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Determining the success on user adoption of e-procurement in Kenyan Government

Ministries: A case of e-procurement module in the IFMIS

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DECLARATION

I declare that this research is my original work and has not been presented for award of a degree in any other University.

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ABSTRACT

Openness and accountability in Public procurement is a thorn in the flesh that the Government has to deal with. In August 2014, President Uhuru Kenyatta directed a shift from the manual system to e procurement so as to manage public finances and resources better. Currently the system being used by public institutions in Kenya for e-procurement is the e-procurement module of the Integrated Financial Management Information System (IFMIS), also known as procure to pay.

IFMIS is a B2G, an automated system used for public financial management interlinking planning, budgeting, expenditure management, control, accounting, audit and reporting. IFMIS was procured in the 1998 but its implementation began in the year 2003.

This paper sought to determine the level of success on user adoption of e-procurement in Kenyan Government Ministries by analyzing the constructs of the enhanced DeLone and McLean's (2016) IS Success model. Questionnaires were administered to ninety six employees of fourteen key government ministries in Kenya. Descriptive statistics was used to determine the extent of e procurement adoption by the users. Correlation and regression analysis were used to test the relationship between the dependent and independent variables. The results from the findings supported the research hypothesis to a great extent. Empirical evidence revealed that there was success on user adoption of e-procurement in Kenyan Government Ministries. All the variables identified have correlations with the model constructs hence can be used to measure the level of success on user adoption. This study validates the model and would recommend the model for future research in regards to success on e-government projects and especially in Kenya.

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May the Almighty God bless you all for making this study a success

ABBREVIATIONS & ACRONYMS

- 1.1 IFMIS – Integrated Financial Management Information System
- 2.1 PFM–Public Financial Management
- 3.1 IT – Information Technology
- 4.1 UNSPSC- United Nations Standard Product and Services Classification
- 5.1 ERP-Enterprise resource planning
- 6.1 MRO- Maintenance, Repair and operations

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CHAPTER ONE

INTRODUCTION

1.1 BACKGROUND OF THE STUDY

The challenges of trade liberalization and globalization, has brought about the migration of many governance functions to the internet. The feasible choices for conducting business electronically will continue to emerge. Many developing nations are implementing e-procurement. "E-procurement refers to the use of internet based integrated information technology systems for procurement functions, including search, sourcing, negotiation, ordering, receipt and post-purchased review" (Croom and Brandon-Jones, 2007).

According to Roman, (2012), e-procurement is the use of information technology in the development of a procurement process that is responsive to changes in the environment.

The various types of e-procurement include:- e-tendering, web based ERP, E-MRO, e-sourcing, e-informing and e-auction/reverse auction

E- Procurement can be viewed more broadly as an end-to-end solution that integrates and streamlines many procurement processes throughout the organization. Businesses have realized that time and cost savings can be achieved by having a link with major suppliers through private networks such as electronic data interchange (EDI).

The current generation of e- procurement is pay per use utilizing the Cloud infrastructure.

At most times, the merits and demerits of e- Procurement mirrors the benefits and detriment of the internet

1.2 IFMIS

An IFMIS can be explained as an automated system that is used for public financial management interlinking various processes which include drawing of a plan, drawing a budget, managing expenditure and control, accounting, audit and finally reporting.

The automation and streamlining the government's financial management processes and procedures was to be achieved by the introduction of the Integrated Financial Management Information System (IFMIS) as a PFM reform initiative by the National Treasury. The IFMIS system brought was aimed at ensuring transparency and accountability in financial management and standard financial reporting as contemplated in Article 226 of the Constitution and Section 12 of the Public Finance Management (PFM) Act 2012.

1.3 PROBLEM STATEMENT

IFMIS Kenya system was procured in the year 1998 but full deployment was in the year 2003 as contained in the IFMIS re-engineering strategic plan 2011-2013.

Various factors have led to the success of e-procurement applications. There are organizations that fail in their implementation of e-procurement technologies while as others fail. The reasons for this contrast in outcomes has attracted researchers to this topic of e-procurement systems adoption.

Vaidya *et al* (2006) through his study on critical success factors in public sector adoption of e-procurement concluded that broader discussion and conclusion need to be reached on the constitutes of success factors and the criteria for the assessment of success.

The main objective of implementing an IFMIS was to achieve transparency and accountability in public finance management and enhance workforce performance to achieve business objectives. The Government launched an IFMIS re-engineering initiative in the year 2011 and the system is still facing challenges and key among this is the human element (Mumo, 2013). In the year 2014 the e-procurement platform was launched by the then president Uhuru Kenyatta who directed a switch over to e-procurement with the aim of better public finance management. Regardless the realization of value created by e- procurement, Mwangi (2013) noted that the e- procurement adoption is a bit slow. Though previous studies have been done, there has been no harmonized approach for determining the success on user adoption of e-procurement in Kenyan Government Ministries.

1.4 RESEARCH OBJECTIVES

The study is aimed at determining the success on user adoption of e-procurement in Kenyan national Government basing the study on the following objectives.

1. To determine the extent of e-procurement adoption on the IFMIS e-procurement module
2. To test and validate the enhanced DeLone and McLean's (2016) IS Success model in the context of national government.
3. To measure the level of success in user adoption of the e-procurement module using the chosen model

HYPOTHESIS

H1: There exists Positive relationship between information quality of the e-procurement system and Usage.

H2: There exists Positive relationship between system quality of the e-procurement system and Usage.

H3: There exists Positive relationship between service quality of the e-procurement system and Usage.

H4: There exists Positive relationship between stakeholder engagement of the e-procurement system and Usage.

H5: There exists Positive relationship between information quality of the e-procurement system and users' satisfaction.

H6: There exists Positive relationship between system quality of the e-procurement system and users' satisfaction.

H7: There exists Positive relationship between service quality of the e-procurement system and users' satisfaction.

H8: There exists Positive relationship between the use of the e-procurement system and users' satisfaction.

H9: There exists Positive relationship between stakeholder engagement of the e-procurement system and Users' satisfaction.

H10: There exists Positive relationship between the use of the e-procurement system and net system benefits.

H11: There exists Positive relationship between user satisfaction of the e- procurement system and the system net benefits.

1.5 SIGNIFICANCE OF THE RESEARCH

This study will provide information about e- procurement for governments that wish to adopt and implement electronic procurement and for those already engaged in the practice to improve their governance. It will also form a basis of reference for researchers wishing to conduct studies in e- procurement and other related disciplines. E-procurement as a procurement strategy is meant to reduce the procurement expenses for the organization so as to increase its returns and earnings. The study is expected to make contributions to the effects of e- procurement to the nation.

The research also aims at assisting learning institutions which offer procurement related courses to design appropriate curriculum tailor-made for procurement personnel in practice. This can enable them to link theoretical concepts to actual practice in the field and make necessary adjustments to suit the market. By so doing the strategy can be relevant to the public sector environment.

The study will assist the Government formulate policies as well as regulations specifically on e- procurement that can enable both private and public firms improve their performance through procurement process.

Policy makers will devise e-procurement policies that are based on empirical evidence from the study. From the conclusion and recommendations of this research the Government can be able to appreciate the holistic approach to implementation of an ICT based procurement so as to give direction as to how the strategy can be successfully implemented in Kenya.

CHAPTER TWO

LITERATURE REVIEW

2.1 PROCUREMENT EVOLUTION

Procurement can be defined as the complete process of obtaining services as well as goods beginning with the preparation and processing of a requisition through to receipt and approval of the invoice for payment. According to Kenya Institute of supplies and management, the generic procurement process constitutes: - need identification, specification, invitation to bid, bid evaluation, contract negotiation, award, contract management, and finally the project closeout.

Aligning the procurement objectives with those of the organization is becoming necessary. The supply chain has become complex. Tracking, aligning procurement performance and ensuring that its impact on the company's goals is increasingly becoming difficult.

E-procurement came into being in the 1980s. This was made possible with the development of electronic data interchange (EDI). EDI is a family of standards that enabled customers and suppliers to electronically exchange documents such as invoices, purchase orders, shipping notices among others.

In the 1990s blue chip companies began to develop electronic catalogues to be used by vendors. Marketplaces are also so common an addition to the e-procurement software.

The evolution of Mobile technology has improved access, delivery and sharing at personal as well as enterprise levels. This evolution has enabled procurement better connections and collaborations with the buyers, suppliers, customers as well as other trading partners.

At present we are sitting in the evolution of cloud-based applications which remove cumbersome technological infrastructure and eliminates lengthy training courses among other notable advantages.

2.2 PUBLIC PROCUREMENT IN KENYA

According to Cambridge online dictionary, Public procurement is the buying of goods and services by government organizations. Often used interchangeably with government procurement.

2.2.1 Objectives of public procurement in Kenya

The main objectives of public procurement include:-

- ▶ The realization of economic efficiency in the procurement process
- ▶ To promote the local industry hence sparring the development of the economy
- ▶ Fostering public confidence in the process

- ▶ To ensure that fairness is observed throughout the process and also promote integrity, transparency and accountability
- ▶ To ensure that there is fairness for all competitors

The development that public procurement in Kenya has undergone cannot be ignored. In the 1960s the system had no regulations. In the year 1978, the supplies manual contained the Kenyan Government's Procurement system, from time to time the treasury issued circulars which supplemented the suppliers manual which was managed by the Director of Government Supply Services. Concerns had been raised over the transparency of procurement processes in government ministries and parastatals; this saw the introduction of the Public Procurement and Disposal Act (PPDA) of 2005. The County Government Procurement Regulation (2013) introduced new standards for public Procurement in Kenya and currently The Public procurement and asset disposal Act 2015 which took effect as from January 2016. The law provides for National Treasury to be responsible for asset disposal policy formulation and public procurement.

The Public Procurement Oversight Authority (PPOA) is a regulatory body that was created in 2005 to oversee fairness and transparency whenever a government body seeks to procure any goods or services. Its main responsibilities include: offering assistance in the implementation and operation of the public procurement system, monitoring the procurement system and reporting on its overall functioning, formulating public procurement policy as well as ensuring that procurement procedures established under the PPDA Act are complied with.

2.3 E-PROCUREMENT

Electronic procurement is defined as the use of an electronic network for instance the internet to do business to business purchase as well as the sale of services and goods. This allows the automation of internal business processes at a global level and is not limited to enterprise resource planning ERP systems. The advantages of e-procurement include: - simply and effectively allowing communication of information, streamlining the global process of procuring goods and services, time and cost reduction with no compromise on quality.

Ilhan and Rahim, (2013) described E- Procurement systems as web-based solutions that automate the procurement process. Tatsis et al. (2006) a range of technologies that qualify as e-procurement systems include: - Electronic Data Interchange (EDI), online auctions, procurement modules of Enterprise Resource Planning (ERP) systems, and packaged e-procurement solutions and e-marketplaces.

Currently the system that is being used by public institutions in Kenya for e-procurement is the e-procurement module of the IFMIS known as the procure to pay module.

IFMIS is a B2G. It was procured in the 1998 but its implementation began in the year 2003. The Kenyan government undertook a modular approach in the implementation of IFMIS

IFMIS has brought about the Automation of procurement processes from procurement planning, requisition, tendering, contract management, award and payment. According to the Kenya Institute of Supplies Management, Original rollout of IFMIS facilitated purchasing, payment and limited reports. A few issues came up with the use of IFMIS. There were issues of integration of budgeting that was developed on a separate module, Bank reconciliation were done manually because the Cash management module was not implemented and the lack of national collection

visibility. With the above challenges, there was need for a more comprehensive strategy which saw the rationale for IFMIS reengineering in the year 2011.

According to the National treasury IFMIS strategic plan 2013-2018 moves IFMIS from the full roll out to sustainability of the end to end processes. It will also include implementation of a business intelligence solution for financial management analysis for ease in decision making

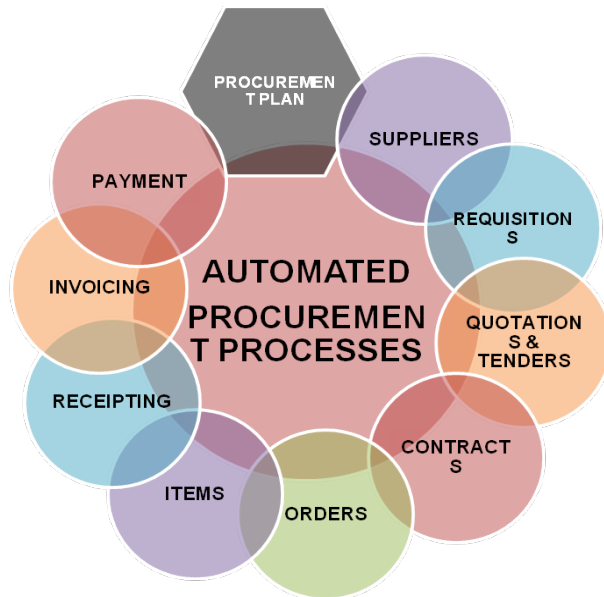


Figure 1: The e- Procurement process

2.4 DRIVERS AND CHALLENGES FACED IN THE ADAPTING E-PROCUREMENT IN THE PUBLIC SECTOR

2.4.1 Drivers for successful implementation of an e-procurement system

With top management support and commitment the adoption of e- procurement will be made easier as they will provide the resources in terms of finances, human, and physical. They will also drive the policy implementation and make sure that there exists a legal framework. Human technical capacity and training ensures that the users and implementers of the system will be able to effectively use the tool. Infrastructure is important and will form the backbone of the system from the servers, network and work stations and issue of security and data integrity.

Effective change management and communication strategies will ensure that the present staff accepts the new procurement system being implemented and them that will be declared redundant are adequately compensated. It also ensures that the processes are aligned to the requirements of e-procurement.

A phased implementation is important as it guarantees that problems encountered are resolved early, costs are kept within limits and constant reviews are undertaken to ensure that the original targets are complied with and there exists no scope creep. Motivating factors of perceived usefulness of the system and perceived ease of use of the system will encourage the adoption of e- procurement by the users.

Other drivers as stated by the Kenya school of Supplies and management include:-Reduced operating and inventory costs, world competition, pressure on prizes and technology explosion

2.4.2 Factors affecting the adoption of e-procurement

Previous studies have featured various factors hindering e-procurement adoption.

Cost savings and the perceived improvement of tasks.

Both the buyer as well as the supplier side gains from the e-procurement systems. (Kauffman and Mohtadi, 2004). Cost savings is realized by the improvement in efficiencies and effectiveness of procurement tasks, cutting down of buying prices and the cutting down of administrative tasks (Croom and Brandon-Jones, 2004). Cutting down the administrative dimension of the procurement process enables purchasing experts focus more resources on the strategic aspects of procurement for instance the development of supplier programs, fostering supplier relationships, and enhancing the process of communication. The perceived improvements may have an actual contribution in motivating the purchasing experts to take up electronic technologies.

Influence of suppliers

Incentive programs encourage the uptake of unfamiliar behaviors and have been used severally within the management of supply chain. It's particularly crucial while using e-procurement systems so as to encourage uptake (Croom and Brandon-Jones 2004). Incentive programs play a major role in the uptake of e-procurement systems. (Kauffman and Mohtadi, 2004). Supplier incentives allows: improvement in the terms of payment, improved flow of communication and information, improved co-ordination and better terms of negotiation. Previous studies concluded that supplier incentives encourage buyers' uptake of e-procurement (Deeter-Schmelz et al., 2001).

Suppliers also can influence buyers to embrace e-procurement systems by non forceful means such as "we won't supply" and "disadvantaged terms of contract" (Joo and Kim 2004; Dooley and Purchase, 2004). Supplier pressure can be of eminent when the buyer side less dominant or a big number of other participants in the supply chain has embraced information technology. (Subramanian and Shaw ANZMAC 2005)

Integration of Electronic Systems

Savings and benefits can be achieved when there is integration of systems in an organization. (Min and Galle, 2003). Lack of integration brings about redundancy during data entry, poor process coordination and lack of information flow in an organization. (Osmonobekov et al., 2002). Integration enables the information exchange thus contributing to an organizations improved decision making.

Internal Support for Adoption Processes

E-procurement brings improvement within the supply function (Lancioni, Schau, Smith, 2003). The forces include: - the level of technical abilities of the buying professionals (Zahay and Handfield, 2004); the level of investment in training (Subramanian and Shaw, 2002; Joo and Kim, 2004; Panayiotou et al., 2004); the influence of IT department in procuring software (Osmonbekov et al., 2002) and the support provided by the top management (Kennedy and Deeter-Schmelz, 2001).

2.5 RESEARCH FRAMEWORKS AND PROPOSITIONS

2.5.1 Theory of diffusion of innovations

This theory investigates the means, the reason and by how far ideas and technology are disseminated. Professor Everett Rogers, who specializes in communications patronized this theory in the form of book titled *Diffusion of Innovations*; published in 1962. He stated that diffusion the means that an innovation is made known over a period to agents in a social set up whose heritage are varied.

According to Rogers, new ideas spread due to; - the selected innovation, the medium, period, and the social system. For this process to occur there should be availability of human capital. The extent of innovation brings forth its sustainability. There exists a point of critical mass within the rate of adoption.

The adopters are classified as:- innovators, early adopters, early majority, late majority, and laggards.

Diffusion manifestation depends on the adopter type as well as the process of innovation decision.

However, this theory faces major criticism which includes: lack of consistency, the complex nature of networks and humans making it unquantifiable, and also the various variables which brings in the lack of cohesion in the output reducing the heuristic value.

2.5.2 Theory of planned model

It's among theories used in technology adoption. In the year 2002 Ajzen investigated the residual impact of later and past behavior and concluded that the aftermath impact of past behavior is degraded when the motive and conduct are consistent and dissolve when the motive is well grounded , sober intentions and there exists precise implementation method.

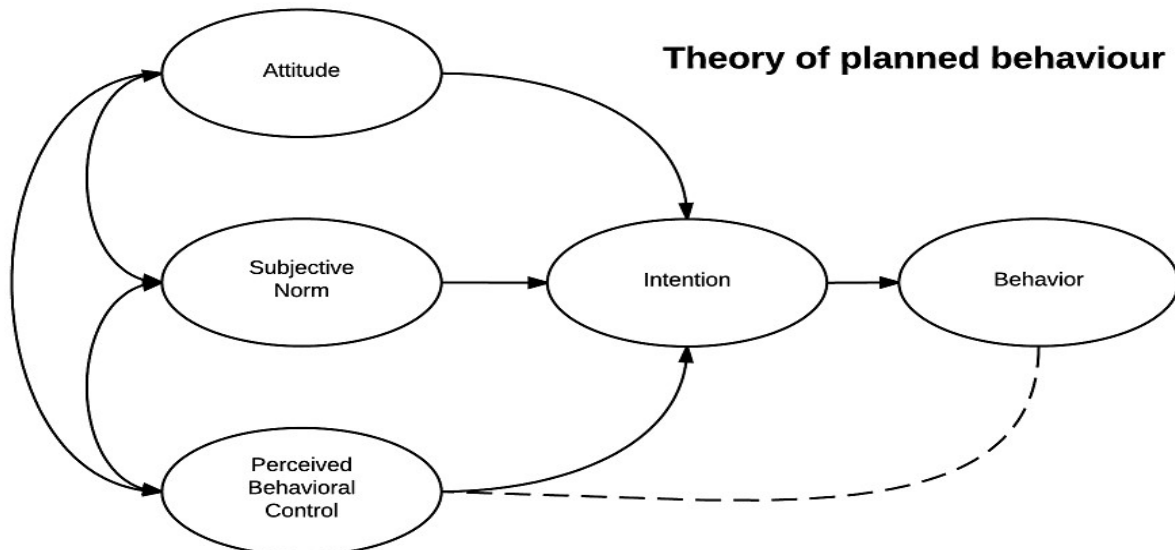


Figure 2: Theory of planned behavior

2.5.3 Technology acceptance model (TAM)

The model explains the approval and practice of a technology by users. It was developed by Fred Davis and Richard Bagozzi (Davis, Bagozzi, & Warshaw, 1989). TAM has evolved overtime to TAM2 to include, social influence (subjective norm, voluntariness, and image), cognitive instrumental processes (job relevance, output quality, and result demonstrability) and experience (Venkatesh & Davis, 2000).

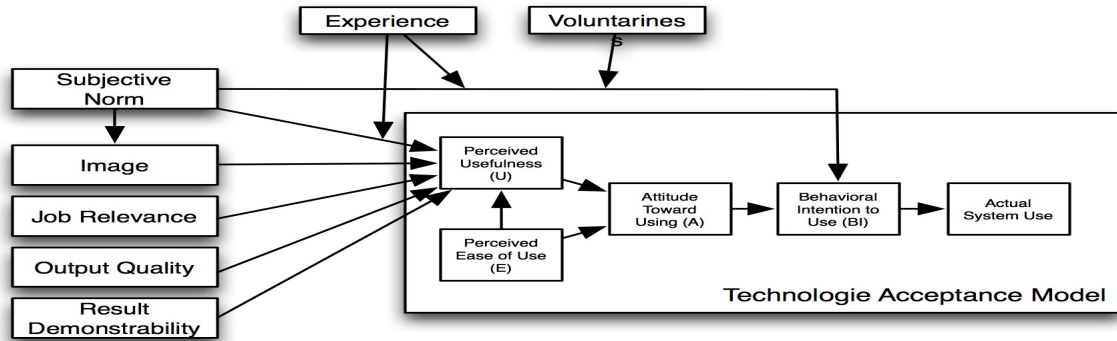


Figure 3: Technology acceptance model-TAM2-Extension of TAM

2.5.4 The DeLone and McLean Model of Information Systems Success:

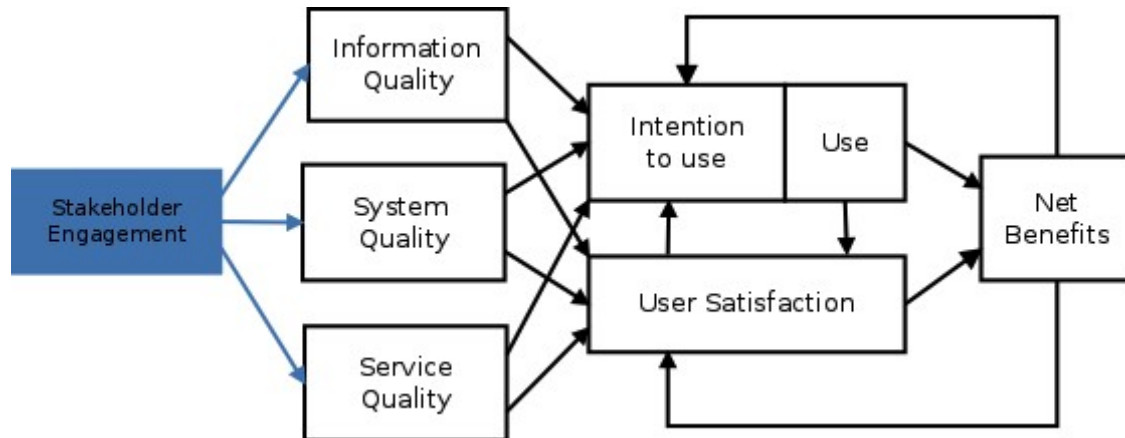


Figure 4: the enhanced D and M Information Systems success model

This study was guided by the enhanced D and M IS success model. It was derived from the updated DeLone and McLean Model of Information Systems Success, which is one of the widely used success models. The theory was initially developed by William H. DeLone and Ephraim R. Mclean in the year 1992. The same authors refined the model a decade later after reviewing feedback from scholars who had interacted with the model. According to their journal *published* after a ten year success, they acknowledged that the model has been used successfully in nearly 300 articles in refereed journals. The model is considered the most influential theories in contemporary IS systems research. The recent model was enhanced by B. Ondego and C.Moturi (2016), in their study, *Evaluation of the Implementation of the e-Citizen in Kenya*.

2.5.5 Operationalization of the research variables

Factor	Evaluation parameter	Description
System quality	Performance	The accomplishment of a given task by the e-procurement module
	Availability	Measured by the number of times the e-procurement module is up or down
	Response time	Refers to the interval between a request and the feedback from the IFMIS e-procurement module
	Usability	Ease, speed, and intuitiveness in using the IFMIS e-procurement module
Information quality	Accuracy	That the e-procurement module truly reflects the transaction it documents
	Understandability	That the output of the e-procurement module is can be understood easily
	Relevance	That the output from the e-procurement module aids in decision making
Service quality	IT support	The frequency in which the users call IT support while using the e-procurement system
	IFMIS support	The frequency in which users call IFMIS or procurement for support
	Network up/ downtime	How often the internet goes down in a day
Usage	Nature of use	How is the e- procurement IFMIS module being used?
	Number of executed transactions	The number of successful procurement transactions in a day
	Navigation patterns	Which sub modules the customers visit most of the time
User satisfaction	Number of sites visits	How many users visits the e-procurement module in a day
	Repeat visits	The frequency a user visits the e-procurement module
	User surveys	The pattern of users activities in the e-procurement module
Net benefits	User benefits	The system has reduced search costs
		Time Taken to complete a transaction has significantly reduced
		The procure to pay module saved the organizations money

Table 2.1 operationalization of research variables

2.6 GAPS IN THE PREVIOUS STUDIES

There is not much documentation on the level of adoption of the procure to pay module in the IFMIS. Previous studies also lack a tested and validated framework to measure the level of success in the e-procurement adoption. The research focus is unique to key central Government ministries in Kenya.

CHAPTER THREE

RESEARCH DESIGN, DATA COLLECTION AND ANALYSIS

3.1 INTRODUCTION

The manner in which research is conducted may be described by a number of items including; the philosophy the study subscribe to, the strategy prescribed to as well as the instruments utilized during the research. The research objectives are discussed in the first chapter. This chapter will mainly deal with:

- I. The discussion of our research philosophy in relation to other philosophies;
- II. Employ our research strategy, including the research methodologies used during data collection, data processing as well as the translation of data to meaningful information.
- III. Demonstrate the use of research instruments utilized during the study.

The process of research for the study was primarily exploratory. This was chosen from the rest due to the need of discovering the possible relationships that existed between theoretical constructs.

3.2 RESEARCH PHILOSOPHY

Positivism is the philosophy that was employed for this research. Alavi and Carlson (1992) reviewed 902 IS research articles and concluded that to a greater extent, empirical studies are positivist. Positivism has also had a particularly successful association with the physical and natural sciences. Positivism assumes the situation is independent of the researcher. Two different observers using the same set of instruments in the same context will come to the same conclusion; it assumes the existence of a prior fixed relationship within a phenomenon.

3.3 RESEARCH DESIGN

Descriptive case study was the approach for this research since it leads to rich, detailed analysis of a phenomenon and its context. The method was appropriate for the reason that it adequately enabled the researcher meet the three research objectives mentioned in chapter one. It was chosen from the rest because it focused on depth rather than breadth (the researcher obtained as much details as possible about one instance of the phenomenon under investigation); the study was conducted at the ministries natural setting. It also employed a holistic study- focusing on complexity of relationships and processes, and how they are inter-connected and inter-related. We will also have the liberty of choosing multiple sources and methods of data collection – multiple interviews, observation, questionnaires, document analysis, to mention but a few.

A case study can be difficult and time consuming to negotiate access to the necessary settings, people and documents. This was tackled by obtaining the necessary authorization documents from the University to conduct the research.

A deductive approach was preferred.

3.4 POPULATION SAMPLE

Stratified random sampling was used with the following criteria

- Users who have worked with procure to pay module of the IFMIS for not less than 6 months
- Users who have worked in the government for more than 6 months

Simplified sample size formula was used to get strata

$$n = \frac{N}{1 + N(e)^2}$$

Where **n** denotes the sample size, **N** denotes population size, and **e** represents level of precision.

From Yamane's formula calculation our population was 150 respondents having a sample size of 109 respondents.

The error was 5% at 95% coefficient confidence

3.5 SAMPLING

The sampling technique Stratified random sampling method was applied to the different ministries of the national government. The population from the different ministries of the central government was considered heterogeneous. Stratified random sampling ensured that each user of the e-procurement system in IFMIS is represented.

The population was subdivided into smaller groups based on shared attributes. A random sample from each group was taken in a number proportional to the group's size when compared to the population. According Schindler (2006) every sample must have a non zero probability of selection.

We made a deliberate choice to restrict our attention to the key government ministries in order to explore the existence of core constructs which will enable us determine the success on user adoption of e-procurement in Kenyan Government Ministries

3.6 DATACOLLECTION

The methods used for collecting data included:- e-mail communications, documents related to e-procurement that are maintained by the organizations and information from the ministries websites. The questionnaires were administered to the sample population through a drop and pick method. Questionnaires were developed with questions on the demographic of respondents on section one, section two covered Objective one, section three covered the rest of the objectives. The enhanced DeLone and McLean Model of Information Systems Success guided the questionnaire.

3.7 MEASURES

The variables from the questionnaires were measured with a weighted scale. All scales were measured using a 5-point Likert scale with the following response options: Objective one: 1 = Do not agree, 2 = Small extent, 3 = Moderate extent, 4= Great extent, 5 = Very great extent. Objective three: 1 = strongly agree, 2 = Agree, 3 =Undecided, 4= Disagree, 5 = strongly disagree. The average mean for each variable indicated the average attitude for each variable

3.8 DATA ANALYSIS

Quantitative analysis was done on the data collected from the study. To begin with the questionnaires used in the survey were evaluated for reliability using Chronbach's α measure for each construct in the questionnaire. Secondly, the dependencies among the components were analyzed using regression analysis. Inferential statistics was used to test the hypotheses of the study. Descriptive statistics identified the data patterns as well as consistency of the responses in each of the results from the survey. Results were presented in tables.

3.9 STATISTICAL MODEL

In research, theoretical models are commonly used to demonstrate functional relationships that may exist among variables. More than often, these models enable the researcher to statistically determine the level of contribution made by the independent variable on the dependent variable. For the purpose of this study, we adopted linear regression equation denoted below.

$$NB_i = \beta_0 + \beta_1 SE_i + \beta_2 IQ_i + \beta_3 SQ_i + \beta_4 SEQ_i + \beta_5 USE_i + \beta_6 US_i + \epsilon_i$$

Where:

NB : denotes Net benefits

SE : denotes Stakeholder engagement

IQ : denotes Information Quality

SQ : denotes System Quality

SEQ : denotes Service Quality

USE : denotes Usage

US : denotes User Satisfaction

β_0 : a constant, the value of NB when all products values are 0

β_1 : denotes the regression coefficient of Stakeholder engagement

β_2 : denotes the regression coefficient of Information Quality

β_3 : denotes the regression coefficient of System Quality

β_4 : denotes the regression coefficient of Service Quality

β_5 : denotes the regression coefficient of Usage

β_6 : denotes the regression coefficient of user satisfaction

ε_i : is the error time which is assumed to be a white noise.

In this study, the key independent variables were: Stake holder engagement, Information quality, System Quality, Service Quality, Usage and user satisfaction. The key dependent variable was success in the user adoption measured by Net Benefits NB.

CHAPTER FOUR

DATA ANALYSIS, RESULTS AND DISCUSSION

4.1 INTRODUCTION

This chapter is concerned with presentation of the result of the analysis of the data obtained through the various analysis techniques. As stipulated in the research design, various data collection methods were used. The results of the data obtained from the study has been analyzed, using SPSS version 21.0 and the results presented into tables,

Table on objectives in relation to the questionnaire

Associated section in the questionnaire	Objectives	Purpose
Section One	(General)Demographic data	To aid the researcher in the analysis of the survey responses and break down the overall survey responses into meaningful groups of respondents
Section two	To determine the extent of e-procurement adoption on the IFMIS e-procurement module	The researcher tested the level of acceptance on users using the processes in the procurement processes.
Section Three	To test and validate the enhanced DeLone and McLean’s (2016) IS Success model in a local context	The researcher will validate the model using empirical evidence gathered during data collection
Section three	To measure the level of success in user adoption of the e-procurement module using the chosen model.	For this study the researcher adopted the enhanced DeLone and McLean Model of Information Systems Success

Table 1: Table on objectives in relation to questionnaire

4.2 RESPONSE RATE

The study targeted key government ministries in Kenya. Of all the 109 questionnaires distributed, 96 were filled in and returned for analysis, accounting to 88% of the total target response. Fourteen central government ministries were interviewed with each ministry having at least 6 respondents from the procurement department.

Table 2 below lists the demographic characteristics of the sample. The male gender formed majority of the respondents with a percentage of 58%. The Key government ministries in Kenya have a majority workforce working in the procure to pay module of the IFMIS consisting of Undergraduates at 62.5%. Respondents between 31 to 40 years formed the largest age group at (39.6%) and with good computer skills at 69.8% who would therefore work with the e-procurement module without difficulties. The majority of the respondents had interacted with the procure to pay module for more than two years and were from the procurement department.

Table 2: Response by demographics (source: research data 2016)

Gender		
	Frequency	Percent
Male	56	58.3
Female	40	41.7
Total	96	100.0
Academic qualifications		
postgraduate	22	22.9
Undergraduate	60	62.5
Diploma	14	14.6
Total	96	100.0
Years interacted with the Procure to pay module		
Two years and below	37	38.5
More than two years	59	61.5
Total	96	100.0
Age		
20-30 yrs	21	21.9
31-40 yrs	38	39.6
41-50 yrs	29	30.2
51 and above	8	8.3
Total	96	100.0
Department		
Finance	4	4.2
Procurement	92	95.8
Total	96	100.0
Computer Skills Rating		
Fair	7	7.3
Good	67	69.8
Excellent	22	22.9
Total	96	100.0

4.3. THE EXTENT OF USER ADOPTION ON THE PROCURE TO PAY MODULE OF THE IFMIS

This section was aimed at determining the level at which e-procurement had been adopted on the procure to pay module of the IFMIS. A likert scale of 5 was used and the values were: - 1 = Do not agree, 2 = Small extent, 3 = Moderate extent, 4= Great extent, 5 = Very great extent

Descriptive Statistics extent of adoption

	Mean	Std. Deviation	Minimum	Maximum	N
Tenders advertised online	3.83	.890	2	5	96
Proposals are submitted online	3.41	1.062	1	5	96
Short listing of tenders done by the system	2.75	1.306	1	5	96
A functioning website to facilitate e-procurement	3.96	.972	1	5	96
Call for proposals done through the organizations website	3.66	.982	1	5	96
Tenders are received through the organizations website	3.24	1.064	1	5	96
Tender evaluation done through procure to pay	2.59	1.139	1	5	96
Any necessary clarification is done through the system	2.80	1.166	1	5	96
Contract is awarded by the e-procurement system	2.60	1.326	1	5	96
Debriefing of necessary bidders done through the system	1.61	1.040	1	5	96
Appraisal is done through the system	2.31	1.127	1	5	96
Payment approvals done excessively through the system	3.50	1.036	1	5	96
Payment made through the system	3.74	1.039	1	5	96
All staff make requisition online	2.97	1.192	1	5	96
Specifications for procured items posted to organizations website	3.73	1.010	1	5	96
Valid N (listwise)	3.11	1.090			96

Table 3: Descriptive statistics on extent of adoption (source: research data 2016)

The respondents were in agreement that procure to pay has been adapted to a moderate extent at an average mean of 3.11. All the 14 ministries sampled agreed that the tenders were advertised online. Majority of activities as depicted on table 3 were supported to be carried out using the e-procurement system ranging from a moderate extent to a very great extent. However there are other activities that are still manual processes which include: - tender evaluation (mean 2.59), short listing of tenders not exclusively done by the system at (mean 2.75), contract being awarded by

the e-procurement system at (mean 2.60), Appraisal being done through the system (mean 2.31). The activity that is to a larger extent manual is the Debriefing of unsuccessful bidders through the system (mean 1.61).

4.4 DETERMINANTS OF SUCCESS IN THE USER ADOPTION OF PROCURE TO PAY MODULE OF THE IFMIS

To assess the determinants of success in the user adoption of procure to pay module of the IFMIS. Respondents were presented with seven categories of statements derived from the enhanced DeLone and McLean Model of success on a 5- point likert scale. They were asked to rank their agreement on the assessment of statements. The statements were ranked ranging from “5- strongly agree” to “1-strongly disagree”. Descriptive statistics was employed to describe the respondent’s views

DESCRIPTIVE STATISTICS

4.4.1 Stakeholder engagement

Descriptive Statistics Stakeholder engagement

	Mean	Std. Deviation	Minimum	Maximum	N
That users were engaged during the development of procure to pay	3.93	1.117	1	5	96
Was trained on how to use the procure to pay module	3.70	1.362	1	5	96
I receive communication regularly about updates on the system	3.75	1.338	1	5	96
Valid N (listwise)	3.79	1.27			96

Table 4: Stakeholder engagement (Source: Research Data 2016)

The respondents generally agreed that stakeholder engagement led to the successful adoption of e-procurement at an average mean of 3.79. Three items were used to measure stakeholder engagement which include: - awareness, training and communication. The users were involved during the development of the procure to pay module yielded (mean 3.93), the users being trained on how to use the procure to pay module (mean 3.70) and the users receiving communication on any updates on the system (mean 3.75). Majority of the respondents were engaged during the implementation therefore they embraced the system.

4.4.2 System quality

The respondents agreed that the system quality was good at an average mean of 3.46

The metrics that were used to measure system quality included: - Performance (mean 4.42), availability (mean 2.92), Response time (mean 4.34) and usability (mean 2.16). Most of the users agreed that they do not encounter errors often with the system and that the system does not take long to execute a command.

It was observed that the system is not available all the time and also some respondents noted that the procure to pay module is complex to work with.

Descriptive Statistics System Quality

	Mean	Std. Deviation	Minimum	Maximum	N
I do not encounter errors often with the system	4.42	.627	2	5	96
The system is available all the time	2.92	1.083	1	5	96
The system does not take long to execute a command	4.34	.819	2	5	96
Procure to pay module is not complex to work with	2.16	1.182	1	5	96
Valid N (listwise)	3.46	0.93			96

Table 5: System quality (Source: Research Data 2016)

4.4.3 Information Quality

Information quality was measured using three items which resulted to an average mean of 3.79. They included: - Accuracy, (mean 3.88) that they are in agreement that the information provided in the system is accurate and free from errors, understandability (mean 3.69) that they have no trouble understanding the output from the system and relevancy (mean 3.81) that information derived from the system helps the management make decisions in regards to procurement.

Descriptive Statistics Information quality

	Mean	Std. Deviation	Minimum	Maximum	N
Information provided in the system is accurate and free from errors	3.88	.921	1	5	96
Output generated from the system is easy to understand	3.69	.998	1	5	96
Information generated from system helps in decision making	3.81	1.019	1	5	96

Valid N (listwise)	3.79	0.98			96
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Table 6: Information quality (Source: Research Data 2016)

4.4.4 Service quality

The sampled respondents were in agreement with the procure to pay service quality at an average mean of 3.52. The metrics that were used to measure service quality included: - IT support (mean 3.79) users agreed that they get the necessary support from the IT department in pertaining the e-procurement module, IFMIS support (mean 3.56) that the IFMIS department offers adequate support and therefore can comfortably work with the e-procurement system and Network up/downtime (mean 3.22) that to a moderate level, in the ministries, the network infrastructure can support the delivery of the system. There is room for improvement on the infrastructure to allow for a better experience with the e procurement system.

Descriptive Statistics Service quality

	Mean	Std. Deviation	Minimum	Maximum	N
I get necessary support from IT	3.79	.983	1	5	96
I get adequate support from IFMIS department	3.56	1.131	1	5	96
experience network issues when using the system	3.22	1.198	1	5	96
Valid N (listwise)	3.52	1.10			96

Table 7: Service quality (Source: Research Data 2016)

4.4.5 Usage

Using descriptive statistics the respondents were in agreement with system usage at an average mean of 3.84. Three statements were used to measure usage, that the e-procurement module improves life efficiency and work (mean 3.90), that I use the e-procurement module frequently for my work (mean 4.02), and that I access the e-Procurement module several times in a day for my work (mean 3.60).

Descriptive Statistics Usage

	Mean	Std. Deviation	Minimum	Maximum	N
The e-procurement module improves life efficiency and work	3.90	.968	1	5	96
Use e-procurement module frequently for my work	4.02	.725	2	5	96
accessing the system several times a day for work	3.60	1.061	1	5	96
Valid N (listwise)	3.84	0.92			96

Table 8: Usage (Source: Research Data 2016)

4.4.6 User satisfaction

Generally the respondents were satisfied with the e-procurement module at an average mean of 4.26. The statements used to test user satisfaction included: - I would recommend the system to another user (mean 4.76), users can easily acquire the information they need by using the system (mean 3.92), generally the system is useful (mean 4.11)

Descriptive Statistics User satisfaction

	Mean	Std. Deviation	Minimum	Maximum	N
I would recommend the system to another user	4.76	5.233	2	55	96
Users can easily acquire the information they need by using the system	3.92	.842	1	5	96
Generally the system is useful	4.11	.724	2	5	96
Valid N (listwise)	4.26	2.27			96

Table 9: User satisfaction (Source: Research Data 2016)

4.4.7 Net benefits

At an average mean of 4.30, the respondents agreed that the e-procurement module is beneficial to them. The statements used here were, that the system has reduced search cost (mean 4.20), that the time taken to complete a transaction has reduced significantly at (mean 4.33) and that the e-procurement module has saved the organization money (mean 4.36)

Descriptive Statistics net Benefits

	Mean	Std. Deviation	Minimum	Maximum	N
The system has reduced search costs	4.20	.659	2	5	96
Time Taken to complete a transaction has significantly reduced	4.33	.574	2	5	96
The procure to pay module saved the organizations money	4.36	.651	2	5	96
Valid N (listwise)	4.30	0.63			96

Table 10: Net benefits (Source: Research Data 2016)

4.5 PEARSON'S CORRELATION ANALYSIS

Table 11 below shows the correlation analysis results obtained for the 7 constructs from SPSS version 21. The results demonstrate the existence of positive correlations among several constructs of the chosen model

		Correlations						
		Stakeholder engagement	Information quality	System quality	Service quality	Usage	User satisfaction	Net benefits
Stakeholder engagement	Pearson Correlation	1	-.075	-.015	.095	.197	.100	.135
	Sig. (2-tailed)		.467	.882	.358	.054	.334	.188
	N	96	96	96	96	96	96	96
Information quality	Pearson Correlation	-.075	1	-.143	.210*	.161	.096	.103
	Sig. (2-tailed)	.467		.164	.040	.117	.353	.319
	N	96	96	96	96	96	96	96
System quality	Pearson Correlation	-.015	-.143	1	-.091	-.039	.001	.094
	Sig. (2-tailed)	.882	.164		.379	.706	.995	.363
	N	96	96	96	96	96	96	96
Service quality	Pearson Correlation	.095	.210*	-.091	1	.267**	.112	-.093
	Sig. (2-tailed)	.358	.040	.379		.009	.277	.366
	N	96	96	96	96	96	96	96
Usage	Pearson Correlation	.197	.161	-.039	.267**	1	.298**	.085
	Sig. (2-tailed)	.054	.117	.706	.009		.003	.410
	N	96	96	96	96	96	96	96
User satisfaction	Pearson Correlation	.100	.096	.001	.112	.298**	1	.186
	Sig. (2-tailed)	.334	.353	.995	.277	.003		.070
	N	96	96	96	96	96	96	96
Net benefits	Pearson Correlation	.135	.103	.094	-.093	.085	.186	1
	Sig. (2-tailed)	.188	.319	.363	.366	.410	.070	
	N	96	96	96	96	96	96	96

*. Correlation is significant at the 0.05 level (2-tailed).

** Correlation is significant at the 0.01 level (2-tailed).

Table 11: Pearson's correlation (Source: Research Data 2016)

4.5.1 Hypotheses Testing and Model validation

In this section, we based our interpretations from the SPSS output as depicted on table 11. Most of the hypotheses were accepted. A stated hypothesis was accepted as long as the p-value was positive. The study had eleven hypotheses H1 to H11 that were tested by conducting Pearson's correlation analysis between the independent and dependent variables.

H1₊: There exists Positive relationship between information quality of the e-procurement system and Usage.

Information quality is viewed as the quality of the information that the e procurement system is able to store, deliver, or produce. One of Its outputs is mainly the reports produced by the e procurement system. The measures of information quality that were used in this study are: - Relevancy, Understandability and Accuracy. The study explained that the information provided in the system is accurate and free from errors, that the output from the system is easy to understand and that the information provided by the system helps in decision making in regards to procurement which contributes to the usage of the e procurement system. The constructs can therefore be useful for future research. Based on the study we therefore accept the hypothesis with the Pearson Correlation value of **.161** as depicted on table 11 that there exists a positive relationship between information quality of the e procurement system and usage

H2₊: There exists a positive relationship between system quality of the e-procurement system and Usage.

System quality construct was used to measure the desired characteristics of the e procurement system. The characteristics associated with the use of procure to pay system that were used in this study included:- Performance (whether the users do no encounter errors often with the system), Availability (whether the system is available all the time), Response time(that the system does not take long to execute a command) and usability(that the e-procurement module is not complex to work with). Some users stated that the procure to pay module is complex to work with. This is mainly because the system was introduced barely three years ago and capacity building is yet to be completed in some ministries. It was noted that there are connectivity issues in some of the ministries; therefore the system could not be available all the time. There could be other factors that explain the relationship between System quality and system usage. The findings of the study reject the hypothesis at a Pearson Correlation value of **-.039**, that there is a positive relationship between system quality and system usage.

H3₊: There exists Positive relationship between service quality of the e-procurement system and Usage.

Service quality measures the overall quality of support delivered by the service providers. For this study, the metrics used are: - IT support (getting the necessary support from the IT department), IFMIS support (getting adequate support from IFMIS department), network up/downtime (that there no network issues while using the system). The results of the study agree that there exists a positive relationship between service quality of the e-procurement system and usage. The hypothesis is therefore accepted at a Pearson Correlation value is **.267**

H4+: There is Positive relationship between stakeholder engagement of the e-procurement system and Usage.

Stakeholder engagement construct is all about Kenyan government engaging the public during development of the procure to pay module of the IFMIS. The metrics that were used in this study included: - Awareness (that the users were engaged during the development of the system), Training (that the users were trained on how to use the procure to pay module) and communication (that the users receive communication regularly about updates on the system), the results yielded a Pearson correlation value of **.197**. The study therefore accepts the hypothesis that there exists a positive relationship between stakeholder involvement and the e procurement system.

H5+: There exists Positive relationship between information quality of the e-procurement system and users' satisfaction.

Information quality is viewed as the quality of the information that the e procurement system is able to store, deliver, or produce. One of its outputs is the reports produced by the e procurement system. The measures of information quality that have been used in this study are: - Relevancy, Understandability and Accuracy. The study explained that the information provided in the system is accurate and free from errors, that the output from the system is easy to understand and that the information provided by the system helps in decision making in regards to procurement which contributes to user satisfaction of the e procurement system. The constructs can therefore be useful for future research. This case yielded a Pearson correlation value of **.096**. Which accept the hypothesis that, there exists a Positive relationship between information quality of the e-procurement system and user satisfaction.

H6+: There exists Positive relationship between system quality of the e-procurement system and users' satisfaction.

System quality construct was used to measure the desired characteristics of the e procurement system. The characteristics associated with the use of procure to pay system that were used in this study included: - Performance (whether the users do not encounter errors often with the system), Availability (whether the system is available all the time), Response time (that the system does not take long to execute a command) and usability (that the e-procurement module is not complex to work with). This study yielded a weak Pearson correlation value of **.001**.

There could be other factors that explain the relationship between System quality and user satisfaction that were not captured during this study. We therefore accept the hypothesis that there exists a Positive relationship between system quality of the e-procurement system and users' satisfaction

H7+: There exists Positive relationship between service quality of the e-procurement system and users' satisfaction.

Service quality measures the overall quality of support delivered by the service providers. For this study, the metrics used were: - IT support (getting the necessary support from the IT department), IFMIS support (getting adequate support from IFMIS department), network up/downtime (that there are no network issues while using the system). The results of the study yielded a Pearson correlation value of **.112** indicating that there exist a positive relationship between service quality of the e-procurement system and user satisfaction. We therefore accept the hypothesis

H8₊: There exists positive relationship between the use of the e-procurement system and users' satisfaction.

To test user's satisfaction by use, the researcher used three statements; that the e procurement module improves life efficiency and work, that they use the e procurement system frequently for their work and that they access the system several times in a day for their work. The target respondents were from the procurement department who had interacted with the system for at least six months who therefore strongly agreed with most of the statements. The Pearson Correlation value was **.298****. We therefore accept the hypothesis that there is a positive relationship between the use of the e-procurement system and users' satisfaction.

H9₊: There exists positive relationship between stakeholder engagement of the e-procurement system and Users' satisfaction.

Stakeholder engagement construct is all about Kenyan government engaging the public during development of the procure to pay module of the IFMIS. The metrics that were used in this study included: - Awareness (that the users were engaged during the development of the system), Training (that the users were trained on how to use the procure to pay module) and communication (that the users receive communication regularly about updates on the system). The respondents agreed that to a certain extent, there was stakeholder engagement and more therefore need to be done especially when it comes to training. The study yielded a Pearson Correlation value of **.100**. We therefore accept the hypothesis that there exists positive relationship between stakeholder engagement of the e-procurement system and Users' satisfaction.

H10₊: There exists Positive relationship between the use of the e-procurement system and net system benefits.

To test system usage on net benefits, the researcher used three statements; that the e procurement module improves life efficiency and work, that they use the e procurement system frequently for their work and that they access the system several times in a day for their work. The target respondents were from the procurement department who had interacted with the system for at least six months who therefore agreed with most of the statements. The study yielded a Pearson's correlation value of **.085**. We can therefore conclude that, system use can be used to predict net system benefits. Based on the study, we can accept the hypothesis that, there exists Positive relationship between the use of the e-procurement system and net system benefits.

H11+: There exists Positive relationship between user satisfaction of the e- procurement system and the system net benefits.

The assessment of user satisfaction was studied using three statements; that the current user would recommend the system to another user, that users can acquire the information they need by using the system and that generally the system is useful. Most users agreed with the statements. To test the relationship between user satisfaction and net system benefits, Pearson’s correlation was used which yielded **.186**. We therefore accept the hypothesis that there exists Positive relationship between user satisfaction of the e- procurement system and the system net benefits

4.6 RESULTS ON REGRESSION ANALYSIS

4.6.1 Regression on e-procurement usage

To estimate the impact of information quality, Service quality, Stakeholder engagement and system quality on Usage of the e-procurement module, Ordinary Least Square method was used. The results of the multiple regression analysis are shown in the Tables below

4.6.1.1 The Multiple Coefficient of Determination R²

The coefficient of determination is a measure of linear relationship. R² is a statistical term saying how good one variable is at predicting another. If R² is 1.0 then given the value of one variable, you can perfectly predict the value of another variable. If R² is 0.0, then knowing one variable does not help to know the other variable at all. More generally, a higher value of R-Square indicates that you can better predict one variable given another.

The rule of thumb is that, usually an R square of more than 50% is considered better for prediction. In this study it the R square is at 51.1% which is good. It’s recommended that other factors that influence e-procurement usage can be included in the model for future study. The results are shown in table 12 below.

The contribution of SQ, IQ, SQ and SE on Usage

Table 12: Model summary SQ, IQ, SE, SQ on usage (Source: Research Data 2016)

Model Summary				
Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.342 ^a	.117	.078	.64351

a. Predictors: (Constant), Service quality, System quality, Stakeholder engagement, Information quality

4.6.1.2 ANOVA Interpretation

ANOVA table shows that the sum of squares of the regression is 4.979 at 4 degrees of freedom and a mean square of 1.245. The residual sum of squares is 37.683 with 91 degrees of freedom and mean square value of .414. The Total sum of squares is 42.662 with 95 degrees of freedom. The test for the joint significant which is given by the F statistic is 3.006.

This implies that the independent variables, that is, Service quality, System quality, stakeholder engagement and information quality jointly explain the usage of e-procurement in the Key government ministries.

Anova

Anova Model	Sum of Squares	df	Mean Square	F	Sig.
1 Regression	4.979	4	1.245	3.006	.022 ^b
Residual	37.683	91	.414		
Total	42.662	95			

a. Dependent Variable: Usage

b. Predictors: (Constant), Service quality, System quality, Stakeholder engagement, Information quality

Table 13: ANOVAs interpretation on Usage (Source: Research Data 2016)

From the study we can conclude that among other factors the combination of independent variables (Service quality, System quality, stakeholder engagement and information quality) contribute 11.7% to Usage of the e-procurement module. The magnitude of the relationship is significant at 0.022 which is less than 0.05 therefore, highly significant

4.6.2 Regression on e-procurement user satisfaction

To estimate the impact of information quality, Service quality, Stakeholder engagement and system quality on user satisfaction of the e-procurement module, Ordinary Least Square method was used. The results of the multiple regression analysis are shown in the Tables below

Table 14: Contribution of SQ, IQ, SQ and SE on user satisfaction (Source: Research Data 2016)

The contribution of SQ, IQ, SQ and SE on User satisfaction

Model Summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	3.987	.159	1.15	1.91063

a. Predictors: (Constant), Service quality, System quality, Stakeholder engagement, Information quality

4.6.2.1 The Multiple Coefficient of Determination R²

In this study the R square is at (0.159). The four factors highly contribute to user satisfaction at 15.9%, implying that for future research the four predictors can be used to explain user satisfaction. There are also other factors that influence e-procurement user satisfaction that are not included in the model while in this study. The results are shown in table 14 above.

4.6.2.2 ANOVA Interpretation

ANOVA table shows that the sum of squares of the regression is 2.564 at 4 degrees of freedom and a mean square of 1.391. The residual sum of squares is 32.195 with 91 degrees of freedom and mean square value of 0.650. The Total sum of squares is 41.759 with 95 degrees of freedom. The test for the joint significant which is given by the F statistic is 2.655 and as observed in a table above, it is statistically significant at 0.625 level of significance. This implies that the independent variables, that is, service quality, System quality, Stakeholder engagement and information jointly explain the user satisfaction with e- procurement in government ministries in Kenya

Table 15: ANOVAs interpretation on user satisfaction (Source: Research Data 2016)

ANOVA ^a					
Model	Sum of Squares	df	Mean Square	F	Sig.
1 Regression	2.564	4	1.391	2.655	.125 ^b
Residual	32.195	91	0.650		
Total	41.759	95			

a. Dependent Variable: User satisfaction

b. Predictors: (Constant), Service quality, System quality, Stakeholder engagement, Information quality

The findings from the study indicate that the combination of service quality, system quality, stakeholder engagement and information quality contribute to user satisfaction at 15.9%. However the magnitude of the relationship as not significant at .125 which is greater than the accepted 0.05

4.6.3 Regression of Usage and user satisfaction on e-procurement Net benefits

To estimate the impact of usage and user satisfaction on net benefits of the e-procurement module, Ordinary Least Square method was used. The results of the multiple regression analysis are shown in the Tables below

4.6.3.1 The Multiple Coefficient of Determination R²

In this study the R square is at (0.235) implying that there are other factors that influence e-procurement net benefits that are not included in the model while in this study. The results are depicted in table 16 below.

Table 16: The contribution of usage, user satisfaction on user benefits (Source: Research Data 2016)

The contribution of usage, User satisfaction on Net benefits

Model Summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	4.847 ^a	.235	.115	.61152

a. Predictors: (Constant), User satisfaction, Usage

4.6.3.2 ANOVA Interpretation

ANOVA table shows that the sum of squares of the regression is 0.580 at 2 degrees of freedom and a mean square of .290. The residual sum of squares is 15.749 with 93 degrees of freedom and mean square value of .169. The Total sum of squares is 16.329 with 95 degrees of freedom. The test for the joint significant which is given by the F statistic is 0.655 and as observed in a table above, it is statistically significant at 0.186 level of significance. This implies that the independent variables, that is, Usage and User satisfaction explain the Net benefits of e-procurement in government ministries in Kenya at 23.5% at a low level of significance of .186. This indicates that there are other factors that could significantly contribute to Net benefits but were not included in this study.

Table 17: ANOVAs interpretation on Net benefits (Source: Research Data 2016)

ANOVA^a

Model	Sum of Squares	df	Mean Square	F	Sig.
1 Regression	.580	4	.290	1.711	.186 ^b
Residual	15.749	91	.169		
Total	16.329	95			

a. Dependent Variable: Net benefits

b. Predictors: (Constant), User satisfaction, Usage

4.6.4 Regression on e-procurement net benefits

To estimate the impact of usage, user satisfaction, system quality, stakeholder engagement, service quality and information quality on net benefits of the e-procurement module, Ordinary Least Square method was used. The results of the multiple regression analysis are shown in the Tables below

Table 18: Model summary on regression of Net system benefits (Source: Research Data 2016)

Model Summary				
Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.7148 ^a	.511	.529	.90846

a. Predictors: (Constant), User satisfaction, System quality, Stakeholder engagement, Service quality, Information quality, Usage

The combination of all the independent variables on dependent variable Net benefits yielded an R square value of 51.1% which indicates a significant relationship between the independent variables and the dependent variable. This implies that there are other factors that constitute to the other 48.9%. For future research in Kenyan context, system quality, service quality, information quality, stakeholder engagement, information quality, user satisfaction and use can be used to predict user net benefits of e-procurement

Table 19: ANOVAs interpretation on Net system benefits (Source: Research Data 2016)

ANOVA ^a						
Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	8.480	4	3.247	7.479	.015 ^b
	Residual	64.849	91	.624		
	Total	92.329	95			

a. Dependent Variable: Net benefits

b. Predictors: (Constant), User satisfaction, System quality, Stakeholder engagement, Service quality, Information quality, Usage

The significance level of the relationship is at .015 which is highly significant.

4.7 Comparing the enhanced DeLone and McLean's (2016) IS Success model with improved DeLone and McLean's (2003) IS Success model in a local context

We compared the regression on usage using the earlier predictors Service quality, system quality and information quality against the earlier constructs having an inclusion of stakeholder engagement as suggested by B. Ondego and C.Moturi (2016). Using empirical evidence, the results are illustrated in the table below.

The updated DeLone and McLean's (2003) IS Success model

Table 20: the updated D and M (2003) model summary on usage

Model	R	R Square	Adjusted R Square
1	.137 ^a	.019	-.013

Model	Sum of Squares	df	Mean Square
1 Regression	6.389	3	2.130
Residual	335.371	92	3.645
Total	341.759	95	

Table 21: The updated D and M (2003) Anova interpretation on usage

The combination of the three independent variables, Service quality, System quality and Information quality yielded a small R square value of 1.9% and a low magnitude of 0.627.

The results of the study conclude that the three independent variables cannot be used to predict usage of the adoption of e-procurement in the Kenyan context. The need for other predictors is evident using the case of Kenyan Government ministries.

The enhanced DeLone and McLean's (2016) IS Success model

R	R Square	Adjusted R Square
.342 ^a	.117	.078

ANOVA^a

Model	Sum of Squares	df	Mean Square	F	Sig.
1 Regression	4.979	4	1.245	3.006	.022 ^b
Residual	37.683	91	.414		
Total	42.662	95			

a. Dependent Variable: Usage

b. Predictors: (Constant), Service quality, System quality, Stakeholder engagement, Information quality

After including another construct Stakeholder engagement as suggested by B. Ondego and C.Moturi (2016), the R square value increased to 11.7% at a significance level of 0.22 which is a high level of significance. Therefore we can conclude that the inclusion of stakeholder engagement as a construct for testing Usage of the e procurement system is supported in the context of Kenyan government ministries.

CHAPTER FIVE

SUMMARY, CONCLUSION AND RECOMMENDATIONS

5.1 INTRODUCTION

This section of the research summarizes the findings, draws conclusions and also suggests recommendations as per the findings of the study.

5.2 SUMMARY OF FINDINGS

This study determined the success on user adoption of e-procurement in Kenyan government ministries. The study was based on a case of an e procurement module that is used for public procurement commonly known as procure to pay module of the IFMIS. To achieve this objective the research investigated four frameworks used in assessing ICT projects in developing countries and adopted the enhanced DeLone and McLean of Information Systems Success model (2016). To meet the general objective, the study also answered the specific objectives of the study which included:-

1. To determine the extent of e-procurement adoption on the IFMIS e-procurement module
2. To test and validate the enhanced DeLone and McLean's (2016) IS Success model in a local context
3. To measure the level of success in user adoption of the e-procurement module using the chosen model.

Questionnaires derived from the conceptual framework were administered to individuals in key government ministries focusing on user experience in interacting with the procure to pay module of the IFMIS. Interviews were conducted with system users who had interacted with the e procurement system for a minimum period of six months. The findings informed the extent of success on user adoption of the e procurement in Kenyan government ministries.

Data generated from the completed questionnaires and the insights that came about from the qualitative data that was conducted through interviews was analyzed and was able to meet our objectives whose findings are summarized below.

5.2.1 Objective 1: To determine the extent of e-procurement adoption on the IFMIS e-procurement module.

The researcher tested the level of acceptance on usage using the procurement processes. The study revealed that there was a moderate to great extent of adoption of the e procurement processes in the key government ministries. It was however noted that some of the activities are still carried out manually. This needs to be addressed in order to achieve the full benefits of e procurement. It was observed that there was need for retraining in some of the ministries and in other ministries, the network infrastructure needs to be improved.

5.2.2 Objective 2: To test and validate the enhanced DeLone and McLean's (2016) IS Success model in a local context

The model has seven dimensions namely, stakeholder engagement, information quality, system quality, service quality, system usage, user satisfaction and net benefits. The original model lacked the inclusion of stakeholder engagement.

The validity of the enhanced DeLone and McLean's (2016) IS Success model was tested by regression analysis. Regression analysis was used to test the significance of relationship comparing the two models. A test was carried out to compare the current enhanced DeLone and McLean's (2016) IS Success model with the previous improved DeLone and McLean's (2003) IS Success model on system use in the case of the government ministries. The results from the study yielded an R square value of 1.9%; table 20 at 0.627%; level of significance for the 2003 model; table 21 and an R square value of 11.7%; table 12 at 0.02% level of significance on the 2016 model; table 13. Therefore we can conclude that the inclusion of stakeholder engagement was valid as supported by the results of the study. Empirical evidence concluded that stakeholder engagement which had constructs, awareness, communication and training was significant and improved determining the level of success on user adoption of e procurement. In addition a majority of the hypothesis was accepted. Furthermore, correlation analysis on the system net benefits as depicted on table 18 yielded a correlation value of 51.1% when the independent variables were run against the dependent variable, net benefits. The level of significance was high at .015 which is less than .05, implying that the enhanced DeLone and McLean IS success model holds when used in the Kenyan context to determine the level of success of user adoption of e-procurement in the government ministries.

5.2.3 Objective 3: To measure the level of success in user adoption of the e-procurement module using the chosen model.

Descriptive statistics was used to measure the success on user adoption of the procure to pay module. The enhanced DeLone and McLean IS success model guided the achievement of the results. It was gathered from the results that the adoption of system was successful.

During the system roll out there was high stakeholder engagement according to the results from the study. This in turn contributed to usage of the system and users satisfaction of the e procurement module. It is evident that during any system roll out and especially in the public sector the government stakeholder engagement leads to system adoption by the users. Training is an ongoing process and from time to time the government should organize for refresher training. This will in turn improve the system quality since users will not experience any difficulties when using the system therefore will not find the system complex to work with as witnessed in some of the responses.

The respondents agreed that the information provided in the system is accurate and free from errors and the output of the system is easy to understand. The information is therefore helpful in decision making.

5.3 LIMITATIONS OF THE RESEARCH

The major limitation in this study is that it focused on selected national government ministries and left other Government agencies, thus it may not generalize for all Government agencies. This should be replicated in all Government agencies in future research so as to assess public procurement in general.

5.4 POLICY RECOMMENDATIONS AND CONCLUSION

This study provides a number of broad recommendations as follows:

First, the Government should ensure that all the stakeholders are motivated to a great extent. For successful implementation of the e procurement module in the remaining part of the public sector, the government should employ a phased approach and have clear objectives, stakeholder involvement and understanding of human factors as well as local culture and values. Good infrastructure also needs to be in place so as to support the process.

The Government should engage in more awareness creation programmes to create positive stance towards e-government projects amongst stakeholders. A lot of sensitization needs to be done to the users and all stakeholders for the adoption of the projects to be successful.

Executive directive is also a factor that cannot be ignored when rallying for adoption of a system. For the case of e procurement, President Uhuru Kenyatta had to give an executive direction in August 2014 for all the government offices to switch over from manual systems to the Procure to pay system so as to better manage public finances and resources. To a large extent the directive has assisted in the adoption of the system.

There exists also a need for all the procurement processes to be automated so as to minimize interference with the fair processes of procurement.

5.5 SUGGESTIONS FOR FUTURE RESEARCH

More research should be carried out on some of the parameters or factors that may not have been used in this study to test their validity. Other constructs seems to have a positive effect but not significantly affect the level of success in the user adoption of the e procurement module. The study also concentrated on the internal users of the system and the internal customers and future research should be carried to include external users who interact with the system such as the suppliers to have their views of the e-procurement system.

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APPENDIX 1: PROJECT SCHEDULE

The proposed pure research project is to be completed in four phases over the 5 months project period. Specifically, the following schedule is planned, assuming a start date on or about June 1st, 2016 the project is set to complete on October 12th, 2016

TASK	TARGET DURATION (Weeks)
Phase I	
1. Proposal Revision	1 week
2. Final Proposal Approval	1 week
3. Pilot Testing of Questionnaires	2 weeks
4. Supervisors Approval	1 week
Phase II	
5. Respondents sampling	1 week
6. Questionnaires administration	2 weeks
7. Completed questionnaires collection	1 week
Phase III	
8. Data entry and editing	1 week
9. Data coding and cleaning	1 week
10. Data Analysis	1 week
Phase IV	
11. Write up and submit research findings for review and comments	3 weeks
12. Write up executive summary; present results to the Panel	1 week
13. Disseminate research finding through journals & conferences	3 weeks
Estimated Project Duration	19 weeks

APPENDIXII: LETTER OF INTRODUCTION

APPENDIX III: STATEMENT OF INFORMED CONSENT

10th August 2016

Dear respondent,

REQUEST FOR YOUR PARTICIPATION IN FILLING IN THE ENCLOSED QUESTIONNAIRE

I am Carol Murathi, a postgraduate student in Masters of Science in Information Technology Management, School of computing and informatics at the University of Nairobi. I am conducting a study on *determining the success on user adoption of e-procurement in Kenyan Government Ministries: A case of e-procurement module in the IFMIS*

The purpose of the study is to investigate the extent of e-procurement adoption as well as determining the level of success in user adoption of e-procurement in the Kenyan public sector. I appreciate your consideration to fill in the enclosed questionnaire. Be assured that all your responses will be confidential and will be handled with utmost integrity.

Sincerely,

Carol Murathi

Carol.murathi17@gmail.com

APPENDIX IV: QUESTIONNAIRE

This questionnaire is divided into three short sections that should take just a few minutes of your time to complete. Please respond by choosing a single option for each of the questions. Kindly respond to all the questions.

Thank you very much for your cooperation

SECTION A: DEMOGRAPHIC DATA

1.1 Indicate your gender: Male Female

1.2 What are your highest academic Qualifications: Postgraduate Undergraduate College diploma Secondary Certificate

1.3 Please indicate the department you work with: Accounts Finance Procurement

1.4 How long you have interacted with the e-procurement module? 2 years and below

Above two years

1.5 How would you rate your computer/ ICT skills?

(a) Very poor (b) Poor (c) Fair (d) Good (e) excellent

1.6 Age? 20-30 years 31-40 years 41-50 years 51 and above

SECTION B:

DETERMINING THE EXTENT OF E-PROCUREMENT ADOPTION ON THE IFMIS E-PROCUREMENT MODULE

This section is aimed at determining the level at which e-procurement has been adopted on the IFMIS. kindly indicate to which extent you agree with the statements below in regards to determining the extent of e-procurement adoption on the IFMIS e-procurement module

1= don't agree 2= Small extent 3=Moderate extent 4=Great extent 5=Very great extent

Extent of adoption	1	2	3	4	5
Tenders are advertised online	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Prospective suppliers submit proposals online	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Short listing of tenders is done by e-procurement system	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
There is a functioning website to facilitate e-procurement	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Call for proposals is done through the Organizations' website	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
The tenders are received through the Organization's website	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Tender Evaluation is done by the e-procurement system	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Any necessary clarification is done through the e-procurement system	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

Contract is awarded by the procurement system	[]	[]	[]	[]	[]
Debriefing of unsuccessful bidders through the system	[]	[]	[]	[]	[]
Appraisal of the contract and contractor is done through the system	[]	[]	[]	[]	[]
Payment approvals done exclusively through the e-procurement module	[]	[]	[]	[]	[]
Payments are made through the e-procurement module	[]	[]	[]	[]	[]
All staff make requisition online	[]	[]	[]	[]	[]
Specifications for procured items are posted to IFMIS website	[]	[]	[]	[]	[]

SECTION C:

DETERMINANTS OF SUCCESS IN THE USER ADOPTION OF THE E-PROCUREMENT MODULE

This section is concerned with assessing the determinants of success in the user adoption of the e-procurement module. The determinants were derived from the DeLone and McLean Model of Information Systems Success.

1. Please indicate your assessment on the following statements about the E-Procurement module of the IFMIS

Stakeholder engagement	Strongly agree	Agree	Undecided	Disagree	Strongly disagree
Awareness	5	4	3	2	1
1) That users were engaged during the development of procure to pay					
Training					
2) That I was trained on how to use the procure to pay module					
Communication					
3) That I receive communication regularly about updates on the system					

2. Please indicate your assessment on the following statements about the E-Procurement module of the IFMIS

Information quality	Strongly agree	Agree	Undecided	Disagree	Strongly disagree
Accuracy	5	4	3	2	1
1) That the information provided in the system is accurate and free from errors					
Understandability					
2) The output from the system is easy to understand					

Relevancy					
3) that the information provided by the system helps in decision making in regards to procurement					

3. How do you rate your agreement with the following statements?

System Quality	Strongly agree	Agree	Undecided	Disagree	Strongly disagree
Performance	5	4	3	2	1
1) I do not encounter errors often with the system					
Availability					
2) That the system is available all the time					
Response time					
3) That the system does not take long to execute a command					
Usability					
4) The E-procurement not module is complex to work with					

4. Please indicate your assessment on the following statements

Service quality	Strongly agree	Agree	Undecided	Disagree	Strongly disagree
IT Support	5	4	3	2	1
1) That I get the necessary support from the IT department					
IFMIS support					
2) That I get adequate support from the IFMIS department					
Network up/downtime					
3) There are network issues while using the system					

5. Please rate your agreement with the following statements

Usage	Strongly agree	Agree	Undecided	Disagree	Strongly disagree
1) The e-procurement module improves life					

efficiency and work					
2) I use the e-procurement system frequently for my work					
3) I access the e-procurement system several times in a day for my work					
User satisfaction					
1) I would recommend the system to another user					
2) Users can easily acquire the information they need by using the system					
3) Generally the system is useful					

6. Please rate your agreement with the following statements

User Benefits	Strongly agree	Agree	Undecided	Disagree	Strongly disagree
	5	4	3	2	1
1) The system has reduced search costs					
2) Time Taken to complete a transaction has significantly reduced					
3) The procure to pay module saved the organization money					