Its population consisted of 500 whereas its samples size was 50. Data was analyzed using percentages, means and frequencies	Use of ICT integration in institutions can lead to innovating and using new technological ideas and enhance service delivery	**Conceptual Gap** –the study included two sub-constructs such as government funding and customer quality; without linking their significance to topic under investigation. **Methodological Gap**- The sampling frame was inappropriate; the study was technical in nature. There is	**Conceptual:** study sub-constructs were relevant to the topic under study. **Methodological:** The sampling frame encompassed technically qualified

Author	Focus of the Study	Research Methodology	Major Findings	Research Gap	How Current Study addresses the Gap
				no indication the strata included professionals in the field of study.	heads of procurement function, with capacity to conceptualize and respond to questionnaires.
Christopher & Lee, (2004).	The study focused its attention on Mitigating Supply Chain Risk Through Improved Confidence	The study utilized descriptive research design The Population was 120; with a sample size of 48 The study used statistical mean and	Information based procurement and supply chain systems enhance purchasing decisions which are necessary in	**Conceptual Gap** – The study did not examine service delivery confidence in regulated environments where matters of law take precedence	**Conceptual**: Study surveyed MDAs which are highly regulated through the PPADA, 2015 **Contextual**: Study employed census

Author	Focus of the Study	Research Methodology	Major Findings	Research Gap	How Current Study addresses the Gap
		std deviation analysis	timely deliveries of goods and services; improving on inventory optimality	**Contextual Gap** - the study used a global approach, yet countries and regional dynamics are different with emerging economies still exposed to supply chain risks due to use of traditional practices	with the use of PLS-SEM to establish relationships within context of the study.
Davy, (2003).	The research focused its attention on contract management within Public	Descriptive Survey	Principles of good governance vary across nations, with accountability and transparency	**Contextual Gap** – The applicability of governance practices and principles in Europe have relatively different output on service delivery from the Kenyan	Contextual: study made constitutional reference and considerations in relation to the existing procurement

Author	Focus of the Study	Research Methodology	Major Findings	Research Gap	How Current Study addresses the Gap
	Sector with a special focus on strategic procurement and governance Issue		issues remaining shared goals	context; where funding and governing procurement laws are inequitable.	laws in Kenya.

2.8 Conceptual Framework

The conceptual framework for the study is shown in Figure 2.1. The key independent variable is procurement governance and the dependent variable is service delivery. The other variables of the study are procurement performance and information technology integration.

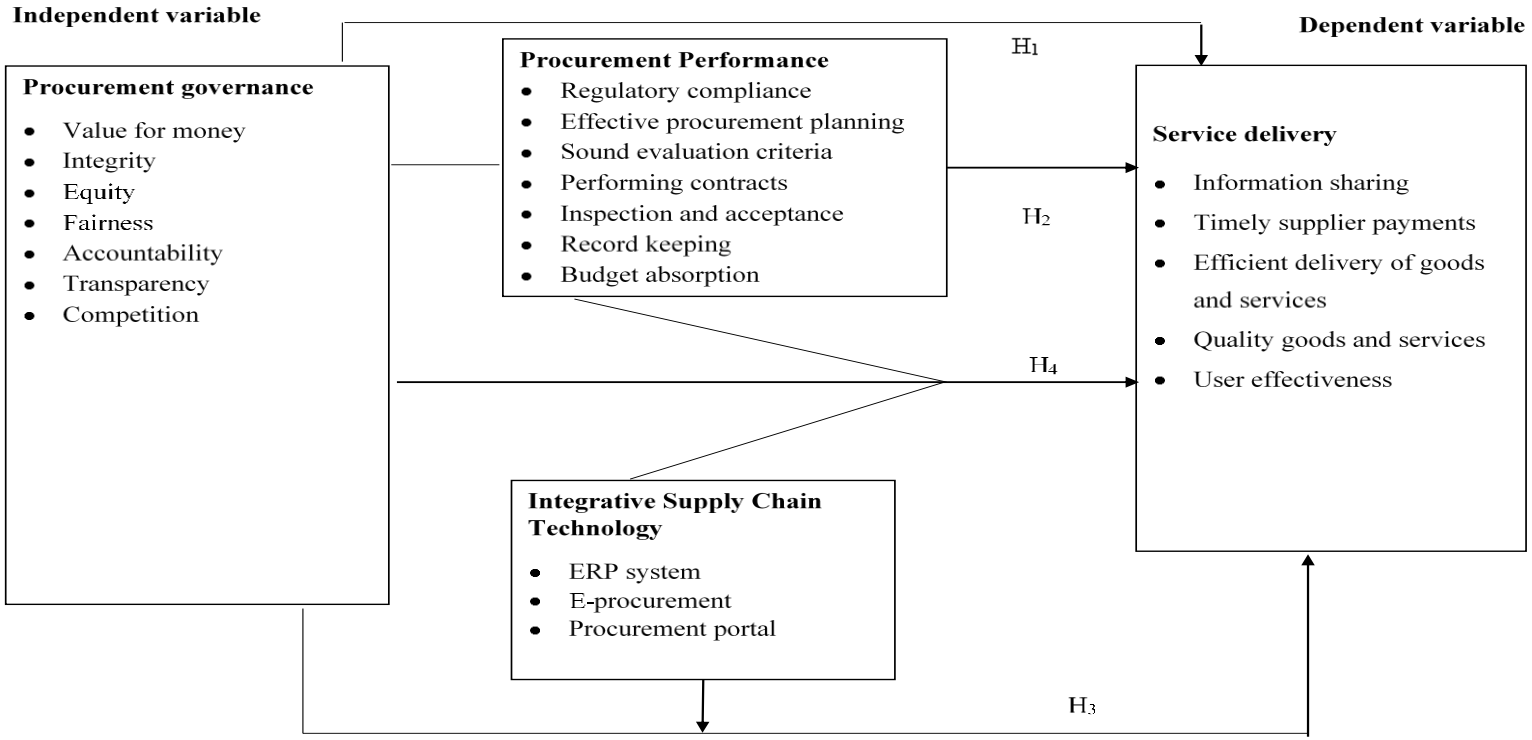

Figure 2.1: Conceptual Framework

Source (Author, 2020).

2.9 Conceptual Hypotheses

The hypothesis represents a statement that can be tested to determine the form of association or relation between the stated variables. The H_1, H_2, H_3 and H_4 are the null hypotheses that were used to test proposition about the relation among the identified concepts. The following were the hypotheses:

H_1: Procurement governance has no significant effect on service delivery.

H_2: Procurement performance has no significant mediating influence on the relationship between procurement governance and service delivery.

H_3: Integrative supply chain technology has no significant moderating effect on the relationship between procurement governance and service delivery.

H_4: Procurement governance, integrative supply chain technology and procurement performance have no significant combined effect on service delivery.

The conceptual hypothesis tested the claim about certain parameters identified from population as they were measured from the sample. The intention was to determine whether the parameters are representative of those from the population.

CHAPTER THREE: RESEARCH METHODOLOGY

3.1 Introduction

This chapter discusses the methodology that the study adopted. The study design, population, reliability and validity testing, data collection, diagnostics tests and data analysis utilizing structural equation modeling, operationalization of the study variables, are all covered in this section.

3.2 Research Philosophy

Beliefs as well as presumptions about knowledge development on a subject under research must follow a systematic methodology (Saunders, Lewis, & Thornhill, 2016). A researcher should develop self-reflexive procedure shaping philosophical position in understanding relationships among variables and how to undertake research (Alvesson & Skoldberg, 2000). Epistemologically, assumptions are made about knowledge, what would constitute satisfactory and valid and justifiable knowledge and the way knowledge will be communicated to others (Burrell & Morgan, 1997). Ontological assumptions shape the nature of reality within a study and the way it is viewed (Thomas & Hardy, 2011). On ethical and value systems of the research, axiological assumption guides the choice of one study over another (Heron, 1996).

Phenomenological or interpretivist techniques in research claim that the researcher is a part of reality and hence not autonomous and postulate the presence of many socially created realities (Cooper & Schindler, 2014). Positivist paradigm or empirical science approach are quantitative methodology that presume deterministic philosophy where

causes determine outcomes (Crotty, 1998); epistemologically providing an environment to observe, discover and measure meaningful data. This study adopted a positivism approach where causal relationships in the data collected and analyzed (Gill & Johnson, 2011). Since the researcher was completely cut off from the phenomena being studied, both the formation of hypotheses and the utilization of quantitative data were pertinent to this study.

3.3 Research Design

Descriptive cross-sectional survey entails generating profiles of settings, people, and events, and this was the study's design. Descriptive studies are undertaken to describe characteristics and directional relationships among variables of interest (Sekaran, 2006). The design can also be used to comprehend organizational characteristics that follow specific common practices; and develop relevant questions that answer a variety of research objectives including description of phenomena (Njenga & Kabiru, 2009).

Research objectives were well defined and aimed at understanding relationships between several characteristics, such as procurement governance, procurement performance, and service delivery, making cross-sectional survey research the most appropriate approach. In cross-sectional research, collection of data is done at a point in time (Saunders et al., 2016; Zikmund, 2003; Churchill, Iacobucci, &s Israel, 2009). A cross-sectional study design was required since the PhD program has a restricted amount of time to conduct research (Cooper & Schindler, 2014).

3.4 Population of the Study

All public procuring entities in Kenya formed the study population. Public procuring entities are government agencies that obtain goods and services through a regulated procurement framework. There are 157 public procuring entities comprising government ministries, departments and agencies (MDAs). The MDAs constitute 21 ministries, 42 State Departments, and 94 State Agencies (Government of Kenya, 2019). A census was the most appropriate for this study and with a population of 157, partial least squares structural equation modeling (PLS-SEM), becomes a suitable data analyses techniques for the study (Wong, 2011). According to Hoyle (1995), samples consisting between 100 and 200 subjects are sufficient for path modeling.

3.5 Data Collection

Primary data was gathered from all public procurement organizations using a five-section semi-structured questionnaire. Section A detailed the organizational background. Section B dealt with questions related to procurement governance. Section C collected information regarding information technology integration. Section D sought data related to procurement performance. The last Section E collected information related to service delivery. The study targeted the head of procurement function. The head of procurement function is well versed with all the activities involving procurement governance, integrative supply chain technology, procurement performance and service delivery. The process of dropping and picking at a later date was utilized to administer questionnaire.

3.6 Operationalization of Study Variables

Each variable was measured using its component indicators. Table 3.1 shows the manner in which the variables were operationalized.

Table 3.1: Operationalization of Study Variables

Variable & Type	Sub-Construct	Indicator	Informing Literature	Scale (Ordinal)	Question Number
Procurement Governance (Independent Variable)	Value for money	Market surveys, quality goods and services, fair prices	Sople (2011); Handfield et al., (2013); Aquilano et al., (2010); Shileswa 2017	5-point Likert type	Section C
	Integrity	Honesty, trustworthy and uprightness in processes			
	Equity	Impartial treatment of suppliers, being just to all, reasonable in awards			
	Fairness	Indiscriminatory payment of supplier, not favouring one supplier over another, reasonable in procurement proceedings			
	Accountability	Reporting on processes, taking responsibility for decisions, being liable for procurement processes			
	Transparency	Openness with all procurement proceedings, involving all stakeholders, making all process accessible by tenderers			
	Competition	Open tendering, objective tender documents, responsiveness to bidders			
Integrative Supply Chain Technology	ERP System	Functional integration, audit trail, accountability, information sharing	Lysons,(2012); van Weele (2010); Baily (2015); Wanyonyi and Muturi (2015)	5-point Likert type	Section B
	E-procurement	Online data sharing, internet banking, traceability of data			
	Procurement Portal	Online Open Tender Publishing, ubiquity, visibility, information			

Variable & Type	Sub-Construct	Indicator	Informing Literature	Scale (Ordinal)	Question Number
		sharing with tenderers			
Procurement Performance	Regulatory Compliance	Adherence with the law, litigation free environment, timely reports	Davy (2003); Lysons & Farrington (2012), Leenders, Johnson, Flynn & Fearon (2011), Okinyi& Muturi (2016)	5-point Likert type	Section D
	Effective procurement plan	Timely procurements, adherence to procurement methods,			
	Sound evaluation criteria	According to Specifications, to ensure conformance, to ensure quality of goods and services			
	Proper Inspection and acceptance	Right quantities, quality and price.			
	Performing Contracts,	Relative to terms and condition and capacity to deliver			
	Record keeping	Accuracy of stocks, no stock losses, accountability			
	Budget absorption	Periodic reviews of budget absorption to determine levels of procurements and service delivery.			
Service Delivery (Dependent Variable)	Timely Supplier Payments,	Payments on due dates, no pending bills, accuracy in payments	Knight (2007); Leenders, (2010); Langley (2009); Kiprop (2014)	5-point Likert type	Section E
	Efficient delivery of goods and services	Timely service provision to users, delivery of goods when needed			
	The quality of goods and services	Ensuring best quality due to proper inspection and acceptance			
	User Effectiveness	Satisfaction of the end users due to timely delivery of quality goods and services			
	Information Sharing	Availability and use of information across the organization for decision			

Variable & Type	Sub-Construct	Indicator	Informing Literature	Scale (Ordinal)	Question Number
		making.			

3.7 Reliability and Validity Tests

The reliability of results relates to consistency of results over time to enhance the representation of population under study if the study was to be carried out for a second or third time (Cooper & Schindler, 2014). As the study utilizes structural equation modelling, confirmatory factor analysis was utilized to measure composite reliability. To measure internal consistency, the latent constructs were assessed and accepted if the composite reliability had results in the range of $0.7 \leq \alpha < 0.8$ (Bagozzi & Yi, 1988). Repeatability was measured with the test-retest method using Cronbach's Alpha to estimate the true score to measure internal reliability; whereby data collection using the questionnaire was conducted at two separate points using the same respondents (Zikmund, 2003; Yin, 2014; Denzin, 2012). Using items-to-total-correlations for the indicator that indicate constructs, construct unidimensionality was established. A correlation score of at least 0.3 was accepted as true measure of a construct being measured by other included items (Bryne, 2001).

Validity is determined by whether or not a tool correctly measure what it is meant to (Corbin & Strauss, 2008). Prior to conducting a pre-test on 10 procurement specialists with expertise in buying processes, supervisors discussed issues about the questionnaire's clarity, readability, specificity, representativeness, substance, and face validity (Hair, Black, Babin, & Anderson, 2014). Construct validity ensure that construct measure what they claim to actually measure; and this was achieved through pilot testing. The data

collection technique, through the questionnaire gathered information that supported the variable propositions required for the interpretation in each question (Buchanan, 2012). Confirmatory factor analyses as statistical approach was employed to test the construct validity in measuring non-observable variables and findings approved with factor loadings of >0.4. (Stevens, 2002).

In addition, content validity was established based on whether all relevant questions had been included in the questionnaire and if the respondents understood each question. Convergent validity was determined through measurement model where every latent variables' Average Variance Extracted (AVE) were ascertained and significant if greater than 0.5. To test for discriminant validity, factor loadings on indicators sub constructs are evaluated to determine the strength of relationships with their corresponding constructs. According to this method, average variance extraction of the square root of the from each latent variable in comparison to other correlation coefficients among the latent variables (Fornell & Larcker, 1981). To be considered valid, you must prove that your AVE is superior to corresponding interconstruct squared correlations value. The Heterotrait-Monotrait ratio of correlation was also utilized in measuring the discriminant validity. If the Heterotrait-Monotrait value is less than 0.90, it has been shown to have discriminant validity (Hair et al., 2017).

Reliability, Internal consistency and validity were all tested on the outer model before it was estimated (Hair, Sarstedt, Ringle, & Mena, 2012). In order to conduct statistical analyses, variables having an outer loading greater than 0.7 were allowed. Models of

reliability and validity were ascertained using R^2 and Path coefficients (β values). In the endogenous construct of the structural model, researchers were able to use a coefficient of determination (R^2) to gauge the strength of correlations and variance.

3.8 Data Analysis

Details on the steps involved in gathering and organizing the data are contained in this section. Organization and responder demographics were analyzed using descriptive statistics. This exercise was completed using SPSS version 25. SEM analytical technique for testing hypothesis, and general test for model predictive relevance were all included in the subsequent inquiry. SEM has two major methods; Covariance-based structural equation modelling (CB-SEM) and Component-based structural equation modelling. Partial Least Squares structural equation modelling (PLS-SEM) is one approach in component-based structural equation modelling. In this work, the main data was analyzed using PLS-SEM, which was implemented in SmartPLS. The SEM method was chosen because it can test and estimate causal linkages among huge figures of latent variables simultaneously (Hair, Sarstedt, Hopkins & Kuppelwieser, 2014).

3.8.1 Structural Equation Modeling

According to Rigdon (1998), SEM has emerged as a key option among statistical approaches applied in academic writing in a range of subjects. SEM is designed to allow researchers to look at a large number of interdependent relationships between various components at the same time, while taking measurement error into consideration. Thus, it provides several advantages over conventional analytical methods, leading to an

improved generic framework for linear modeling. For this reason, SEM has become a favorite statistical analysis method for academic study across a variety of subjects. When one or more exogenous variables (constructs) interact with one or more endogenous variables (constructs), to investigate indirect and direct interaction, a multivariate statistical was utilized also known as SEM (Hashim, 2012).

Testing of theoretically based linear causal models is made easier with the use of SEM, an advanced multivariate data analysis tool. It is important to emphasize that regression-based approaches from the first generation of analysis are predicated on perfect data. Clusters of variance, exploratory factor analysis, and multidimensional scaling are all instances of methods such as multiple regression and logistic regression. Measurement and structural models may be tested, and overall model fit can be evaluated, using SEM. Additionally, the SEM method examines correlations between the concept and its related measurements, as well as the theoretical structural relationships among latent variables (Urbach & Ahlemann, 2010). SEM is a good choice for measuring latent constructs that are difficult to see or quantify. This technique uses many latent components at the same time to analyze and estimate their causal relationships (Gefen et al., 2000).

SEM has two models: an outside measuring model and an interior structural model (inner model). It is a link among latent constructs and their supporting indicators that a model depicts. Latent constructs are dependent and independent on one another in structural models, which shows their interconnections. Using PLS-SEM and CB-SEM models is critical when it comes to structural equation modeling analysis. The statistical

assumptions and assessment statistics generated by the two methods may be used to distinguish between them (Gefen et al., 2000). It is vital to acknowledge patterns of covariance across manifest variables (indicators) and to explain as much of that variation as feasible within a given research model while using CB-SEM (Kline, 2011). Covariance structure of all SEM models, however, is important. Exogenous and endogenous covariance is maximized in PLS-SEM, but not in CB-SEM (Hair et al., 2014). It employs canonical correlations and least squares approximation for both single and multi-component representations, in contrast to approaches based on CB-SEM. Although this has been shown by Fornell and Bookstein (1982), the PLS-SEM method avoids some obstructive conventions and guards against incorrect answers and build indeterminacy with the greatest degree of certainty.

3.8.2 The Current Study's PLS-SEM Model

According to the previous explanations of CB-SEM and PLS-SEM, PLS-SEM was optimal approach for the present investigation since the objective was to predict the covariance of model variables rather than theory testing or validation. It was decided that PLS-SEM would be the most acceptable SEM method for this investigation because of the small sample size. PLS-SEM was used to meet the study's first, second, third and fourth objectives. Using PLS-SEM, latent variables were computed using PLS algorithm and then Ordinary Least Squares computed on the latent variables to obtain the scores relevant for estimating the structural equations (Hwang, Malhotra, Kim, Tomiuk, & Hong, 2010). With 157 items, PLS-SEM was suited for this investigation owing to the limited sample size created and also because the prediction accuracy for this study is key

in identifying direction of associations (Bacon, 1999; Wong, 2010; Hwang, 2010; Esposito et al., 2010).

The validity, reliability, and consistency of reflective measurement models are examined. It is possible to quantify reliability using the composite reliability metric. According to Hair et al. (2014), validity may be assessed using discriminant and convergent validity tests. The indicator loadings (or measurement loadings) in a reflective model are evaluated to verify the indicator's dependability. The indicator loadings in SmartPLS are standardized to have a range of 0 to 1. There must be a loading of 0.7 or greater for an indicator to be considered reliable. Moreover half of the variation in the indicator may be attributed to this one factor (Henseler et al., 2012). This study's composite reliability score is more conservative than Cronbach's (1951) alpha, a more commonly regarded measure of internal consistent reliability. A composite reliability Index of at least 0.7 is required. Internal consistency is connected to total reliability (Hair et al. 2012). Additionally, the investigation conducted an additional statistical test, Cronbach’s Alpha in order to confirm the results. Alpha scores between 0 and 1 are feasible for Cronbach's tests.

External and internal validity are both measured for validation. External validity refers to the ability of data to be generalized when used for various individuals, contexts, and time periods, whereas internal validity refers to an instrument's ability to evaluate its primary purpose (Cooper & Schindler, 2006). Validity is concerned with the precision and relevance of research results interpretations (Bryman & Cramer, 2005). The construct

validity of the questionnaire was ensured in this study by constructing it based on earlier studies, instruments, and a coherent conceptual framework. Convergent validity is the extent to which the indicators of a construct are converging. As a result, the indicator's fluctuation is taken into consideration. Fornell and Larcker (1981) used the average variation extracted (AVE) of all indicators associated to the concept to assess convergence validity. The AVE value is calculated by multiplying the squared loadings of the measurement components by two. An AVE score of more than or equal to 0.50 suggests convergent validity. This suggests that at least half of the indicator's volatility may be ascribed to the idea (Chin, 2010).

Using Baron and Kenny (1986) mediation analysis, it was determined whether there was a substantial link between procurement governance, procurement performance, and service delivery for objective number three. Statistical significance was also assessed between procurement performance and service delivery. Bootstrapping method was more appropriate to establish if there is direct path; with the first step being a test between procurement governance and service delivery (Hair et al, 2014). If there is no direct path, then the study concludes there is no mediation. If it is determined that the path is significant, the research will then include procurement performance and test the indirect path. If the indirect path is significant, the research then calculated the variance accounted for (VAF); accepting VAF >0.8.

As shown by literature, the researchers used the reflective measurement approach to examine the link between a given concept and its corresponding indicators (Wong, 2015;

Edwards & Bagozzi, 2000). Standardized Root Mean Square Residual (SRMR) was used with an acceptable goodness of fit value of less than 0.08 in assessing overall model fit (Hwang, Malhotra, Kim, Tomiuk, & Hong, 2010). Predictive accuracy was assessed by R^2 and accepted at a value of > 0.75 for this model (Hair et al., 2014; Evans & Olson, 2000). Path coefficients from PLS were utilized to assess the significance of the hypothesis that was put to the test using the bootstrapping process. When the beta coefficient (β) is greater, an external latent construct has a greater impact on an internal latent construct (Chin, 1998).

To measure the degree of effect of the endogenous latent construct on the exogenous latent constructs, the effect size (f^2) was evaluated whose values are significant to support hypothesis if $f^2 \geq 0.35$. To establish the quality of the PLS and to check on multicollinearity, a measure of the predictive relevance of the model (Q^2) was evaluated. This was done through standardizing the independent variables, the variance inflation factors are reduced to acceptable levels. Using blindfolding procedures, the Q^2 values must be greater than 0 for the endogenous latent constructs (Tenenhaus, Esposito, Chatelin, & Lauro, 2005). To explain empirical data, a goodness of fit (GOF) is measured. The values are indicated as 0.1 (small), 0.25 (medium) and 0.36 (large). These were measured using geometric mean value of the average communality (AVE values) and the average R^2 values. A greater value was an indication of validation of the empirical data.

Table 3.2: Statistical Test and Analytical Models

Study Objective	Hypothesis	Analysis	Hypothesis Accept/Reject Criteria
1. Establish the effect of procurement governance on service delivery in MDAs in Kenya.	H_1: Procurement governance has no significant effect on service delivery.	PLS-SEM Analysis. Significance of SRMR and path coefficient	Hypothesis is not rejected if p-values of path coefficient and SRMR is less than 0.05.
2. Determine the mediating influence of procurement performance on the relationship between procurement governance and service delivery in MDAs in Kenya.	H_2: Procurement performance has no significant mediating influence on the relationship between procurement governance and service delivery.	PLS-SEM Analysis. Baron and Kenny (1986) method for testing mediation in SEM;	Hypothesis is not rejected if p-values of path coefficient and SRMR is less than 0.05. If the direct path is rendered insignificant in presence of the mediator, then full mediation is inferred (VAF > 0.8). On the other hand if the direct path remains significant in presence of the mediator, then partial mediation is inferred.
3. Assess the moderating effect of integrative supply chain technology on the relationship between procurement governance service delivery in MDAs in Kenya.	H_3:Integrative supply chain technology has no significant moderating effect on the relationship between procurement governance and service delivery.	PLS-SEM Analysis. Baron and Kenny (1986) method for testing moderation in SEM.	Hypothesis is not rejected if p-values of all path coefficients and SRMR and are less than 0.05. Use bootstrapping procedure to analyze the significance of the direct path coefficient. The path coefficient has to be statistically significant.
4. Examine the combined effect of procurement governance, integrative supply chain technology and procurement performance on service delivery in MDAs in Kenya.	H_4: Procurement governance, integrative supply chain technology and procurement performance have no significant combined effect on service delivery.	PLS-SEM Analysis. Significance of SRMR and path coefficient. f^2->change effect size of R^2 and q^2->change effect of Q^2	The hypothesis is not rejected if p-values of AVE are > 0.05. The hypothesis is not rejected if p-values of path coefficient and SRMR are less than 0.05; (The coefficient of determination R^2 value and the value Q^2 must be statistically significant. The results of R^2 and Q^2 values of service delivery were significant at <0.05.

CHAPTER FOUR

DESCRIPTIVE DATA ANALYSIS, RESEARCH FINDINGS AND INTERPRETATION

4.1 Introduction

In this chapter, discussion and findings are the focus as derived from the objectives. To find out how procurement governance, integrative supply chain technology, and procurement performance affect MDA service delivery in Kenya, this research was conducted. The study's primary objective was to investigate the effect of procurement governance on Kenyan MDAs' ability to provide services. Procurement performance was examined as a factor in the link between procurement governance and service delivery in Kenyan government agencies. Another objective was to examine the effect of integrative supply chain technology on the link between procurement governance and service delivery in Kenyan MDAs. Procurement governance, integrative supply chain technology, and procurement performance were also examined as a whole among Kenyan MDAs in the research.

This research, therefore, offers government bodies with useful guidance for policy formation. Data on the demographics of the population, characteristics of respondents, response rate, data processing, and descriptive statistics for each variable and its indicators are presented in this chapter. It also discusses measurement, model reliability and construct validity, and structural model evaluation in this chapter. A section on hypothesis testing is also included in this chapter. Results are then analyzed in accordance with the study's objectives.

4.2 Response Rate

The study's population were all 157 of the government's public procurement bodies, such as departments and agencies (MDAs). A total of 21 ministries, 42 state departments, and 94 state agencies made up Kenya's MDAs in 2019. There were 50 physical surveys and an online Google form for MDA procurement personnel to complete, where a total of 157 questionnaires were distributed. Among these, 138 completed responses were received, resulting in a response rate of 88%. Response rates of 88% were deemed to be satisfactory and adequate for analysis and are shown in Table 4.1. If a response rate of 50% is achieved, it is deemed sufficient, 60% and above good, and 70% or above excellent (Hertman & Hedborn, 1979).

Table 4.1: Response Rate

	Frequency	**Percentage**
Initial Population	157	100%
Usable Responses	138	88%
Response Rate	**88%**	

Source: Research Data, 2021

4.3 Data Preparation and Coding

The filled questionnaires both online and physical were examined for accuracy, completeness, suitability, and consistency and coded into appropriate format. From 138 returned questionnaires 16 responses were found to be unusable hence rejected and eliminated. It was discovered that 10 out of the 16 surveys had questionable response patterns. Straight line was found in which a large number of respondents indicated the same answer, hence the respondent was removed from the data. The remaining six were discarded because they included more than 15% missing data. Errors in data input or refusal to reply to a question or questions may have resulted in

missing data. Consequently, a total of 122 questionnaires provided the data for subsequent analysis. This resulted in a revised response rate of 70.93%.

The study consisted of four constructs and several indicators associated with each of the constructs namely, procurement governance, integrative supply chain technology, procurement performance and service delivery. Section A of the questionnaire was organized and coded using the SPSS application tool Version 25 for primary analysis of data. The SPSS application tool Version 25 was used to organize and code the Likert-type scale component of the questionnaire (sections B, C, D, and E). Data input mistakes were avoided by matching the SPSS labels and titles with those on the questionnaire. A comma-separated values (CSV) file was created from this data and put into the Smart PLS 3.3.3 program for additional analysis. Afterwards, the results were examined.

4.4 Demographic Characteristics of the Respondents

Demographic analysis is a technique used to develop an understanding of the age, sex, job title, work experience, size of the organization, financial performance, and racial composition of a population of study. According to Kothari (2009), descriptive statistics aid in organizing, summarizing, and simplifying the findings of research. The descriptive features of the respondents were compiled and examined using SPSS version 25 in this study. There were a number of demographic parameters that were analyzed using percentages and shown in frequency tables. In spite of the fact that the demographic data had little bearing on the level of analysis, it was useful in giving a basic overview of the population being studied.

4.4.1 Distribution of Respondents by Experience

Inquirers were asked how long they'd been with their current purchasing organization before answering this question. The replies were categorized into four broad groups depending on experience, ranging from 0-5, 5-10, 10-15, and over 15 years of service. The plurality of respondents (45%) had worked for their procurement organization for 10 to 15 year, further 5 to 10 years were 37% and those who had worked for fewer than 5 years (1%), as well as those who had worked for more than 15 years (10 percent). Table 4.2 displays the results. It was found that almost half of the respondents (45 percent) had been employed by the same purchasing organization for more than ten years. According to the results, the majority of participants had a good grasp of their purchasing entity and had some procurement expertise, both of which are critical for an organization's success. A research by Hung and Chin (2011) found a significant link between industry experience and performance.

Table 4.2: Experience of the Respondent in the Procuring Entity

Years	Frequency	Percent
0-5 Year	30	24.6
5-10 Year	37	30.3
10-15 Year	45	36.9
Above 15 Year	10	8.2
Totals	**122**	**100.0**

Source: Research Data, 2021

4.4.2 Distribution of Respondents by Education

The responses were grouped into secondary, diploma, degree, masters and doctoral. The results are presented in Table 4.3. Eight percent (8%) of respondents were diploma holders, 57% degree holders, 48% master's degree holders while only 9% had doctoral degrees. Majority of respondents from the study findings indicated that

they have reliable education backgrounds which imply that they have the technical expertise and procurement skills necessary to handle organisation procurement department. A study by Grable and Lytton (1998) asserts that graduates have strong knowledge achievement, assimilation and transformation skills that aid knowledge of company strategy operations.

Table 4.3: Level of Education by Respondents

Level of Education	Frequency	Percent
Diploma	8	6.6
Degree	57	46.7
Masters	48	39.3
Doctoral	9	7.4
Totals	**122**	**100.0**

Source: Research Data, 2021

4.4.3 Distribution of Respondents by Professional Body

This information was gathered to determine the respondent professional body. There was proof that most of the participants have done KISM (60.6%) and CIPS (15.5%) professional certifications. This implies that MDAs employees should attain professional certification to enhance their procurement skills and competencies.

Table 4.4: Professional Body by Respondents

Professional Body	Frequency	Percent
ACFE	4	3.2
CIPS	19	15.5
ICPAK	4	3.2
IIA	3	2.4
KISM	74	60.6
LSK	3	2.4
No Professional Body	15	12
Total	**122**	**100**

Source: Research Data, 2021

4.5 Sampling Adequacy and Sphericity Test

For each construct, sample adequacy measures were used to determine the data's appropriateness for factor analysis. Two metrics that were used to achieve this were Kaiser-Meyer-Olkin (KMO) and Bartlett's Test (BT). SPSS Version 25 was used to conduct the analysis. Factor A may be relevant in the research data if it has a high value near to 0.1. A sample adequacy KMO of more than 0.5 is required for a successful factor analysis (Burns & Burns, 2008). The KMO index is reported to range from 0 to 1, and the greater the number, the more suitable it is for use in factor analysis. Acceptable values are 0.5 and above. Test of Sphericity (BART) was used to examine the internal connection of concepts or words; a high score suggests better results. At a 0.05 related probability, there is a correlation between the variables.

Researchers that are looking for an explanation for the observed data will need to do this. Rusuli et al. (2013) said that the BT of Sphericity p-value should be not more than 0.05 and the Sampling Adequacy of KMO Measure should be more than 0.5 for factor analysis to be considered suitable. KMO's Sampling Adequacy Index (0.647) and the Bartlett's Test for Sphericity (0.05 or below) both showed significant results, hence the study moved on to the factor analysis stage. Measures of KMO were confirmed to meet the 0.6 standard (Kaiser, 1974). There are no structures that have chi-square values significant at less than 0.001 based on Bartlett's test of sphericity (Barlett, 1954). A factor analysis was appropriate for the items that reflect the latent constructs, based on the results of these two tests.

Table 4.5: Kaiser-Meyer-Olkin (KMO) Measure and Bartlett's Test

Construct				
Procurement Governance	**KMO Measure**	**Aprox. Chi Square**	**df**	**Sig**
Value for Money	0.607	46.964	3	0.000
Integrity	0.747	100.791	6	0.000
Equity	0.663	56.049	3	0.000
Fairness	0.650	99.011	3	0.000
Competition	0.666	112.319	6	0.000
Accountability	0.721	91.950	10	0.000
Transparency	0.616	3.934	3	0.000
Integrative Supply Chain Technology				
ERP system	0.765	133.965	6	0.000
E-procurement	0.663	87.723	3	0.000
Procurement Portal	0.666	65.705	6	0.000
Procurement Performance				
Regulatory Compliance	0.786	231.019	15	0.000
Effective Procurement Planning	0.667	139.873	6	0.000
Sound Evaluation Criteria	0.798	285.382	28	0.000
Performing Contracts	0.842	222.040	21	0.000
Inspection and Acceptance	0.826	210.936	10	0.000
Record keeping	0.673	234.859	10	0.000
Budget Absorption	0.781	160.499	6	0.000
Service Delivery				
Information Sharing	0.678	86.220	3	0.000
Timely Supplier Payments	0.537	77.308	3	0.000
Efficient Delivery of Goods & Services	0.700	98.849	3	0.000
Quality Goods & Services	0.743	163.654	6	0.000
User Effectiveness	0.620	91.584	3	0.000

Source: Research Data, 2021

4.6 Reliability and Construct Validity

There were four broad constructs in this research, which include procurement governance (PG), integrative supply chain technology (ISCT), procurement performance (PP), and service delivery (SD). These broad constructs were further split into 22 sub-constructs. Seven were classified under PG, three under ISCT, seven under PP and five under SD. Using reliability and exploratory factor analysis (EFA), the components' unidimensionality was determined. Principal components analyses with varimax rotations were used to do the EFA. Before factor analyses, Kaiser-Meyer-Olkin Measures and BT of Sphericity value of p were computed to determine that sample size was sufficient.

Factor loadings were also obtained for all the indicators of each construct of interest. Factor loadings below 0.4 were eliminated from further assessment (Hair et al., 2011). Internal consistency and reliability of individual component were evaluated. Item-total correlation coefficients for each of the study components were calculated in order to reach this goal. As a result of this investigation, only indicators with correlation values of at least 0.3 were retained for further assessment (Hair et al., 2010). It has been scaled and enhanced for validity besides reliability in subsequent write up for each of the study's concepts.

4.7 Procurement Governance

The procurement governance principles were categorized into seven items which include value for money, integrity, equity, fairness, competition, accountability, and transparency. Distinct indicators were assigned to each of these items. SEM analysis of these procurement governance construct indicators reliability and construct validity

was conducted prior to SEM analysis. Measurement findings for procurement governance are described in the following sections. The constructs were measured using the Likert metric scale ranging from 1 for absence of extent, 2 signifying extent of small magnitude, 3 for the extent of modest extent, 4 indicating extent of great magnitude and finally 5 for the extent of very great magnitude.

4.7.1 Value for Money

Value for money construct was measured using three indicators. Stores staff verify quantities for each supplier delivery was rated as the greatest source for value for money with a mean score of 4.50 (SD = 0.719, N =122). Inspecting and accepting products and services based on the needs of the customer was placed second with a mean score of 4.17 (SD = 0.712, N = 122). The procurement staff's periodic pricing market surveys had the lowest mean value for money rating (SD = 0.720, N = 122) of any indicator of value for money. Based on the mean scores of 4.16 for all items, it shows that most procurement officers agree with all the 3 questions. It implies that they perceived value for money functions are effectively carried out.

Cronbach Alpha was 0.627, which is deemed moderate but acceptable by this metric's standards (Hair et al., 2003). A principal component analysis with Varimax rotation indicated that all factor loadings were over the permissible threshold of 0.4 in EFA (the values varied from 0.682 to 0.828). There was a wide range of item-to-total correlation ratings that were greater than the required 0.3. Consequently, the value for money components were retained since reliability and construct validity were confirmed. Table 4.6 displays these findings.

Table 4.6: Value for Money

Indicators	N	Mean	Std. Dev.	Factor Loadings	Item-Total Correlation	Alpha if Item Deleted
Procurement staff carry out periodic price market surveys	122	3.81	0.720	0.682	0.361	0.630
Inspection and Acceptance Committees carry out quality checks against user specifications on Goods and services	122	4.17	0.712	0.828	0.526	0.397
Stores staff verify quantities for each supplier delivery	122	4.50	0.719	0.758	0.427	0.540

Cronbach's Alpha = 0.627, Grand mean = 4.16 Source: Research Data, 2021

4.7.2 Integrity

Four indicators were used to assess the concept of integrity. A Likert scale of 1 to 5 was used to measure each of these integrity metric. Procurement rules and regulations were recognized as the most significant source of integrity that affected the execution of procurement governance with a mean score of 4.22 (SD = 0.610, N = 122). With an average score of 4.10 (SD = 1.048, N = 122), staff disclose conflicts of interest in all procurement processes. A mean score of 4.07 (SD = 0.879, N = 122) followed after staff was briefed on methods utilized in procurement processes. Topping the list with a mean score of 4.00 (SD =1.060, N =122) was a statement that suppliers are aware of gift rules.

Integrity had a significant impact on procurement governance implementation, with a grand mean of 4.10 out of 5. There was a wide range of factor loadings, from 0.564 to 0.803, and item-to-total correlation values that met at least 0.3 rule of thumb, showing convergent validity. In this case, Cronbach's Alpha for the measuring scale was high at 0.729, confirming the high level of dependability of the design. As a result, all four

integrity indicators were evaluated in this investigation. Table 4.7 displays these findings.

Table 4.7: Integrity

Indicators	N	Mean	Std. Dev.	Factor Loadings	Item-Total Correlation	Alpha if Item Deleted
Every procurement proceeding is done in compliance with the procurement laws and regulations	122	4.22	0.610	0.564	0.351	0.752
Suppliers are informed of gift policies	122	4.00	1.060	0.803	0.598	0.621
Staff are trained on procedures used during procurement proceedings	122	4.07	0.879	0.787	0.578	0.635
Staff declare conflicts of interest in all procurement proceedings	122	4.10	1.048	0.797	0.590	0.626

Cronbach's Alpha = 0.729, Grand mean = 4.10 Source: Research Data, 2021

4.7.3 Equity

Equity construct was measured using three indicators. All indicators were evaluated using the Likert metric. As shown in Table 4.8, the replies varied from a mean of 3.82 to 4.08, indicating that respondents agreed to a moderate to a large level with the questions. "Goods and services are sourced on a rotating basis from a list of vendors" received the highest rating, with a mean of 4.08 (SD = 0.923, N = 122). With a mean score of 3.89 (SD = 0.964, N = 122), "Suppliers are treated impartially based on their capability" was ranked second. "Payments to suppliers are made fairly and on agreed-upon conditions" had the lowest grade, averaging 3. (SD = 1.305, N = 122).

An equity indicator with a grand mean of 3.93 indicates a significant deal of importance in assessing procurement governance. From 0.762 to 0.800, the factor

loadings met the 0.4 rule of thumb requirement. Moderate, but acceptable, Cronbach's alpha was found to be 0.668 All of the scale's items had item-total correlations of 0.3 or higher, which met the criteria for construct validity and reliability.

Table 4.8: Equity

Indicators	N	Mean	Std. Dev	Factor Loadings	Item-Total Correlation	Alpha if Item Deleted
Suppliers are treated impartially according to their capacity	122	3.89	0.964	0.779	0.494	0.565
Sourcing of goods and services is done from the list of suppliers on a rotational basis.	122	4.08	0.923	0.762	0.471	0.595
Payments to suppliers is done fairly on terms agreed	122	3.82	1.305	0.800	0.518	0.553

Cronbach's Alpha = 0.668, Grand mean = 3.93 Source: Research Data, 2021

4.7.4 Fairness

Fairness construct was measured using three indicators. All indicators were evaluated using the Likert metric. The scale ranged from 1 for "absence of extent" to 5 "notifying extent of very great magnitude". On a scale of 1 to 5, respondents were asked to rate their level of understanding of the effect of procurement governance on service provision. Table 4.9 shows that the answers varied from a mean of 4.02 to a maximum of 4.11. "Payment of suppliers is done according to when they fall regardless" was the least rated fairness indicator, with a mean of 4.02 (SD = 0.803, N = 122). "Procurement processes are conducted in a sufficiently open way" had the highest mean score of 4.11 (SD =0.748, N = 22) of all the indicators.

According to the survey, the second-highest priority was "the selection of suppliers in particular categories is carried out without prejudice against others," with an average

score of 4.07 (SD = 0.810, N = 122). The overall mean was 4.06, indicating that fairness indicators are important in assessing procurement governance. An impressive 0.764 was the Cronbach Alpha for this set of data. From 0.780 to 0.884 and 0.536 to 0.693, factor loadings and item-total correlations met the rule of thumb for reliability and construct validity.

Table 4.9: Fairness

Indicators	N	Mean	Std. Dev.	Factor Loadings	Item-Total Correlation	Alpha if Item Deleted
Procurement proceedings are carried out in a reasonably open manner	122	4.11	0.748	0.808	0.566	0.716
Selection of suppliers in certain categories is carried out without discrimination against others	122	4.07	0.810	0.884	0.693	0.567
Payment of suppliers is done according to when they fall regardless	122	4.02	0.803	0.780	0.536	0.750

Cronbach's Alpha = 0.764, Grand mean = 4.06 Source: Research Data, 2021

4.7.5 Competition

Four indicators were used to gauge the overall competitiveness of the teams. All indicators were evaluated using the Likert metric. Table 4.10 shows the findings. The replies had a mean of 4.23 to 4.41. The highest rating was "procuring entity invites bidders to watch tender opening" with a mean score of 4.41 (SD = 0.724, N = 122). "Tenders are solicited through competitive methods" had the lowest mean score of all the competition indicators (SD = 0.780, N = 122). "Procurement processes open to all bidders" had a mean score of 4.28 (SD = 0.753) and "Bidders are invited to participate in tenders" has a mean score of 4.28 (SD = 0.806). According to the grand mean for competition, respondents agreed that competition has a significant effect on procurement governance. The factor loadings ranged from 0.673 to 0.805. The scale's

Cronbach's Alpha score was impressive, coming in at 0.726. Measurement reliability and construct validity were met with item-to-total correlations of more than 0.3. Further investigation took into account each and every one of the items.

Table 4.10: Competition

Indicators	N	Mean	Std. Dev.	Factor Loadings	Item-Total Correlation	Alpha if Item Deleted
Tenders are solicited through competitive methods	122	4.23	0.780	0.673	0.437	0.710
Procurement processes are done openly to all bidders	122	4.28	0.753	0.798	0.591	0.619
Bidders are invited to participate in tenders	122	4.28	0.806	0.805	0.591	0.617
Procuring Entity encourages bidders to witness tender opening	122	4.41	0.724	0.683	0.448	0.702

Cronbach's Alpha = 0.726, Grand mean = 4.30 Source: Research Data, 2021

4.7.6 Accountability

Accountability construct was measured using five indicators. All indicators were evaluated using the Likert metric scale. Details of the measurement scales for accountability are presented in Table 4.11. With a mean of 4.35 (SD = 0.760, N = 122), "each official in the supply chain authenticates their paperwork" was ranked as the strongest source of accountability. A mean of 4.25 (SD = 0.785, N = 122) was assigned to "Procurement audits are conducted for all procedures". A mean of 4.22 (SD = 0.838, N = 122) is then given, to the statement "documentation is done by committee." The item "monthly reports are prepared for all procedures" had an average score of 4.20. A mean of 4.18 (SD = 0.750, N = 122) was the lowest for "individual responsibility is taken in the procurement processes" as a source of accountability.

Grand average of 4.24 was considered moderate. There was a high degree of Cronbach's Alpha, with a value of 0.683. Using Principal Component Analysis and Varimax rotation, exploratory factor analysis yielded factor loadings of between 0.578 and 0.744. Item-total correlations ranged from a 0.359 to a 0.522. All of the accountability items were retained for further investigation because of their proven reliability and construct validity.

Table 4.11: Accountability

Indicators	N	Mean	Std. Dev.	Factor Loadings	Item-Total Correlation	Alpha if Item Deleted
Individuals take responsibility in the procurement proceedings	122	4.18	0.750	0.744	0.517	0.595
Procurement audit is undertaken for all processes	122	4.25	0.785	0.654	0.410	0.640
Each officer in the supply chain authenticates their documents	122	4.35	0.760	0.740	0.522	0.592
Documentation is done by committees	122	4.22	0.838	0.602	0.378	0.656
Periodic reports are made for all processes	122	4.20	0.802	0.578	0.359	0.663

Cronbach's Alpha = 0.680, Grand mean = 4.24 Source: Research Data, 2021

4.7.7 Transparency

Transparency construct was measured using three indicators. Likert metric was used to evaluate all indicators. Details of the measurement scales for transparency are presented in Table 4.12. This indicator was scored the highest in terms of openness, with an average score of 4.35 out of a possible 5 (SD = 0.862, N = 122). "Staff file every transaction for audit trail and reference" placed second with a mean of 4.21 (SD = 0.671, N = 122) Procurement processes are announced in daily newspapers and

online, with an average score of 4.07 (SD = 0.64) and a total of 122 respondents, the least rated source of transparency.

The grand average was 4.21. The scale has a Cronbach's Alpha of 0.569. Preliminary factor analyses based on principal component analysis and Varimax rotation revealed factor loadings of between 0.698 and 0.783, all of which were greater than the acceptable criterion of 0.4. The item-total correlation rule of thumb is 0.3, and the results varied from 0.346 to 0.433. Since reliability and construct validity were validated, all of the accountability items were maintained for additional research.

Table 4.12: Transparency

Indicators	N	Mean	Std. Dev.	Factor Loadings	Item-Total Correlation	Alpha if Item Deleted
Staff file every transaction for audit trail and reference	122	4.21	0.671	0.698	0.346	0.522
Procurement proceedings are advertised on daily newspapers and on websites	122	4.07	0.864	0.783	0.433	0.378
Committees keep minutes on all the proceedings	122	4.35	0.862	0.720	0.372	0.483

Cronbach's Alpha = 0.569, Grand mean = 4.21 Source: Research Data, 2021

4.8 Integrative Supply Chain Technology

ERP system, e-procurement, and a procurement portal were the three components of the integrative supply chain technology build that were examined. The latent variable was represented by each of these indicators. These supply chain technologies were tested for reliability and construct validity prior to conducting this PLS-SEM analysis. The following sections detail the outcomes of the various supply chain technology constructs studied in this research. The constructs were measured using the Likert metric scale ranging from 1 representing "not at all" to 5 representing "to a very large extent."

4.8.1 Enterprise Resource Planning System

ERP system construct was measured using four indicators. All indicators were evaluated using the Likert metric scale. The respondents were asked to indicate the extent to which they agreed with the statement about ERP system. “Departments share information through the system functions” indicator had a mean of 4.15 (SD = 0.849, N = 122). “The procuring entity sustains communication with suppliers” had a mean of 4.14 (SD = 0.912, N = 122). “The procuring entity uses integrated system” indicator had an average of 4.13 (SD = 0.760, N = 122). “The procuring entity has implemented enterprise resource planning system” returned a mean of 3.91 (SD = 0.750, N = 122).

The grand mean of 4.08 indicates that the ERP system effect of integrative supply chain technology on service delivery is significant on average. All item-total correlations were over the 0.3 criterion, demonstrating that the concept validity of the test has been established. The Cronbach's Alpha for the scale was high at 0.785, a sign of the scale's good dependability. Because of this, all four indicators were examined in more detail. Table 4.13 displays these findings.

Table 4.13: ERP system

Indicators	N	Mean	Std. Dev.	Factor Loadings	Item-Total Correlation	Alpha if Item Deleted
The procuring entity has implemented enterprise resource planning system	122	3.91	0.750	0.801	0.615	0.723
The procuring entity uses integrated system	122	4.13	0.760	0.798	0.609	0.725
The procuring entity sustains communication with suppliers	122	4.14	0.912	0.780	0.595	0.733
Departments share information through the system functions	122	4.15	0.840	0.749	0.559	0.748

Cronbach’s Alpha = 0.785, Grand mean = 4.08 Source: Research Data, 2021

4.8.2 E-procurement

E-procurement system construct was measured using three indicators. All indicators were evaluated using the Likert metric scale with the highest rated e-procurement measure being “Entities carry out seamless transactions through the system” which had a mean of 4.01 (SD = 0.828, N = 122), and “Entities and suppliers easily access documents and information” with same mean of 4.01 (SD = 0.848, N = 122). The lowest rated measure was the indicator “The procuring entity enhances electronic communication” with a mean score of 3.96 (SD = 0.786, N = 122).

An average of 3.99 was found, demonstrating that e-procurement had a considerable influence on service quality. There was a wide range of factor loadings and item-to-total correlations between 0.583 and 0.640 in the study. At 0.746, Cronbach's Alpha was deemed to be strong evidence. A high degree of reliability and construct validity was shown by all of these metrics. The results are summarized in Table 4.14 .

Table 4.14: E-procurement

Indicators	N	Mean	Std. Dev	Factor Loadings	Item-Total Correlation	Alpha if Item Deleted
The procuring entity enhances electronic communication	122	3.96	0.786	0.827	0.583	0.651
Entities carry out seamless transactions through the system	122	4.01	0.828	0.861	0.640	0.580
Entities and suppliers easily access documents and information	122	4.01	0.848	0.756	0.500	0.747

Cronbach’s Alpha = 0.746, Grand mean = 3.99 Source: Research Data, 2021

4.8.3 Procurement Portal

Procurement portal construct was measured using four indicators. All indicators were measured using the Likert metric scale ranging from 1 for "absence of extent" to 5 "very great magnitude". The results indicate that the indicator "open tenders are advertised to all tenderers through PPIP" and "Several tenderers access the procurement portal" was rated highest with mean of 4.22 (SD = 0.798, N = 122) and 4.22 (SD = 0.848, N = 122) respectively. "The system links suppliers with procuring entities" indicator was rated third highest with average of 4.21 (SD = 0.845, N = 122). These were followed by the least rated indicator "Procuring entities save administration costs" with a mean of 4.08 (SD = 0.839, N = 122).

The grand mean was 4.18 indicating that on average, procurement portal had been enhanced to a great extent. Items' factor loadings ranged from 0.633 to 0.773. There was a wide range of item-total correlations, from 0.369 to 0.511. Cronbach's Alpha was 0.649, which was regarded moderate, but acceptable. As a result, the validity of the construct and its dependability were both validated. Table 4.15 contains this information.

Table 4.15: Procurement Portal

Indicators	N	Mean	Std. Dev	Factor Analysis	Item-Total Correlation	Alpha if Item Deleted
Open tenders are advertised to all tenderers through PPIP	122	4.22	0.798	0.633	0.369	0.619
Several tenderers access the procurement portal	122	4.22	0.848	0.707	0.438	0.573
Procuring entities save administration costs	122	4.08	0.839	0.773	0.511	0.520
The system links suppliers with procuring entities	122	4.21	0.845	0.674	0.397	0.602

Cronbach's Alpha = 0.649, Grand mean = 4.18 Source: Research Data, 2021

4.9 Procurement Performance

The procurement performance construct is comprised of seven components: regulatory compliance, effective procurement planning, sound assessment criteria, performance contract inspection and acceptance, record keeping, and budget absorption. Each of these elements was considered an independent indication of the hidden variable. Prior to doing PLS-SEM analysis on each of these procurement performance measures, reliability and construct validity were determined. The subsections that follow detail the findings obtained for each of the procurement performance measurement categories. The constructs were measured using the Likert metric scale ranging from 1 representing “not at all” to 5 representing “to a very large extent.”

4.9.1 Regulatory Compliance

Regulatory compliance construct was measured using six indicators. All indicators were evaluated using the Likert metric. Regulatory compliance measuring scales are detailed in Table 4.16. The highest ranked indicator of 4.36 (SD = 0.728, N = 122) was assigned to the statement "All communications relate to procurement regulations”, whereas the least ranked indicator of 4.08 (SD = 0.839, N = 122) was assigned to the statement "Committee directives are followed at all times.".

The mean regulatory compliance item scores varied from 4.08 to 4.36, with a grand mean of 4.20. Findings of factor loadings from 0.629 to 0.785 were made. 0.812 was a high value for Cronbach's Alpha. In light of this, it is concluded that the regulatory compliance has a high degree of authenticity and dependability.

Table 4.16: Regulatory Compliance

Indicators	N	Mean	Std. Dev.	Factor Analysis	Item-Total Correlation	Alpha if Item Deleted
Procurement proceedings are in line with approved procurement methods	122	4.15	0.757	0.740	0.580	0.780
Procuring entity ensures submission of regulated reports on timely basis	122	4.16	0.672	0.785	0.645	0.770
All communications refer to procurement laws	122	4.36	0.728	0.729	0.595	0.778
Procurement proceedings comply with process timelines by all committees	122	4.18	0.918	0.718	0.575	0.784
Segregation of duty is done for all proceedings	122	4.25	0.775	0.734	0.596	0.777
Committees' mandates are observed at all times	122	4.08	0.839	0.629	0.479	0.804

Cronbach's Alpha = 0.812, Grand mean = 4.20 Source: Research Data, 2021

4.9.2 Effective Procurement Planning

Effective procurement planning construct was measured using four indicators. All indicators were evaluated on scale of 1 to 5. Details of the measurement scales for effective procurement planning are presented in Table 4.17. "Staff ensure regular review of procurement plan" was rated highest with mean of 4.08 (SD = 0.819, N =122). "Procuring entity ensure annual procurement planning is done by 30th June every year" was ranked second with a mean of 4.02 (SD =0.913, N =122). "Users emphasize proactive early requisitioning was ranked third with an average of 3.99 (SD =0.983, N=122). "Users ensure adherence to procurement planning schedule" was ranked last with a mean of 3.95 (SD = 0.908, N = 122).

The mean item scores for efficient procurement planning varied from 3.95 to 4.08, with a grand mean of 4.01. Between 0.723 and 0.837 were the factor loadings and 0.511 to 0.669 were the item-total correlations. A high Cronbach's Alpha indicates a high degree of reliability. They all point to a high level of relibility and construct validity in the successful procurement planning.

Table 4.17: Effective Procurement Planning

Indicators	N	Mean	Std. Dev.	Factor Loadings	Item-Total Correlation	Alpha if Item Deleted
Procuring entity ensure annual procurement planning is done by 30th June every year	122	4.02	0.913	0.723	0.511	0.746
Users ensure adherence to procurement planning schedule	122	3.95	0.908	0.837	0.669	0.661
Users emphasize proactive early requisitioning	122	3.99	0.983	0.779	0.574	0.715
Staff ensure regular review of procurement plan	122	4.08	0.819	0.739	0.541	0.731

Cronbach's Alpha = 0.770, Grand mean = 4.01 Source: Research Data, 2021

4.9.3 Sound Evaluation Criteria

Sound evaluation criteria construct was measured using eight indicators. All indicators were evaluated using a five-point Likert scale ranging from 1 to 5. According to Table 4.18, answers varied between a mean of 3.80 and 4.34. The indication with the lowest rating for sound assessment criteria was "Financial evaluation must be conducted prior to award decision," with a mean of 3.80 (SD = 1.257, N = 122). The indicators with the highest mean of 4.34 (SD =0.756, N= 122) were "Evaluation exercise is finished within 30 days after tender opening" and

"Evaluation reports are provided following the evaluation exercise" with a mean of 4.34 (SD =0.788, N= 122). 4.25 was the grand mean. Cronbach Alpha was 0.307 at the time.

The loadings of factors varied from 0.217 to 0.758. Four items; “Evaluation committees always review the tender documents prior to evaluation of tenders”, This process must be completed within 30 days after tender opening, bidders must fulfill all essential conditions before an award recommendation can be made, and a financial review must be completed before an award decision can take place. These items were not eligible for further investigation because their item-to-total correlation values were less than 0.3. Cronbach's Alpha for the last four indicators rose to 0.716, with item-to-total correlations ranging from 0.376 to 0.627. Moreover, all factor loadings exceeded the threshold of 0.4. (ranged from 0.603 to 0.833). Four objects were chosen for further investigation.

Table 4.18: Sound evaluation criteria

Indicators	N	Mean	Std. Dev.	Factor Loadings	Item-Total Correlation	Alpha if Item Deleted
Evaluation committees ensure conformity to specifications during evaluation exercise	122	4.14	0.708	0.758	0.284	0.272
Evaluation committees always review the tender documents prior to evaluation of tenders	122	4.30	6.388	0.217	0.144	0.737
Evaluation committees make variations recommendations and reports	122	4.17	0.924	0.631	0.362	0.243
Evaluation exercise is completed within 30 days after date of tender opening	122	4.34	0.756	0.695	0.220	0.280
Evaluation reports are prepared after the evaluation exercise	122	4.34	0.788	0.700	0.362	0.254
Bidders must meet all mandatory requirements before recommendation of their award	122	3.98	0.971	0.556	0.236	0.268
Evaluation criteria encompasses technical specifications	122	4.14	0.816	0.758	0.413	0.242
Financial evaluation must be carried out prior to determination for award.	122	3.80	1.257	0.375	0.164	0.276

Cronbach's Alpha =0.307, Grand mean =4.151 Source: Research Data, 2021

4.9.4 Performance Contracts

Performance contracts construct was measured using seven indicators using the Likert metric scale ranging from 1 to 5. Details of the measurement scales for performance construct are presented in Table 4.19. The highest rating was 4.29 (SD =0.895, N =122) for the indicator "contract implementation teams are appointed for complex and specialized contracts". The indicator "Conflict resolution is made amicably to enhance supplier relationship" was rated second with mean of 4.11 (SD =0.831, N =122), while the indicator "Procuring entity conduct contract variations to ensure service continuity" was ranked third with a mean of 4.09 (SD = 0.833, N =122).

Other indicators included “contract performance review is ensured by the head of procurement with a mean of 4.04 (SD = 0.754, N =122); “Suppliers make timely deliveries for all orders” with an average of 3.95 (SD =0.943, N =122); “Existing contracts are subject to contract administration for monitoring” with a mean of 3.89 (SD =0.870, N =122); and “supplier payments are made when they fall due” with a mean of 3.89 (SD = 1.006, N =122).

Items in the performance construct had mean item scores ranging from 3.89 to 4.29, with a grand mean of 4.036. Item-to-total correlation coefficient varied from 0.421 to 0.628. Cronbach's Alpha was at an excellent level of 0.806 after the study was completed. Performance contracts showed a high level of reliability and construct validity, as shown by these findings.

Table 4.19: Performance Contracts

Indicators	N	Mean	Std. Dev.	Factor Loadings	Item-Total Correlation	Alpha if Item Deleted
Existing contracts are subject to contract administration for monitoring	122	3.89	0.870	0.646	0.500	0.788
Contract performance review is ensured by the head of procurement	122	4.04	0.754	0.725	0.587	0.775
Contract Implementation	122	4.29	0.895	0.558	0.421	0.802
Teams are appointed for complex and specialized contracts						
Suppliers make timely deliveries for all orders	122	3.95	0.943	0.754	0.628	0.764
Supplier Payments are made when they fall due	122	3.89	1.006	0.753	0.620	0.765
Procuring entity conduct contract variations to ensure service continuity	122	4.09	0.833	0.621	0.472	0.792
Conflict resolution is made amicably to enhance supplier relationship	122	4.11	0.831	0.704	0.569	0.776

Cronbach's Alpha = 0.806, Grand mean = 4.036 Source: Research Data, 2021

4.9.5 Inspection and Acceptance

Inspection and acceptance construct was measured using five indicators. All indicators were evaluated using the Likert metric ranging from 1 for absence of extent, 2 notifying extent of small magnitude, 3 notifying extent of modest extent, 4 notifying extent of great measure and finally 5 notifying extent of very great magnitude. Details of the measurement scales for inspection and acceptance are presented in Table 4.20. The inspection and acceptance items were rated as follows, "inspection and acceptance committees ensure quality and quantity is achieved" with a mean of 4.16 (SD = 0.720, N =122). "Quality and quantity certificate is issued for

every delivered consignment inspected and accepted" with a mean of 4.30 (SD = 0.757, N =122). "Goods receipts process is only for goods that pass necessary tests" with a mean of 4.20 (SD = 0.918, N =122). "Inspection certificates must be attached to every supplier payment to ensure audit trail" with a mean of 4.25 (SD = 0.896, N =122) and "inspection reports are a mandatory prerequisite to goods being accepted" with a mean of 4.22 (SD = 0.905, N =122).

Inspection and acceptance construct had mean values ranging from 4.16 to 4.30, with a grand mean of 4.228. From 0.587 to 0.854 factor loadings and 0.431 to 0.715 item-total correlations were found. Cronbach's Alpha was 0.809. All of this suggest that the inspection and acceptance model has a high level of construct validity and reliability.

Table 4.20: Inspection and Acceptance

Indicators	N	Mean	Std. Dev	Factor Loadings	Item-Total Correlation	Alpha if Item Deleted
Inspection and Acceptance Committees ensure Quality and quantity is achieved	122	4.16	0.720	0.838	0.691	0.749
Quality and quantity certificate is issued for every delivered consignment inspected and accepted	122	4.30	0.757	0.854	0.715	0.740
Goods receipts process is only for goods that pass necessary tests	122	4.20	0.918	0.587	0.431	0.825
Inspection certificates must be attached to every supplier payment to ensure audit trail	122	4.25	0.896	0.757	0.598	0.772
Inspection reports are a mandatory prerequisite to goods being accepted	122	4.22	0.905	0.763	0.600	0.771

Cronbach's Alpha = 0.809, Grand mean = 4.228 Source: Research Data, 2021

4.9.6 Record Keeping

Record keeping construct was measured using five indicators. All indicators were evaluated using the Likert metric scale of 1 to 5. Details of the measurement scales for record keeping are presented in Table 4.21. The highest rated indicator of record keeping was "Procuring entity assures stock adjustments for explained deviations," with a mean of 4.25 (SD = 0.912, N =122). "Stock taking is stressed for monthly, quarterly, and yearly exercises" came in second place with a mean of 4.02 (SD = 0.853, N = 122). "At all times, stock records are kept" came in third place with a

mean of 3.98 (SD = 0.876, N = 122). With a mean of 3.76 (SD = 1.273, N =122), "Stores stock checklists are examined on a regular basis" was rated fourth.

'The shops security is guaranteed at all times' had the lowest average score of 3.59 (SD = 1.043, N = 122) of any of the questions. The average item scores for record-keeping ranged from 3.59 to 4.25, with a grand mean of 3.918. Factor loadings were ranged from 0.533 to 0.897 and 0.403 to 0.772 item-to-total correlations were found. At 0.764, Cronbach's Alpha was the highest. All of this suggests that the record-keeping construct has a high level of reliability and construct validity.

Table 4.21: Record Keeping

Indicators	N	Mean	Std. Dev.	Factor Loadings	Item-Total Correlation	Alpha if Item Deleted
Stock records are maintained at all times	122	3.98	0.876	0.710	0.464	0.745
Stock taking is emphasized for periodical monthly, quarterly, and annual exercises.	122	4.02	0.853	0.758	0.533	0.725
Procuring entity ensures stock adjustments for explained variances	122	4.25	0.912	0.897	0.772	0.643
Stores stock checklists are inspected regularly	122	3.76	1.273	0.722	0.571	0.717
The stores security is ensured at all times	122	3.59	1.043	0.533	0.403	0.768

Cronbach's Alpha = 0.764, Grand mean = 3.918 Source: Research Data, 2021

4.9.7 Budget Absorption

Budget absorption construct was measured using four indicators. All indicators were evaluated using the Likert metric scale. Details of the measurement scales for budget absorption are presented in Table 4.22. The indicators were ranked as follows, "Budget absorption corrective measures are undertaken on timely basis", was rated as the greatest source of budget absorption with a mean of 4.11 (SD = 0.95, N = 122).

“Procuring entity ensures approvals are given to reallocate unutilized funds to other better uses” was rated second with an average of 4.10 with a standard deviation of 1.048 from 122 responses. "Mandatory communication of budget absorption information with users" came in third place with a mean of 4.07 (SD = 0854, N =122), and "Budget committees guarantee frequent budget absorption reviews" came in last place with a mean of 3.93 (SD = 0.613, N =122).

Budget absorption item scores ranged from 3.93 to 4.11 out of a possible 4. In contrast to the item-total correlations, the factor loadings ranged from 0.759 to 0.847. Cronbach Alpha for this scale was 0.804. According to all of this, the budget absorption is reliable and valid.

Table 4.22: Budget Absorption

Indicators	N	Mean	Std. Dev.	Factor Loadings	Item-Total Correlation	Alpha if Item Deleted
Budget committees ensure regular budget absorption reviews	122	3.93	0.613	0.759	0.574	0.790
Budget absorption information sharing with users is mandatory	122	4.07	0.854	0.812	0.639	0.746
Budget absorption corrective measures are undertaken on timely basis	122	4.11	0.952	0.847	0.702	0.712
Procuring entity ensures approvals are given to reallocate unutilized funds to other better uses	122	4.10	1.048	0.789	0.627	0.761

Cronbach’s Alpha = 0.804, Grand mean = 4.053 Source: Research Data, 2021

4.10 Service Delivery

Service delivery construct was broken down into five main components: information exchange, timely payments for supplies, effective product and service delivery, high-quality products and services, as well as user effectiveness. The latent variable was

represented by each of these indicators. PLS-SEM analysis was performed before each of these service delivery components was tested for reliability and validity. For each service delivery method, the following subsections describe the findings. The constructs were measured using the Likert metric scale ranging from 1 for absence of extent, 2 signifying extent of small magnitude, 3 for the extent of modest extent, 4 indicating extent of great magnitude and finally 5 for the extent of very great magnitude.

4.10.1 Information Sharing

Information sharing construct was measured using three indicators and evaluated using Likert metric scale in range of 1 to 5. Supply chain visibility was identified as the most important source of information sharing with an average 4.11 rating (SD = 0.902, N = 122). A mean of 4.09 (SD = 0.717, N = 122) was assigned to the statement, "There is enhanced information exchange between suppliers and procurement entity." "Information access is increased to users" was the least ranked source of information sharing with an average of 3.82 (SD = 0.843, N = 122). 4.007 was the grand mean. Respondents on average stated that their purchasing entity was heavily impacted by these variables.

Cronbach alpha was 0.744. The exploratory factor analysis using principal component analysis and varimax rotation indicated that all of the factor loadings were over the acceptable 0.4 criterion for factor loadings (they ranged from 0.775 to 0.847). Items-to-total correlations were found to vary from 0.525 to 0.615. Because all of the information sharing components have been shown to be reliable and legitimate, they were utilized further analysis. Table 4.23 displays these findings.

Table 4.23: Information Sharing

Indicators	N	Mean	Std. Dev.	Factor Loadings	Item-Total Correlation	Alpha if Item Deleted
Information access is enhanced to users	122	3.82	0.843	0.847	0.615	0.604
There is improved information sharing between vendors and the procuring entity	122	4.09	0.716	0.828	0.589	0.651
There is visibility of processes throughout the supply chain	122	4.11	0.902	0.775	0.525	0.724

Cronbach's Alpha = 0.744, Grand mean = 4.007 Source: Research Data, 2021

4.10.2 Timely Supply Payments

Timely supply payments construct was measured using three indicators. All indicators were evaluated using the Likert metric scale. Details of the measurement scales for market performance are shown in Table 4.24. There was a wide range of average item ratings for timely supply payments, ranging from 3.93 to 4.01. An item-total correlation varied from 0.206 to 0.339 and factor loadings from 0.36 to 0.890. 0.303 was the Cronbach Alpha. Thus, there is a lack of reliability and validity.

To avoid bias, the "Supplier payments is enhanced" indicator was discarded due to its low item-total correlation score of 0.206. A new Cronbach's Alpha of 0.803 was achieved. All factor loadings were likewise over the 0.4 threshold. This limited the scope of this investigation to just a few indicators of timely supplier payments.

Table 4.24: Timely Supply Payments

Indicators	N	Mean	Std. Dev.	Factor Loadings	Item-Total Correlation	Alpha if Item Deleted
Supplier payments is enhanced	122	4.01	3.819	0.436	0.206	0.803
Timely payments are made online to suppliers as fall due	122	3.83	0.951	0.885	0.334	0.181
Supplier debt aging report is produced for payments decision making	122	3.93	1.038	0.890	0.339	0.156

Cronbach's Alpha =0.303, Grand mean =3.921 Source: Research Data, 2021

4.10.3 Effective Delivery of Goods and Services

Three indicators were used to gauge how well the distribution of products and services was going on. Each indicator was ranked on a Likert scale ranging from 1 to 5. With a mean of 4.08 (SD = 0.941, N = 122), the "Supplier deliveries are monitored for planning purposes" indicator was found to be the biggest source of effective delivery of goods and services. Delivery schedule information being shared with suppliers was placed second, with an average of 3.95 (SD = 0.842, N = 122). "Supplier's deliveries are made as and when items are required" received the lowest rating with an average of 3.93 (SD = 0.805, N = 122) out of a possible 5 points.

That's based on the overall mean score of 3.986 for all three questions, which indicates that most people agree. In other words, procurement officials believe that products and services are delivered as promised. The scale has a high Cronbach Alpha of 0.7771. Factor loadings ranging from 0.819 to 0.849 were observed in a preliminary factor analysis using principal component analysis and Varimax rotation., the item-to-total correlations were found to be between 0.594 and 0.641. For this reason, all items related to effective delivery of products and services were retained

for further analysis since the reliability and construct validity of the data had been confirmed. Table 4.25 shows these results.

Table 4.25: Effective Delivery of Goods and Services

Indicators	N	Mean	Std. Dev.	Factor Loadings	Item-Total Correlation	Alpha if Item Deleted
Suppliers' deliveries are made as and when goods are needed.	122	3.93	0.805	0.819	0.594	0.722
Delivery schedule information is shared with suppliers	122	3.95	0.842	0.849	0.641	0.670
Supplier deliveries are tracked for planning purposes	122	4.08	0.941	0.832	0.615	0.704

Cronbach's Alpha = 0.777, Grand mean = 3.986 Source: Research Data, 2021

4.10.4 Quality Goods and Services

Quality goods and services construct was measured using four indicators. Each indicator was rated on five point Likert metric scale. According to Table 4.26, the responses had a mean between 4.20 and 4.49. "Quality inspection is done on all products and services provided," with a mean score of 4.19 (SD = 0.742, N = 122), was the lowest scoring quality goods and services indicator. "Communication to suppliers is made for any quality discrepancies" had the highest mean of 4.49 (SD = 0.752, N = 122). The other indicators were "Specifications are verified for quality conformity" with an average of 4.20 (SD =0.768, N =122) and "All defects are addressed immediately and remedied" with mean of 4.32 (SD =0.874, N = 122). The grand mean was 4.299, which indicates that the quality of products and services is being successfully implemented by the respondents. Cronbach Alpha was 0.797 indicating high reliability. The factor loadings ranged between 0.764 and 0.878. The item-total correlation varied from 0.513 to 0.746. Consequently, all products and

services classified as "quality" were preserved for further analysis because of their proven reliability and construct validity.

Table 4.26: Quality Goods and Services

Indicators	N	Mean	Std. Dev.	Factor Loadings	Item-Total Correlation	Alpha if Item Deleted
Quality inspection is done on all goods and services delivered	122	4.19	0.742	0.764	0.567	0.766
Specifications are verified for quality conformity	122	4.20	0.768	0.816	0.634	0.734
Communication to suppliers is made for any quality variations	122	4.49	0.752	0.878	0.746	0.680
All defects are addressed immediately and remedied	122	4.32	0.874	0.709	0.513	0.801

Cronbach's Alpha =0.797, Grand mean =4.299 Source: Research Data, 2021

4.10.5 User Effectiveness

User effectiveness construct was measured using three indicators. All indicators were evaluated using the Likert metric scale. An average of 4.12 and a standard deviation of 0.778 were reported by 122 respondents, with "distribution of products and services acquired from suppliers being made quickly" being the most influential user effectiveness factor on service delivery. The second most popular answer, "Users conduct market surveys to evaluate service performance," had a mean score of 4.02 (SD = 1.028, N = 122). A mean of 3.87 (SD = 0.852, N = 122) was recorded for the indicator "End users get service when necessary.".

The grand mean of 4.003 shows how much user effectiveness affects service delivery on average. Factor loadings ranged from 0.699 to 0.881. All item-total correlations

were found to be over the requisite 0.3 threshold. With a Cronbach's Alpha value of 0.713, the scale was found to be quite reliable. Table 4.27 displays these findings. As a result, because the reliability and construct validity of all the items under user effectiveness had been established, they were all kept for further examination.

Table 4.27: User effectiveness

Indicators	N	Mean	Std. Dev.	Factor Loadings	Item-Total Correlation	Alpha if Item Deleted
End users receive service when required	122	3.87	0.852	0.838	0.556	0.597
Distribution of goods and services received from suppliers are made immediately	122	4.12	0.778	0.881	0.652	0.503
Users carry out market surveys to appraise service delivery	122	4.02	1.028	0.699	0.429	0.784

Cronbach's Alpha =0.713, Grand mean =4.003 Source: Research Data, 2021

4.11 Measurement Model and Structural Model Assessment

Henseler et al. (2009) recommend a two-step technique for analyzing and presenting findings from gathered data of PLS-SEM path models. Measurement model (outer model) evaluation and structural model (inner model) evaluation are both part of the two-step process. Procurement governance (PG), procurement performance (PP), integrative supply chain technology (ISCT) and the delivery of services (SD) are four latent components with reflective indicators in the research model. In reflective path models, there are causal arrows that connect the latent concept to the observable objects. A representative sample of all indicators accessible, which reflect reality of the hidden concept, is what this indicates. Following Hair's (2006) criteria, an examination was carried out to determine the construct's reliability and validity as well as its dimensions. The measurement model (outer model) consists of all the

indicators pertinent to each exogenous variable. Each variable has its own block of indicators.

The measurement item's overall contribution to the specification of its latent construct is represented by the outer loadings. The acquired data is used to assess the theorized relationships. This is an examination of the proposed connections and a testing of the supposed connections between the many constructs that have been proposed. For the PLS-SEM outer model analysis, 22 measurement indicators representing four (4) components were analyzed using CFA. The relationships between the measured variables and their 22 components were highlighted using an outside measurement model. The measurement model explains the link between each block of indicators and the appropriate latent variables. There were a number of items used to measure the study's various components. Table 4.28 lists the kinds of structures and the number of variables observed. The latent concept is reflective and warrants further testing for both reliability and validity due to the observed variables' high levels of correlation and interchangeability.

Table 4.28: Research Constructs

Latent Construct	Type of latent constructs	Number of observed variables
Procurement governance	Reflective	7 items
Procurement performance	Reflective	7 items
Integrative supply chain technology	Reflective	3 items
Service delivery	Reflective	3 items

Source: Research Data, 2021

Reflective indicators are also known as impact indicators. All of them can be considered as a representative sample of the latent variable (Nunnally & Bernstein, 1994). As Anderson and Gerbing (1988) point out, in reflective models, indicators represent the sum of all potential measurement items that reflect the latent variable

that is assessed. It is assumed that the construct represents reality, and that the indicators constitute a sample of all potential indications of that reality, under the reflective model of thinking. Since all indicators represent the same notion, Edwards and Bagozzi (2000) conclude that they should be strongly correlated.

To calculate the latent variable procurement governance, 7 observable indicators, each representing a weighted average were used. Three of these are: value for money; four are: integrity; three are equity; three are fairness; three are competition; four are accountability; five are transparency. Integrative supply chain technology is a reflective construct comprising of three observed variables; the first one is ERP system (ISCTES) which is an average of 4 indicators, the second one was E-procurement (ISCTEP), an average of 3 indicators and the third was procurement portal (ISCTPP) which is an average of 4 indicators.

Procurement performance is also a reflective latent construct which was comprised of 7 observed indicators; regulatory compliance (PPRC) which had a total of 6 indicators, effective procurement planning (PPEP) which had 4 indicators, sound evaluation criteria (PPEC) which had 8 indicators, performance contracts (PPPC) which had 7 indicators, inspection and acceptance (PPIA), which has 5 indicators, record keeping (PPRK) which had 5 indicators and budget absorption (PPBA) which was derived by averaging 4 items. The last construct service delivery which is also reflective was obtained from 5 observed indicators; Information sharing (SDIS) – 3 items, timely supplier payments (SDTSP) – 3 items, efficient delivery of goods and services (SDEGS) – 4 items, quality goods and services, and use effectiveness (SDUE) - 3 items. Four PLS-SEM models were estimated each for study objectives one, two, three and four.

4.12 Construct Unidimensionality

The term "construct unidimensionality" refers to the fact that there is only one underlying measurement construct responsible for the variation in responses (Yu et al., 2007). It ensures that all latent construct indicators are measuring the construct in question. Calculating the item to total coefficients for each build indicator is one method of determining the unidimensionality of a construct. There should be a minimum item to total score of 0.3 in order to be included on the scale reliably. In Kidder (1981), it is said that Two degrees of unidimensionality were examined in this research.

Validating the first-level constructs' signals for their unidimensionality was a requirement of the level's initial step. The reliability and validity of these notions have to be tested as part of this process. Previous sections removed indicators having item-to-total correlation scores of less than 0.3 or loadings less than 0.4. Analysis was then carried out using Smart PLS 3.3.3 on the remaining indicators. The second level of analysis was used to convert item scores to total scores for each latent component in the model. Table 4.29 indicates that all the indicators indicating latent constructs have adjusted item-total correlation values greater than 0.3.

Table 4.29: Item to Total Correlation Coefficients

Latent Construct	Indicator Items	Corrected Item-Total Correlation
Procurement governance	Value for money	0.437
	Integrity	0.529
	Equity	0.494
	Fairness	0.598
	Competition	0.516
	Accountability	0.437
	Transparency	0.383
Integrative supply chain technology	ERP System	0.59
	E-procurement	0.574
	Procurement Portal	0.428
Procurement performance	Regulatory Compliance	0.578
	Effective procurement planning	0.573
	Sound evaluation criteria	0.355
	Performing Contracts	0.542
	Inspection and acceptance	0.607
	Record keeping	0.548
	Budget Absorption	0.635
Service delivery	Information Sharing	0.576
	Timely Supplier Payments	0.336
	Efficient Delivery of Goods and Services	0.616
	Quality goods and services	0.615
	User Effectiveness	0.545

Source: Research Data, 2021

4.13 Indicator Loadings and Indicator Reliability

The loadings in SmartPLS range from 0 to 1, since the data is normalized automatically. If the indicator loadings are near to 1, they are more accurate. A loading of 0.7 indicates that a construct accounts for at least half of the variation in the indicator (Henseler et al., 2012). To conclude, this means that the concept and its indicator have a bigger variation in common than the measurement error itself does. Because 0.50 is the square root of 0.7082, the outer loading of an indicator should be more than 0.708. In social science research, it is common to find weaker outer loadings below 0.70, especially when using freshly designed scales (Hulland, 1999).

An indicator's influence on composite reliability and content validity must be examined carefully when its outer loading is below 0.70, rather than deleting it. Unless the composites reliability and the average extracted variance (AVE) fall below the stated threshold, indicators with outer loadings between 0.4 and 0.7 should be retained. Indicators with lower outside loadings are kept because of the significance of the data they reflect for the content validity (Hair et al., 2017). Even if the outer loading is as low as 0.40, indicators with such outer loading should never be included in the model (Hair et al., 2011).

4.14 Procurement Governance and Service Delivery

The initial objective of the study was to determine how procurement governance affects service delivery in Kenyan MDAs. To do this, PLS-SEM analysis using Smart PLS was utilized. Because the two constructs, procurement governance and service delivery, are both reflective, the final results were extensively verified for reliability and validity before being interpreted. The section below discusses the reliability and validity of the model.

4.14.1 Outer Model Loadings

The outer model of the two constructs is examined in this work. Table 4.30 shows the outcomes. In this study the construct with loadings below 0.40 were deleted and eliminated. Procurement governance construct originally had 25 indicators, 1 was dropped leaving 24 indicators. The findings demonstrate that most indicators of the two latent constructs have individual indicator reliability ratings above the minimum allowed threshold of 0.4. Bootstrap findings reveal that all p-values are below the 0.05 significance threshold. Because of this, the loadings on the outside models are quite important.

Table 4.30: Outer Model Loadings

Latent Variable	Indicators	Loadings	Indicator Reliability	T statistics	P Values
Procurement Governance	PGVM	0.562	0.316	4.358	0.00
	PGI	0.615	0.378	7.897	0.00
	PGE	0.580	0.336	8.140	0.00
	PGF	0.653	0.426	6.863	0.00
	PGC	0.628	0.394	8.187	0.00
	PGA	0.600	0.360	6.210	0.00
	PGT	0.558	0.311	6.042	0.00
Service Delivery	SDIS	0.705	0.497	11.987	0.00
	SDTSP	0.690	0.476	13.724	0.00
	SDEDGS	0.720	0.518	14.501	0.00
	SDQGS	0.670	0.448	7.325	0.00
	SDUE	0.703	0.494	11.677	0.00

Source: Research Data, 2021

4.14.2 Internal Consistency Reliability

Internal consistency dependability is often the first criteria to be addressed in a measurement model. Internal consistency has traditionally been measured using

Cronbach's alpha. All indicators are assumed to be equally trustworthy, with equal outside loadings on the constructions, according to Cronbach's alpha. As a consequence, academics advise against using internal consistency reliability in favor of composite reliability (Hair et al., 2012). With a wide range of values, the composite dependability parameter indicates more reliability. In exploratory investigations, composite reliability ratings of 0.60 to 0.70 are acceptable; however, values of 0.70 to 0.90 are acceptable in more advanced phases of study.

In general, greater degrees of composite dependability indicate more internal consistency within the structures themselves. Hair et al. (2012) state that composite reliability ratings of 0.7 or above are acceptable and satisfactory, which is in agreement with Bagozzi and Yi (1988). The service delivery and procurement governance constructs have a combined dependability of 0.933. All composite reliability ratings above the allowed 0.70 threshold for converging validity and reliability. Since the findings are above the 0.7 criterion and are statistically significant, it can be concluded that the two constructs are internally consistent using Cronbach's Alpha. Table 4.31 shows the findings.

Table 4.31: Construct Internal Consistency Reliability

Construct	Cronbach's Alpha	Composite Reliability	Average Variance Extracted (AVE)
Procurement Governance	0.924	0.933	0.370
Service Delivery	0.924	0.934	0.484

Source: Research Data, 2021

4.14.3 Convergent Validity

According to statistics, convergent validity refer to the degrees where by a particular measure coincides with other measurements on the same subject. It is possible to measure the same notion using a variety of methods in a reflecting model. A

substantial connection should exist between the items in the research that indicate the presence of a certain reflective construct. Reflective concepts may be validated using the AVE and outer loadings of the indicators (Hair et al., 2017). At least 0.50 is considered desirable for an acceptable AVE value. Over half of the variance in the construct's indicators is predicted to be explained by an AVE score of at least 0.50.

More variation remains in the items' mistakes on average than in the concept's variance, according to AVEs smaller than 0.50. Table 4.32 shows the AVE values from the study. Much lower than the desired value of 0.5, the AVE range from 0.370 to 0.48. In spite of Fornell and Larcker's (1981) assertion that the AVE is below 0.5, the concept's convergent validity is sufficient. Findings from this study show that procurement governance and service delivery were found to have AVE values of 0.370 and 0.484. The convergent validity and composite reliability values were determined together (which were more than 0.6 for each component). This study shows that AVE scores are meaningful as well after bootstrapping the two components.

Table 4.32: Average Variance Extracted

Constructs	Composite Reliability	Average Variance Extracted
Procurement Governance	0.933	0.370
Service delivery	0.934	0.484

Source: Research Data, 2021

4.14.4 Discriminant Validity

In terms of empirical criteria, a concept's distinctiveness may be measured by its discriminant validity. Discriminant validity may be used to demonstrate a model's distinctness and capacity to capture occurrences that are not mirrored by other constructs (Hair et al., 2014). The cross-loading and Fornell-Larcker criteria are the main methods for testing discriminant validity in structural equation modeling based on variance, such as partial least squares. However, while being widely utilized in

applied research, the methods do not allow for the reliable detection of discriminant validity problems in common research situations, as a result Heterotrait-Monotrait Ratio (HTMT), a more dependable alternative criterion, should be used (Henseler et al., 2015). A cross-loading criteria that fails to reveal a lack of discriminant validity when two conceptions are entirely connected is inappropriate for empirical inquiry. The Fornell-Larcker criteria, on the other hand, performs poorly when the indicator loadings of the constructs under examination are just slightly different. The HTMT ratio is the product of the correlations between traits and the correlations within traits. According to HTMT, the average correlations of the correlations of all indicators across distinct constructs are compared with their average correlations across all indicators that measure the same construct.

Hetero-trait correlations should be fewer than mono-trait correlations, which means that the best measurement model hetero-trait correlations should be less than the mono-trait correlations, which means that the best measurement model HTMT ratio should be less than 1. (Teo et al., 2003). There is no discriminant validity if the HTMT value is greater than 0.90. It appears appropriate to choose a lower and hence less cautious threshold value of 0.85 when the path model's components are conceptually more different (Henseler et al., 2015). Table 4.33's results show that discriminant validity has been demonstrated based on values below the criterion of 0.90.

Table 4.33: Heterotrait-Monotrait Ratio

Constructs	Procurement Governance	Service Delivery
Procurement Governance		
Service Delivery	0.814	

Source: Research Data, 2021

The HTMT may also be used to conduct a statistical discriminant validity test. Traditional parametric significance tests cannot be used to assess if the HTMT statistic differs substantially from 1 since PLS-SEM makes no assumptions about distributions. A method called as bootstrapping is used to determine the HTMT distribution. Assuming a certain level of confidence, a confidence interval is the range of values that the true HTMT population value may fall within (for example, 95 percent). The absence of discriminant validity is indicated by a confidence interval with a value of one. It is only when the value 1 goes beyond the interval's boundaries that it is clear that the two concepts are empirically separate. Fornell-and Larcker's cross-limitations loading's necessitate the employment of the HTMT-based assessment based on a confidence interval, which is based on inferential statistics (Henseler et al., 2015).

Table 4.34 shows the lower and upper boundaries of the 95 percent (bias-corrected and accelerated) confidence interval with columns labeled 2.50 percent and 97.50 percent. There is no value in any of the confidence intervals that is greater than 1. Procurement governance and service delivery are linked with an HTMT confidence range of 0.67 to 0.915, which supports discriminant validity.

Table 4.34: Heterotrait Monotrait Ratio Confidence Intervals

Constructs	Original Sample (O)	Sample Mean (M)	Bias	2.50 %	97.50 %
Service Delivery -> Procurement Governance	0.814	0.808	-0.006	0.674	0.915

Source: Research Data, 2021

4.14.5 Assessment of the Structural Model

In the second stage of PLS-SEM evaluation, the structural (inner) model is assessed. This is only done once evaluation of measurement models is complete and there is confidence in their validity. If the measurement model fails to fulfill acceptable

reliability and validity requirements, the structural model estimations are meaningless (Henseler et al., 2016). The structural model may be used by the researcher to evaluate the model's assumptions, as long as the assumptions are reasonable. As stated by Garson (2016), the present measurements models fulfilled the criterion for reliability and validity.

PLS-SEM estimates parameters in a way that optimizes the endogenous latent variables' explained variance in the structural models. It is against this backdrop that the PLS-SEM model's endogenous variable predictions are evaluated. Model problems such as collinearity, model significance and relevance, degree of R^2, f^2 effect size and predictive relevance Q^2 and q^2 impact size are investigated by assessing the model.

4.14.5.1 Collinearity Assessment

Before any additional analysis can be performed on the structural model, it must be checked for potential multicollinearity among the predictor components. The PLS-SEM variance inflation factor (VIF) coefficients demonstrate multicollinearity. If the VIF is less than 5.0, there is no indication of multicollinearity. Sarstedt et al. (2014) argued that it is impossible to determine the relative locations of independent variables using structural path coefficients when there is multicollinearity. This is true for exogenous variables in PLS-SEM structural model analysis. Assessment of multicollinearity in PLS-SEM is done by calculating the VIF value. The VIF coefficients value in an appropriately fitted model should be 4.0 or below; nevertheless, VIF value 5.0 is frequent on more permissive criterion (Garson, 2016). Multicollinearity is a statistical concept where independent variables in a model are

correlated. This model had one independent variable hence evaluation of multicollinearity doesn't apply.

4.14.5.2 Structural Model Path Coefficients

Path coefficients (that is, structural model connections) are estimated after the PLS-SEM approach is done. These coefficients represent the projected relationships between the constructs. Path coefficients may have a broad range of values, although the most typical range is -1 to +1. Around +1 is an indicator of strong positive connections, whereas near-1 is an indicator of strong negative ties. Coefficients closer to zero indicate weaker connections.

Most of the time, extremely small values around 0 don't vary all that much from the value zero (Hair et al., 2017). Table 4.35 summarizes the models path coefficient estimates, t-values, p values, and confidence ranges. The path coefficients results were, $\beta = 0.771$, $t = 12.577$ and $P < 0.05$. The confidence intervals bias corrected (95% confidence intervals).

Table 4.35: Model Path Coefficients

Constructs	Path Coefficients	T Statistics	P Values	95% Confidence intervals
Procurement Governance -> Service Delivery	0.771	12.577	0.000	[0.622, 0.868]

Source: Research Data, 2021

4.14.5.3 Coefficient of Determination

R^2 value measures the model's ability to predict endogenous values. This coefficient represents the total of the influence of external latent factors on the endogenous latent variable. There must be a way for the coefficient to include both endogenous and exogenous variables in its calculation. The squared correlation between observed and

predicted values, which is known as R^2 for predictive power, represents all of the data necessary to determine the model's predictive ability (Rigdon, 2012).

R^2 values vary from 0 to 1, with higher values suggesting a stronger ability to forecast the future. It is difficult to establish criteria for appropriate R^2 values since they vary substantially depending on the complexity of the model and the study topic. Higher R^2 values, such as 0.75 and above, are required by academics in fields like consumer behavior and research aiming at understanding customer satisfaction or loyalty, for instance. R^2 values of 0.75, 0.50, and 0.25 are considered to be strong, moderate, and weak for endogenous latent variables, according to academic research on marketing challenges. (Hair et al., 2011) (Hair et al). Latent constructs of procurement governance and service delivery were combined in a single model for the first time.

The coefficient of determination, R^2, values for the variables in Table 4.35 are as follows, at the 0.05 level of significance: service delivery at $R^2 = 0.595$, $t = 6.360$, $p = 0.000$. In this case, the model explains 59.5% of the variance in service delivery, and it is statistically significant at the 0.05 level. The coefficient of determination for the endogenous variable was moderate, and this is typical for R^2 values of 0.75, 0.50, or 0.25 (Hair et al., 2014).

Table 4.35: Predictive Power R^2

Endogenous latent construct	R^2	T Statistics	P Values
Service Delivery	0.595	6.344	0.000

Source: Research Data, 2021

4.14.5.3 Effect Size f^2

f^2 effect size is the change in R^2 when an exogenous construct is supplied and may be used to determine if the missing component has a meaningful influence on the

endogenous constructs (Hair et al., 2017). Exogenous latent variables with a f^2 of ≥ 0.02 (little), ≥ 0.15 (medium), and ≥ 0.35 (big) are considered to have a significant influence (Cohen, 1988). The absence of an effect is indicated by effect sizes less than or equal to 0.02. The f^2 value for the endogenous construct (service delivery) is significant at p = 0.034, as shown in the research results in Table 4.36. Exogenous construct (procurement governance) has a large size effect of 1.467 on service delivery. Removing exogenous construct will have an impact on R^2 value.

Table 4.36: Effect size f^2

Construct Variable	f^2	T Statistics	P values
Procurement Governance -> Service Delivery	1.467	2.117	0.034

Source: Research Data, 2021

4.14.5.4 Blindfolding and Predictive Relevance Q^2

The value of Q^2 parameter is used to determine the relevance or the power out-of-sample predictive. Incase PLS path model is used to forecast data that was not included in the estimate, an accurate prediction may be produced. Given a reflecting endogenous latent variables, structural models Q^2 value more than zero postulates the path model's predictive power for that response construct (Geisser, 1974). A Q^2 score of 0 or a negative result indicates that the model is unfit for the given data. Q^2 has an inverse value of predictive of 0.02, a positive predictive value of 0.15, and a high predictive value of 0.35 or above.

This study findings indicated in Table 4.37 Q^2 endogenous construct service delivery values are significantly above 0. More precisely service delivery has Q^2 value of 0.264. These findings clearly demonstrate the model's very low predictive significance for the endogenous latent variables of service delivery and procurement success.

Table 4.37: Predictive Relevance Q^2

Latent Construct Variable	SSO	SSE	Q^2 (=1-SSE/SSO)
Procurement Governance	2928	2928	
Service Delivery	1830	1346.814	0.264

SSO - Sum of squared observations; SSE - sum of squared predictive errors

Source: Research Data, 2021

4.14.5.5 Effect Size q^2

The path model's capacity to accurately anticipate observed values is shown by the Q^2 values. The q^2 effect size may be used to evaluate the relative influence of predictive relevance to the f^2 effect size when evaluating R^2 values. It compares Q^2 predictive relevance scores for models that do not incorporate a particular exogenous component. Thus, q^2 impact size affords the relative predictive significance of individual external component to be evaluated (Garson, 2016). An exogenous construct's predictive importance for a given endogenous construct may be inferred from q^2 values as low as 0.15, moderately high as 0.35, and very high as 0.40 or more. It's possible to compute the q^2 effect size for all structures using the following formula (Cogen, 1988): q^2. = Q^2included-Q^2excluded (1-Q^2included). This model had one exogenous variable.

4.14.5.6 Overall Model Fit

The standardized root mean square residual (SRMR) was used in this study to assess model fit. The measure of discrepancy among actual correlation and those predicted by the model is known as SRMR. That's why this method provides an absolute measure of (model) fit criteria by comparing observed correlations to anticipated correlations. As long as the number is less than 0.10 or 0.08, it's a good match (Hu & Bentler, 1999). The SRMR composite model was found to have a p-value of 0.085 in this study. According to bootstrapping findings, this model is statistically significant

at the composite SRMR of 0.05, showing that this model is well-fitted. Table 4.38 displays this information.

Table 4.38 Composite Model SRMR Statistics

SRMR	Sample Mean	Standard Error	T Statistic	P Value
0.085	0.771	0.061	12.637	0.000

Source: Research Data, 2021

Figure 4.1 and 4.2 shows procurement governance and service delivery structural equation model diagrams with path coefficients and T-values respectively. PLS-SEM analyses the significance of SRMR and path coefficient.

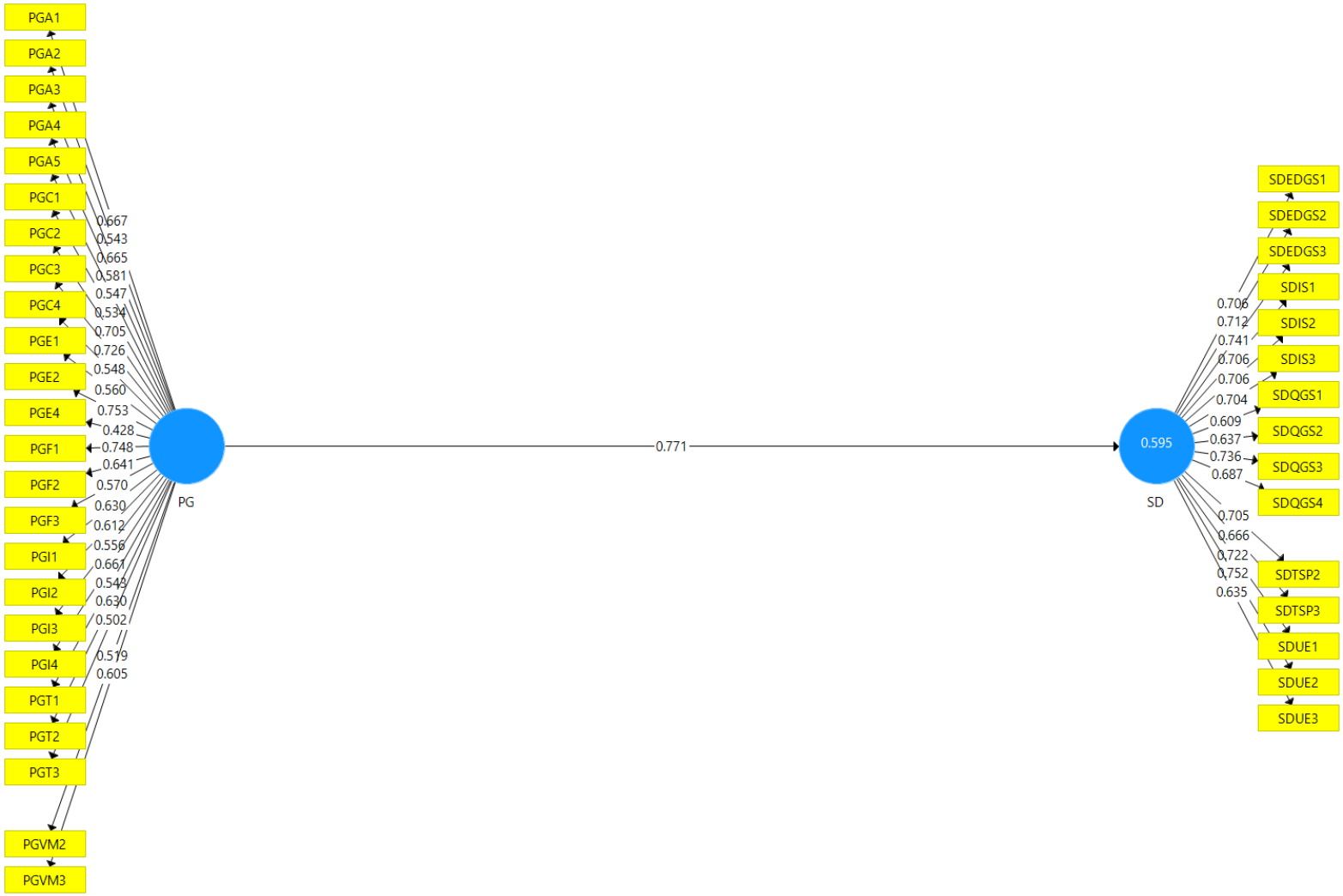

Figure 4.1: Structural Equation Model Diagram with Path Coefficients

Figure 4.2: Structural Equation Model Diagram with T-values

4.15 Procurement Governance, Procurement Performance and Service Delivery

Procurement performance was examined as a mediator between procurement governance and service delivery in Kenyan government agencies. PLS-SEM with Smart PLS was applied to evaluate this metric. Dependability of the model procurement governance, procurement performance, and service delivery structures were tested. Before interpreting the PLS-SEM study findings, the subsections that follow analyzes the model's reliability and validity.

4.15.1 Model Outer Loadings

Two items (1 from procurement performance and 1 from procurement governance) were omitted from the study as part of the measurement model assessment due to their low factor loadings (0.400). As evident in Table 4.38, majority of indicators for the three construct in this model have individual indicator dependability ratings better than the 0.4 criterion. Additionally, bootstrapping findings indicate that all factor loadings are statistically significant, with t-statistic not less than 1.96 as well as value of p not more than 0.05. As a result, it may be argued that the loadings on the outer model are quite substantial.

Table 4.38: Outer Loadings of the Model

Latent Variable	Indicators	Loadings	Indicator Reliability	T Statistics	P Values
Procurement Governance	PGA1	0.670	0.4489	6.506	0.000
	PGA2	0.545	0.2970	5.399	0.000
	PGA3	0.667	0.4449	8.422	0.000
	PGA4	0.577	0.3329	6.523	0.000
	PGA5	0.548	0.3003	4.735	0.000
	PGC1	0.534	0.2852	4.675	0.000
	PGC2	0.702	0.4928	9.354	0.000
	PGC3	0.724	0.5242	14.327	0.000
	PGC4	0.546	0.2981	4.170	0.000
	PGE1	0.561	0.3147	4.561	0.000
	PGE2	0.754	0.5685	16.794	0.000
	PGE4	0.428	0.1832	3.872	0.000
	PGF1	0.751	0.5640	10.364	0.000

	PGF2	0.646	0.4173	4.985	0.000
	PGF3	0.576	0.3318	5.085	0.000
	PGI1	0.632	0.3994	7.071	0.000
	PGI2	0.611	0.3733	8.576	0.000
	PGI3	0.554	0.3069	6.018	0.000
	PGI4	0.659	0.4343	9.498	0.000
	PGT1	0.543	0.2948	5.280	0.000
	PGT2	0.628	0.3944	8.971	0.000
	PGT3	0.496	0.2460	4.032	0.000
	PGVM2	0.520	0.2704	3.504	0.000
	PGVM3	0.604	0.3648	4.652	0.000
Procurement Performance	PPBA1	0.668	0.4462	6.891	0.000
	PPBA2	0.678	0.4597	11.179	0.000
	PPBA3	0.650	0.4225	12.827	0.000
	PPBA4	0.689	0.4747	13.941	0.000
	PPEC1	0.608	0.3697	5.232	0.000
	PPEC3	0.616	0.3795	8.389	0.000
	PPEC4	0.559	0.3125	5.551	0.000
	PPEC5	0.611	0.3733	6.266	0.000
	PPEC6	0.507	0.2570	4.960	0.000
	PPEC7	0.607	0.3684	6.621	0.000
	PPEC8	0.537	0.2884	7.424	0.000
	PPEPP1	0.561	0.3147	5.718	0.000
	PPEPP2	0.697	0.4858	12.396	0.000
	PPEPP3	0.508	0.2581	9.092	0.000
	PPEPP4	0.564	0.3181	8.397	0.000
	PPIA1	0.624	0.3894	5.096	0.000
	PPIA2	0.689	0.4747	7.580	0.000
	PPIA3	0.608	0.3697	6.157	0.000
	PPIA4	0.580	0.3364	6.642	0.000
	PPIA5	0.587	0.3446	5.997	0.000
	PPPC1	0.543	0.2948	9.957	0.000
	PPPC2	0.622	0.3869	8.319	0.000
	PPPC3	0.596	0.3552	6.212	0.000
	PPPC4	0.627	0.3931	11.749	0.000
	PPPC5	0.656	0.4303	14.045	0.000
	PPPC6	0.655	0.4290	8.873	0.000
	PPPC7	0.703	0.4942	10.117	0.000
	PPRC1	0.521	0.2714	3.885	0.000
	PPRC2	0.610	0.3721	5.156	0.000
	PPRC3	0.661	0.4369	9.586	0.000
	PPRC4	0.688	0.4733	12.912	0.000
	PPRC5	0.654	0.4277	7.115	0.000
	PPRC6	0.593	0.3516	8.130	0.000
	PPRK1	0.601	0.3612	6.748	0.000
	PPRK2	0.553	0.3058	5.296	0.000

	PPRK3	0.724	0.5242	11.677	0.000
	PPRK4	0.551	0.3036	9.481	0.000
	PPRK5	0.504	0.2540	6.194	0.000
Service Delivery	SDEDGS 1	0.708	0.5013	13.559	0.000
	SDEDGS 2	0.715	0.5112	16.253	0.000
	SDEDGS 3	0.740	0.5476	12.830	0.000
	SDIS1	0.705	0.4970	11.074	0.000
	SDIS2	0.703	0.4942	9.656	0.000
	SDIS3	0.707	0.4998	13.667	0.000
	SDQGS1	0.606	0.3672	4.901	0.000
	SDQGS2	0.633	0.4007	5.554	0.000
	SDQGS3	0.734	0.5388	8.724	0.000
	SDQGS4	0.684	0.4679	8.536	0.000
	SDTSP2	0.709	0.5027	14.962	0.000
	SDTSP3	0.675	0.4556	13.277	0.000
	SDUE1	0.716	0.5127	13.883	0.000
	SDUE2	0.749	0.5610	12.481	0.000
	SDUE3	0.640	0.4096	7.244	0.000

Source: Research Data, 2021

4.15.2 Internal Consistency Reliability

Data from SmartPLS was applied in deriving reliability measures for internal consistency and composite reliability. Table 4.39 shows that these values are higher than the 0.7 threshold. These outcomes are also statistically significant since the value of p is not greater than 0.05. A significant degree of internal consistency is maintained by the three reflective latent variables. Internal consistency has been shown by Cronbach's Alpha scores for three indicators exceeding the 0.7 threshold and being statistically significant. Table 4.39 summarizes the data.

Table 4.39: Construct Internal Consistency Reliability

	Cronbach's Alpha	Composite Reliability	Average Variance Extracted (AVE)
Procurement Governance	0.924	0.933	0.370
Procurement Performance	0.955	0.958	0.377
Service Delivery	0.924	0.934	0.485

Source: Research Data, 2021

4.15.3 Convergent Validity

Convergent validity may be assessed using the indicator's outer loadings as well as its AVE. An acceptable AVE value of 0.50 is deemed optimal by the majority of individuals. On the contrary, an AVE of less than or equal to 0.50 shows that item error has a greater degree of variability than can be well explained by concept variation. Table 4.40 displays the study's AVE results. It is unacceptable for the average AVE to go below 0.50 between 0.370 and 0.485 Even if Fornell and Larcker (1981) said that the AVE is not greater than 0.5, convergent validity of the notion is still true. There are AVE values less than 0.5 for all three components in the study. However, when the composite reliability scores for each concept exceeded 0.6, the convergent validity was shown. Bootstrapping results from the three construct results show that AVE scores are also significant.

Table 4.40: Average Variance Extracted

Latent Variable	Composite Reliability	Average Variance Extracted (AVE)
Procurement Governance	0.933	0.370
Procurement Performance	0.958	0.377
Service Delivery	0.934	0.485

Source: Research Data, 2021

4.15.4 Discriminant Validity

To measure discriminant validity, Heterotrait-Monotrait Ratio (HTMT) was used. Correlations between multiple traits (hetero- and monotrait) should be lower than correlations between traits (monotrait). This indicates that the optimal measurement model HTMT ratio should be lower than 1. (Teo et al., 2003). If the HTMT value is larger than 0.90, there is no discriminant validity. It appears appropriate to choose a lower and hence less cautious threshold value of 0.85 when the path model's components are conceptually more different (Henseler et al., 2015). Because only

procurement performance had a value of 0.951, the study's findings in Table 4.41 reveal that discriminant validity was established below the criterion of 0.90.

Table 4.41: Heterotrait-Monotrait Ratio

Latent Variable	Procurement Governance	Procurement Performance	Service Delivery
Procurement Governance			
Procurement Performance	0.877		
Service Delivery	0.814	0.951	

Source: Research Data, 2021

Additionally, bootstrapping study findings indicated in Table 4.42. The value 1 is not included in any of the confidence ranges. HTMT's lower and upper confidence intervals for the three constructs do not contain a value of 1, indicating discriminant validity.

Table 4.42: Heterotrait Monotrait Ratio Confidence intervals

Latent Variable	Original Sample (O)	Sample Mean (M)	Bias	2.50 %	97.50 %
Procurement Governance -> Procurement Performance	0.836	0.835	-0.001	0.686	0.91
Procurement Governance -> Service Delivery	0.059	0.057	-0.002	-0.119	0.248
Procurement Performance -> Service Delivery	0.846	0.847	0.001	0.670	0.997

Source: Research Data, 2021

4.15.5 Assessment of the Structural Model

Structural (inner) model evaluation is performed as the next stage in the PLS-SEM evaluation process As soon as the measurement model has been evaluated and is judged to be reasonable, this phase will be implemented. The current measuring methodology was determined to meet the study's criteria in terms of validity and reliability. Look for issues about collinearity, model significance and relevance, degree of R^2, f^2 effect size and predictive relevance Q^2 as well as q^2 effect size in the

structural model in order to examine predictive capabilities and links between components.

4.15.5.1 Collinearity Assessment

The variance inflation factor (VIF) coefficients in PLS-SEM reflect the amount of multicollinearity. VIF values of less than 5.0 indicate a well-fitting model with no multicollinearity (Sarstedt et al., 2014). If there is multicollinearity, the structural path coefficients cannot be used to consistently and accurately assess the relative positions of independent variables. A correctly fitted model should have VIF coefficients of 4.0 or below; nonetheless, VIF values of 5.0 are common using more lenient criteria (Garson, 2016). As can be seen in Table 4.43, the model's VIF results are rather interesting. Multicollinearity was found to be nonexistent in the VIF values for all predictor constructs.

Table 4.43: Collinearity Statistics - Variance Inflation Factors

Latent Construct Variable	Procurement Governance	Procurement Performance	Service Delivery
Procurement Governance		1.000	3.311
Procurement Performance			3.311
Service Delivery			

Source: Research Data, 2021

4.15.5.2 Structural Model Path Coefficients

Structural model path coefficients reveal that the expected direct impact paths between procurement governance and procurement performance (0.835) are statistically significant with p-values of 0.001 and service delivery and procurement performance (0.852). However, a p-value of 0.611 indicates that the correlation between procurement governance and service delivery (0.053) is not statistically significant. Table 4.44 presents the model's path coefficient estimates, t values, p values, and confidence ranges. Therefore, it may be inferred that procurement

performance is a predictor of service delivery, but procurement governance does not directly predict service delivery. This is an indication of full mediation.

Table 4.44: Model Path Coefficients

Constructs	Path Coefficients	T Statistics	P Values	95% Confidence intervals
Procurement Governance -> Procurement Performance	0.835	16.305	0.000	**[0.686, 0.904]**
Procurement Governance -> Service Delivery	0.053	0.509	0.611	**[-0.149, 0.254]**
Procurement Performance -> Service Delivery	0.852	9.38**0**	0.000	[0.675, 1.029]

Source: Research Data, 2021

4.15.5.3 Total Effect Analysis

There are statistically significant overall impacts for each of the three expected path links in Table 4.45. There was no significant relationship between procurement governance and service delivery (β = 0.053, t = 0.509, P-value < 0.611), but when total effects (β = 0.764, t = 11.274, P-value < 0.001) and indirect effects are taken into account (β = 0.711, t = 7.595, P-value < 0.001), this path relationship becomes significant. This study supports the notion that when the procurement performance mediating construct is considered, the relationship between procurement governance and service delivery is improved.

Table 4.45: Total Effect Analysis

Hypothesized Path Relationship	Total effect	T Statistics	P Values
Procurement Governance -> Procurement Performance	0.835	16.305	0.000
Procurement Governance -> Service Delivery	0.764	11.274	0.000
Procurement Performance -> Service Delivery	0.852	9.380	0.000

Source: Research Data, 2021

The next step was to figure out how much of an influence the mediation had. When the direct impact is negligible but the indirect effect is substantial, a complete mediation is recommended, indicating that only the mediator's influence can be felt

(Zhao et al., 2010). As a result, it can be said that procurement performance is the only mediator in the link between procurement governance and service delivery (from study model direct effects is insignificant and indirect effects is significant). Additionally, the variance adjusted for (VAF) may be used to determine the kind of mediation. According to Hair Jr et al. (2014), VAF values might be interpreted as follows: VAF > 80% denotes complete mediation, 20% VAF 80% indicates partial mediation, and VAF 20% indicates no mediation. The VAF formula is as follows:

VAF is an abbreviation for indirect effect/total effect. (16.305*9.380 + 0.509) (16.305*9.380/16.305*9.380 + 0.509)

VAF is 152.941/153.45 = 0.996 in the present investigation.

This indicates that the magnitude of mediation is 99.6%. The conclusion therefore is that the relationship between procurement governance and service delivery is fully mediated by procurement performance.

4.15.5.4 Coefficient of Determination

R^2 values of 0.75 is substantial, 0.50 is moderate, and 0.25 is weak for endogenous latent variables (Hair et al., 2014). The model integrated one exogenous latent construct, procurement governance and two endogenous latent constructs, procurement performance and service delivery. The following are the coefficient of determination, R^2 values for the two variables at $p < 0.05$ significant level; procurement performance with $R^2 = 0.698$, $t = 8.355$, $p < 0.001$ and service delivery at $R^2 = 0.803$, $t = 17.072$, $p<0.001$. This means that 69.8% (0.698) of the variance in procurement performance and 80.3% (0.803) of the variance in service delivery is explained by the model and that both are statistically significant. The coefficient of

determination for the variable procurement performance was moderate and service delivery was substantial. The R^2 results are presented in Table 4.46.

Table 4.46: Predictive Power R^2

Endogenous Latent Construct	R^2	T Statistics	P Values
Procurement Performance	0.698	8.355	0.000
Service Delivery	0.803	17.072	0.000

Source: Research Data, 2021

4.15.5.5 Effect Size f^2

The research results are summarized in Table 4.47, which lists the f^2 values for all combinations of endogenous and exogenous constructs in columns and their corresponding exogenous constructs in rows. According to Cohen (1988), f^2 values of 0.02 is (small), 0.15 (medium), and 0.35 (large effects) of the exogenous latent variables. Whereas the effect size values of less than 0.02 indicate that there is no effect. Procurement governance has a small effect of 0.004 (effect was almost non-existent at 0.004) on service delivery and procurement performance has a large effect on service delivery.

Table 4.47: Effect Size f^2

Latent Construct Variable	Procurement Governance	Procurement Performance	Service Delivery
Procurement Governance		2.311	0.004
Procurement Performance			1.110
Service Delivery			

Source: Research Data, 2021

4.15.5.6 Blindfolding and Predictive Relevance Q^2

It's important to note that a Q^2 value of 0.02, 0.15, and 0.35 or more indicates strong predictive relevance; the lower the Q^2 value, the lower the predictive relevance. There are considerable differences in service delivery and procurement performance Q^2 values in Table 4.48, according to this research. Q^2 value for service delivery is 0.364 and Q^2 value for procurement performance is 0.244. It is obvious from these findings

that the model has a medium predictive relevance value for the endogenous latent variables of service provision and procurement performance.

Table 4.48: Predictive Relevance Q^2

Latent Construct Variable	SSO	SSE	Q^2 (=1-SSE/SSO)
Procurement Governance	2928	2928	
Procurement Performance	4636	3506.16	0.244
Service Delivery	1830	1163.709	0.364

SSO - Sum of squared observations; SSE - sum of squared predictive errors

Source: Research Data, 2021

4.15.5.7 Effect Size q^2

The q^2 effect size can be calculated for all constructs by using the following formula (Cogen, 1988): $q^2=Q^2$included-Q^2excluded / (1-Q^2included). The q^2 value less than 0.15 represents a weak effect, between 0.15 and 0.35 is moderate, while above 0.35 is strong effect indicating that the exogenous construct has a strong predictive relevance for the particular endogenous construct. Table 4.49 shows the effect size (q^2). The negative q^2 effect size for procurement governance is no surprise, as the variables did not show any significant effects.

Table 4.49: Effect Size q^2

	Q^2 (=1-SSE/SSO)	Q^2 change (q^2)
Omission of PG	0.244	-0.008
Omission of PP	0.364	0.167

Source: Research Data, 2021

4.15.5.8 Overall Model Fit

SRMR was determined to be 0.094 in the composite model. This number is less than 0.1, indicating that the model fits well. A value of less than or equal to 0.10 or 0.08 is regarded to be a good fit (Hu & Bentler, 1999). Additionally, bootstrapping results indicate that the composite SRMR is significant at 0.05, indicating that this model fits well. This information is shown in Table 4.50.

Table 4.50: Composite Model SRMR Statistics

SRMR	Sample Mean	Standard Error	T Statistic	P Value
0.094	0.706	0.096	7.377	0.000

Source: Research Data, 2021

Figure 4.3 and 4.4 shows procurement governance, procurement performance and service delivery structural equation model diagrams with path coefficients and T-values respectively. The figures shows the measurement model analysis.

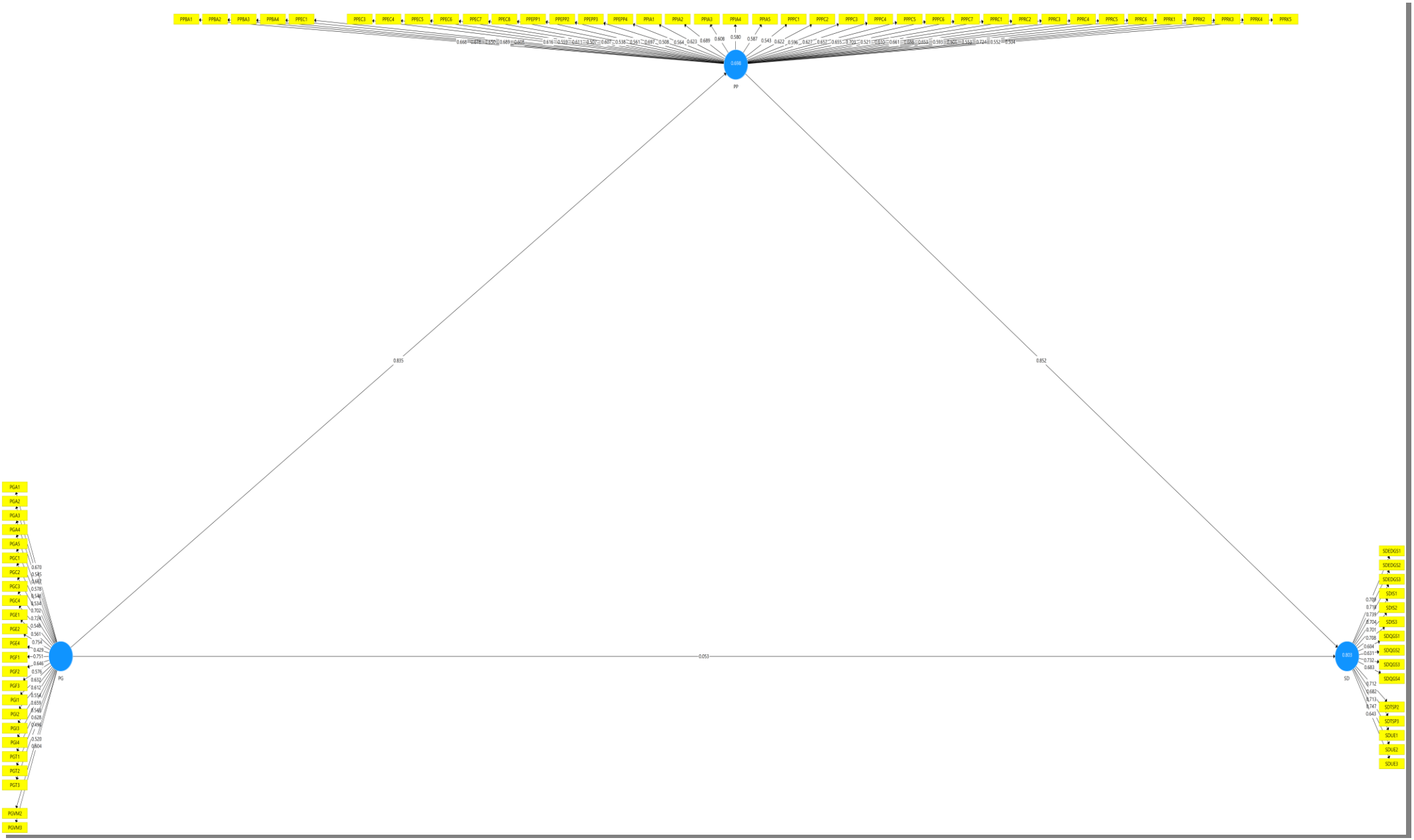

Figure 4.3: Structural Equation Model Diagram with Path Coefficients

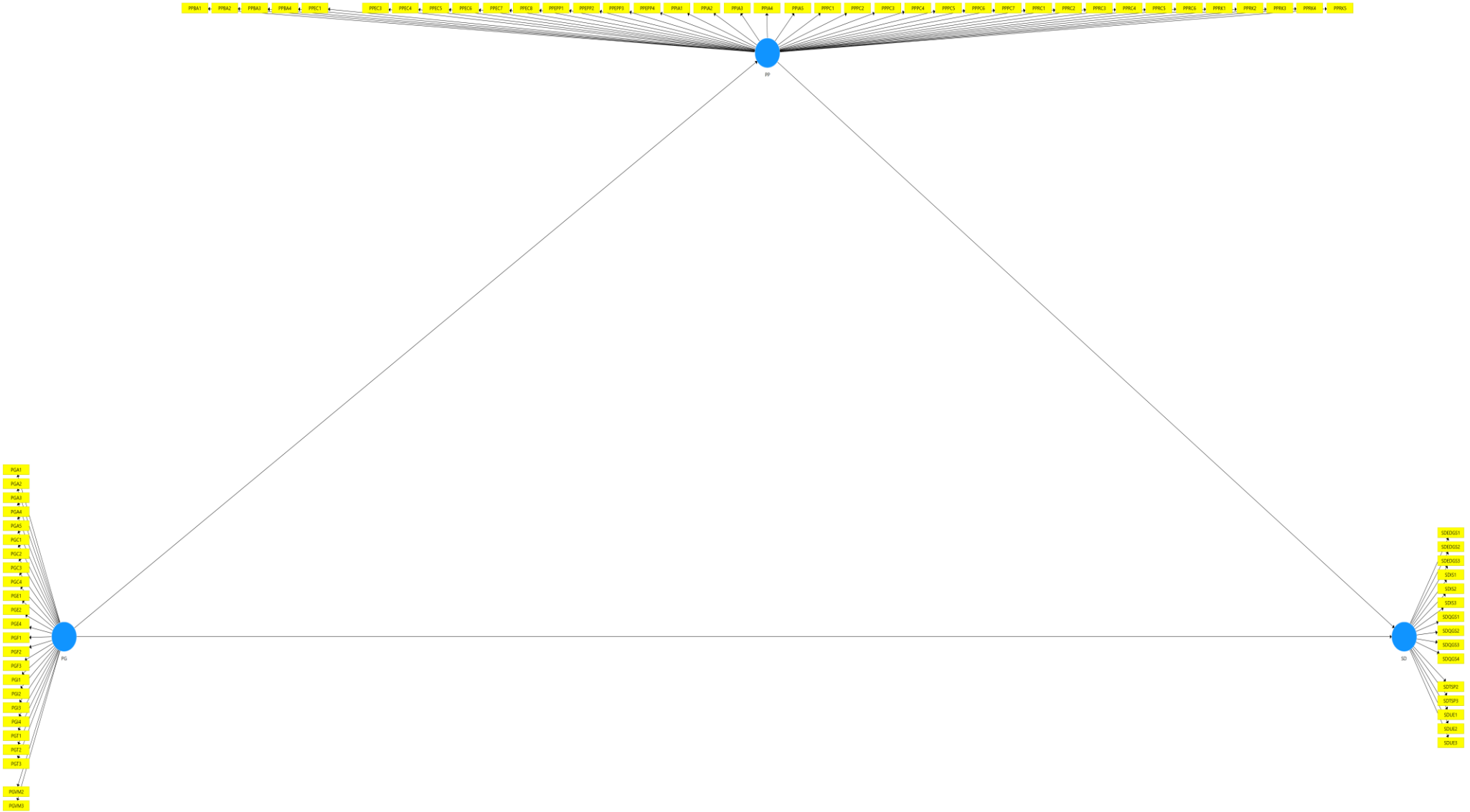

Figure 4.4: Structural Equation Model Diagram with T-values

4.16 Procurement Governance, Integrative Supply Chain Technology and Service Delivery

The third purpose of the research was to investigate the moderating influence of integrative supply chain technology on the link between procurement governance and service delivery in MDAs in Kenya. This aim was validated by running PLS-SEM analysis using SmartPLS. The latent constructs variables in the model were first checked for validity and reliability because all the three constructs are reflective. The subsections that follow address the model's reliability and validity analysis before evaluating the PLS-SEM study findings.

4.16.1 Outer Model Loadings

All three latent constructs' indicators are shown in Table 4.51 were found to be reliable, with individual indicator reliability values in excess of the minimum acceptable threshold of 0.4. All of the p-values obtained by bootstrapping fall inside the 0.05 significance threshold. Therefore, it may be inferred that all of the outside model loadings are statistically significant.

Table 4.51: Outer Loadings of the Model

Latent Variable	Indicators	Loadings	Indicator Reliability	T Statistics	P Values
Integrative Supply Chain Technology	ISCTEP1	0.723	0.523	11.867	0.000
	ISCTEP2	0.732	0.536	18.138	0.000
	ISCTEP3	0.688	0.473	16.717	0.000
	ISCTES1	0.715	0.511	12.832	0.000
	ISCTES2	0.738	0.545	13.81	0.000
	ISCTES3	0.685	0.469	12.123	0.000
	ISCTES4	0.704	0.496	14.899	0.000
	ISCTPP1	0.544	0.296	6.131	0.000
	ISCTPP2	0.557	0.310	6.641	0.000
	ISCTPP3	0.578	0.334	5.872	0.000
	ISCTPP4	0.629	0.396	8.261	0.000
Procurement governance	PGA1	0.666	0.444	6.075	0.000
	PGA2	0.543	0.295	4.998	0.000
	PGA3	0.665	0.442	8.181	0.000

	PGA4	0.582	0.339	7.196	0.000
	PGA5	0.547	0.299	4.865	0.000
	PGC1	0.533	0.284	4.408	0.000
	PGC2	0.705	0.497	10.181	0.000
	PGC3	0.726	0.527	14.341	0.000
	PGC4	0.547	0.299	4.339	0.000
	PGE1	0.561	0.315	4.469	0.000
	PGE2	0.754	0.569	16.200	0.000
	PGE4	0.430	0.185	3.826	0.000
	PGF1	0.747	0.558	10.145	0.000
	PGF2	0.641	0.411	4.756	0.000
	PGF3	0.571	0.326	4.679	0.000
	PGI1	0.629	0.396	7.310	0.000
	PGI2	0.613	0.376	8.363	0.000
	PGI3	0.557	0.310	5.943	0.000
	PGI4	0.662	0.438	10.014	0.000
	PGT1	0.541	0.293	5.629	0.000
	PGT2	0.630	0.397	8.476	0.000
	PGT3	0.502	0.252	4.644	0.000
	PGVM2	0.517	0.267	3.766	0.000
	PGVM3	0.603	0.364	5.084	0.000
Service Delivery	SDEDGS1	0.708	0.501	13.146	0.000
	SDEDGS2	0.714	0.510	15.449	0.000
	SDEDGS3	0.740	0.548	13.732	0.000
	SDIS1	0.706	0.498	11.178	0.000
	SDIS2	0.706	0.498	10.043	0.000
	SDIS3	0.713	0.508	15.109	0.000
	SDQGS1	0.600	0.360	5.156	0.000
	SDQGS2	0.625	0.391	5.730	0.000
	SDQGS3	0.731	0.534	9.664	0.000
	SDQGS4	0.688	0.473	9.580	0.000
	SDTSP2	0.708	0.501	15.57	0.000
	SDTSP3	0.673	0.453	12.471	0.000
	SDUE1	0.717	0.514	13.54	0.000
	SDUE2	0.747	0.558	12.297	0.000
	SDUE3	0.646	0.417	7.403	0.000

Source: Research Data, 2021

4.16.2 Internal Consistency Reliability

A composite dependability value was used to arrive at this conclusion. Composite dependability ratings higher than 0.6 are shown in Table 4.52 (Bagozzi & Yi, 1988). The great internal consistency and reliability of the three reflective latent variables is due to this. Because all of these composite reliability ratings have p-values of 0.000,

the bootstrapping findings are likewise statistically significant. In addition, all five constructs have Cronbach's Alpha values over the 0.7 threshold. All Cronbach's Alpha values are statistically significant, according to the bootstrapping findings. In other words, the notions used here are internally consistent.

Table 4.52: Construct Internal Consistency Reliability

Latent Variable Constructs	Cronbach's Alpha	Composite Reliability	Average Variance Extracted (AVE)
Integrative supply chain technology	0.873	0.897	0.444
Procurement Governance	0.924	0.933	0.370
Service Delivery	0.924	0.934	0.484

Source: Research Data, 2021

4.16.3 Convergent Validity

The study's AVE values are shown in Table 4.53. Although this AVE is below the required threshold of 0.5, it is still significantly better than nothing at all. Even though the AVE is less than 0.5 and the composite reliability is more than 0.6, the construct's convergent validity is adequate, according to Fornell and Larcker (1981). There are AVE values below 0.5 for each of the three components in the research. For each concept, the convergent validity was established if the composite reliability exceeded 0.6. According to the bootstrap findings, AVE scores are also important.

Table 4.53: Average Variance Extracted

Latent Variable Constructs	Composite Reliability	Average Variance Extracted (AVE)
Integrative supply chain technology	0.897	0.444
Procurement Governance	0.933	0.370
Service Delivery	0.934	0.484

Source: Research Data, 2021

4.16.4 Discriminant Validity

The HTMT was employed as a measure of discriminant validity. With an HTMT ratio of less than one, best measurement model heterotrait correlations should be lower than one, giving discriminant validity between two reflective latent concepts (Teo et

al., 2003). Discriminant validity is impaired by an HTMT score that is high. When the components of the path model are more distinct, a lower and more conservative criteria of 0.85 is suitable (Henseler et al., 2015). Table 4.54 shows the results of the investigation, which reveal that discriminant validity was proved by values below the 0.90 cutoff limit.

Table 4.54: Heterotrait-Monotrait Ratio

Latent Variable Constructs	ISCT	PG*ISCT	PG	SD
ISCT				
PG * ISCT	0.527			
PG	0.576	0.719		
SD	0.769	0.627	0.814	

Source: Research Data, 2021

Table 4.55 summarizes the results of a bootstrapping analysis. The value 1 is not included in any of the confidence ranges. A result of 1 does not fall within the HTMT confidence intervals for any of the three components, therefore demonstrating discriminant validity.

Table 4.55: Heterotrait Monotrait Ratio Confidence Intervals

Latent Variable Constructs	Original Sample (O)	Sample Mean (M)	Bias	2.50%	97.50%
Integrative supply chain technology -> Service Delivery	0.406	0.417	0.011	0.254	0.559
PG * ISCT -> Service Delivery	-0.022	-0.021	0	-0.094	0.04
Procurement Governance -> Service Delivery	0.525	0.519	-0.006	0.375	0.646

Source: Research Data, 2021

4.16.5 Assessment of the Structural Model

The structural (inner) model will be reviewed when the measurement model has been thoroughly examined and verified. The present measurement model was judged to be valid and reliable and to meet the criteria. PLS-SEM estimates the parameters in the structural model in a way that optimizes the explained variance of the endogenous

latent variables. Using the PLS-SEM model, the endogenous components are assessed based on how well they are predicted. Structural models are tested for collinearity, importance and relevance of the model relationship, degree of R^2, effect size f^2, predictive relevance Q^2, and the q^2 effect size in this step. The model's structural features include procurement governance, supply chain integration technology and service delivery.

4.16.5.1 Collinearity Assessment

The variance inflation factor coefficients were used to test for multicollinearity in this model (VIF). Table 4.56 shows the VIF findings as a result of employing this model. Predictor constructs' VIF values were checked to make sure they were not multicollinear in order to exclude this possibility. VIF values of less than 5.0 indicate a well-fitting model with no multicollinearity (Sarstedt et al., 2014). The VIF coefficients value in an appropriately fitted model should be 4.0 or below; nevertheless, VIF value of 5.0 is frequent on more permissive criterion (Garson, 2016).

Table 4.56: Collinearity Statistics - Variance Inflation Factors

Latent Construct Variable	ISCT	PG	SD
Integrative supply chain Technology			1.446
PG * ISCT			1.967
Procurement Governance			2.059
Service Delivery			

Source: Research Data, 2021

4.16.5.2 Structural Model Path Coefficients

Table 4.57 contains the structural model path coefficients. As a consequence, the following findings about the association between the moderating variable (ISCT) and service delivery emerged: $t = 0.633$, $p < 0.527$, $\beta = -0.022$. The findings indicated that ISCT had a negligible moderating effect on the association between PG and SD. The

moderating effect of integrative supply chain technology on the connection between procurement governance and service delivery is negative, but statistically negligible at the 0.05 and t > 1.96 significance levels. ISCT has little influence on the link between procurement governance and service delivery.

The direct influence of procurement governance on the path coefficients for service delivery was as follows: t = 7.468, p < 0.001, β = 0.525. This demonstrates a favorable and statistically significant direct association between procurement governance and service delivery. The direct impact of ISCT on the path coefficients for service delivery was as follows: t = 5.388, p < 0.001, β = 0.406. This demonstrates a favorable and statistically significant direct association between ISCT and service delivery.

Table 4.57: Model Path Coefficients

Constructs	Path coefficients	T Statistics	P Values	95% confidence intervals
Integrative supply chain technology -> Service Delivery	0.406	5.388	0.000	[0.256, 0.548]
PG * ISCT -> Service Delivery	-0.022	0.633	0.527	[-0.089,0.041]
Procurement Governance -> Service Delivery	0.525	7.468	0.000	[0.371,0.649]

Source: Research Data, 2021

4.16.5.3 Coefficient of Determination

The model integrated one exogenous latent construct, procurement governance and one endogenous latent construct, service delivery moderated by integrative supply chain technology. The following are the coefficient of determination (R^2) values in table 4.58, at p < 0.05 significant level; service delivery latent variable at $R^2 = 0.717$, t = 11.083, p < 0.001. This means that 71.7% (0.717) of the variance in service delivery is explained by the model and statistically significant at 0.005 level of significance through moderating variable integrative supply chain technology. The coefficient of

determination for the variable service delivery was moderate. Significant, moderate, and weak may be used to define the endogenous construct's R^2 values, accordingly (Hair et al., 2014).

Table 4.58: Predictive Power R^2

Endogenous Latent Construct	R^2	T-Statistics	P-Values
Service Delivery	0.717	11.083	0.000

Source: Research Data, 2021

4.16.5.3 Effect Size f^2

An external construct's contribution to explaining a particular endogenous construct is measured by the effect size f^2. The study findings in Table 4.59 shows integrative supply chain technology on service delivery had large effect (0.403), moderating variable on service delivery shows no effects (0.004) and procurement governance on service delivery had a large effect (0.474).

Table 4.59: Effect Size f^2

Latent Construct Variable	Effect size f^2	T Statistics	P Values
Integrative supply chain technology -> Service Delivery	0.403	2.411	0.016
PG * ISCT -> Service Delivery	0.004	0.243	0.808
Procurement Governance -> Service Delivery	0.474	2.223	0.026

Source: Research Data, 2021

4.16.5.4 Blindfolding and Predictive Relevance Q^2

For the purpose of determining how effectively the path model can predict the initially observed values, a blindfolded PLS-SEM approach was used. Endogenous construct service delivery has a Q^2 score of 0.320, which indicates moderate predictive power. Predictive significance is shown by Q^2 values greater than 0 indicate minor predictive relevance, medium predictive relevance, and high predictive relevance are all represented by Q^2's 0.02, 0.15, and 0.35 values respectively (Geisser, 1974).

Table 4.60: Predictive Relevance Q^2

Latent Construct Variable	SSO	SSE	Q^2 (=1-SSE/SSO)
Integrative supply chain technology	1342	1342	
PG * ISCT	122	122	
Procurement Governance	2928	2928	
Service Delivery	1830	1245.111	0.320

SSO - Sum of squared observations; SSE - sum of squared predictive errors

Source: Research Data, 2021

4.16.5.5 Effect Size q^2

The relative impact of predictive relevance can be compared by means of the measure to the q^2 effect size. The q^2 effect size was calculated for all constructs by using the following formula $q^2 = Q^2$included - Q^2 excluded / (1 - Q^2 included): (Cogen, 1988). Table 4.61 shows the effect size q^2 impact size for the relative predictive relevance for each exogenous variable examined. The moderating variable shows a weak effect size (0.001) hence the moderating ISCT has a weak predictive relevance for the relationship between procurement governance and service delivery. Both integrative supply chain technology and procurement governance have moderate q^2 effect size on endogenous variable service delivery.

Table 4.61: Effect Size q^2

Latent variable	Q^2 (=1-SSE/SSO)	Q^2 change (q^2)
Omission of ISCT	0.320	0.082
Omission of PG	0.320	0.151
Omission of PG * ISCT	0.320	0.001

Source: Research Data, 2021

4.16.5.6 Overall Model Fit

It was determined that this model has an SRMR of 0.087. Models that fit well are those that have an SRMR value of less than 0.10, according to Henseler and colleagues (2014). As a result, this model is a good match. Composite SRMR is statistically significant at level of significance of 0.001 based on bootstrapping findings, indicating that this model is well-fitted. Table 4.62 displays this information.

Table 4.62 Composite Model SRMR Statistics

SRMR	Sample Mean	Standard Error	T Statistic	P Value
0.087	0.525	0.071	7.411	0.000

Source: Research Data, 2021

Figure 4.5 and 4.6 shows assessment of reflective measurement model for the moderating effect of integrative supply chain technology on the relationship between procurement governance and service delivery. The figures represent the structural equation model diagrams with path coefficients and T-values respectively.

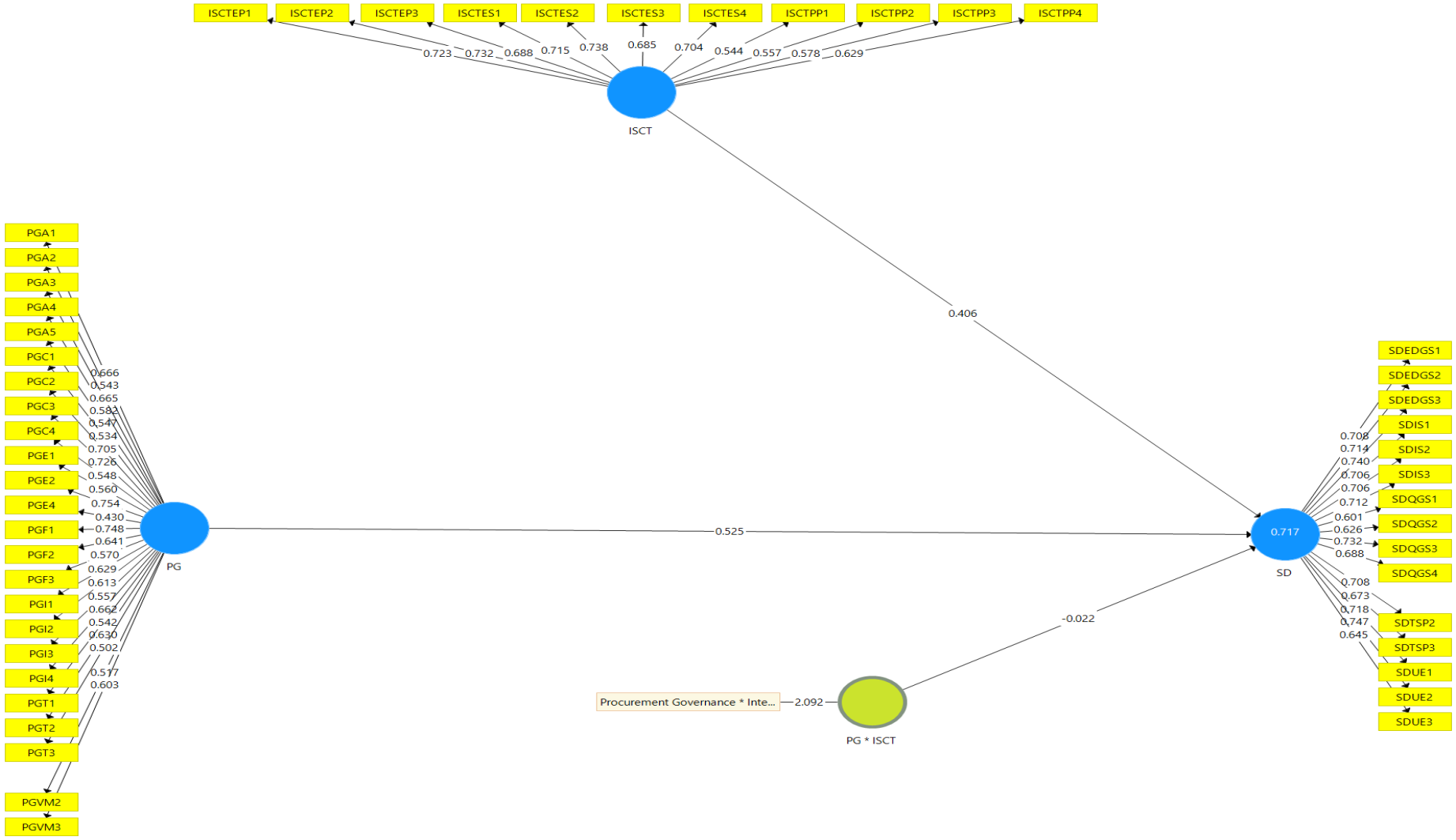

Figure 4.5: Structural Equation Model Diagram with Path Coefficients

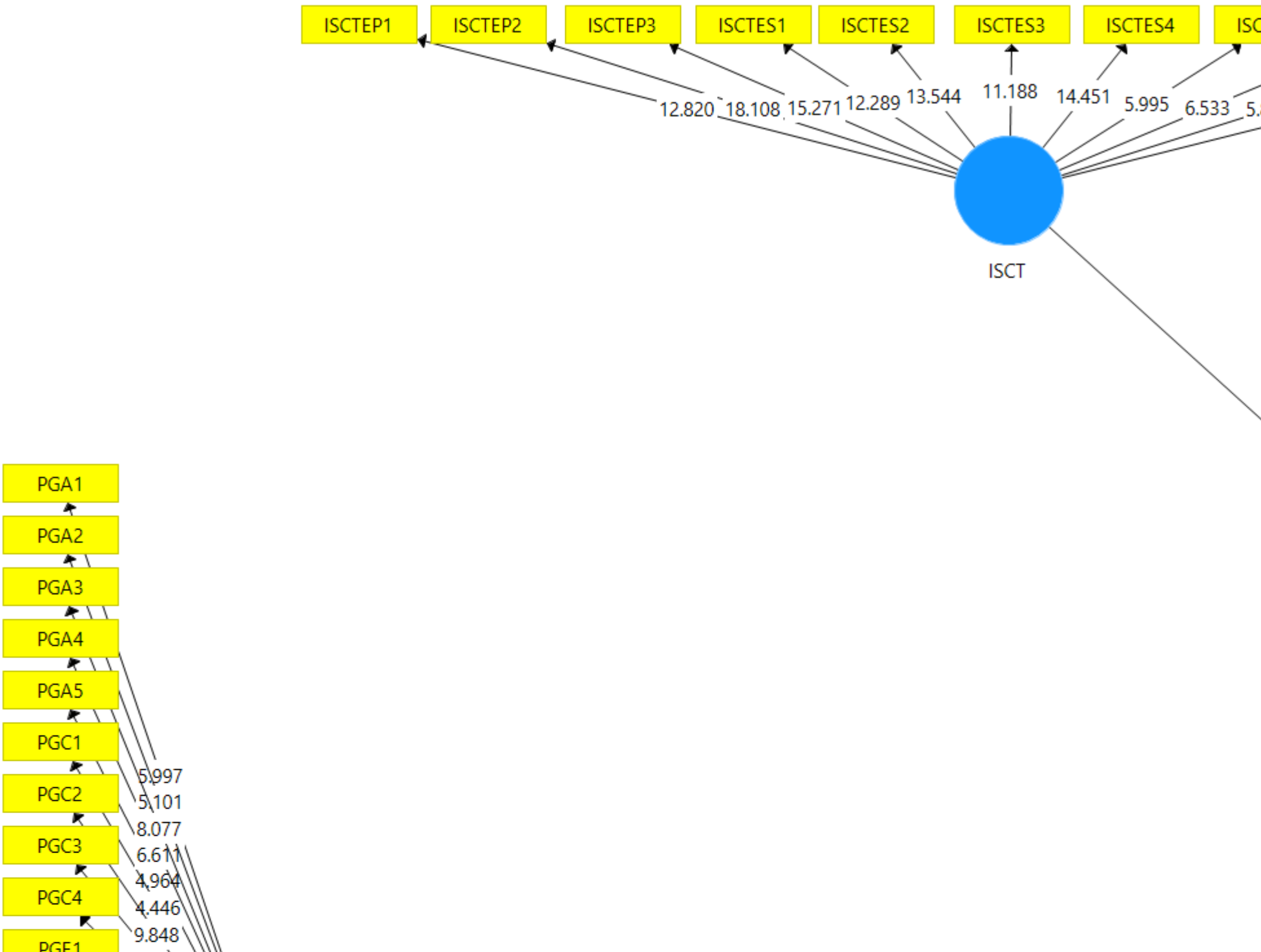
ISCTEP1
ISCTEP2
ISCTEP3
ISCTES1
ISCTES2
ISCTES3
ISCTES4
12.820
18.108
15.271
12.289
13.544
11.188
14.451
5.995
6.533
ISCT
PGA1
PGA2
PGA3
PGA4
PGA5
PGC1
PGC2
PGC3
PGC4
5.997
5.101
8.077
6.611
4.964
4.446
9.848

Figure 4.6: Structural Equation Model Diagram with T-Values

4.17 Procurement Governance, Integrative Supply Chain Technology, Procurement Performance and Service Delivery

The fourth purpose of this study was to assess the combined effect of procurement governance, supply chain technology, and procurement performance on service delivery in Kenyan MDAs. This objective was analyzed by conducting PLS-SEM analysis with SmartPLS. The latent constructs variables in the model were first checked for validity and reliability because all the constructs are reflective. The subsections that follow address the model's reliability and validity analysis before evaluating the PLS-SEM study findings.

4.17.1 Model Outer Loadings

Table 4.63 shows that majority of the indicator of three latent construct have individual indicator reliability values greater than the minimal allowed threshold of 0.4. An indicator reliability value greater than or equal to 0.4 was found in the fewest number of procurement performance components (14). As a consequence, bootstrapping demonstrates that all p-values are below the 0.05 significance level. So it may be concluded that all the outside model loadings have statistical significance.

Table 4.63: Outer Loadings of the Model

Latent Variable	Indicators	Loadings	Indicator Reliability	T Statistics	P Values
Integrative Supply Chain Technology	ISCTEP1	0.722	0.521	12.291	0.000
	ISCTEP2	0.732	0.536	18.317	0.000
	ISCTEP3	0.688	0.473	15.844	0.000
	ISCTES1	0.716	0.513	12.307	0.000
	ISCTES2	0.738	0.545	14.006	0.000
	ISCTES3	0.685	0.469	10.901	0.000
	ISCTES4	0.704	0.496	13.401	0.000
	ISCTPP1	0.544	0.296	5.693	0.000
	ISCTPP2	0.557	0.310	6.591	0.000
	ISCTPP3	0.578	0.334	5.761	0.000
	ISCTPP4	0.629	0.396	8.039	0.000
Procurement Governance	PGA1	0.666	0.444	6.109	0.000
	PGA2	0.543	0.295	5.059	0.000
	PGA3	0.665	0.442	8.343	0.000

	PGA4	0.582	0.339	6.427	0.000
	PGA5	0.546	0.298	4.942	0.000
	PGC1	0.533	0.284	4.270	0.000
	PGC2	0.705	0.497	9.581	0.000
	PGC3	0.725	0.526	14.502	0.000
	PGC4	0.547	0.299	4.023	0.000
	PGE1	0.560	0.314	4.561	0.000
	PGE2	0.754	0.569	16.529	0.000
	PGE4	0.430	0.185	3.707	0.000
	PGF1	0.747	0.558	9.160	0.000
	PGF2	0.641	0.411	4.713	0.000
	PGF3	0.570	0.325	4.836	0.000
	PGI1	0.629	0.396	6.859	0.000
	PGI2	0.614	0.377	8.110	0.000
	PGI3	0.557	0.310	5.676	0.000
	PGI4	0.662	0.438	9.416	0.000
	PGT1	0.541	0.293	4.886	0.000
	PGT2	0.630	0.397	8.259	0.000
	PGT3	0.502	0.252	4.174	0.000
	PGVM2	0.517	0.267	3.586	0.000
	PGVM3	0.603	0.364	4.649	0.000
Procurement Performance	PPBA1	0.664	0.441	6.846	0.000
	PPBA2	0.682	0.465	10.565	0.000
	PPBA3	0.663	0.440	13.123	0.000
	PPBA4	0.698	0.487	13.113	0.000
	PPEC1	0.589	0.347	4.479	0.000
	PPEC3	0.617	0.381	7.943	0.000
	PPEC4	0.552	0.305	4.846	0.000
	PPEC5	0.599	0.359	5.360	0.000
	PPEC6	0.506	0.256	5.090	0.000
	PPEC7	0.598	0.358	6.136	0.000
	PPEC8	0.553	0.306	8.270	0.000
	PPEPP1	0.554	0.307	5.432	0.000
	PPEPP2	0.707	0.500	13.598	0.000
	PPEPP3	0.527	0.278	9.494	0.000
	PPEPP4	0.567	0.321	7.953	0.000
	PPIA1	0.608	0.370	4.875	0.000
	PPIA2	0.681	0.464	7.345	0.000
	PPIA3	0.611	0.373	6.513	0.000
	PPIA4	0.577	0.333	6.187	0.000
	PPIA5	0.582	0.339	5.796	0.000
	PPPC1	0.548	0.300	10.419	0.000
	PPPC2	0.629	0.396	9.191	0.000
	PPPC3	0.591	0.349	5.992	0.000
	PPPC4	0.640	0.410	12.139	0.000
	PPPC5	0.664	0.441	14.910	0.000

	PPPC6	0.654	0.428	8.568	0.000
	PPPC7	0.699	0.489	9.426	0.000
	PPRC1	0.508	0.258	3.528	0.000
	PPRC2	0.595	0.354	4.761	0.000
	PPRC3	0.654	0.428	8.062	0.000
	PPRC4	0.691	0.477	12.902	0.000
	PPRC5	0.647	0.419	6.855	0.000
	PPRC6	0.583	0.340	7.280	0.000
	PPRK1	0.598	0.358	7.210	0.000
	PPRK2	0.553	0.306	5.554	0.000
	PPRK3	0.734	0.539	13.761	0.000
	PPRK4	0.573	0.328	9.927	0.000
	PPRK5	0.514	0.264	5.726	0.000
Service Delivery	SDEDGS 1	0.708	0.501	12.532	0.000
	SDEDGS 2	0.716	0.513	16.370	0.000
	SDEDGS 3	0.740	0.548	13.615	0.000
	SDIS1	0.705	0.497	10.873	0.000
	SDIS2	0.704	0.496	9.152	0.000
	SDIS3	0.711	0.506	13.925	0.000
	SDQGS1	0.601	0.361	4.952	0.000
	SDQGS2	0.626	0.392	5.602	0.000
	SDQGS3	0.731	0.534	9.231	0.000
	SDQGS4	0.685	0.469	9.615	0.000
	SDTSP2	0.711	0.506	15.348	0.000
	SDTSP3	0.678	0.460	12.542	0.000
	SDUE1	0.715	0.511	12.394	0.000
	SDUE2	0.747	0.558	11.520	0.000
	SDUE3	0.646	0.417	7.561	0.000

Source: Research Data, 2021

4.17.2 Internal Consistency Reliability

The output of SmartPLS was used to produce reliability ratings for internal consistency and composite reliability. As indicated in Table 4.64, all latent variables have composite reliability ratings greater than 0.6. Bagozzi and Yi (1988) posited that reflective latent variables exhibit high degrees of internal consistency and dependability based on such statistical evidence. Because all of these composite reliability ratings have p-values of 0.000, the bootstrapping findings are likewise statistically significant. In addition, all five constructs have Cronbach's Alpha values

over the 0.7 threshold. All Cronbach's Alpha values are statistically significant, according to the bootstrapping findings. In other words, the constructs used here are internally consistent.

Table 4.64: Construct Internal Consistency Reliability

Latent Variable Constructs	Cronbach's Alpha	Composite Reliability	Average Variance Extracted (AVE)
ISCT	0.873	0.897	0.444
PG	0.924	0.933	0.370
PP	0.955	0.958	0.377
SD	0.924	0.934	0.485

Source: Research Data, 2021

4.17.3 Convergent Validity

The study's AVE values are shown in Table 4.65. Between 0.370 and 0.485, the average AVE falls below the acceptable standard of 0.5. Fornell and Larcker (1981) claim that the concept's convergent validity is still true even if the AVE is less than 0.5. All three constructs in the study had AVE values that are less than 0.5. Since the composite reliability of each component was more than 0.6, the convergent validity was established. Bootstrapping results from the three construct results show that AVE scores are also significant.

Table 4.65: Average Variance Extracted

Latent Variable Constructs	Composite Reliability	Average Variance Extracted (AVE)
ISCT	0.897	0.444
PG	0.933	0.370
PP	0.958	0.377
SD	0.934	0.485

Source: Research Data, 2021

4.17.4 Discriminant Validity

In testing discriminant validity, the HTMT was used. Measurement model heterotrait correlations should be smaller than one in order to provide discriminant validity between two reflective latent constructs that are of interest (Teo et al., 2003). Discriminant validity is impaired if a high HTMT score is obtained. When the

components of the path model are more distinct, a lower and more conservative criteria of 0.85 is suitable (Henseler et al., 2015). As indicated in Table 4.66, just one procurement performance value of 0.951 falls below the criterion of 0.90, hence discriminant validity was shown.

Table 4.66: Heterotrait-Monotrait Ratio

Latent Variable Constructs	ISCT	PG	PP	SD
ISCT				
PG	0.576			
PP	0.711	0.877		
SD	0.769	0.814	0.951	

Source: Research Data, 2021

Additionally, bootstrapping study findings are indicated in Table 4.67. The value 1 is not included in any of the confidence ranges. A result of 1 does not fall within the HTMT confidence intervals for any of the three components, therefore indicating discriminant validity.

Table 4.67: Heterotrait Monotrait Ratio Confidence Intervals

Latent Variable Constructs	Original Sample (O)	Sample Mean (M)	Bias	2.50%	97.50 %
ISCT -> SD	0.194	0.202	0.009	0.062	0.317
PG -> SD	0.09	0.099	0.009	-0.098	0.244
PP -> SD	0.696	0.684	-0.012	0.523	0.894

Source: Research Data, 2021

4.17.5 Assessment of the Structural Model

The structural (inner) model may then be analyzed when the measurement model is validated. Once the structural model has been validated, it is feasible to systematically examine whether or not the hypotheses it suggests are supported by the data (Urbach & Ahlemann, 2010). R^2 coefficient of determination, challenges with collinearity, amount of f^2 effect, predictive relevance Q^2 and size and path coefficients of the q^2 impact were all tested to determine the structural model's credibility.

4.17.5.1 Collinearity Assessment

For the predictor constructs, all the VIF values were below 5.0 (Hair et al., 2017), which implies that there is no evidence of multicollinearity. This number should be below 4.0 for well fitted models, however VIF coefficients as high as 5.0 are not uncommon when using more flexible criteria (Garson, 2016). As a result, the structural model does not suffer from collinearity issues.

Table 4.68: Collinearity Statistics - Variance Inflation Factors

Latent Construct Variable	ISCT	PG	PP	SD
ISCT				1.791
PG				3.174
PP				4.106
SD				

Source: Research Data, 2021

4.17.5.2 Structural Model Path Coefficients

After using the PLS-SEM approach, the structural model path coefficients are estimated. These represent the assumed connections between the various constructs. Traditional values for path coefficients range from -1 to +1. Values that fall between these parameters are most often seen. The structural model path coefficients suggest that the direct and total effects path relationships between ISCT and SD (0.194) are statistically significant with p values < 0.05, procurement governance and service delivery (0.090) is insignificant with p value = 0.338 and procurement performance and service delivery (0.696) with p values <0.001. Table 4.69 provides details of the path coefficient estimates, t values, p values, and confidence intervals for the model.

Table 4.69: Model Path Coefficients

Constructs	Path Coefficients	T Statistics	P Values	95% Confidence intervals
ISCT -> SD	0.194	2.971	0.003	[0.060,0.320]
PG -> SD	0.090	0.959	0.338	[-0.098,0.271]
PP -> SD	0.696	7.336	0.000	[0.514,0.88]

Source: Research Data, 2021

4.17.5.3 Coefficient of Determination

After analyzing the validity and reliability of both the outer and inner models, it was necessary to interpret the coefficient of determination (R^2) and path coefficients. According to Table 4.70, the service delivery endogenous latent variable has a coefficient of determination of 0.831. Three external latent components were included into the model, whereas one endogenous latent construct was included (service delivery). The coefficient of determination, R^2, values in Table 4.70 are significant at the p 0<.001 level: service delivery are $R^2 = 0.831$, $t = 21.851$, $p < 0.001$. For endogenous latent variables, R^2 values of 0.75 are significant, 0.50 are moderate, and 0.25 are negligible (Hair et al., 2011). This indicates that the model adequately accounts for 83.1 percent (0.831) of the variation in service delivery and is statistically significant at $p < 0.001$.

Table 4.70: Predictive Power R^2

Endogenous latent construct	R^2	T Statistics	P Values
SD	0.831	21.851	0.000

Source: Research Data, 2021

4.17.5.4 Effect Size f^2

The study findings presented in the Table 4.71 shows the f^2 values for the endogenous construct (service delivery) and exogenous constructs. Integrative supply chain technology on service delivery (0.124), procurement governance relationship with service delivery (0.015) and procurement performance relationship with service delivery (0.695). Cohen (1992) gave the guidelines for assessing f^2 values as follows; if f^2 values is 0.02 then the effect size is small; if it is 0.15, then the effect size is medium and if the f^2 values is 0.35, then the effect size is big. This means that procurement governance has small effect, if procurement governance is removed from the model the change variance difference is explained in service delivery.

Table 4.71: Effect Size f^2

Latent Construct Variable	ISCT	PG	PP	SD
ISCT				0.124
PG				0.015
PP				0.695

Source: Research Data, 2021

4.17.5.5 Blindfolding and Predictive Relevance Q^2

Table 4.72 demonstrates that the Q^2 values of the endogenous construct service delivery have a strong predictive relevance of 0.374. A Q^2 score of zero or negative implies that the model is of no use to the researcher. Low predictive relevance is indicated by a Q^2 value of 0.02, medium predictive relevance by a Q^2 value of 0.15, and high predictive relevance by a Q^2 value of 0.35 or higher.. The findings show that the model has a strong predictive relevance for the endogenous latent factor of service delivery.

Table 4.72: Predictive Relevance Q^2

Latent Construct Variable	SSO	SSE	Q^2 (=1-SSE/SSO)
SD	1830	1145.515	0.374

SSO - Sum of squared observations; SSE - sum of squared predictive errors

Source: Research Data, 2021

4.17.5.5 Effect Size q^2

Table 4.73 shows the effect size q^2 predictive relevance values for models that do not include a specific exogenous component. An external construct with a 0.02, 0.15, and 0.35 relative predictive importance for a certain endogenous construct indicates a minor, medium, or substantial predictive significance. The following formula was used to compute the q^2 effect size for all constructs (Cogen, 1988): $q^2 = Q^2$ included - Q^2 excluded / (1 - Q^2 included). Omission of integrative supply chain technology and procurement governance shows a small effect while procurement governance and shows a medium effect.

Table 4.73: Effect Size q^2

	Q^2 (=1-SSE/SSO)	Q^2 change (q^2)
Omission of ISCT	0.374	0.111
Omission of PG	0.374	0.002
Omission of PP	0.374	0.088

Source: Research Data, 2021

4.17.5.6 Overall Model Fit

The model's standardized root mean square residual (SRMR) was determined to be 0.094. This number is less than or equal to 0.10, which is closer to the 0.08 value proposed by Henseler et al. (2014). This suggests that this model is a good fit. The significance of this SRMR was determined via bootstrapping (0.094). Table 4.74 shows that the SRMR is statistically significant at the 0.001 level.

Table 4.74: Composite Model SRMR Statistics

SRMR	Original Sample	Standard Error	T Statistic	P Value
0.094	0.696	0.096	7.269	0.000

Source: Research Data, 2021

Figure 4.7 and 4.8 presents measurement model to assess the combined effect of procurement governance, supply chain technology, and procurement performance on service delivery in Kenyan MDAs using PLS-SEM analysis with SmartPLS. The figures shows equation model diagrams with path coefficients and T-values respectively.

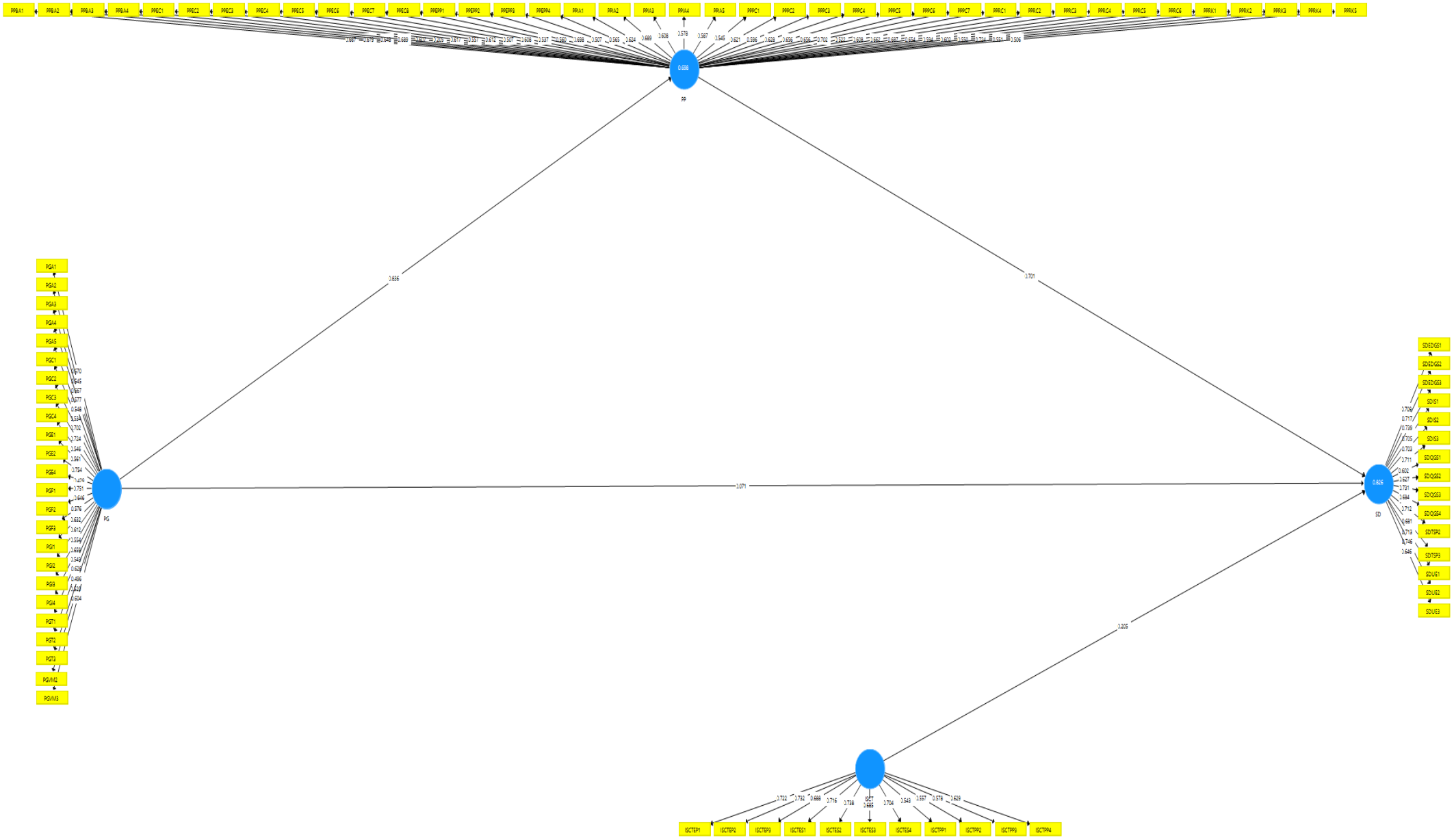

Figure 4.7: Structural Equation Model Diagram with Path Coefficients

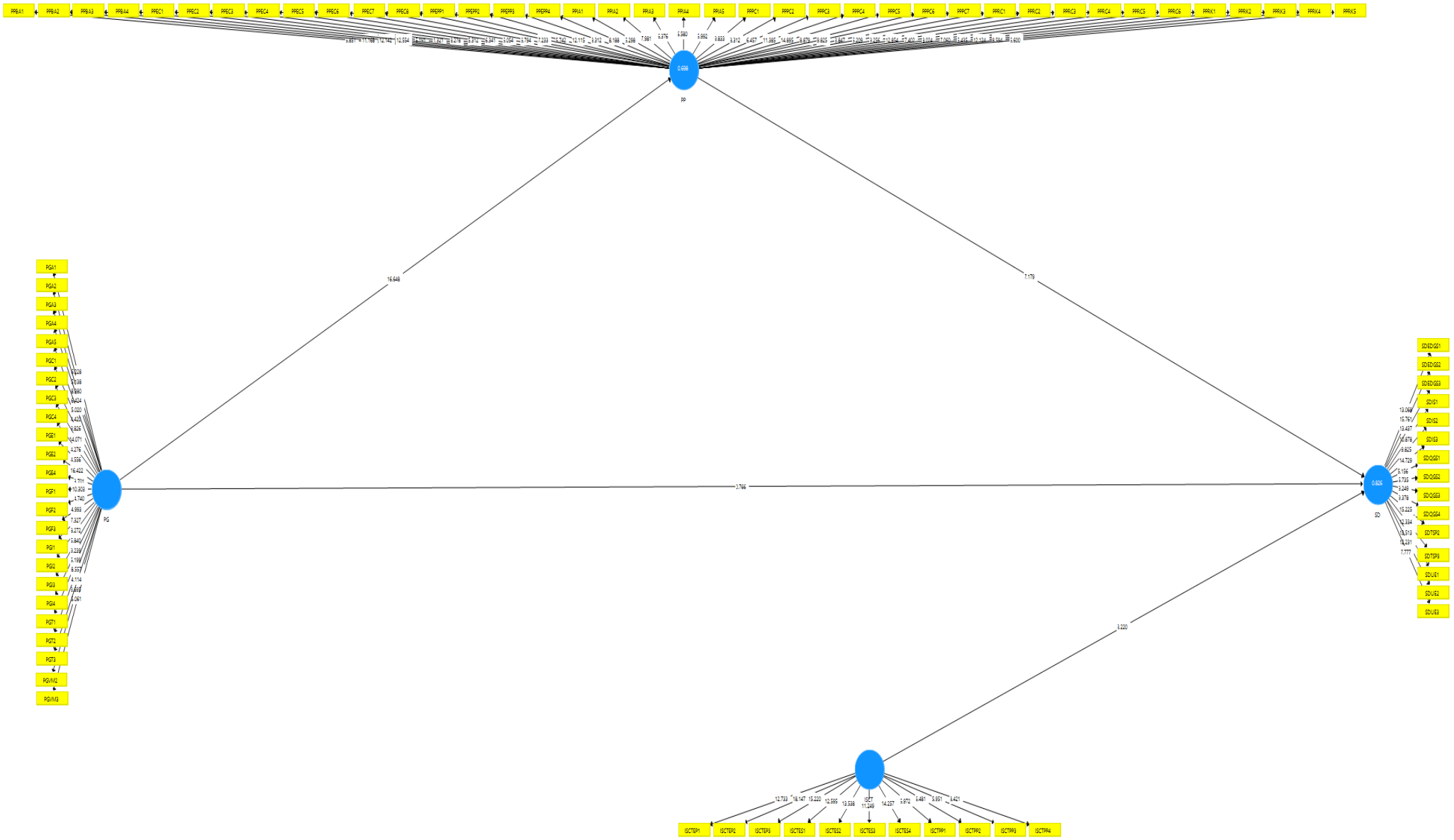

Figure 4.8 Structural Equation Model Diagram with T-Value

CHAPTER FIVE

HYPOTHESES TESTING, INTERPRETATIONS AND DISCUSSION

5.1 Introduction

The study's primary objective was to determine the effect of procurement governance, integrative supply chain technology, and procurement performance on service delivery of MDA in Kenya. In order to solve the study questions, four hypotheses were constructed. Based on the literature, the model included four latent constructs namely: procurement governance, integrative supply chain technology, procurement performance and service delivery. It Incorporated all the elements of these four constructs. It was necessary to use EFA to establish the validity and reliability of the four latent constructs in order to assess their unidimensionality.

Before further analysis, the construct indicators found to have low factor loadings and item to total correlation scores were removed. After that, the descriptive statistics were calculated. Analysis of associations between the constructs was carried out using the PLS-SEM SmartPLS program. To evaluate the PLS-SEM structural model, the path coefficients, often referred to as path weights, were used. Chin (1998) urged researchers to use bootstrapping to determine the t statistics and p values. In the present study, therefore this advice was followed. As a consequence, this chapter presents the results of hypothesis testing and analyses, as well as the interpretation of the links between the four latent constructs that were studied. Using SmartPLS 3.3.3 software, the relationship coefficients and related p values were generated to estimate the SEM structural model for the investigation.

5.2 Hypothesis Testing

Analysis and hypothesis testing were performed using SEM-PLS. The structural model was discovered via the use of hypothesis testing based on the evaluation of path coefficients. The paths connecting the constructs describe a certain hypothesis. If a hypothesis is proven or disproved, the path coefficient may be used to comprehend the relationship between exogenous and endogenous components. By obtaining high R^2 and significant t-values, the statistical purpose of SEM is to disprove the null hypothesis of no effect. R^2 values range from 0 to 1, with a value of 1 signifying a strong model prediction (Hair et al., 2010). The direction and intensity of an effect are determined by estimating the path coefficients (Bordens & Abbott, 2008). Bootstrapped T-test findings serve as the basis for determining if statistically significant relationships exist (Hensler et al., 2009).

According to Chin (1998), t statistics and p values were obtained using bootstrapping with 500 resamples, as recommended. Analytical goals of SEM-PLS include revealing high R^2 and corresponding significant t-values, which may be used to validate theoretically postulated propositions. Thus, the path coefficients' statistical significance could easily be determined. Exogenous components in the structural model were examined for their shifting effects of R^2 and Q^2 values using effect sizes f^2 and q^2. The significance threshold of ($t > 1.96$, $p \leq 0.05$) was used to assess the path coefficients. It was used in SmartPLS version 3.3.3 to perform data hypothesis testing using PLS-SEM.

5.3 Procurement Governance and Service Delivery

The first objective of this study was to establish the effect of procurement governance on service delivery in MDAs in Kenya. The procurement governance variable was measured using the following sub-constructs; value for money, integrity, equity, fairness, accountability, transparency and competition whereas service delivery construct variable was measured using the following sub-constructs; information sharing, timely supplier payments, efficient delivery of goods and services and user effectiveness. A structural model and a hypothesis were developed to answer the research question. One exogenous latent construct variable (procurement governance) and one endogenous latent construct variable (service delivery) were integrated in the model. The following hypothesis was tested.

The Hypothesized Relationship between Procurement Governance and Service Delivery.

H_1: Procurement governance has no significant effect on service delivery.

Hypothesis H_1 proposed that procurement governance has no significant effect on service delivery. PLS-SEM analysis was used to test this hypothesis. The hypothesis was formulated

based on relevant theories and extant empirical studies. The path coefficient was found to be $\beta = 0.771$ ($t = 12.577$, and $p < 0.001$), respectively. $R^2 = 0.595$ ($t = 6.344$, $p < 0.001$) and $f^2 = 1.467$ were the predictive power values. This suggests that procurement governance accounts for 59.5% (0.595) of the variation in service delivery in this model. These findings indicate a statistically significant positive correlation between procurement governance and service delivery. The magnitude of the f^2 impact is rather big. Based on the analysis outcome, procurement governance

with its associated measures registered a statistically significant relationship with service delivery. Therefore, H_1 is rejected at $t > 1.96$, $p \leq 0.05$ significance level.

5.4 Procurement Governance, Procurement Performance and Service Delivery

The second purpose was to determine if procurement performance acts as a moderator in the link between procurement governance and service delivery in Kenyan MDAs. To address the research objective, a structural model and hypothesis were built. One exogenous latent construct (procurement governance) and one endogenous latent construct (service delivery) and mediating variable, procurement performance (with the sub-constructs; regulatory compliance, effective procurement planning, sound evaluation criteria, performing contracts, inspection and acceptance, book keeping and budget absorption) were integrated in the model. The test then hypothesized the mediation of procurement performance in the relationship between procurement governance and service delivery as follows.

H_2: Procurement performance has no significant mediating influence on the relationship between procurement governance and service delivery.

PLS-SEM analysis was used to test this hypothesis. Mediation analysis effects was performed in accordance with the Nitzl et al. (2016), Hair et al. (2017) and Cepeda et al. (2017) guidelines to assess the mediating role of procurement performance (PP) on the linkage between procurement governance (PG) and service delivery (SD). The first step involved bootstrapping to establish the indirect effect when analyzing mediating effect. When the mediator construct procurement performance is included in the model, this is referred to as the indirect path. The model was then analyzed using bootstrapping to determine statistical significance. The indirect path's model

findings were determined to be statistically significant at $p < 0.001$. The indirect path coefficient was found to be $\beta = 0.711$ ($t = 7.663$, $p < 0.001$), whilst the coefficient of determination (R^2) was found to be = 0.803 ($t = 16.643$, $p < 0.01$) and $f^2 = 0.004$. This shows that procurement performance has a statistically significant mediating role in the relationship between procurement governance and service delivery ($t > 1.96$, $p < 0.05$). It shows that the mediating role of procurement performance in the relationship between procurement governance and service delivery may be responsible for around 80.3% of the variance in service delivery. The indirect impact is particularly noteworthy, since none of the 95% confidence ranges contains zero (0.530, 0.895).

The next step involves bootstrapping to establish whether the direct effect relationship between procurement governance and service delivery with inclusion of mediating variable procurement performance, was statistically significant. After bootstrapping the direct effect results were as follows; $\beta = 0.053$ ($t = 0.520$. $p = 0.603$). This indicates that the direct path involving procurement governance and service delivery is statistically insignificant. With presence of mediator (procurement performance) the effect of procurement governance and service delivery is insignificant. Furthermore, the total effect results on effect of procurement governance on service delivery without the presence of mediating variable (procurement performance) was analysed and was found to be statistically significant, the results were as follows; $\beta = 0.764$ ($t = 11.214$, $p < 0.001$).

Full mediation was determined by computation of the mediation effect using VAF values. When the direct impact is not significant but the indirect effect is significant, full mediation is suggested, meaning that only the mediator's indirect effect occurs

(Zhao et al., 2010). This shows that the relationship between procurement governance and service delivery is fully mediated by procurement performance. In view of these results, hypothesis H_2 which proposed that procurement performance has no significant influence on the relationship between procurement governance and service delivery is rejected.

5.5 Procurement Governance, Integrative Supply Chain Technology and Service Delivery

The third purpose was to determine the moderating influence of integrative supply chain technology on the connection between procurement governance and service delivery in Kenyan MDAs. To address the research objective, a structural model and hypothesis were formulated. One exogenous latent variable (procurement governance), one endogenous latent variable (service delivery) and one moderator construct (integrative supply chain technology) with sub-constructs; ERP system, E-procurement and procurement portal were integrated in the model. The relevance of the interaction term is the key concern when interpreting the results of a moderation analysis.

When the effect of the interaction term on the endogenous construct is significant, the moderator construct has a significant impact on the relationship between the two constructs. In order to find out whether or not integrative supply chain technology moderates the relationship between procurement governance and service delivery, the PLS-SEM analysis was carried out.

H_3: Integrative supply chain technology has no significant moderating effect on the relationship between procurement governance and service delivery.

The hypothesis was tested using a two-stage PLS method to examine the moderating influence of the variable (Hair et al., 2017). The first step was to see whether procurement governance and service delivery had a moderating influence on the use of supply chain technologies. Additional insights were gleaned by conducting a second round of research that intended to examine how procurement governance and service delivery are linked.

The results achieved were: $\beta = -0.022$ ($t = 0.633$, $p = 0.527$), and $R^2 = 0.717$. The finding for the moderated relationship of the effect size (f^2) is none at 0.004. However, at a significance threshold of ($t > 1.96$, $p < 0.05$), the influence of integrative supply chain technology on procurement governance and service delivery was determined to be statistically insignificant.

This indicates that the link between procurement governance and service delivery is not moderated by the integrative supply chain technology. As a result, Hypothesis H_3, which claimed that integrative supply chain technology had no effect on the relationship between procurement governance and service performance, is not rejected. The findings of the direct association between procurement governance and service delivery, on the other hand, suggest the following statistically significant relationship: $\beta = 0.525$ ($t = 7.468$, $p < 0.001$). $R^2 = 0.717$, ($t = 11.083$, $p < 0.001$), and $f^2 = 0.474$ were the predictive power (R^2) values. although the direct impact of ISCT on the path coefficient of service delivery revealed a positive and statistically significant link.

Procurement governance and service performance are not influenced by integrative supply chain technology, according to the findings of this research. When it comes to service delivery, Yator and Shale (2014) found that empowering personnel, innovation, and the availability of integrative systems increased service delivery by enhancing process visibility. Malela (2010), on the other hand, claims that there are still capacity limits that impede the deployment of integrative supply chain systems due to insufficient infrastructure, a lack of management support, and a lack of technical support.

5.6 Procurement Governance, Integrative Supply Chain Technology, Procurement Performance and Service Delivery

The fourth objective was to test how procurement governance, integrative supply chain technology, and procurement performance interact to affect service delivery in Kenyan MDAs. To solve the research issue, a PLS-SEM structural model and a hypothesis were devised. Three exogenous latent constructs (procurement governance, integrative supply chain technology and procurement performance) and one endogenous latent construct (service delivery) were integrated in the model.

SEM-PLS aims to reveal strong R^2 values and their associated significant t-values in order to test the theoretically predicted model analytically. The path coefficients' statistical significance might thus be determined in this way. For the structural model's exogenous constructs, the R^2 and Q^2 values shifted the f^2 and q^2 effect sizes. SmartPLS version 3.3.3 was used to conduct the analysis using PLS-SEM. PLS-SEM was used to assess the hypothesized combined influence of procurement governance,

integrative supply chain technology, and procurement performance on service delivery.

H_4: Procurement governance, integrative supply chain technology and procurement performance have no significant combined effect on service delivery.

To test this hypothesis, the impact changes of each external latent variable on R^2 and cross-validated redundancy for endogenous latent variable Q^2 values were utilized. The following conclusions were drawn from this hypothesis assessment of the path coefficients for the combined model: $R^2 = 0.831$ ($t = 21.851$, $p < 0.001$). This suggests that the combined influence of procurement governance, procurement performance, and integrative supply chain technology may account for 83.1 percent of the variation in service delivery. This may be regarded as a high degree of predicting ability.

The current study's findings reveal that when all exogenous components are integrated, their combined influence on service delivery is stronger than the effect of individual exogenous constructs (procurement governance, procurement performance, and integrative supply chain technology). Although each exogenous variable adds a different amount to the overall R^2 of the endogenous variable, none of the values surpass the overall R^2 of any endogenous variable associated with service delivery. Procurement governance on its own results into R^2 value of 0.595, procurement performance with R^2 value of 0.808, and integrative supply chain technology with R^2 value of 0.506. This indicates that in direct relationships between procurement governance, procurement performance and integrative supply chain technology, only 59.5%, 80.8% and 50.6% respectively of the variance in constructs can be attributed to service delivery.

The effect change of R^2 for each latent variable is measured by f^2 values. If procurement performance was to be excluded from the model, the f^2 effect size would be 0.608 indicating that the R^2 would reduce by this magnitude. In the same vein f^2 effect size when integrative supply chain technology is excluded is 0.130; and none effect (statistically insignificant) for exclusion of procurement governance. Procurement performance is the only external variable that decreases the explained variation in service delivery more than any other. For this reason the most significant explanatory component in the present model is procurement performance. In contrast, excluding procurement performance would have the least impact on reducing explained variation in service performance. Procurement performance mediates the link between procurement governance and service delivery, which explains why this is the case.

The q^2 values are used to gauge how much of an impact Q^2 has. Changes in model fit or model reliability caused by excluding significant external variables are reflected in the q^2 values, and the Q^2 impact alters the model's predictive relevance. The q^2 values are the primary indicators of the exogenous variable's contribution to the model's ability to accurately forecast the endogenous variable. All of the exogenous factors' q^2 values are lower/none or small effect; procurement governance excluded q^2 was none (0.002), procurement performance q^2 was small (0.087), and integrative supply chain technology q^2 was none (0.011) than the aggregate Q^2 (0.374) of endogenous variable service delivery, showing that the model's predictive relevance is better when all exogenous variables are included. These results disapprove the proposition of hypothesis H_4 above. Findings reveal that the overall effect of procurement governance, procurement performance and integrative supply chain technology on

service delivery is significantly greater than that of the individual effect of constructs on service delivery, therefore H_4 is rejected.

5.7 The Final Conceptual Model

The research study reveals that some of the relationships as proposed by the original conceptual model were not supported by the research findings. Based on these findings, the study proposed a respecified conceptual model. The final model proposes that there is a relationship between procurement governance and service delivery; that the relationship between procurement governance and service delivery is mediated by procurement performance; that the relationship between procurement governance and service delivery is not moderated by integrative supply chain technology; that the combined effect of procurement governance, integrative supply chain technology and procurement performance have a significant combined effect on service delivery. Figure 4.9 represents the reconfigured conceptual model.

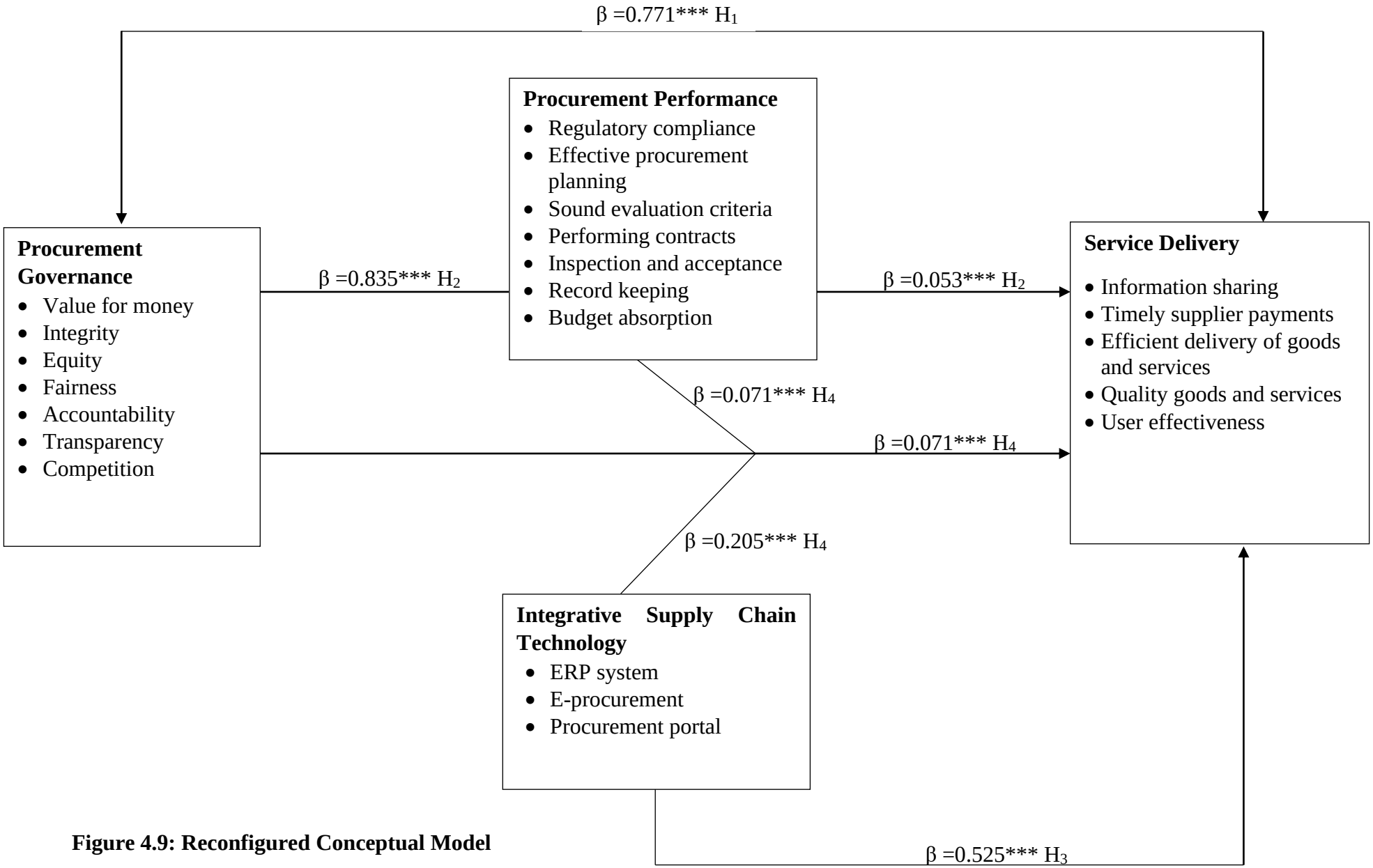

Figure 4.9: Reconfigured Conceptual Model

Source: Research Data, 2021

Table 5.1: Summary of Test of Hypotheses Results

Study Objective	Hypothesis	Findings	Conclusion
Establish the effect of procurement governance on service delivery in MDAs in Kenya.	H_1: Procurement governance has no significant effect on service delivery.	$\beta = 0.771$, $t = 12.577$, $p < 0.05$ $R^2 = 0.595$, $t = 6.344$, $p < 0.05$ SRMR = 0.085	The result revealed path coefficients statistically significant relationship at 0.001. H_1 was hereby rejected.
Assess the mediating influence of procurement performance on the relationship between procurement governance and services delivery in MDAs in Kenya.	H_2: Procurement performance has no significant mediating influence on the relationship between procurement governance and service delivery.	Indirect effect; $\beta = 0.711$, $t = 7.663$, $p < 0.001$, $R^2 = 0.803$, $t = 16.643$, $p < 0.001$, $f^2 = 0.004$ Direct effect; $\beta = 0.053$, $t = 0.520$, $p = 0.603$, Total effects; $\beta = 0.764$, $t = 11.214$, $p < 0.001$. Direct effect is insignificant, indirect effect is significant implying full mediation VAF = 99.6% SRMR = 0.094	The result showed statistically significant mediation. H_2 was thereby rejected.
Assess the moderating effect of integrative supply chain technology on the relationship between procurement governance service delivery in MDAs in Kenya.	H_3: Integrative supply chain technology has no moderating effect on the relationship between procurement governance and service delivery.	$\beta = -0.022$, $t = 0.633$, $p = 0.527$ $R^2 = 0.717$, $f^2 = 0.004$ SRMR = 0.087	The analysis revealed statistically insignificant relationship. H_3 was thereby not rejected.
Examine the combined effect of procurement governance, integrative supply chain technology and procurement performance on service delivery in MDAs in Kenya.	H_4: Procurement governance, integrative supply chain technology and procurement performance have no significant combined effect on service delivery.	R^2 for PG, ISCT, PP on SD = 0.831, $t = 21.851$, $p < 0.001$; Q^2 for SD = 0.374; f^2 for PP = 0.608, f^2 for ISCT = 0.130, f^2 for PG = none; q^2 =0.002 for PG, q^2 for PP = 0.087, q^2 for ISCT = 0.011 SRMR= 0.094	The results of R^2 and Q^2 values of service delivery were significant at 0.05 level. H_4 was thereby rejected.

Source: Research Data, 2021

5.8 Discussion of Findings

The results of the research are discussed in this section, which is grouped around the study's five objectives and primary hypotheses. Other relevant empirical research are also examined in light of these conclusions. The present research's results are also explored in respect to the numerous hypotheses that underlie the investigation. The section is organized as follows: sub-section 5.7.1 discusses the effect of procurement governance on service delivery in MDAs in Kenya. This is associated with objective one of the study. The influence of procurement performance on the relationship between procurement governance and service delivery in MDAs in Kenya is deliberated in sub-section 5.7.2. It is associated with objective two of the study.

Sub-section 5.7.3 discusses the moderating effect of integrative supply chain technology on the relationship between procurement governance and service delivery as proposed by hypothesis H_3 associated with study objective three. Concluding this is chapter is sub-section 5.7.4 which addresses objective four and hypothesis H_4, which is the combined effect of procurement governance, integrative supply chain technology and procurement performance on service delivery in MDAs in Kenya.

5.8.1 Relationship between Procurement Governance and Service Delivery

The first hypothesis (H_1) examined the link between procurement governance and service delivery. This research hypothesized that procurement governance and service delivery are related. This included a direct examination of the link between procurement governance and service delivery. The following findings were obtained: $\beta = 0.771$ ($t = 12.577$, and $p < 0.001$), whereas $R^2 = 0.595$ ($t = 6.344$, and $p < 0.001$). This suggests that when procurement governance and service delivery are considered

separately, data indicate a positive and significant association at a significance level of 0.05. This also suggests that procurement governance accounts for 59.5 percent of the variation in service delivery.

Today, procuring entities are focusing on increasing service delivery by effectively coordinating operations and simplifying processes involved in those chains (Lysons & Farrington, 2012). The primary focus of governance is on sourcing strategy for value for money; bidding process for fairness and accountability; supplier evaluations for transparency; and supplier award programs for delivery efficiency, all of which are components of a healthy service delivery mechanism (Slack et al., 2010). Due to the large quantities of money involved, as well as the fact that the money comes from the public, government procurement requires accountability and transparency (Hui et al., 2011). Due to inefficiencies and losses in state-owned enterprises' operations, the government is compelled to shoulder considerable procurement liabilities (SCAC, 2013).

Procurement governance and service delivery have been connected by academics. According to Anane et al. (2019), 73.6 percent of service delivery variances were explained by procurement procedures (procurement policy, procurement planning and sustainable procurement). These results are consistent with the findings of this study. Procurement governance has an effect on service delivery, according to Otieno (2019). Procurement rules and procedures, procurement planning, performance monitoring, standard procurement templates, and periodic procurement staff training are all critical components of procurement governance, according to the research. Rita (2020) study findings showed that procurement methods and procurement strategy

have a positive influence on service delivery. According to Chepngetich (2018), appropriate requirement assessment, cost calculation, quality specification and service delivery were shown to have a favorable correlation. Risk assessment, on the other hand, was shown to be adversely associated with the provision of services.

This study extended knowledge by looking at the following measures of the procurement governance which include value for money, integrity, equity, fairness, competition, accountability and transparency. This study also extended knowledge in governance theories which included transaction cost economics theory, stakeholders' theory, and stewardship theory. Stoker (1998) extends the issue of public administration through the delivery of services. In support of theories of governance, the practice of regulating the society has evolved over time into exercising control over human behaviors in order to produce the intended common good. The current study therefore agrees with governance theories because they relate to the use of public finances in the process of acquiring goods and services required for service delivery to public service users. Today's society is governed by leaders who are expected to be democratic while also accountable for providing services to citizens (Ostrom, 1973).

The theories link governance enforcement to rules, claiming that this results in the desired control by public administrators to supply services (Mathiasen, 1996). Procurement governance serves as a foundation for the implementation of controls and constraints on how organizations attempt to achieve their goals. Tsoi (2017) emphasizes the need of accountability and transparency through sharing information with all stakeholders. Procurement governance is critical for firms to operate

efficiently and reduce operational risks. According to the findings of this study, theories of governance pertaining to the use of public funds in procuring items and services needed for the common welfare of public service consumers are supported by this research. The government is tasked with providing residents with services that would otherwise be unavailable to the public at reasonable prices. According to Saravanan and Shreedhar (2011), service delivery comprises providing services that are of high quality, fulfill public needs, exceed their expectations, and are conveniently available to all persons who require them. Delivering high-quality services is critical for service providers who want to generate and offer value to their customers (Gronroos & Ravald, 2011).

5.8.2 Mediating Role of Procurement Performance in the Relationship between Procurement Governance and Service Delivery

Hypothesis two (H_2) propose that procurement performance mediates the link between procurement governance and service delivery. It was necessary to run the model using bootstrapping to test for the mediation, which required evaluating the direct, indirect, and total effects of each construct variable. A positive and statistically insignificant correlation between the two variables was established. Including a mediator did not make sense, based on the results of the study, There was a positive and statistically significant result for the indirect effects link ($t > 1.96$, $p \leq 0.05$) in the test findings. In other words, the procurement performance mediation on the link between procurement governance and service delivery accounts for 80.3 percent of variance in service delivery. This shows that procurement governance's effect on service delivery is significantly mediated by procurement performance, indicating that the effect is indirect.

Following the confirmation of the first two tests, a third test was conducted to ascertain the quantity of mediation. The Variance Accounted For test is used in this experiment (VAF). The VAF had a rating of 0.996, which meant it was almost 99 percent. In other words, procurement performance acts as a mediator between procurement governance and service delivery. A full mediation is indicated when the direct impact is insignificant, but the indirect effect through the mediator is significant (Zhao et al., 2010). According to the agency theory, the procurement department serves as a connection between various departments within an organization who are all working towards the same goal: obtaining goods and services. Efforts should be made to enhance company operations and organizational performance by establishing good supplier relationships, according to procurement management It is possible to increase mutual trust by encouraging procurement company managers to strive for optimum procurement performance in order to increase firm value and, as a consequence, shareholders' net worth.

The findings of the study present that procurement performance (regulatory compliance, effective procurement planning, sound evaluation criteria, performing contracts, inspection and acceptance, record keeping, and budget absorption) significantly and positively mediates the relationship between procurement governance and service delivery in MDAs in Kenya. This research extended knowledge by looking at the following procurement performance measures which include regulatory compliance, effective procurement planning, sound evaluation criteria, performing contracts, inspection and acceptance, record keeping and budget absorption.

While several studies have concentrated on different areas of the topic or subject area, none of them has dealt with the mediating effect of procurement performance on the link between procurement governance and service delivery. It was shown that procurement performance and service delivery are positively and directly associated in the Yornu (2020) research. This study was closely related. Information technology, top management, procurement policy, and personnel competence were all shown to have positive effects on procurement performance in the Kingori et al. (2014) research. Yornu (2020) showed a positive and direct correlation between procurement performance and service quality. Because of this, the anticipated quality of service in institutions may be favorably impacted by good procurement governance.

5.8.3 Moderating Effect of Integrative Supply Chain Technology on the Relationship between Procurement Governance and Service Delivery

Hypothesis three (H_3) claimed that the link between procurement governance and service delivery is significantly moderated by integrative supply chain technology. The two-stage PLS algorithm approach was employed in the present research to check for moderating effect. A negative moderating influence on procurement governance and service delivery was established, although it was statistically insignificant at a significance level of 0.05. The data obtained suggested that integrative supply chain technology did not have a significant moderating effect on this connection. This indicates that the link between procurement governance and service delivery is not moderated by the integration of supply chain technology. The net benefit is predicted to be larger than the direct association between procurement governance and service delivery when integrative supply chain technology significantly moderates this

relationship. ERP system, E-procurement, and procurement portal are the three integrative supply chain technology measures that were considered.

Integrative supply chain technology support ethical standards such as transparency during the procurement process (Lysons & Farrington, 2012). Despite integrative supply chain technology, Barsemoi et al. (2014) discovered that traditional procurement methods and personnel incompetence were impeding the achievement of procurement governance output. Supply chain technology combine people and functions, resulting in more efficient processes and more effective service delivery (Mburu & Njeru, 2014). According to Magutu et al. (2015), there is a significant correlation between supply chain technology, strategy and business performance. They observed that supply chain technologies and strategies account for 88.2 percent of the variation in company performance, although previous research on integrative supply chain technology had been scarce.

The issue is whether supply chain technology can assist strengthen the relationship between procurement governance and service quality. According to Cook et al. (2011) research, an organization's supply chain function impacts certain supply chain practices that result in increased performance. The relative importance of a particular practice seems to vary among supply chain roles, suggesting that a general association between practice and performance may be erroneous if the unique context of the business in question is not taken into consideration. Managers may benefit from the study's conclusions by seeing that not all techniques are suited for every company. In order to identify procedures that will be accepted, managers must evaluate the role-specific environment of their company in the supply chain. Farmer et al. (2015), argue

that integrative supply chain technologies cannot improve service delivery unless user departments participate. Realistic specifications input into the ISCT will result in equity, justice, and competition. According to Malela (2010), capacity constraints continue to impede the deployment of integrative supply chain systems owing to insufficient infrastructure, a lack of management support, and a lack of technical assistance. As a result, ethical and best practices in procurement through integrative systems is critical to service delivery excellence (Van, 2010).

According to Orina (2011), reluctance to change, a lack of commitment, staff skills, and, to some extent, procurement regulations all have an influence on the readiness of public institutions for e-procurement. According to the survey, respondents agreed that technology, the legal framework, and procurement rules all have an impact on the preparedness of Kenya's public procurement institutions. Furthermore, the scope of procurement level in public procurement was limited due to lack of interaction with other systems and poor utilization of electronic commerce. Personnel skills, resistance to change, and a lack of passion among staff were also identified as hurdles in E-procurement preparation.

This research extended network theory knowledge by describing the relationship between suppliers, organizations, and other parties. Network theory has been applied to the supply practice. The idea focuses on the use of integrative supply chain technology and its impact on process decision support. It recognizes that service delivery is a complex network of people and events. One of the assumptions of this theory is that pivotal locations inside networks might provide firms with a competitive edge over competitors provided they are ready to exchange information with partners.

The network theory is mostly applicable to the effective allocation of resources in order for relationships to be formed, and it assumes that procurement entities can choose providers autonomously for their own profit (Jones et al., 1997). Relationships between different parties are considered as trustworthy; they bring value and simplify decision making.

5.8.4 Combined Effect of Procurement Governance, Integrative Supply Chain Technology and Procurement Performance on Service Delivery

PLS-SEM has been hailed as a second-generation analysis technology with superior capabilities to first-generation analysis methods. Versatility in testing different construct relations is one of these improvements. Observable and latent constructs in a model can be put to the test in order to achieve this (Kline, 2011). As a consequence, the present research concentrated on the interactions between distinct construct combinations as well as the total cumulative influence of all exogenous constructs on endogenous constructs as a whole. For hypothesis four (H_4), this was carried out. H_4 proposed that procurement governance, integrative supply chain technology, and procurement performance have no significant combined effect on service delivery. This hypothesis passed the statistical tests. There was an R^2 of 0.831 in the model, which means that procurement governance, integrative supply chain technology and procurement performance all contributed to 83.1 percent of variance in service delivery.

For each exogenous component (procurement governance, procurement performance and integrative supply chain technology), f^2 values suggest that they each contributed to the overall predictive power (R^2) of the endogenous construct, service delivery.

Even if one or more of the exogenous components, such as procurement governance and procurement performance, is deleted from the model, it does not significantly alter the model's ability to accurately forecast future outcomes. R^2 change refers to the degree to which the predictive power changes when an exogenous construct is removed (f^2). The q^2 values of all exogenous variables are lower/none or small when they are individually included in the model (procurement governance excluded, q^2 was none, procurement performance, q^2 was small, and integrative supply chain technology q^2 was none). The aggregate Q^2 of endogenous variable, service delivery was found to be 0.374, indicating that the model predictive relevance improves when all exogenous variable are included. This demonstrates that the combined variables have a much greater impact on service delivery compared to the individual variable studied separately.

This technique has been lauded as a second generation analytical approach with greater capabilities than first generation technologies. Improvements such as more testing flexibility for various construct interactions are among these enhancements. It is possible to test models' observable and latent constructs by putting them to the test (Kline, 2011). It was therefore decided to investigate various construct combinations and their combined influence on the overall impact on endogenous constructs as a whole in the present research. This was done for the fourth hypothesis (H_4). For example, H_4 argued that the combined effect of procurement governance, integrative supply chain technology and procurement performance had no effect on service delivery.

The statistical tests showed that this hypothesis was rejected. The model's R^2 was 0.831, indicating that 83.1 percent of the variation in service delivery can be attributed to procurement governance, integrative supply chain technology, and procurement performance. This findings support the complementarity theory concept that organizational activities and practices are complementary in nature, and when chosen and implemented together, they increase each other's total contribution (Choi et al., 2008). Thus, it can be concluded that the combined effect of procurement governance, procurement performane and integrative supply chain technology has a significant effect on service delivery in MDAs in Kenya.

The finding adds knowledge to the current literature by looking at combined effect of procurement governance, procurement performane and integrative supply chain technology has on service delivery in MDAs in Kenya.

CHAPTER SIX

SUMMARY, CONCLUSIONS, IMPLICATIONS AND RECOMMENDATIONS

6.1 Introduction

Each of the distinct research hypotheses and their aims, as well as the conclusions obtained from the study data, are summarized in this chapter. Also included are an overview of the findings, a set of recommendations, and a discussion of the significance of the findings. As a final note, the researchers discuss the study's limitations and possible next steps in research.

6.2 Summary of Findings

The overall objective of the study was to establish the effect of procurement governance, integrative supply chain technology, and procurement performance on service delivery in MDAs in the Kenya. To achieve the objective, a conceptual model was developed based on previously studied literature. A PLS-SEM model that corresponded to the conceptual model was also created. These four models served as the blueprint for answering the study’s questions and meeting the objectives of the associated study.

To test the conceptualized relationships, four particular objectives and accompanying hypotheses were applied. Specific objectives were as follows: establish the effect of procurement governance on service delivery in MDAs in Kenya; assess the mediating influence of procurement performance on the relationship between procurement governance and service delivery in MDAs in Kenya; assess the moderating effect of integrative supply chain technology on the relationship between procurement

governance service delivery in MDAs in Kenya; examine the combined effect of procurement governance, procurement performance and integrative supply chain technology on service delivery in MDAs in Kenya.

This study adopted a descriptive cross-sectional survey research design. To test the proposed relationships, a survey was done and data collected. This study's population included all public procuring institutions in Kenya. Government agencies that buy products and services under a regulated procurement framework are known as public procuring bodies. There are 157 public procuring entities in the government, which include ministries, departments, and agencies (MDAs). MDAs are made up of 21 ministries, 42 state departments, and 94 state agencies. A total of 157 questionnaires were issued; fifty (50) were distributed physically, while a Google form was created for MDA procurement personnel to complete out online. A total of 138 respondents returned their completed responses, resulting in an 88 percent response rate. The data was then analysed using SPSS and PLS-SEM. A summary of the findings of each of the research hypothesis are presented in the subsequent sections.

The study had four research objectives each with a corresponding hypothesis. These hypotheses were tested. Specifically, the study's hypotheses were as follows; H_1: Procurement governance has no significant effect on service delivery; H_2: Procurement performance has no mediating influence on the relationship between procurement governance and service delivery; H_3: Integrative supply chain technology has no moderating effect on the relationship between procurement governance and service delivery; H_4: Procurement governance, integrative supply chain technology and procurement performance have no significant combined effect

on service delivery. PLS-SEM was used to evaluate the links proposed in the conceptual and SEM models of the study. The SmartPLS 3.3.3 software was used in the analysis. Because the primary purpose of the current study was to predict the covariance of model constructs, PLS-SEM was chosen as the optimal statistical technique. The number of public procuring bodies (government ministries, departments, and agencies) are small; therefore, PLS SEM was also appropriate for the study.

Before employing the measures in PLS-SEM analysis, exploratory factor analysis (EFA) was performed on the scale items using various approaches such reliability and construct validity testing. A few scale elements were eliminated, while others were aggregated for later PLS-SEM analysis.

The PLS- SEM analysis consists of two phases the first being assessment of measurement model also referred to as the outer model. This phase was aimed at establishing convergent validity and discriminate validity of the outer model. In this the indicator loadings were examined and those that did not achieve the minimum requirement for indicator loadings of 0.4 were dropped one by one and the loadings readings were reexamined every time one was dropped until all had loadings of 0.4 and above. A total of four items were dropped from the model constructs. The structural model was similarly validated for appropriate convergent and discriminant validity, with AVE values above 0.50 and additional tests, such as Forner-Larcker and HTMT, registering values above the permissible cut-off marks.

The indicators in the investigation loaded on their associated constructs, and the square roots of AVE individual constructs recorded larger values than the needed inter-correlation. Discriminant validity was also established, which means that the model's constructs are distinct and can be identified by components not represented by any other construct in the model. After all of this, it was determined that the measurement model met the requirements for reliability and validity. After the measurement model (outer model) was validated, the structural model (inner model) was analyzed for the coefficients of determination R^2, effect size -f^2, predictive relevance Q^2 and hypotheses testing (path coefficients). The SEM model's predictive relevance for service delivery implied predictive power.

Three out of four presupposed relationships within the structural associations were significantly validated. The first objective of the extant study was to determine whether there is a relationship between procurement governance and service delivery. Using SmartPLS 3.3.3 application, PLS SEM analysis was conducted to test the direct relationship between procurement governance and service delivery. Results indicated that procurement governance had a positive and statistically significant effect on service delivery.

The second objective involved establishing the mediation role of procurement performance on the relationship between procurement governance and service delivery. The mediation test in PLS-SEM required that a bootstrap test be carried out. The model results for the indirect path found to be statistically significant at $p<0.001$. The direct path results involving relationship between procurement governance and service delivery was statistically insignificant. Furthermore, the total effects results

on effect of procurement governance on service delivery without the presence of mediating variable (procurement performance) was analysed and was found to be statistically significant. Full mediation is indicated when the direct effect is insignificant but the indirect effect is significant, implying that only the indirect effect via the mediator exists. Furthermore, calculation of the magnitude of the mediation effect using VAF results indicated full mediation.

Objective three focused on determining whether integrative supply chain technology had a moderating effect on the relationship between procurement governance and service delivery. The test for moderation was done in two stages where the moderating effect was tested for within the current model and subsequently the direct effect of procurement governance on service delivery was also tested. The results indicated that integrative supply chain technology has a negative moderating effect on the relationship between procurement governance and service delivery, however this effect was found to be statistically insignificant. This means that integrative supply chain technology does not have a moderating effect on the relationship between procurement governance and service delivery. However, the results of the direct relationship between procurement governance and service delivery indicated a statistically significant relationship.

The last objective involved examining whether the combined effect of procurement governance, integrative supply chain technology and procurement performance on service delivery. To determine this, the models overall R^2 and Q^2 value was assessed. The current study's findings reveal that the combined influence of all exogenous components has a bigger effect on service delivery than the effect of individual

exogenous constructs (procurement governance, procurement performance, and integrative supply chain technology).

6.3 Conclusions of the Study

From the study findings, the following conclusions can be made. Service delivery in Kenyan MDAs are influenced directly by procurement governance. Statistically significant effect on service quality can be traced to procurement governance. According to studies, procurement governance has a significant effect on service quality. As a result, businesses should manage procurement governance with an eye on maximizing value for money, integrity, equality, fairness, and competitiveness, as well as increasing accountability and transparency. There seems to be a strong correlation between public procurement processes and procurement outcomes, according to recent research (Quesada et al., 2010, 2018; Makabira & Waiganjo, 2014; Alsetoohy & Ayoun Bag, 2012; Eyaa & Ntayi, 2010). According to Butler (2017), a well-governed organization is one that has its systems and procedures under control, its plan laid down, and its risks monitored.

According to Pinder (2017), governance is crucial because public resources are spent and taxpayers who pay taxes to the government must get value for their money. According to Saravanan and Shreedhar (2011), service delivery comprises providing services that are of high quality, fulfill public requirements, surpass expectations, and are conveniently available to all persons who require them. Deficient procurement governance may result in the loss of funds necessary for service delivery, because resources meant to pay for services wind up in the hands of self-interested persons who are corrupt, affecting service delivery. Therefore this study concludes that

procurement governance should be implemented to improve service. Any company that procures goods and services and develops appropriate policies and processes is certain to provide high-quality products and services.

Procurement performance in Kenyan MDAs serves as a key mediator in the link between procurement governance and service delivery, according to this research. Performance in procurement has an enormous influence on the effectiveness of procuring services. It is crucial to measure procurement performance during an economic crisis since the buying department plays a greater role in the supply chain during these times (Vonderembse & Tracey, 1999). Improving service quality requires an organization's ability to shift its emphasis and become more competitive.

According to Amaratunga et al. (2002), the decline of the purchasing function might be attributed to the continued use or absence thereof of poor procurement procedures. Research shows that increasing service delivery in public sector companies depends heavily on procurement success. Procurement governance has been the subject of several studies. However, most of these studies focused on other elements of procurement governance and service delivery, rather than the mediating function of procurement performance. It was found in the literature research that procurement practices lead to procurement competence and procurement competence leads to procurement success (Das & Narasimhan, 2000: Chow et al., 2008).

The research found that procurement governance and service performance were not moderated by integrative supply chain technology in Kenyan MDAs. According to studies, supply chain tactics may have a significant influence on an organization's

performance (Lenny et al., 2007; Ibrahim, 2011; Chow et al., 2008). Supply chain technology mitigated the link between strategy and firm success in a supply chain, according to Magutu and colleagues (2015). According to a review of the literature, supply chain management abilities are critical for enhancing financial and operational success (Derwik & Hellstrom, 2017). Only a few studies have been done on moderating effect of integrative supply chain technologies. There are a number of blunders to avoid when firms attempt to adopt integrative supply chain management. For instance, top executives don't have the necessary supply chain expertise or knowledge, and there is a dearth of supply chain experts. In addition, top leaders are unable to develop an understanding of how daily supply chain management activities relate to the financial success of the entire company (Ijomba, 2010).

Despite the advantages of an integrative supply chain system, many firms are still trying to manage separate tasks rather than integrating them into essential supply chain processes. Furthermore, the integrative supply chain is only used by a small number of companies (Cook, Heiser & Sengupta, 2011). The study revealed that a number of reasons including some departments still using manual systems affected the implementation of integrative supply chain technology may have led to this.

The research found that the overall effect of procurement governance, integrative supply chain technology, and procurement performance on service delivery in Kenyan MDAs was much larger than that of a single component. There was an increase in competitive advantage owing to the complex and causally ambiguous nature of integrated linkages, which is why the study's constructs had such an impact on service delivery. The notion of complementary theory helps explain why procurement

governance, integrative supply chain technology, and procurement performance have such a favorable influence on service delivery (Choi et al., 2008).

6.4 Implications of the Study

The overall objective of the research was to determine the effect of procurement governance, integrative supply chain technologies, and procurement performance on Kenyan MDA service delivery. The following subsection deliberates the knowledge, theoretical, practical and policy that the current study contributes to.

6.4.1 Implications for Knowledge

This study contributes to theoretical and empirical knowledge. It establishes that the effect of procurement governance, integrative supply chain technology, and procurement performance on service delivery in MDAs in the Kenya is positive and significant. The result effectively adds to the body of research on positive relationships between effective service delivery within the procuring entities and the implementation of procurement governance, procurement performance, and integrative supply chain technology. This study adds to a better knowledge of the real effect of procurement governance, procurement performance, and integrative supply chain technology on service delivery within Kenya's purchasing institutions. This study clarifies the real effect of implementing procurement governance and procurement performance to improve service delivery.

Second, the study also extends literature knowledge by employing various sub-constructs to the study variables. The sub-constructs such as value for money, integrity, equity, fairness, competition, accountability, transparency as relevant

subconstructs of procurement governance, being measured in this study have great impact in legislative review of procurement laws and requirements. These findings address previous studies' shortcomings, which focused on a small number of study factors, indicators and sub-constructs. According to Pinder (2017) procurement governance is crucial since public resources are being spent and taxpayers who pay taxes to the government are required to be accountable. The study also considers more sub-constructs in the other study variables which include procurement performance (regulatory compliance, effective procurement planning, sound evaluation criteria, performing contracts, inspection and acceptance, record keeping and budget absorption). Measuring procurement performance comprehensively is critical because, during an economic crisis, the purchasing department plays an increasingly essential role in the supply chain (Tracey & Vonderembse, 1999). The study also includes the following sub-constructs for integrative supply chain technology (ERP System, E-procurement, procurement portal). Integrative supply chain technology is critical in procurement for error proofing and eliminating administrative errors, hence increasing efficiency and service delivery (Leenders et al., 2010). The study sub-constructs and indicators are relevant to the topic under study.

Third, the study also broadens knowledge by considering the mediation and moderating effects. Exogenous constructs have a direct impact on endogenous constructs, with no systematic influence from other variables, according to PLS-SEM path model correlations. Although this assumption may be valid in many circumstances, it may affect the understanding of the model interactions when a third variable is included. Examples of such expansions are mediation and moderation (Hair et al.,2017). More knowledge is generated about how procurement performance

affect the link between procurement governance and service delivery, thanks to this research. Mediation takes into consideration the presence of an intermediate variable or mechanism that carries the impact of an antecedent variable to a conclusion, according to this evidence (Aguinis, 2017). The link between procurement governance and service delivery may be moderated by the integration of supply chain technologies. The findings of this study provide the groundwork for additional investigation into the moderating effect of integrative supply chain technologies on the relationship between procurement governance and service delivery.

Fourth, the current study contributes to the corpus of empirical research data using the PLS-SEM technique. For the first time, PLS-SEM extends beyond regression analysis and into the category of categorization. Due to its inherent sensitivity to measurement error, PLS-SEM represents a significant advancement above earlier generations of analytical devices. Structural equation modeling simplifies the study of relationships between variables, both those that can be directly seen and those that may be inferred from the data themselves.

Fifth, the study adds to knowledge in mediation analyses. SEM also enhances the approach in mediation analyses. Hair et al. (2004) support a more comprehensive technique of SEM mediation analysis, which not only checks for mediation's existence or absence but also analyzes the quantity of mediation in terms of Variance Accounted For (VAF). Baron and Kenny (1986) supported a stepwise technique to testing for mediation, which does not accurately measure the amount of mediation. The current study used the bootstrap method to determine whether or not a significant

mediation relationship exists then, the VAF test was used to determine the size of mediation once a mediation relationship was established.

Last but not least, the results contribute to a better understanding of how procurement governance, integrative supply chain technology, and procurement performance affect service delivery in Kenyan MDAs. A survey of MDAs that are subject to strict regulation under the PPADA was carried out in 2015. This study's results are predicted to have a significant effect on the degree of procurement governance, integrative supply chain technology, and procurement performance practices used in Kenyan companies.

6.4.2 Contribution to Theory

This study is anchored on theories of governance, network theory and agency theory. The study demonstrated the significance of these theories in the different ways. Governance theories were applicable in expressing and emphasizing the importance of public administration in directing human behavior to provide services for public consumption. Governance theories include transaction cost economics theory, which in essence in the hierarchical structure facilitates conducting contractual interactions. The stakeholder theory was a relevant emphasis in that all stakeholders' interests must be considered in service delivery. Stewardship theory was also applicable in asserting that when incumbent directors act autonomously to deliver services, shareholder interests are maximized.

Network theory literature was necessary in conceptualizing the classification of the linkage among supply chain players and procurement performance and

competitiveness (Pai, 2012). This linkage allows seamless flow of activities between players. Also, while focusing on the agency theory, the study tried to explore the influence of service delivery in situations where the interests of both the employer and the employee are at odds. Procurement proceedings and its governance and the resultant service delivery have a close relationship with the concepts of governance, agency theory, and network theory. It is however, not clear how procurement performance and supply chain technologies influence service delivery linkages, and there are few empirical studies to support this claim. Procurement governance and service delivery are very briefly examined in this collection of publications. In Kenyan MDAs, this research found a statistically significant link between procurement governance and service delivery. The study's conclusions are also in line with arguments from theories of governance, network theory, and agency theory. The theories link governance enforcement to rules, arguing that this results in the desired control by public administrators to service delivery.

6.4.3 Implications for Managerial Practice

The outcomes of this study have direct implications for managerial practice. According to the study findings, procurement governance and service delivery are critical in every government agency in enhancing information sharing, delivery of goods and services and ensuring quality of service to its targeted recipients. Procurement officers can adopt the findings in efforts to enhance ethical practices when sharing information, during tender evaluation, when developing technical specifications for tenders among others in their operations.

The officers and staff in general can use integrative supply chain technology findings in their efforts to improve speed and accuracy of logistical supply efficiency. There are a critical lessons learnt through the study for procurement officers and government agencies based on the confirmation of the negligible moderating effect of integrative supply chain technology on the link between procurement governance and service delivery. While procurement governance has a direct effect on service delivery, various performance enablers enabled by integrative supply chain technology should be examined and applied in order to improve service delivery. The implication of this is that organizations should train their staff on use of technologies such as Enterprise Resource Planning systems for audit trails and ensure that there is value for money along the organizations' supply chains.

Cook et al. (2011) found that an organization's supply chain function impacts which supply chain strategies lead to better performance. Although there is abundant evidence that supply chain functions differ in the relevance of certain practices, managers can use this study and its theoretical comprehension to use situational circumstances to ensure procurement is innovative, comply with the procurement laws at the same time and have timely and quality deliveries. The study's findings provide managers with practical advice, proving that not all tactics are acceptable for all firms. Before deciding whether tactics are likely to be acceptable, managers must evaluate their organization's role-specific environment in the supply chain. According to Farmer et al. (2015), integrative supply chain technology will not enhance service delivery unless user departments engage.

The study has also contributed towards management practice of organizations especially the procurement department because it gives empirical evidence that procurement governance and procurement performance are very significant in any organisation seeking to improve service delivery. In their effort to improve service delivery, managers should purpose to improve procurement governance in terms of processes and procurement performance in reference to compliance. Therefore organization managers can use this research as a foundation to argue for the awareness and purposeful practice of better processes aimed at ensuring that there is useful procurement plans, formulation of practical evaluation criteria for ease of contracts management. Today, organization managers are expected to continuously improve on the quality of goods and services and efficiency in delivering those goods using optimal resources. The study findings have brought out those parameters that organizations' leadership can use for management practice.

This study challenges procuring entities to pay close attention to the integrative supply chain implementation and support. The role of integrative supply chain in procuring entities as vehicles of enhanced service delivery is unprecedented. As organisation strive to take advantage associated with technology , huge investments of resources in terms of time money, workforce has been expensed (Bostrom et al., 2009). As management make decisions to invest and implement integrative supply chain technologies, considerations should be made by managers such as inadequate funding, inability to adopt dynamic strategies for change management and lack of trained resources to apply integrative technologies.

6.4.4 Implications for Policy

In recent years, the Cabinet Secretary for The National Treasury has been consistent in implementing integrative supply chain technologies to improve service delivery in the public sector. Governance difficulties have recently wreaked havoc on public procurement. The Directorate of Criminal Investigations, the Director of Public Prosecutions, and the Director of the Ethics and Anti-Corruption Commission have all been involved in investigations into possible anomalies in the country's procurement processes. As a result, this study will provide realistic principles that government bodies can use to design policy.

Policy formulation for governance in procurement can be influenced by governance theory. The government, particularly the National Treasury, will use the study's findings to develop appropriate rules for implementing integrative e-procurement. The government will also utilize the research to impose openness and accountability in the implementation of governance principles via the application of governance theory ideas. The theory assists procuring bodies in implementing real regulatory compliance and ensuring service delivery.

The research results are useful in corporate solutions between procuring entities and vendors. Procurement officials would also benefit from this research since it offers actual proof that procurement governance, integrative supply chain technology, and procurement performance have a direct effect on service delivery in Kenyan MDAs. It provides policymakers with a solid foundation on which to build rules that facilitate both procurement governance and service delivery.

6.5 Recommendations

The findings of this research show that procurement governance has a major effect on service delivery. Implementing procurement governance leads to improved service delivery. Therefore, MDAs in Kenya should implement procurement governance practices through value for money, integrity, equity, fairness, competition, accountability, transparency. As a consequence, the government's procurement divisions are expected to improve service to its residents.

Procurement governance and service delivery have been shown to be connected via procurement performance, according to the findings of the research As a result, the government agencies may enhance the scope of procurement performance practices implementations, which include regulatory compliance, effective procurement planning, sound assessment criteria, executing contracts, inspection and acceptance, record keeping, and budget absorption. While the lack of or wrong use of procurement performance metrices might be an obstacle to change and degrade the purchasing function, according to Amaratunga and Baldry (2002), it is vital for any firm to shift its focus and increase its competitiveness. A key recommendation of this research is that MDAs in Kenya use procurement performance as a key component of their service delivery strategies in order to enhance service quality.

Research shows that the link between procurement governance and service performance is not moderated by the use of integrative supply chain technology. However, integrative supply chain technology improves visibility, which promotes transparency and information exchange in the functioning of organizations. Integrative supply chain technology connects people and functions, making processes

more efficient and resulting in more effective service delivery. Farmer et al. (2015) argue that integrative supply chain technology cannot improve service delivery without the engagement of user departments. Interdepartmental and Interorganizational meetings will allow benchmarking improve on service delivery.

Realistic requirements placed into the integrative supply chain technology will result in equity, fairness, and competition. The study recommends incorporating procurement ethical and best practices through integrative systems for improved service delivery. It is critical that MDAs' management continue to support the structure and strategy for ISCT. Training and courses for ISCT should be enhanced to cultivate ISCT skills as should be practiced. Ethics in procurement should be introduced as a mandatory unit in all levels to professional and academic studies. This way, graduates will begin practicing these best practices at early stages in life.

The study also recommends that departments should invest in information systems, collective planning, organized workflow, supply chain innovation and continuous flow of information for enhanced service delivery. Implementation of ISCT may be affected by the lack of cooperation between management and user department. To increase Kenya's ISCT preparedness, the report advises government and e-procurement players to strengthen the legal framework and procurement procedures. In order to improve ISCT efficacy, the research advises management to plan seminars and workshops for internal and external staff training, which will help workers feel more invested in the process.

An analysis of procurement governance, integrative supply chain technology, and procurement performance revealed that these three factors work in concert to improve service delivery outcomes overall. The procurement regulator and all relevant bodies dealing in procurement matters should enforce transparency through practical methodologies. Use of Government Portal as a mandatory requirement will enhance accountability and fair competition.

A recent analysis concludes that procurement governance, supply chain integration, and procurement performance work best when used in concert to ensure that MDAs are able to provide enough, economical, and high-quality basic services while also improving the level of service they provide. The use of integrated financial management systems should be fully integrated and implemented for use by all MDAs. The IFMIS systems should also be upgraded and all procurements done through the enhanced system.

Capacity building by relevant authorities such as the Public Procurement Regulatory Authority and the National Treasury should improve on their training budgets to ensure that procurement officers are trained on matters procurement and service delivery. This will give assurance to the public that relevant skills have been impacted on the officers. Facilitation through implementation of infrastructure between public organizations is crucial. While several officers are well trained on the procurement proceedings, certain basic items such as computers, internet, and working environments are not adequately provided. Motivated staff with proper working tools will ensure better service delivery.

6.6 Limitations of the Study

During the course of the investigation, the researcher ran across a few roadblocks. In spite of this, the study's result was not significantly affected by these factors. As with any human-driven endeavor, there are always limitations and potential for growth. Research work is no exception; some of these constraints are attributable, among other things, to the inherent nature of the subject. This could be due to the study's methodology, tools, and uncontrollable concerns with the study units and scheduling.

The geographical spread of Kenya's MDAs department posed a significant challenge. There are 157 public procuring entities comprising government ministries, departments and agencies (MDAs). They may be found in a variety of sites across Nairobi. A census of all MDAs necessitated a great deal of difficulty in accessing the departments, which delayed the data gathering procedure significantly.

Due to COVID-19's health dangers and government actions such as physical separation, conventional primary data gathering methods such as drop and pick surveys have been severely hampered. In order to collect primary data, the current study opted to employ remote methodologies for data collection, such as google forms. Furthermore, the data collection method was exceedingly costly, especially since the researcher did not receive any financing grant to help with the process.

Respondents don't have to read the questionnaire because of the Likert scale, which enables them to just cross off the answers as they think of them. Due to questionable answer patterns, 10 questionnaires were discarded in the present research. Although the research used PLS-SEM, this form of SEM works well with small sample sizes, but larger samples are generally advised when using SEM in order to improve the

accuracy of the predicted parameters. Despite this, the research relied on a census rather than a sample taken using PLS-SEM since there were only 157 MDAs in the country.

The nature of the unit of analysis can present certain inherent difficulties. Government ministries, departments, and organizations make up the 157 public procurement bodies (MDAs). The MDAs consist of 21 ministries, 42 state departments, and 94 state agencies, according to the Government of Kenya (2019). This area is highly regulated, making it difficult for respondents to freely provide information, which might result in inaccurate responses. Public procurement has recently been plagued by governance challenges, and the study's data gathering period corresponded with this. The Directorate of Criminal Investigations, The Director of Public Prosecution, The Director of the Ethics and Anti-Corruption Commission have been engaged in investigations into suspected irregularities in the processes of procuring goods and services in the country.

As a result of this, data gathering was challenging, but more importantly, the respondents' transparency was a source of concern. This was reduced, however, by not requesting exact procurement performance statistics from respondents in the few questionnaires that were physically collected. Regardless of the foregoing, the fact that the findings coincided with previous studies is a clear justification of the study's objectivity.

6.7 Suggestions for Future Research

Only Kenya's government ministries, departments, and agencies (MDAs) were included in this research. The bulk of Kenya's economy is made up of medium and large-sized businesses. The study might be expanded to include the East African area in future studies. E-procurement and procurement portals were operationalized as integrative supply chain technology using the moderating architecture. Procurement governance and service delivery have been shown to be negatively affected by this construct, however this effect was determined to be statistically negligible in the study. Since the ISCT are supposed to be service delivery facilitators, this conclusion was surprising. This study recommends that similar studies be conducted to gain in-depth empirical evidence or validation by examining each of the factors in integrative supply chain technology, such as ERP System, E-procurement, and procurement portal, individually as moderators in the relationship between procurement governance and service delivery.

The necessity of studying service delivery in public entities was limited to the fact that these entities utilize public funds to provide those services. Further research is critical to find out the characteristics of service delivery in the private sector. This will provide information about decision making variables in that environment. From the challenges identified in the study that pointing to that organizations faced in the use of technology due to skills or provision of infrastructure, further research is necessary to establish if use of ISCT has better output to ensuring there is transparency and service delivery to consumers.

Procurement governance was restricted to processes. Further research is necessary to analyse how organizational structure as a governance issue may affect service delivery. Decision making through the organogram can be tasking due to the bureaucratic nature of wide organizational structures.

6.8 Chapter Summary

The results of the research were summarized, concluded, and discussed in this section. The results were presented first, followed by a discussion of the findings' implications. The chapter then examined the study's contributions to knowledge, theory, policy, and management practice. Despite the study's limitations, the authors made suggestions for further study in the field of procurement governance and service delivery to expand our understanding of these issues.

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APPENDICES

Appendix I: Research Questionnaire

The questionnaire is designed to collect data from Ministries, Department and Agencies in Kenya. The data obtained is utilized for academic purpose only; as such, it will be treated as confidential.

Section A: ORGANIZATIONAL BACKGROUND

1. Name of the Procuring Entity……..…….

2. Position in the organization ……..…….……..

3. Years worked in the procuring entity: 0-5 ( )5-10 () 10-15 () Above 15 Years ( )

4. Your Level of Education: Secondary ( ) Diploma ( ) Degree ( ) Masters ( ) Doctoral ( )

5. Member of a Professional Body ()……Specify

Section B: PROCUREMENT GOVERNANCE

Using scale below, indicate your understanding on the effect of procurement governance on service delivery in Ministries, Department and Agencies in Kenya. Please tick appropriately.

(1) Not at all (2) Small extent (3) Moderate extent (4) Great extent (5) Very great extent.

No.	**Value for money**	1	2	3	4	5
1.	Periodic price market surveys are undertaken					
2.	Goods and services are subjected to quality checks					

	against user specifications					
3.	Quantities are verified for each supplier delivery					
No.	**Integrity**	1	2	3	4	5
1.	Every procurement proceeding is done in compliance with the procurement laws and regulations					
2.	Suppliers are informed of gift policies					
3.	Staff training and sensitization is done on procedures during procurement proceedings					
4.	Conflicts of interest are declared in all procurement proceedings					
No.	**Equity**	1	2	3	4	5
1.	Suppliers are treated impartially according to their capacity					
2.	Sourcing of goods and services is done from the list of suppliers on a rotational basis.					
3.	Payments to suppliers is done without fairly on terms agreed					
No.	**Fairness**	1	2	3	4	5
1.	Procurement proceedings are carried out in a reasonably					

	open manner					
2.	Selection of suppliers in certain categories does not discriminate against others					
3.	Payment of suppliers is done according to when they fall regardless					
No.	**Competition**	1	2	3	4	5
1.	Tender solicitation is done through competitive methods					
2.	Procurement processes are done openly to all bidders					
3.	There is tender participation by bidders					
4.	Procuring Entity encourages bidders to witness tender opening					
No.	**Accountability**	1	2	3	4	5
1.	Individual responsibility is taken in the procurement proceedings					
2.	Procurement audit is undertaken for all processes					
3.	Each officer in the supply chain authenticates their documents					
4.	Documentation is done by committees					
5.	There are periodic reports on all processes					
No.	**Transparency**	1	2	3	4	5
1.	Every transaction has an audit trail filed for reference					

2.	Procurement proceedings are advertised on daily newspapers and on websites					
3.	Committees keep minutes on all the proceedings					

Section C: INTEGRATIVE SUPPLY CHAIN TECHNOLOGY

Using the scale below, indicate your understanding on the impact of integrative supply chain technology has on service delivery in Ministries, Departments and Agencies in Kenya. Please tick appropriately.

(1) Not at all (2) Small extent (3) Moderate extent (4) Great extent (5) Very great extent

No.	**ERP System**	1	2	3	4	5
1.	The enterprise resource planning system are integrative					
2.	There is visibility of processes in the organization					
3.	Data integrity is assured through use of the systems					
4.	Information is shared through the system functions					
No.	**E-procurement**	1	2	3	4	5
1.	There is real time communication and decision making					
2.	The system helps in seamless transactions throughout the day					
3.	Access is easy and evidently documented					
No.	**Procurement Portal**	1	2	3	4	5

1.	Open tenders are advertised to all tenderers					
2.	The procurement portal is accessible by several tenderers					
3.	The system is cost effective to the procuring entity					
4.	The portal integrates suppliers with procuring entities					

Section D: PROCUREMENT PERFORMANCE

Using the scale below, indicate your understanding on the impact of procurement performance on service delivery in Ministries, Departments and Agencies in Kenya. Please tick appropriately.

Not at all (2) Small extent (3) Moderate extent (4) Great extent (5) Very great extent

No.	**Regulatory Compliance**	**1**	**2**	**3**	**4**	**5**
1.	The procuring entity adheres to approved procurement methods in all its procurement proceedings					
2.	The procuring entity submits all regulated reports					
3.	All communications make reference to the procurement laws					
4.	Timelines in processes are adhered to					
5.	There is segregation of duty for all proceedings					
6.	Committees adhere to their mandates					

No.	Effective procurement planning	1	2	3	4	5
1.	Annual procurement planning is completed by 30th June					
2.	Users ensure adherence to procurement planning schedule					
3.	User requisitions are done early for procurement planning					
4.	Procurement plan is reviewed regularly to meet needs					
No.	**Sound evaluation criteria**	1	2	3	4	5
1.	Evaluation committees adhere to set criteria in their evaluation exercises					
2.	Tender documents are critically reviewed during evaluation					
3.	The evaluation committee report variations between tender documents and evaluation criteria					
4.	Evaluation is done within 30 days after date of tender opening					
5.	Reports are done after the evaluation exercise					
6.	All mandatory requirements are met by bidders					

7.	All technical specifications are well evaluated					
8.	Financial evaluation is done for every bidder					
No.	**Performing Contracts**	1	2	3	4	5
1.	Contract administration applies to all contracts					
2.	Periodic reviews are done on all existing contracts					
3.	Contract implementation committees are appointed for complex and specialized contracts					
4.	Deliveries and made on timely basis					
5.	Suppliers are paid when their payments fall due					
6.	Variations are done in accordance with the law					
7.	Conflicts are resolved amicably					
No.	**Inspection and acceptance**	1	2	3	4	5
1.	Goods are inspected for quality and quantity					
2.	Certificates are issued for every consignment inspected					
3.	Suppliers ensure their goods are inspected prior to receiving by the procuring entity					
4.	Inspection certificates are attached to every supplier					

	payment					
5.	Inspection reports are prerequisite to goods being accepted					
No.	**Record keeping**	1	2	3	4	5
1.	Stock records are maintained at all times					
2.	Stock taking is done monthly, quarterly and annually					
3.	Variances are explained and adjustments made					
4.	There are no obsolescence of stores and equipment					
5.	There are zero losses and pilferage					
No.	**Budget Absorption**	1	2	3	4	5
1.	Budget absorption is reviewed to determine level of service delivery					
2.	Users are periodically updated and encouraged to improve their budget absorption					
3.	Corrective actions are taken on budget absorption.					
4.	Unutilized funds are reallocated to other better uses					

Section E: SERVICE DELIVERY

Using the scale below, indicate your understanding on the impact of integrative supply chain technology, governance and procurement performance on service delivery in Ministries, Departments and Agencies in Kenya. Please tick appropriately.

Not at all (2) Small extent (3) Moderate extent (4) Great extent (5) Very great extent

No.	**Information Sharing**	1	2	3	4	5
1.	There is better access to information by users					
2.	Information is shared between vendors and the procuring entity					
3.	There is visibility of processes throughout the supply chain					
No.	**Timely Supplier Payments**	1	2	3	4	5
1.	IFMIS enhances supplier payments					
2.	Online payments are made to suppliers as fall due					
3.	Debt aging is analyzed per supplier to make payments					
No.	**Efficient Delivery of Goods and Services**	1	2	3	4	5
1.	Suppliers make delivery of goods when needed.					
2.	Delivery schedule information is shared for tracking of goods and services					
3.	Delivery needs are shared between the procuring entity and supplier for planning					

No.	**Quality goods and services**	1	2	3	4	5
1.	All goods and services delivered are inspected for quality					
2.	Specifications are verified for quality conformity					
3.	Any quality variations are communicated with suppliers					
4.	All defects are addressed immediately and remedied					
No.	**User Effectiveness**	1	2	3	4	5
1.	End users receive service when required					
2.	All goods and services received from suppliers are distributed to needed use immediately					
3.	Users carry out market surveys to appraise service delivery					

Appendix II: List of Ministries in Kenya

1. Ministry of Interior and Co-ordination of National Government
2. Ministry of Defence
3. The National Treasury and Planning
4. Ministry of Foreign Affairs
5. Ministry of Industry, Trade & Co-operatives
6. Ministry of Health
7. Ministry of Agriculture, Livestock, Fisheries and Irrigation
8. Ministry of Transport, Infrastructure, Housing, Urban Development and Public Works
9. Ministry of Devolution and the ASALS
10. Ministry of Information, Communication and Technology (ICT)
11. Ministry of Sports, Culture and Heritage
12. Ministry of Education
13. Ministry of East African Community (EAC) and Regional Development
14. Ministry of Labour and Social Protection
15. Ministry of Tourism and Wildlife
16. Ministry of Environment and Forestry
17. Ministry of Water and Sanitation
18. Ministry of Lands and Physical Planning
19. Ministry of Energy
20. Ministry of Petroleum and Mining
21. Ministry of Public Service, Youth and Gender

Source (Government of Kenya, 2020)

Appendix III: List of State Department

□

1. State Department of Interior
2. State Department of Correctional and Rehabilitation Services
3. State Department of Immigration, Border Control and Registration of Persons
4. The National Treasury
5. State Department for Planning
6. State Department of Foreign Affairs
7. State Department of International Trade
8. State Department of Defence
9. State Department of Health
10. State Department of Early Learning and Basic Education
11. State Department of Post Training and Skills Development
12. State Department of University Education and Research
13. State Department of Transport
14. State Department of Infrastructure
15. State Department of Public Works
16. State Department of Housing and Urban Development
17. State Department of Shipping and Maritime Affairs
18. State Department of Devolution
19. State Department of Arid and Semi-Arid Lands (ASALs)
20. State Department of Lands
21. State Department of Environment and Forestry
22. State Department of mining
23. State Department of Petroleum
24. State Department of Agricultural Research
25. State Department of Crop Development
26. State Department of Livestock
27. State Department of Fisheries
28. State Department of Irrigation
29. State Department of East African Community and Northern Corridor Development
30. State Department of Labour
31. State Department of Social Protection, Pensions and Senior Citizens Affairs

Appendix IV: List of Agencies in Kenya

24. Kenya Bureau of Standards (KBS)
25. Kenya Civil Aviation Authority
26. Kenya Coconut Development Authority
27. Kenya Ferry Services Limited
28. Kenya Film Commission
29. Kenya Flower Council
30. Kenya Forest Service
31. Kenya ICT Board
32. Kenya Law Reform Commission (KLRC)
33. Kenya Maritime Authority
34. Kenya Medical Supplies Agency (KEMSA)
35. Kenya National Audit Office (KENAO)
36. Kenya National Bureau of Statistics (KNBS)
37. Kenya National Commission for UNESCO
38. Kenya National Commission of Human Rights (KNCHR)
39. Kenya National Examinations Council (KNEC)
40. Kenya National Highways Authority (KENHA)
41. Kenya National Trading Corporation Limited
42. Kenya Plant Health Inspectorate Services (KEPHIS)
43. Kenya Ports Authority (KPA)
44. Kenya Revenue Authority (KRA)
45. Kenya Roads Board
46. Kenya Sugar Board
47. Kenya Tourist Board

48. Kenya Urban Roads Authority (KURA)

49. Kenya Valley Development Authority (KVDA)

50. Kenya National Disaster Operation Centre (NDOC)

51. Kenya Wildlife Service (KWS)

52. Kenya Yearbook Editorial Board

53. LAPFUND in Kenya

54. Media Council of Kenya

55. Medical Practioners and Dentists Board in Kenya

56. National Aids Control Council in Kenya

57. National Cereals and Produce Board (NCPB) in Kenya

58. National Council for Law Reporting in Kenya

59. National Council for Persons Persons With Disabilities in Kenya

60. National Council for Population and Development in Kenya

61. National Crime Research Centre in Kenya

62. National Environment Management Authority (NEMA)

63. National Gender and Equality Commission (NGEC) in Kenya

64. National Hospital Insurance Find (NHIF) in Kenya

65. National Intelligence Service (NIS) in Kenya

66. National Irrigations Board in Kenya

67. National Land Commission in Kenya

68. National Museums of Kenya

69. National Police Service Commission in Kenya

70. National Social Security Service (NSSF) in Kenya

71. National Transport and Safety Authority in Kenya

72. Non-Governmental Organization Cordination Board in Kenya

73. Nyayo Tea Zones Development Corporation in Kenya

74. Office of Attorney General and Department of Justice in Kenya

75. Office of The Controller of Budget in Kenya

76. Office of The Director of Public Prosecution in Kenya

77. Parliamentary Service Commission in Kenya

78. Pest Control Products Board in Kenya

79. Postal Corporation of Kenya

80. Privitization Commission in Kenya

81. Public Service Commission of Kenya

82. Retirement Benefits Authority in Kenya

83. Salaries and Remuneration Commission in Kenya

84. Tana and Athi River Development Authority (TARDA) in Kenya

85. Tea Board of Kenya

86. Teachers Service Commission in Kenya

87. The Commission on Administrative Justice (Office of The Ombudsman) in Kenya

88. The Judiciary in Kenya Other Courts in Kenya

89. The Kenya National Disaster Operation Centre (NDOC)

90. The Sacco Societies Regulatory Authority (SASRA) in Kenya

91. Tourism Fund in Kenya

92. Transition Authority (TA) in Kenya

93. Vision 2030 Delivery Secretariat in Kenya

94. Youth Enterprise Development Fund in Kenya

Source (Government of Kenya, 2020)

Appendix V: Admission to Postgraduate Studies

UNIVERSITY OF NAIROBI
GRADUATE SCHOOL

Telephone: 020 491-0000/3129
Email: gs@uonbi.ac.ke
P. O. Box 30197 00100
NAIROBI, KENYA

Our Ref: D80/50269/2015

12th January 2021

Mr. Harley Kisyula Mutisya
C/o Dean,
School of Business

Dear Mr. Mutisya,

FULL ADMISSION TO POSTGRADUATE STUDIES (DOCTORATE)

Following your application for a higher degree at this University, I am pleased to inform you that the Director, Graduate School has approved your application for full registration for the degree of Doctor of Philosophy in Business Administration in the School of Business. She has also approved **Dr. Stephen Odock, Prof. Kate Litondo** and **Mary Kinoti** as the supervisors of your thesis entitled; **"Procurement Governance, Integrative Supply Chain Technology, Procurement Performance and Service Delivery of Ministries, Departments and Agencies in Kenya."** The Guidelines on Postgraduate Supervision can be accessed on our website (www.gs.uonbi.ac.ke) while the Research Notebook is available at the University Bookstore.

The degree for which you are registered will be offered by coursework, research and thesis.

Your registration is governed by the common regulations for Doctorate degrees in all Faculties and the School of Business. **You will be expected to carry out supervised thesis research in your chosen area of study for a minimum period of four (4) semesters, with effect from the date of this letter, culminating in a doctoral thesis. You shall be required to file quarterly progress reports to Graduate School to confirm the progress in your research work.**

Please note that all fees and other charges due shall be paid by **Direct Cash Deposits, EFT (Swift Code is "BARCKENX) or RTGS transfer to UON CESSP Collection Account No. 2032771362 at Barclays Bank (ABSA), Barclays Plaza Nairobi, Kenya or at any Barclays Bank (ABSA) Branch countrywide using the Reference Number quoted above.** Personal Cheques, Bankers Cheques or Institutional Cheques are NOT acceptable. The student account will be updated the next working day after payment and can be accessed through the student online portal (http://smis.uonbi.ac.ke) available in the University website (www.uonbi.ac.ke).

You will also be required to provide evidence of 2 publications or 2 letters of acceptance from peer reviewed journals from your PhD work before the oral defence. The publication should be co-authored with the supervisors.

Details regarding payment of fees and other charges remain as outlined in the attached fees structure.

Yours sincerely,

CATHERINE NJUE (MS)
FOR: DIRECTOR, GRADUATE SCHOOL

c.c. Dean, School of Business
Associate Dean, Graduate Business School
Chairman, Dept. of Management Science, School of Business
Dr. Stephen Odock (Supervisor) – Dept. of Management Science, School of Business
Prof. Kate Litondo (Supervisor) – Dept. of Management Science, School of Business
Prof. Mary Kinoti (Supervisor) – Associate Dean, GBS, School of Business

Encl. Fees structure
CN/mv

Appendix VI: Introduction Letter for Research

UNIVERSITY OF NAIROBI
COLLEGE OF HUMANITIES & SOCIAL SCIENCES
SCHOOL OF BUSINESS

Telephone: 0724-200311
Telegrams: "Varsity" Nairobi
Telex: 22095 Varsity

P.O. Box 30197
Nairobi, KENYA

14th January, 2021

TO WHOM IT MAY CONCERN

Dear Sir/Madam,

INTRODUCTORY LETTER FOR RESEARCH
HARLEY KISYULA MUTISYA – REGISTRATION NO. D80/50269/2015

The above named is a registered PhD candidate at the University of Nairobi, School of Business. He is conducting research on ***"Procurement Governance, Integrative Supply Chain Technology, Procurement Performance and Service Delivery of Ministries, Departments and Agencies in Kenya"***.

The purpose of this letter is to kindly request you to assist and facilitate the student with necessary data which forms an integral part of the research project. The information and data required is needed for academic purposes only and will be treated in **Strict-Confidence**.

Your co-operation will be highly appreciated.

Thank you.

Prof. Mary Kinoti
Associate Dean, Graduate Business Studies
SCHOOL OF BUSINESS

Appendix VII: NACOSTI

NATIONAL COMMISSION FOR SCIENCE,TECHNOLOGY & INNOVATION

AC 10277

OFFICIAL RECEIPT

Station:	Nairobi	**Date:**	20/Jan/2021
Received from:		Harley Kisyula Mutisya	
KES:		*** Two Thousand only ***	
On Account of		Research Permit Fees ref 09173	
Vote Head		R-43	

USD	
Kshs	2,000
AC	
NO	

Item A-1-A

Cash/Cheque No MPESA

Appendix VIII: NACOSTI Research Permit

REPUBLIC OF KENYA

NATIONAL COMMISSION FOR SCIENCE,TECHNOLOGY & INNOVATION

Ref No: **139668**

Date of Issue: **02/February/2021**

RESEARCH LICENSE

This is to Certify that Mr.. Harley Kisyula Mutisya of University of Nairobi, has been licensed to conduct research in Nairobi on the topic: "Procurement Governance, Integrative Supply Chain Technology, Procurement Performance and Service Delivery of Ministries, Departments and Agencies in Kenya". for the period ending : 02/February/2022.

License No: **NACOSTI/P/21/8682**

139668

Applicant Identification Number

Director General
NATIONAL COMMISSION FOR SCIENCE,TECHNOLOGY & INNOVATION

Verification QR Code

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Appendix IX: Final Plagiarism Report

PROCUREMENT GOVERNANCE, INTEGRATIVE SUPPLY CHAIN TECHNOLOGY, PROCUREMENT PERFORMANCE AND SERVICE DELIVERY OF MINISTRIES, DEPARTMENTS AND AGENCIES IN KENYA

ORIGINALITY REPORT

15%	13%	3%	4%
SIMILARITY INDEX	INTERNET SOURCES	PUBLICATIONS	STUDENT PAPERS

PRIMARY SOURCES

Dr. Stephen Odock
18/11/2022

1	Erepository.uonbi.ac.ke Internet Source	2%
2	Submitted to Regis University Student Paper	1%
3	journals.uonbi.ac.ke Internet Source	1%
4	www.coursehero.com Internet Source	1%
5	erepository.uonbi.ac.ke Internet Source	1%
6	ir.jkuat.ac.ke Internet Source	1%
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