UNIVERSITY OF NAIROBI

School of Computing & Informatics

A Citizen-Centric Model for Evaluating the Intermediate Impact of E-government: A Case Study of Huduma Centres in Kenya

Name: Ibrahim Otieno

Registration No: P80/94849/2014

Supervisors: Prof. Elijah. I. Omwenga and Prof. Timothy M. Waema

This thesis is submitted for the partial fulfillment of the requirement for PhD in Information Systems

Declaration

I declare that this thesis has been written on the basis of my own work and that where other sources have been used, they have been acknowledged appropriately.

Name: Ibrahim Otieno **Reg No:** P80/94849/2014

Signature: _____ **Date**: _____

This thesis is submitted for the partial fulfillment of the requirement for PhD in Information Systems of the University of Nairobi with my approval as the University Supervisor.

Supervisors:

Prof. Elijah I. Omwenga

Signature: _____ **Date**: _____

Prof. Timothy M. Waema

Signature: _____ **Date**: _____

Dedication

To my spouse Janefrances and our two lovely angels Gloria and Emanuella

List of Abbreviations & Acronyms

1) ACSI – American Customer Satisfaction Index
2) ADAE – French Electronic Administration Development Agency
3) ADF – African Development Forum
4) AGFI – Adjusted Goodness of Fit Index
5) AMOS – Analysis of Moment Structures
6) AU – African Union
7) AVE – Average Variance Extracted
8) CAS – Central Admission System
9) CFA – Confirmatory Factor Analysis
10) CFI – Comparative Fit Index
11) CITI – Cape Information Technology Initiative
12) CMM – Capability Maturity Model
13) COBIT – Control Objectives for Information & related Technology
14) CPI – Corruption Perception Index
15) CR – Construct Reliability
16) CRM – Customer/Citizen Relationship Management
17) CS – Cost of Service
18) DA – Detailed Assessment
19) DeG – Directorate of e-Government
20) DfID– Department for International Development
21) DG – Digital Government
22) DID – Digital Identifier
23) DOI – Diffusion of Innovations
24) EAF – E-Governance Assessment Framework
25) e-GA – e-Government Agency

26) EGAUM – E-government Adoption and Utilization Model

27) EGDI – E-Government Development Index

28) eGEP –e-Government Economics Project

29) EGOV4U – E-Government for You

30) EGR – E-Governance Readiness

31) EIDI – European Index of Digital Inclusion

32) EISI – Egyptian Information Society Initiative

33) ELGDP – Egyptian Local Government Development Project

34) EQS – Equations

35) ER – E-Readiness

36) ERP – Enterprise Resource Planning

37) EU – European Union

38) EVA – Economic Value Added

39) FGD –Focused Group Discussions

40) G2B – Government to Business

41) G2C – Government to Citizens

42) G2E – Government to Employee

43) G2G – Government to Government

44) G-8 – Group of Eight

45) GFI – Goodness Fit Index

46) GITO – Government Information Technology Officers

47) GITS – Government Information Technology Services

48) GLS – Generalized Least Squares

49) GLM – General Linear Model

50) GNI – Gross National Income

51) GoI – Government of India

52) GoK – Government of Kenya

53) GoT – Government of Tanzania

54) GUI – Graphical User Interface

55) HELB – Higher Education Loans Board

56) ICT – Information and Communication Technology

57) ICTA – Information and Communication Technology Authority

58) ID – Identification

59) IEEE – Institute of Electrical and Electronics Engineers

60) IFMIS – Integrated Financial Management Information System

61) IP - Impact

62) IPPS – Integrated Personnel and Payroll System

63) IS – Information System

64) IST – Information, Science & Technology

65) IT – Information Technology

66) KODI – Kenya Open Data Initiative

67) KICTB – Kenya ICT Board

68) KPAs – Key Performance Areas

69) KPIs – Key Performance Indicators

70) KRA – Kenya Revenue Authority

71) LC – Latent Change

72) LDC – Least Developed Countries

73) LISREL – Linear Structural Relations

74) M&E – Monitoring & Evaluation

75) MAR – Missing at Random

76) MAREVA – A Method of Analysis and Value Enhancement

77) MCAR – Missing Completely at Random

78) MDG – Millennium Development Goals

79) MI – Modification Index

80) MIT – Ministry of Information Technology

81) MLE – Maximum Likelihood Estimation

82) NAAIRS – National Automated Archival Information Retrieval System

83) NDRS – National Digital Registry Services

84) NeGP – National e-Governance Projects

85) NFI – Normal Fit Index

86) NHIF – National Hospital Insurance Fund

87) NICTBB – National ICT Broadband Backbone

88) NIP – National Identity Project

89) NPV – Net Present Value

90) NSSF – National Social Security Fund

91) OECD – Organisation for Economic Co-operation and Development

92) PA – Path Analytic

93) PCs – Personal Computers

94) PEoU – Perceived Ease of Use

95) PfID – Partners for International Development

96) PhD – Doctor of Philosophy

97) PNFI – Parsimony Normed Fit Index

98) PPP – Public-Private Partnerships

99) PR – Parsimony Ratio

100) PT – Perceived Trust

101) PU – Perceived Usefulness

102) QS – Quality of Service

103) RMSEA – Root Mean Squared Error of Approximation

104) ROI – Return on Investment

105) SA – Summary Assessment

106) SARS – South African Revenue Service

107) SCM – Supplier Chain Management

108) SEM – Structure Equation Modeling

109) SITA – State Information Technology Agency

110) SMEs – Small & Medium Enterprises

111) SN – Subjective Norm

112) SPSS – Statistical Package for the Social Sciences

113) SR – Structural Relations

114) TAM – Technology Acceptance Model

115) TI – Transparency International

116) TLI – Tucker-Lewis Index

117) TRA – Theory of Reasoned Action

118) UK – United Kingdom

119) UN – United Nations

120) UNASPA – United Nations and American Society for Public Administration

121) UNDP – United Nations Development Programme

122) User Satisfaction

123) USA – United States of America

124) USD – United States Dollars

125) UTAUT – Unified Theory of Acceptance and Use of Technology

126) WLS – Weighted Least Squares

127) WWW – World Wide Web

Definitions of Terms

1) **Construct Reliability** measures the extent to which indicators of a latent construct are internally consistent in their measurement and that the indicators measure the true value and are error free.

2) **Construct Validity** is the extent to which a measure or a set of measures accurately represent the theoretical concept they intend to measure. This is primarily done by the researcher asking the correct questions to ensure that the right data is collected.

3) **Citizen Centric Perspective** is the concept of putting the citizens at the heart of e-government by ensuring that their requirements, needs and desires are met when accessing services

4) **E-governance** goes beyond the scope of e-government and includes engagement and empowerment of citizens and allows for their extensive participation in governance issues in a convenient and transparent manner.

5) **E-government** is the use of ICT to support government operations and access to information with the intent of transforming processes, improving responsiveness, transparency, accountability, efficiency and effectiveness of public service delivery.

6) **E-Government Impact** is the intermediate or short-term significant changes (direct or indirect; positive or negative) in government, businesses and citizens' lives brought about by implementation and uptake of e-government

7) **E-Government Impact Evaluation** is the systematic analysis and valuation of the intermediate significant changes in government, businesses and citizens' lives brought about by the implementation and uptake of e-government.

8) **E-government Initiatives** are introductory ICT projects and application systems spearheaded by government or its agencies with the aim of providing information; and delivering responsive, efficient and effective services to the public.

9) **Evaluation** is the systematic process of analyzing and determining the worth of a project or programme considering covariates and taking into account the effect of attribution and causality.

10) **Huduma Centres** are common citizen service delivery points (one-stop-shops) implemented by the Kenyan government

11) **ICT** is a general term that incorporates use of communication devices or applications that encompass use of radio, television, cellular phones, computers and computer networks.

12) **Impact** is the significant changes (direct or indirect; positive or negative) brought about by implementation and uptake of a proj`ect, programme or intervention

13) **Life Event** is a major event that alters someone's status or circumstances, for example, birth, marriage, death and divorce

14) **Measurement** is the process by which attributes or indicators of a phenomenon are determined and counted

15) **Model** is a set of verifiable mathematical relationships or logical procedures which are used to represent observed, measurable real-world phenomena, to communicate alternative hypotheses about the cause of the phenomena, and to predict future behavior of the phenomena for the purpose of decision making.

16) **Moderator variable** is a qualitative or quantitative variable that affects the strength and/or direction of relationship between an independent and dependent variable.

17) **Monitoring and Evaluation** involves identifying the goals and key indicators of a programme, execution, management and progress of interventions over time and establishing whether the intended targets have been achieved

18) **Outcomes** are perceived as the results of input/output activities and are issues preceding acceptance; uptake and usage of e-government services.

19) **Outlier** is very large or small value of a variable (univariate outliers) or a combination of the same or more variables (multivariate outliers) with a set of characteristics that are unique and distinctively different from others.

20) **Public Value** is the value created by government to citizens through services, laws, regulation and other actions

21) **Structural Equation Modeling (SEM)** is a family of statistical models that seek to explain the relationships among multiple variables. It is a collection of methods that uses multivariate statistical techniques for representing, testing and analyzing the validity of hypothesized network of relationships between latent and observed variables.

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Abstract

It is evident from literature review that theory on e-government measurement and evaluation is still at nascent stages of growth in terms of development and implementation despite the importance of e-government evaluation. In spite of the huge investment in e-government projects by governments, the results of e-government have not been commensurate with the level of investment leading to what some authors refer to as the 'e-government paradox'. One of the main causes of the 'e-government paradox' is the measurement error which is as a result of the inadequacy of the current measurement tools. This study shows that most of the existing evaluation models fail to consider non-conventional values of e-government including public value.

This study reviewed a number of models for e-government measurement and evaluation culminating with the development of a citizen-centric impact evaluation conceptual model that is appropriate in the context of a developing country. Data was collected from common citizen service (*huduma*[1]) centres in Kenya. Structural Equation Modeling[2] (SEM) was used to analyze the data collected, empirically test and validate hypothesized relationships between the constructs in the conceptual model. It was established from the findings of the study that the intermediate impact of e-government on citizens is influenced by: perceived quality of service, cost of services, e-readiness and citizen satisfaction. However, the relationship between perceived trust and the intermediate impact of e-government was not supported. The study also revealed that certain relationships between various constructs are moderated by age, gender and education.

The study also made recommendations to address some of the challenges established as facing e-government development and implementation. The recommendations included: enhancement of ICT infrastructure through public-private-partnerships, creating a suitable legislative framework to support e-government, engaging and sensitizing citizens on e-government services and providing secure online transactions. A citizen-centric model for evaluating the impact of e-government in the context of a developed country was developed and empirically tested. This model partly solves the 'e-government paradox' and can be used by e-government policy makers and implementers, civil society, donors and sponsors in evaluating the impact of e-government projects.

Key words:

E-government, impact, evaluation, SEM, citizen-centric, Huduma centre, public value, e-government paradox

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[1] Huduma is a Swahili word meaning service. Huduma Centres are common citizen service delivery points implemented by the Kenyan government

[2] A family of statistical analysis technique used for multivariate analysis

Table of Contents

List of Tables

List of Figures

CHAPTER ONE – INTRODUCTION

1.1 Background

ICT has recently emerged as a new way of supporting and enhancing public administration. ICT is a general term that incorporates the use of communication devices or applications that encompass use of radio, television, cellular phones, computers and computer networks. The terms e-government and e-governance emerged with the rapid use of ICT, the advent of the World Wide Web (WWW) technology and the Internet revolution in the late 1990s. The terms e-governance and e-government though interrelated and sometimes used interchangeably (Victor et al., 2007) have different meanings. E-government is the use of ICT to promote efficient and cost effective government, facilitate access to information and government services. E-governance on the other hand is a much wider term that covers the use of ICT to deal with state's institutional arrangements, decision making processes and interrelationships between government and the public (Monga, 2008; Cloete, 2012).

The availability of open source software and emergence of cloud computing technology are having a significant impact on implementation of e-government (Yadav & Singh, 2012). The implementation of e-government has been viewed as part of the wider public sector reforms intended to improve efficiency and effectiveness in public service delivery. E-government is used in public sector to enhance the efficiency and effectiveness of public service delivery through the use of ICT. E-government is traditionally related to operations of government and is more than the traditional use of email and website access (Reffat, 2006). E-governance extends this scope further and includes engagement of citizens to increase their participation; improve transparency, responsiveness and accountability of government (Bwalya, 2009; Alghamdi & Beloff, 2014).

Reffat (2006) defines *e-government initiatives* as change efforts intended to use the Internet and other emerging technologies to support transformation in the operations of government. E-government initiatives have been implemented worldwide in both developed and developing countries. These initiatives include but are not limited to: voter registration; online voting; advertising business and job opportunities; license renewal; clearing of goods; submission of tax returns; access to forms, public policy documents and information through use of government portals; and bursting corruption. E-government can be used as an effective tool for fighting corruption (a vice ailing many developing nations) by making information and services that would otherwise be exploited for corrupt practices easily accessible to the public.

Accountability, transparency and trust in government are also enhanced through such initiatives (Bwalya, 2009; Nkwe, 2012; Karokola & Yngström, 2009; Stefanie & Claudio, 2011).

E-government is more than sending of emails and development of websites that facilitate citizen's access to information (Reffat, 2006). It is a new and dynamic phenomenon that involves change of perception and creating innovative ways on how governments can offer services to citizens, businesses and employees. E-government is gaining prominence as a way of supporting government to deliver services to citizens and enabling businesses and employees to supplement or replace the existing traditional and paper-based systems in public administration. Governments are embracing technology and particularly IT to conduct business over the Internet using web-based technologies. This allows citizens and businesses to access services or conduct business in a pervasive way therefore bringing services closer to the people. Yadav & Singh (2012) point out that there are four pillars of e-government: connectivity, IT skills, information and capital.

There are different stakeholders involved in the e-government including citizens, government, businesses and government employees. It is possible to evaluate the impact of e-government from these different perspectives. However, when evaluating e-government is important to evaluate from the perspective of the citizens since they are the greatest taxpayers and beneficiaries of government services. It is for this reason that our study is citizen-centric. It is assumed that implementation of e-government initiatives will automatically bring services closer to the citizens and sometimes this is done without due consideration on how these initiatives are adopted and utilized by them. Carter & Belanger (2004) and Kumar et al. (2007) emphasize that the success and impact of these initiatives are contingent upon citizen's willingness to accept and use these initiatives.

There are several factors that influence how users adopt technology and these have been explained by different theories including Technology Acceptance Model (TAM) developed by Davis, Unified Theory of Acceptance and Use of Technology (UTAUT) model and Everett Rogers' theory of Diffusion of Innovations (DOI) (Bwalya, 2009; Carter & Belanger, 2004). Adoption and uptake of e-government initiatives will definitely contribute to the impact of e-government on the target population and bring the intended benefits including cost savings to both government agencies and citizens. There are other factors that have also been identified to influence the impact of e-government including trust in the services, quality of service, user satisfaction and availability of a conducive environment to support e-government.

There are several models that have been suggested to explain the different maturity stages that governments go through in the implementation of e-government; also called e-government maturity models (Karokola & Yngström, 2009; Coursey & Norris, 2008; Shareef et al., 2012). From the interaction perspective, e-government can be seen to happen in four key dimensions: government-to-citizen (G2C), government-to-employee (G2E), government-to-government (G2G), and government-to-business (G2B) (Carter & Belanger, 2004; Reffat, 2006; Markellos et al., 2007; Jayashree & Marthandan, 2010).

Reffat (2006) explains e-government as the infrastructure developed by governments to transform service delivery to citizens. E-government can be used to integrate and offer government services in more innovative and pervasive ways including 24 hours a day, 7 days a week. E-government if implemented successfully will bring services closer to the citizens and promote use of ICT. This will help to bridge the digital divide and promote the interests of the marginalized groups by allowing their voice to be heard (Reynolds & Regio, 2001). However, if not implemented well, it can lead to widening of the digital divide especially when issues of access, convenience and costs are not addressed, making it a privilege of few in the society. Bwalya (2009) also postulates that full utilization of e-government will bring a paradigm shift in management philosophy of many governments and bridge the interaction gap between citizens and the government.

Bhatnagar & Singh (2010) explain that the use of technology creates opportunities for offering services in innovative ways that were not possible before. E-government implementation has gained prominence in the developed countries and is slowly gaining ground in developing countries. However, e-government development and impact evaluation is still at the nascent stages of growth and there is therefore sparse theory development in the field. The slow speed in uptake of e-government services in developing countries can largely be attributed to: inadequate policy and legislative framework, poor infrastructure, digital divide, lack of leadership and low literacy among the population (Cloete, 2012; Shareef et al., 2012; Bwalya, 2009; Chen et al., 2006; Karunasena & Deng, 2009). These challenges should be addressed to facilitate uptake and enhance the impact of e-government in developing nations. However, in developed economies the greatest challenges are low citizen participation and lack of structured decision making processes (Savoldelli et al., 2012). E-government provides opportunities and challenges in developed countries but the full potential is largely untapped and it is predicted to play a significant role in delivery of government services and governance in future (Ndou, 2004; Chen et al., 2006; Shareef et al., 2012).Jayashree & Marthandan (2010)

portend that e-government supports good governance and could therefore be used to spur growth in developing countries.

There are many e-government initiatives that have been implemented in both developed and developing countries with different levels of success. Although the rate of success is generally low, it is worse in developing countries compared to developed countries. These initiatives are faced by different challenges including inadequate infrastructure, lack of sustainability plans, low ICT literacy and low engagement of citizens. There are different approaches that have been used to evaluate or measure the impact of these initiatives. Madon (2004), Codagnone & Undheim (2008), Bhatnagar & Singh (2010) and Verdegem et al. (2010) argue that though there are numerous e-government assessment frameworks that have been developed and used before; most of them concentrate on e-readiness, maturity levels, web-metrics and front office approaches. Few studies have been conducted on outcome and impact of e-government.

Though e-government has been implemented in developed countries with significant success and impact, many developing countries have been left behind and have a long way to catch up (Chen et al., 2006). Chen et al. (ibid) also allude to the fact that most e-government strategies and action plans in developing countries have been based on experiences of developed countries. However, due to different political, governance, technological, social and environmental factors, these strategies and action plans are usually not fully applicable in the context of developing countries. In developed countries, labour costs are high and equipment cost low and therefore it is easier to justify investment in ICT projects in terms of cost saving. However, in developing countries, labour costs are cheap and equipment cost high and therefore it is much difficult to justify cost savings (Miyata, 2011).Consequently, there is need to develop homegrown solutions and strategies that take into account the context of developing countries and their unique characteristics different from those of the developed countries

In this study, we begin by introducing the Huduma Kenya Programme and major concepts of e-government; review e-government initiatives that have been implemented in Kenya and some selected developing countries in Africa and Asia. The study progresses with literature review and analysis of frameworks/models that have been proposed for benchmarking, measurement and evaluation of e-government. The literature review culminates with the development of a proposed conceptual model for evaluating the impact of e-government that is appropriate in the context of a developing country. The methodology adopted for the study is documented in detail with an elaborate outline of the Structural Equation Modeling (SEM)

technique that was used to guide data collection and analysis. Data collection and analysis is documented and the findings reported and discussed. The study ends with a final submission on the research process including: research contributions, achievements, assumptions, limitations of study, proposed further work, research evaluation and concluding remarks.

1.2 Huduma Kenya Programme

One of the requirements of the Kenyan Constitution is citizens' access to public information and quality public service. According to Ng'aru & Wafula (2015) and Abdalla et al. (2015), the Government of Kenya initiated the *Huduma* Kenya Programme in 2013 to address this constitutional requirement and to transform public service delivery. The *Huduma* Kenya Programme established *Huduma* centres as one-stop-shop citizen service delivery points. The government of Kenya has been implementing this programme through the *Huduma* Kenya Secretariat. The Secretariat was created through the Presidential Gazette Notice No. 2,177 of April 2014 establishing the governance structure of the *Huduma* Kenya Programme. As at the time of the study, there were 11 *Huduma* centers in 9 Counties and plans are underway to establish *Huduma* centres in all 47 counties in Kenya.

The concept of one-stop-shop for citizen service delivery has been successful not just in Kenya but in other countries including Egypt, Singapore, Malaysia and Ireland (Abdalla et al., 2015). The establishment of *Huduma* centres in Kenya has made it possible for citizens to conveniently access consolidated services using ICT from one common place and closer to their locality without having to travel from one place to the other. *Huduma* centres offer various services to citizens including: issuance of duplicate national identity cards, birth and marriage certificates; NHIF member registration; business name registration; HELB loan application and repayment; NSSF member registration and statements among others. A comprehensive list of these services is given on Appendix C.

It was established during the study that most of the government services offered at *Huduma* centres are not fully automated from end-to-end and therefore have not reached the transactional level as described in e-government maturity models. These services are still at the lower end of e-government maturity models continuum. Considering Baum & Di Maio's four-stage model with the following stages: web presence, interaction, transaction and transformation; it is observed that most services are still at the first two stages of the model. The researcher believes that the interactions and perceptions that citizens would have on systems that are fully automated from end-to-end would be different from that of partially automated

systems. However, the Kenyan government has plans to extend the concept of one-stop-shop to provide an online e-*Huduma*[3] web portal that can provide integrated government services; m-*Huduma*[4] platform for mobile phone accessible government services; unified integrated *Huduma* payment gateway to ease payment of government services and establishment of *Huduma* Call Centres (Abdalla et al., 2015; Ng'aru & Wafula (2015).

1.3 The E-government Paradox

Despite the fact that e-government has a lot of potential, studies in the field is still at nascent level of growth (Alghamdi & Beloff, 2014; Savoldelli et al., 2013; Barbosa et al, 2013; Alalwany & Alahmari, 2007; Alshawi & Alalwany, 2009) and there is a lot that needs to be done to tap from this potential. However, there is remarkable growth in the field of e-government and several studies that have been conducted on the development and implementation of e-government in both developed and developing countries. In spite of the remarkable progress in e-government and growth in productivity (Basant et al., 2006), the impact and benefits that have been realized so far are hypothetical and not commensurate with the level of economic and technological investment (Otieno et al., 2016; Savoldelli et al, 2013; Savoldelli et al, 2012; Castelnovo, 2010) leading to what some researchers refer to as the 'e-government paradox'. The 'e-government paradox' is the contrast between impact realized and level of investment.

The 'e-government paradox' follows from the 'IT productivity paradox' which is a term that came into light in the 1980s when it was discovered that the adoption and implementation of IT did not realize the much hyped productivity gains (Bryjolfsson & Hitt, 1998).It was discovered that some IT projects were implemented successfully and had tremendous impact while others were not successful and had negative results hence there was cancellation in terms of the overall impact realized.

One of the main factors leading to the e-government paradox is the inadequacy of the existing measurement and evaluation frameworks/model (Bryjolfsson, 1993; Bryjolfsson & Hitt, 1998; Savoldelli et al, 2012; Otieno et al., 2016). This is attributable to the complex nature of e-government as it is observed that some of the results are intangible and therefore difficult to measure. Bryjolfsson (1993) argues that the conventional methods of measurement and evaluation are based on tangible gains and therefore fail to account for the non-conventional sources of value. This is compounded by the fact that e-government is driven by public value

[3]e-Huduma means fully electronic and transactional citizen services
[4]m-Huduma stands for mobile citizen services

and not economic value. Consequently, some services may be offered by the government not to generate some evidently visible returns but for the sake of public interest like transforming the quality of service by improving the transparency, pervasiveness and the convenience of access to e-government information and services (Savoldelli et al., 2012). Löfstedt (2005) and Savoldelli et al. (2013) also argue that it is incumbent upon researchers to conduct e-government measurement and evaluation process appropriately in order to accurately report the impact of e-government.

It is therefore evident that the conventional instruments used for benchmarking, measurement and evaluation of e-government may not be adequate for measuring the impact or results of e-government. Therefore, there is an urgent need to developed more robust and dynamic frameworks/models that can address the identified gaps. A detailed account of the 'e-government paradox' was captured in a paper presented at the IST-Africa 2016 conference in Durban, South Africa.

1.4 Problem Statement

There are many e-government projects spearheaded by governments all over the world to support public administration and improve service delivery to citizens and other stakeholders. Most of these projects are intended to introduce reforms in the public sector. These projects have been implemented in different countries with varying degrees of success depending on factors that are unique and pertinent to the implementation context (Otieno& Omwenga, 2015). In spite of the fact that there have been a lot of e-government initiatives spearheaded by government, the results of these initiatives are yet to be felt. The term 'e-government paradox' has been used to signify a mismatch between the level of investment and the impact achieved by e-government projects (Savoldelli et al., 2012).

For example, in Kenya, e-government initiatives were started in earnest in the early 2000's and have gained momentum over the years. The government has launched specific e-government projects that include: *Pasha*[5] Centres (Digital Villages); Community Learning Information Centres (CLIC); the Kenya Open Data Initiative (KODI); the Kenya Law Reports website under the National Council for Law Reporting; Tracking of Status of ID Card and Passport Processing, Government Shared Services, the County Connectivity Project; Digitization of Records at the Lands and High Court Registries, Driving License Registration, the e-Citizen Portal and establishment of *Huduma* centres.

[5]Pasha is a Swahili word for inform; Pasha Centres are the equivalent of Tele-Centres

Evaluation of e-government services is extremely important, however, theory on evaluation of e-government is still nascent in terms of development and implementation (Alghamdi & Beloff, 2014; Savoldelli et al., 2013; Alalwany & Alahmari, 2007; Alshawi & Alalwany, 2009). Bhatnagar & Singh (2010) lament that the World Bank report notes that the largest, yet least monitored investments are ICT components of projects in different sectors, highlighting the relevance of systematic monitoring and evaluation of the outcomes of these projects. Most of the e-government projects that have been implemented in Kenya have not been evaluated for their impact on citizens and businesses they are intended to serve (Njuru, 2011a). Odoch (2012) and Njuru (2011a) confirm that it is not known since the introduction of e-government strategy in 2004, which factors influence the utilization and impact of the e-government services in Kenya for reasons that although these factors are well analyzed in published literature on e-government for developed countries, there is little about them in the context of developing countries.

Some studies on benchmarking and measurement of the social and economic impact of e-government initiatives have been conducted in the developed countries, for example, eGEP 2.0, WiBe, Verdegem et al. (2010), Liu et al. (2008) and Wang & Liao (2008). The factors influencing the impact of these initiatives and the context of their implementation (Alshawi & Alalwany, 2009) are different from those of developing countries.

Matavire et al. (2010) argue that ICT is naively adopted in developing countries without considering the social, cultural and historical context of their implementation. Most theories on evaluation of impact of e-government have been developed and implemented in the context of developed countries (Madon, 2004; Chen et. al. 2006; Bhatnagar & Singh, 2010). The context of developed countries is different from that of developing countries where there is little or no application of common service (*huduma*) centres and the ICT infrastructure is highly developed. Models for developing countries also need to account for the different delivery modes and cost factors such as bribes (Bhatnagar & Singh, 2010). Therefore, existing theories and models may not be fully appropriate in the context of developing countries and may require some adaptation taking into consideration the peculiarities of these countries.

Currently, the evaluation of the impact of e-government initiatives especially in developing countries is done in an ad hoc manner. E-government initiatives are implemented in an ad hoc manner with minimum consideration on evaluating their intended impact (Bhatnagar & Singh, 2010). Governments are also making assumptions that citizens and businesses will utilize these services without putting in place mechanisms to promote uptake of these services. The

intended outcome or impact can only be realized if government creates awareness and facilitates adoption (Alshawi & Alalwany, 2009; Jayashree & Marthandan; 2010; Njuru, 2011a; Alghamdi & Beloff, 2015).

It is imperative to establish the extent to which the Kenyan government has improved on efficiency and effectiveness of service delivery after implementing e-government initiatives. Evaluating the impact of e-government and particularly from the citizen's perspective is important in justifying investment in e-government projects (Barbosa et al., 2013; Alshawi & Alalwany; 2009) and consequently help in addressing the 'e-government paradox' (Savoldelli et al., 2012). This evaluation will also assist in revealing the effectiveness of the current e-government initiatives and hence inform future projects to ensure their success (Wang & Liao, 2006; Victor et al., 2007; Alshawi & Alalwany, 2009; Bhatnagar & Singh, 2010).

1.5 Research Questions

Saunders et al. (2009) suggests that when conducting research, you develop a general research question that sums your ideas and then break it down to more specific questions. This helps in gaining a broader picture of the research area and creating a roadmap for solving the bigger problem. Our main research question is:

> What are the main factors that determine the impact of e-government initiatives in developing countries and how can we develop and domesticate a model for evaluating this impact?

The following are specific research questions guided us in realizing our research objective:

1. What is the level of implementation and uptake of e-government in developing countries compared to developed countries and how can we explain the difference?
2. What are some of the challenges faced by developing countries in the implementation and uptake of e-government and how can we address these challenges?
3. Why do we have the 'e-government paradox'?
4. What are the available models for the measurement and evaluation of e-government in both developing and developed countries and what are their short-comings?
5. What model can we develop in the context of a developing country to effectively evaluate the intermediate impact[6] of e-government initiatives from a citizen perspective?

[6] Intermediate impact is the short term results that are realized from implementation of e-government

1.6 Research Objectives

Saunders et al. (2009) suggests that you may start your study with research questions that may form the base of writing your research objectives. Research objectives are generally important in giving the researcher specific direction and purpose. Our main research objective is:

> To establish the main factors that influences the impact of e-government initiatives in developing countries and to develop and domesticate a model for evaluating this impact?

The following specific research objectives guided us in realizing our main research objective:

1. To review level of implementation and uptake of e-government in developing countries compared to developed countries and explain the differences
2. To establish the challenges faced by developing countries in the implementation and uptake of e-government and make recommendations for addressing these challenges.
3. To establish the causes of the 'e-government paradox'.
4. To establish the available models for the measurement and evaluation of e-government in both developing and developed countries and identify their short-comings.
5. To develop a model that can be used in the context of a developing country to evaluate the intermediate impact[7] of e-government from a citizen perspective.

1.7 Justification

Governments all over the world have undertaken numerous and diverse e-government projects. Some governments have depended on anecdotal studies and not invested much on research to systematically establish whether the long-term and short-term objects of these projects have been realized and the intended impact achieved. This is particularly important to government since most of these projects have huge cost investments and a bearing on governance, social and economic development of a country (Alshawi & Alalwany, 2009; Bhatnagar & Singh, 2010). The huge disparity between the investment and impact of e-government has led to what some scholars refer to as the 'e-government paradox.' It is therefore imperative to develop appropriate tools to evaluate the impact of these initiatives to establish their viability and inform future projects.

[7] Intermediate impact is the short term results that are realized from implementation of e-government

The main purpose of this research is to assist governments in developing countries understand and appreciate the factors affecting the achievement of the desired impacts of e-government. This will help in enhancing the impact of e-government projects and justify their funding (Alshawi & Alalwany, 2009). This study will also identify challenges affecting the implementation of e-government and make recommendations that will inform future projects. Scholars will benefit from the new knowledge generated by this research. Policy makers, donors and sponsors of e-government projects will also benefit from our study, as the model adopted will help in identifying factors necessary for realizing the desired impact. The study will also benefit civil society and community-based organizations by using the new knowledge generated to engage the government and make it more accountable (Heeks, 2006).

1.8 Scope

Our study will cover theories, concepts and models for benchmarking, measurement and evaluation of e-government with specific focus on citizen-centric models in the context of developing countries. This study will also identify and analyze some of the challenges that hinder uptake and implementation of e-government with the aim of making recommendations to inform future projects. Data collection will be specific to e-government initiatives implemented in the Kenyan context. This means that the collection and analysis of data will be done from e-government initiatives in the local context and will involve citizens, state organs, corporations, authorities and boards established to implement or support e-government.

1.9 Assumptions

This study does not consider the long-term impact but the intermediate impact of e-government from the citizens' perspective using measurement indicators that can be collected from citizens in a cross sectional study. The study of long-term impact may require significant time and would be done through longitudinal studies.

According to Castelnovo (2010) and Codagnone & Undheim (2008), it is assumed that the uptake and utilization of e-services measured through the number of citizens accessing services and the frequency of use of the services would influence the impact of e-government.

This study also assumes that there will be cooperation from the government, state agencies, corporations, authorities and boards involved in the development and implementation of e-government projects and policies. This means that the relevant data, road maps, plans, implementation strategies and necessary facilitation will be provided when required.

CHAPTER TWO – LITERATURE REVIEW

2.1 E-government Definition

The introduction of railway lines and airlines in the industrial age transformed the way the society interacted by opening opportunities in distant locations in ways that were inconceivable before. Just like the railway and airlines brought this revolution, the Internet has brought tremendous changes in the digital age through informatization; making it possible for government to conduct business, create opportunities and introduce innovative ways of service delivery in ways that were inconceivable before (Reffat, 2006; Bwalya, 2009). Governments can now utilize the new opportunities offered by ICT, which acts as an enabler to offer better services to citizens taking into consideration the new challenges and risks created by such opportunities. The social and economic impact of utilizing such opportunities cannot be gainsaid. E-government has improved the convenience with which government operates and enhanced accountability, responsiveness and transparency in service provision (Bwalya, 2009; Alghamdi & Beloff, 2014). E-government is normally driven by the desire to improve access to public information and services; improve efficiency and public participation; and reduce costs.

From the extant literature, there are various definitions for the term '*e-government*'. To unpack these definitions, it is important to understand the meaning of the term '*govern'* and *'government'* in general. Dwivedi & Bharti (2005) allude to the fact that the term 'govern' comes from the Greek word '*kebernon'* which means to steer. To govern means to direct, control and influence people or society from a position of authority. Therefore, governance is a systematic exercise of power for steering social systems, as well as a process through which organizations are directed, supervised, controlled, and held accountable to its stakeholders. It involves the exercise of political, economic and administrative authority to manage the affairs of a country's economic and social resources (Monga, 2008). According to Pardo (2000), government consists of structures and functions designed to achieve specific goals.

E-government involves new and transformative ways that governments use to deliver services and enables stakeholders to access information and services through the use of ICT. This leads to a transparent, effective, efficient, responsive and accountable government (Dwivedi & Bharti, 2005). David McClure (Layne & Lee 2001: 123) gave the following definition of electronic government:

"Electronic government refers to government's use of technology, particularly web-based Internet applications to enhance the access to and delivery of government information and services to citizens, business partners, employees, other agencies, and government entities. It has the potential to help build better relationships between government and the public by making interaction with citizens smoother, easier, and more efficient. Indeed, government agencies report using electronic commerce to improve core business operations and deliver information and services faster, cheaper, and to wider groups of customers."

Markellos et al. (2007) and Alghamdi & Beloff (2014) define e-government as the use of ICT to improve the efficiency, effectiveness, transparency and accountability of government. E-government refers to the use of ICT to enable civil and political conduct of government, support government services and engage citizens. E-government allows governments to take advantage of ICT and web technologies to devise strategies for reforming public administration and eliminating bureaucracies thereby enhancing services to citizens and reducing costs. It promotes interactions between citizens and governments.

Jayashree & Marthandan (2010) define e-government as the use of technology, the Internet and new media to enhance and optimize information sharing, service delivery, governance, constituency and client participation by transforming internal and external relationships. This includes transactions between the government and its stakeholders. E-government is expected to bring transformation within the three major sectors of government: political, economic and administrative (Markellos et al., 2007; Jayashree & Marthandan, 2010).

The main aim of e-government is to improve on the general public administration and the efficiency and effectiveness of services offered to the people governed. It encourages people's participation and widens the democratic space. There are three main contributions of e-government: improving government processes (e-administration); connecting citizens (e-citizens and e-services); and building external interactions (e-society) (Heeks, 2001).

E-governance revolves around the use of ICT to bring information and services closer to the people governed and improve effectiveness, efficiency, transparency and accountability. This has been made easier with the proliferation of mobile telephony, expansion of ICT infrastructure and reduction of bandwidth cost. Dwivedi & Bharti (2005), point out that good governance has eight major characteristics: participation, transparency, effectiveness and efficiency, responsiveness, accountability, equity, inclusiveness and rule of law. The conceptual model of e-governance in figure 1 depicts these major characteristics with ICT being used as an enabler.

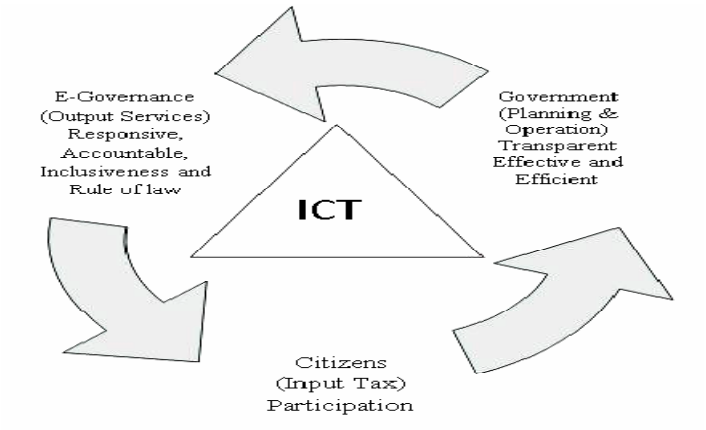


Figure 1: Conceptual model of e-Governance: Adopted from (Dwivedi & Bharti, 2005)

2.2 E-Government Interactions

Jansen (2005) clearly defines three groups of stakeholders in e-government: politicians; public institutions; citizens, businesses and civil society, therefore, distinguishing between three dimensions of e-government as shown in figure 2.

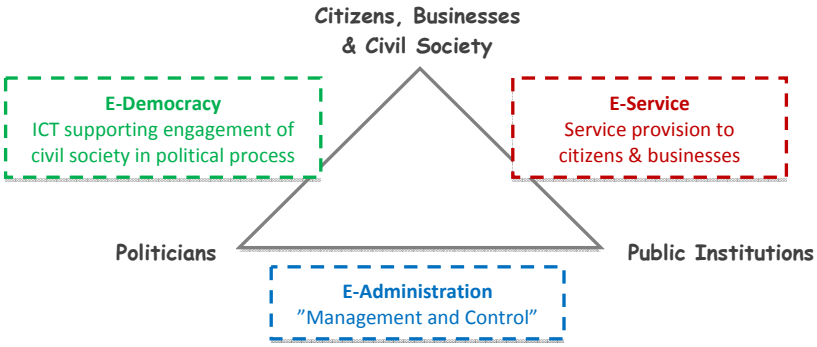


Figure 2: Three Dimensions in E-government Initiatives: Adopted from (Jansen, 2005)

The three dimensions include e-democracy, which involves the interaction between citizens, businesses & civil society and politicians; e-administration, which involves the interaction between politicians and public institutions; and e-service which involves the interaction between citizens, businesses & civil society and public institutions. The interactions involve the use of ICT to provide information and services.

E-government interactions can be grouped into four basic categories: government-to-citizen (G2C) that represents the relationship between government and citizens; government-to-business (G2B) that refers to the relationship between government and businesses; government-to-government (G2G) that relates to the activities that improve and upgrade

government services and the one of government-to-employees (G2E) that improves the relationship between government and its employees (Markellos et al., 2007; Ndou, 2004; Jayashree & Marthandan, 2010; Carter & Belanger, 2004).

Pressure to implement e-government sometimes come from external players or citizens (Chen et al., 2006; Njuru, 2011a) by demanding for services that may include: information on public policy; business opportunities and jobs; renewing driving license; voter registration; voting on the internet; access to one-stop shopping (one portal for government services); and ordering birth, death or marriage (life events) certificates (Pardo, 2000; Wang & Liao, 2008). However, governments should not just implement e-government for the sake of satisfying demands by certain interest groups, but should be focused on achieving specific outcomes and impact guided by well-defined strategies.

2.3 E-Government Models

Markellos et al. (2007) and Jayashree & Marthandan (2010) emphasize that e-government is not a one-stop and revolutionary but an evolutionary process involving multiple stages or phases. Different authors have developed different models of e-government to demonstrate how e-government works by bringing out the purpose, objectives and expected outcomes of e-government. To guide and benchmark e-government development, researchers and academia proposed different types of e-government development models, the so-called maturity models. These models outline various stages that governments go through in e-government development (Karokola & Yngström, 2009).

Baum & Di Maio propose a four-stage model that predicts that e-government will move from web presence in which a government provides basic information to its citizens through the web to a second stage involving interaction with citizens where citizens can be able to contact government online via email. In the third stage which is the transactional stage, citizens conduct business online such as paying for license renewal, paying taxes or submitting bid documents online. The final stage is the transformation stage where total transformation occurs and new and innovative ways of serving citizens emerge permitting a fundamental change in the way the government interacts with citizens, for example, the reinvention and reengineering of how government services are conceived and delivered (Coursey & Norris, 2008; Al-Hashmi & Darem, 2008; Castelnovo, 2010).

World Bank (2003) developed a three-stage model that proposes that e–government will move from publishing information online (disseminating information to citizens through website);

interacting with citizens mainly through email to conducting transactions and obtaining services online (Coursey & Norris, 2008; Karokola & Yngström, 2009; Al-Hashmi & Darem, 2008).

Ronaghan through the United Nations and American Society for Public Administration (UNASPA, 2001) suggested an e-government model with five stages which include: emerging presence, where websites provide formal but limited and static information; enhanced presence, where websites provide dynamic and regularly updated information; interactive presence, websites connect users and service providers with interaction at a more sophisticated level; transactional presence, complete and secure transactions take place; seamless or fully integrated presence where governments utilize a single website to provide a one-stop portal for access of all services (Jayashree & Marthandan, 2010; Karokola & Yngström, 2009; Curtin, 2006).

Layne & Lee (2001) proposed a four-stage model that suggests that governments will move from a cataloguing stage that delivers some basic information and downloadable forms through web sites to the transaction stage that extends the capability of catalogue and enables citizens to do some simple online business transactions such as filling government forms, renewal of driving licenses and paying fines online. The vertical integration stage focuses on integrating government functions at different levels, such as those of local governments and state governments. For example, business-licensing information at the state level could be accessible by county or local governments. The final stage is the horizontal integration that focuses on integrating different functions from separate systems so as to provide users a unified and seamless service, for example a business being able to submit its social security contribution to one state agency and its taxes to another state agency at the same time because the systems are able to talk to each other or share the same database.

Chandler & Emanuel developed a four-stage model with the first two stages similar to the World Bank three-stage model (Karokola & Yngström, 2009). Information is the preliminary stage, where government services delivery is available on-line over a website. Interaction stage involves simple online interaction between citizens and governments that are enhanced through various features including search and emails. In the transaction stage, services that enable transactions between citizen and government are available; citizen can pay taxes and submit forms online. The final stage is integration where vertical and horizontal integration of services across government agencies occurs.

Coursey & Norris (2008) summarized the main models as depicted in table 1. The table gives six generic steps for comparison purposes and attempts to fit the models into these steps. As depicted in table 1, some models start at step two and while others end at step 5. Steps 1 and 2 can generally be combined as they represent a stage where e-government services are emerging and providing basic services to citizens through websites. Stages 5 and 6 could also be merged to represent a stage of integration and transformation in e-government after reaching the transaction stage. Effectively this gives four (4) generic steps instead of six (6).

The summary selected five models, which are similar in different aspects. From the models, it is implied that e-government evolves from an emergent online presence, and transformed to reach full integration of e-government services and participation by actors. The purpose of the evolution is that each stage is better than the previous one. The improvement of the relationships between governments and citizens is a key point that can be utilized to effectively measure the economic and social impacts of e-government (Stefanie & Claudio, 2011).

Table 1: E-government models: Source: Coursey & Norris (2008)

Model	Step 1	Step 2	Step 3	Step 4	Step 5	Step 6
Layne & Lee (2001)		Catalogue		Transaction	Vertical integration	Horizontal integration
Baum & Di Maio (2000)		Presence	Interaction	Transaction	Transformation	
Ronaghan (2001)	Emerging presence	Enhanced presence	Interactive presence	Transactional presence	Seamless	
Hiller & Belanger (2001)	Information dissemination	Two-way Communication	Integration	Transaction	Participation	
Wescott (2001)	Email and Internal network	Enable inter-organizational and public access to information	Two-way Communication	Exchange of value	Digital democracy	Joined-up government

2.4 E-government Initiatives in Developing Countries

Countries of the world can broadly be classified into three major categories: developed economies, economies in transition and developing economies. Within each broad category, some subgroups are defined based either on their geographical location or on ad hoc criteria, such as the subgroup of “major developed economies”, which is based on the membership of the group of seven (G-7) and developing economies that are mainly in Africa and Asia. Economies in transition usually have characteristics which can be used to place them in more than one of the categories and therefore do not have a distinct classification per se (World Economic Situation and Prospects, 2014).

Countries can also be classified by their level of development as measured by per capita gross national income (GNI). Based on this criteria, countries can be classified as high-income, upper middle income, lower middle income and low-income. According to the threshold levels set by the World Bank, countries with less than $1,035 GNI per capita are classified as low-income countries, those with between $1,036 and $4,085 as lower middle income countries, those with between $4,086 and $12,615 as upper middle income countries and those with incomes of more than $12,615 as high-income countries (World Economic Situation and Prospects, 2014). Developing countries will typically have the following characteristics: low growth of the income per capita; inadequate infrastructure; low literacy levels; low life expectancy and high infant mortality rates; and large populations (Yonazi, 2010).

Chen et al. (2006) identifies five key specific issues that can be used to differentiate developed and developing countries: maturity in government and culture; skills of IT staff; robustness of infrastructure; citizens' access to the Internet (digital divide); and appreciation of e-government by government officers. Table 2 summarizes differences between developed and developing countries in aspects of government.

Table 2: Differences Between Developed & Developing Countries: Source: Chen et al. (2006)

Issue	Developed Countries	Developing Countries
History and Culture	• Government and economy developed early, immediately after independence • Economy growing at a constant rate, productivity increasing, high standard of living • Relatively long history of democracy and more transparent government policy and rule	• Government usually not specifically defined; economy not increasing in productivity • Economy not growing or increasing productivity; low standard of living • Relatively short history of democracy and less transparent government policy and rule
Technical Staff	• Has a current staff, needs to increase technical abilities and hire younger professionals • Has outsourcing abilities and financial resources to outsource; current staff would be able to define requirements for development	• Does not have staff, or has very limited in-house staff • Does not have local outsourcing abilities and rarely has the financial ability to outsource; current staff may be unable to define specific requirements
Infrastructure	• Good current infrastructure • High Internet access for employees and citizens	• Bad current infrastructure • Low Internet access for employees and citizens
Citizens	• High Internet access and computer literacy; still has digital divide and privacy issues • Relatively more experienced in democratic system and more actively participate in governmental policy-making process	• Low Internet access and citizens are reluctant to trust online services; few citizens know how to operate computers • Relatively less experienced in democratic system and less active participation in governmental policy-making process
Government Officers	• Decent computer literacy and dedication of resources; many do not place e-government at a high priority	• Low computer literacy and dedication of resources; many do not place e-government at a high priority due to lack of knowledge on the issue

The United States of America (USA), Australia, Canada and United Kingdom (UK) are among the leaders in the implementation of e-government in the world and have reaped significant benefits (Chen et al., 2006; Monga, 2008). These countries have put in place robust infrastructure; their citizens have high IT skills; have good Internet penetration; and have developed good policy frameworks to support e-government. Moreover, they have political stability and mature democratic government systems. The governments of these countries are also offering citizen-centric services which are based on the needs of the citizens gathered through citizen surveys (Islam, 2007; Chen et al., 2006)

Reynolds & Regio (2001) argue that e-government initiatives when implemented effectively will provide a number of benefits including: deliver electronic and integrated public services, bridge the digital divide, offer lifelong learning skills, rebuild government-customer relationship, foster economic development, and create a more participative form of government. This is especially important for developing and least developed countries (LDC).

Egypt, Tunisia, Morocco, Mauritius and South Africa in order of progress are among the leaders in Africa in the E-government Development Index (EGDI) (Cloete, 2012). In the section below, we present an overview of e-government initiatives in the Eastern, Southern and Northern African regions and also in India, which are among developing countries that are advanced in e-government. From the extant literature, there is very little on e-government initiatives in Western and Central African regions as also evidenced by the e-government readiness survey (United Nations, 2014).This survey was done for 193 UN member countries with an index between 0 and 1 (where 1 is the best score). Kenya was placed position 9 in Africa and 119 in the world as shown in table 3. The world average e-government development index (EGDI) was 0.4712 while the African average was 0.2661 implying that the African continent is still behind in e-government and needs to do a lot to catch up with the rest of the world. The top countries in the world like Korea, Australia and Singapore with indices of over 0.9 are performing extremely well compared to top African countries with indices of slightly over 0.5.

Table 3: Top Ranked Countries in E-government in Africa (UN E-Government Survey 2014)

		E-Gov. Development Index		World e-Gov. Development Ranking	
Rank	**Country**	**2014**	**2012**	**2014**	**2012**
1	Tunisia	0.5390	0.4833	75	103
2	Mauritius	0.5338	0.5066	76	93
3	Egypt	0.5129	0.4611	80	107
4	Seychelles	0.5113	0.5192	81	84
5	Morocco	0.5060	0.4209	82	120
6	South Africa	0.4869	0.4869	93	101
7	Botswana	0.4198	0.4186	112	121
8	Namibia	0.3880	0.3937	117	123
9	Kenya	0.3805	0.4212	119	119
10	Libya	0.3753	0.0000	121	191
African Region Average		**0.2661**	**0.2780**		
World Average		**0.4712**	**0.4882**		

Transparency International (TI) also conducts surveys annually and ranks countries based on how their public service is perceived to be corrupt. Corruption Perception Index (CPI) ranks countries on a scale of 0 (highly corrupt) to 100 (very clean). In 2014, the survey ranked a total of 175 countries and table 4 shows CPI for the top 15 least corrupt countries in Africa.

From table 4, it can be hypothesized that there is a correlation between e-government development index (EGDI) and the Corruption Perception (CPI) of a country. It is observed that 7 out of 10 countries in the African ranking of the EGDI ranking of 2014 appear in the CPI ranking of African countries in the same year with the exceptions of Kenya, Egypt and Libya. This is probably because despite the high level corruption taking place in these countries, the countries are still able to substantially develop their ICT infrastructure, improve literacy levels and other e-readiness indicators because of the large nature of their economies. Njuru (2011b) contends that Kenya has constantly been rated as one of the most corrupt countries in the world and it is a surprise that it is still doing well in E-Government Development Index (EGDI).

Table 4: Top ranked Countries in CPI in Africa (Transparency International, 2014)

Rank	Country	Corruption Perception Index		
		2014	2013	2012
1	Botswana	63	64	65
2	Cape Verde	57	58	60
3	Seychelles	55	54	52
4	Mauritius	54	52	57
5	Lesotho	49	49	45
6	Namibia	49	48	48
7	Rwanda	49	53	53
8	Ghana	48	46	45
9	South Africa	44	42	43
10	Senegal	43	41	36
11	Swaziland	43	39	37
12	Sao Tome and Principe	42	42	42
13	Tunisia	40	41	41
14	Benin	39	36	36
15	Morocco	39	37	37

2.4.1 Tanzania

E-government implementation in Tanzania follows that of many developing countries. It is faced with the same challenges of poor planning and coordination, inadequate infrastructure, human capital capacity, limited awareness and appreciation of e-government. Tanzania trails behind in e-readiness index compared to its counterparts: Kenya, Rwanda and Uganda in the East African region. Connectivity and access is localized to the urban areas (Yonazi, 2010). However, the Government of Tanzania (GoT) has realized the importance of e-government and has put in place strategies to address these challenges.

GoT has implemented various e-government strategies and initiatives aimed at improving and sustaining the social and economic development of the Country. Some of the initiatives undertaken include the establishment of the e-Government Agency (e-GA) and development of a state-of-the-art high capacity National ICT Broadband Backbone (NICTBB). The mandate of e-GA just like the former DeG in Kenya is to promote, oversee and coordinate e-government projects in Ministries and Local governments while NICTBB is responsible for providing sufficient broadband connectivity (Sigwejo, 2013).

Sigwejo (2013) and the Tanzania National e-government Strategy (2012-2017) identified the following as some of factors hampering the uptake of e-government services in Tanzania: low level of awareness among citizens; inadequate ICT infrastructure coverage; low level of ICT penetration; low literacy levels among citizens; perception, attitude and cultural challenges; unreliability of e-government services; inadequate legal and institutional framework and low

political goodwill. Tanzania is largely at the presence stage of e-government maturity models and one of the challenges preventing it from reaching the transactional stage is the lack of online payment systems in government institutions (Sigwejo, ibid).

The government recognizes ICT as the key enabler in implementing the identified strategies and has consequently developed and ratified ICT strategy documents including the national ICT policy (2003), the national vision 2025 strategy paper and the e-government Strategy (2012-2017). According to the Tanzania National e-government Strategy, the government plans to jumpstart implementation of e-government by developing a government-wide network infrastructure, creating awareness on opportunities for use of ICT in public service and creating a focal point for consolidating and coordinating fragmented e-government initiatives.

GoT has invested in various e-government projects which are part of reforms in the public sector to improve on service delivery. Some of the e-government initiatives include online provision of secondary schools and teachers colleges examination results (National Examination Council of Tanzania), online provision of tax related information (Tanzania Revenue Authority); National Identity Project (NIP), and the Central Admission System (CAS) for universities (Yonazi, 2010; Yonazi et al., 2010; Karokola, 2012).

2.4.2 Botswana

Nkwe (2012) portends that some South African states including Botswana have started putting in place institutional and regulatory frameworks dedicated to the enhancement of e-government uptake. However, Nkwe (ibid) describes a visit to the government departments in most developing countries including Botswana as being chaotic and is characterized by manual operations, long queues, bureaucracy and frustrations. It is also reported that few government agencies in Botswana have websites customized to the needs of citizens and very few or none offer online transactions. Government departments' websites have outdated information that is difficult to find. E-government in Botswana is at a low level of maturity when evaluated using most common models of e-government.

E-government is still at its nascent stages of development in Botswana but the government is putting strategies in place to develop it. The government of Botswana has recognized ICT as a key driver of its developmental agenda in economic growth, poverty reduction and global competitiveness (Iyanda & Ojo, 2008; Nkwe, 2012).

Botswana has developed strategy towards embracing e-government because its leaders have realized the importance of e-government. The key objective of the Botswana's National e-Government Strategy (2011-2016) which was released in June 2011 was to improve the convenience, quality and efficiency of public sector service delivery. The strategy outlines five major programmes and approximately twenty-five interrelated projects that will collectively move all appropriate government services online, significantly improve public sector service delivery, and accelerate the uptake and usage of ICT across all segments of the society.

The government of Botswana has realized that for e-government to be successful, it will require reviewing and redesigning a number of components including: organizational structures, business processes, skill requirements, job designs, policies and procedures. The government has also developed an ICT policy known as '*Maitlamo*'[8] to provide a roadmap for the country. The expansion of the national infrastructure, rollout and integration of online services is emphasized in the strategy. Mobile telephone penetration was expected to reach over 90% by 2015 and this will offer a good platform to rollout the online services (Botswana's National e-Government Strategy 2011-2016, 2011).

The government of Botswana has put in place a dedicated team to deal with emerging e-government issues, development of ICT infrastructure (construction of the '*Kgalagadi*'[9] optical fiber network) and ensuring penetration of government services to the citizens. The government has initiated e-government projects in land management, e-legislation, e-learning, e-health and e-business. Despite these noble interventions by government to encourage e-government, the limitations have been lack of trust, culture, poverty and limited literacy levels of a greater portion of the population. Due to lack of effective marketing and awareness campaigns of e-Government benefits, many ordinary citizens do not find the urge to engage in e-Government (Nkwe, 2012).

In spite of the challenges, the government of Botswana appreciates the importance of e–government and is in the right path of creating awareness; policy and regulatory framework; and the necessary infrastructure to facilitate the uptake of its initiatives.

[8]Maitlamo is the brand name for the Botswana ICT policy meaning pledge or commitment

[9] Kgalagadi is a district in Botswana that hosts the Kgalagadi Transfontier Park that extends to South Africa.

2.4.3 South Africa

South Africa held its first multi-racial democratic elections in 1994 after a long stint of the apartheid rule, which had created a rift in the society along racial lines. Trusler (2003) contends that when discussing e-government issues in South Africa then one has to consider the historical and social context. This means that e-government initiatives have to consider a number of harsh realities which include: social exclusion and inequality; poverty, poor ICT infrastructure especially in rural areas; low government ICT readiness; and other pressing demands that may hinder prioritization of ICT. These factors have contributed to the low uptake of e-government initiatives despite the fact that South Africa is endowed with vast resources, has a stable political system and its infrastructure and economy more advanced compared to other African countries.

According to Matavire et al. (2010), the South African government has adopted the concept of putting people first ('*Batho Pele'*[10]) by using ICT and e-government to facilitate equal access to information and effective public service delivery. These initiatives are seen as key in the drive to alleviate poverty and effects of social exclusion from the apartheid rule, which had denied citizens equal access to information and services.

The South African constitution, just like the Kenyan case, obligates the state to grant wide access of information to citizens that should be in the public domain. The government has initiated several projects in response to this obligation and amongst the ICT initiatives are: Cape Gateway Project, Cape Information Technology Initiative (CITI), Tele-Centres in rural areas in South Africa, SchoolNet South Africa Project, Mindset Network Organisation and the *Khanya*[11] Project (Matavire et al., 2010). E-government initiatives in South Africa trace their roots on recommendations by the Presidential Commission on the Transformation of the Public Service in 1998, which proposed that the role of IT in government should be strengthened through the formulation of a national Information Management strategy and that government should consider migrating to electronic communication in the next five years. South Africa developed its first e-government policy in 2001, which spelt a ten-year implementation plan. This policy was revised in June 2011(Cloete, 2012).

The government has a strong focus on service delivery improvement and is seeking to achieve three main objectives through its e-government initiatives: increased productivity; reduced costs; and increased citizen convenience in access to information and services (Trusler,

[10] Batho Pele meaning "People First" is a South African initiative standing for better public service delivery
[11] Khanya is a South African Word from the Xhosa language meaning enlightenment

2003). Although there is little consolidation of information in e-government, most of the government departments have their own websites and the national governmental gateway portal available at www.gov.za.

The e-government initiatives are yet to reach the transaction stage as described in the Layne & Lee model (Layne & Lee, 2001). The e-government initiatives have not taken root at the expected rate because of poor government coordination and lack of proper leadership (Trusler, 2003; Cloete, 2012). A study conducted by Matavire et al., 2010 confirms that leadership, uncoordinated strategies, project fragmentation, and low stakeholder engagement are some of the main factors that have hindered the implementation of e-Government projects in South Africa.

However, Matavire et al. (2010) and Cloete (2012) emphasize that e-government initiatives in the provinces of Gauteng and Western Cape Town have been executed effectively and other provinces have indicated intention to emulate strategies used by these provinces. In response to the challenges of coordination, the South African government has put in place statutory bodies like State Information Technology Agency (SITA) and Government Information Technology Officers (GITO) Council to oversee the execution of e-Government initiatives.

Cloete (2012) mentions that some of the e-government initiatives in South Africa which are currently in various stages of implementation include the e-Justice programme for judicial processes, the e-Hanis programme for streamlining personal identification data across government departments and the National Automated Archival Information Retrieval System (NAAIRS) for access to public archived records. The most notable transactional service that the government has implemented is the electronic filing of tax returns by the South African Revenue Service (SARS).

Apparently, the South African government has the will to improve the uptake of e-government but apart from the challenges previously mentioned, there is weak political leadership, lack of capacity and resistance to change by public officials in implementing policy and recommendations (Trusler, 2003; Matavire et al., 2010; Cloete, 2012). These issues need to be addressed to hasten the uptake of e-government initiatives in South Africa.

2.4.4 Egypt

Egypt is one of the leaders in the implementation and uptake of e-government in Africa (Cloete, 2012; Aikins, 2012). This is also evidenced by the e-government benchmarking and readiness survey that is published bi-annually by the United Nations. In terms of the E-government Development Index (EGDI), Egypt was ranked position 3 in Africa in 2014 (behind Tunisia and Mauritius) with an Index of 0.5129 as indicated in table 4 in section 2.4 above. Some of the factors that have led to the good performance are: development of strong ICT infrastructure, liberalization of the telecommunications industry, deployment of PCs and ICT literacy training to bridge the digital divide (OECD, 2013).

Egypt established its local Information & Communication Strategy in 2001 in what was referred to as the Egyptian Information Society Initiative (EISI). EISI was divided into seven tracks one of which was e-government (Aikins, 2012). The others included e-business, e-learning, e-health and e-culture among others. The Egyptian government perceives e-government as an innovative technology and an enabler for reforming and re-inventing public administration.

Azab et al. (2009) re-affirms that the vision of e-government initiative in Egypt is "delivering high quality government services to the public in the manner that suits them". The Egyptian government portal (www.egypt.gov.eg) was inaugurated in a function attended by Bill Gates in January 2004. Some of the services available on the portal include water bill enquiry, birth certificate and national ID card issuing and traffic fine payment. The objectives of Egypt's e-government programmes include: improving access to information, cost reduction, offering efficient, affordable and customized services to meet citizens' needs (Azab et al., 2009).

The Egyptian government implemented the Egyptian Local Government Development Project (ELGDP), which is part of the wider Egyptian Government Services Development Programme. ELGDP is a large project comprising of three main projects. The first focus of service delivery enhancement to citizens was in the municipalities through automation and creation of smart "citizen-service centres". The second is concerned with development of web portals for governorates and the third is Citizen Relationship Management (CRM) systems (Aikins, 2012).

Egypt's success in e-government has been aided to a great extent by a strong leadership, which has provided strategy and vision with coordinated efforts in the state organs. This has led to the growth of a strong ICT infrastructure, improvement in the ICT literacy skills and reduction of the digital divide, which is necessary for the growth, and development of e-government. However, the proliferation of the use of ICT and social media has also had its

negative impact as it led to the Egyptian revolution of January 2011 (OECD, 2013). The revolution, however, did not significantly affect the performance of e-government in Egypt, as the subsequent election was successfully organized and conducted using an electronic system in a more transparent manner than before (OECD, 2013).

2.4.5 India

India has taken great initiatives in e-government, but like many other developing countries, it faces a myriad of challenges. Inadequate infrastructure, poverty, low ICT literacy, language barrier and resistance to change are some of the issues hindering uptake of e-government in India (Dwivedi & Bharti, 2010).

The Government of India (GoI) jumpstarted the use of IT in government by launching a number of initiatives including the approval of the National e-Governance action plan for implementation during the period 2003-2007 as an impetus for long-term growth in e-governance (Monga, 2008).

E-government endeavors in India were initiated by Akshaya project in Kerala. This project involved setting up multi-purpose community Centres called Akshaya e-Kendra's across Kerala which were run by private entrepreneurs. Akshaya acted as a social and economic catalyst focusing on provision of multiple services (Yadav & Singh, 2012). Monga (2008) emphasizes this point by stating that most state governments have initiated the use of ICT in their governance processes to improve service delivery to their citizens by introducing service centres at strategic public places. Most of these service centres are managed through public-private partnerships and multiple services are provided at each Centre. This is a departure from the *self-use* of e-government services through a portal applied by most citizens in developed countries and is an effective method of addressing challenges of access to e-services in developing countries.

The GoI appreciates the importance of e-government because of the perceived benefits like cost reduction, transparency, corruption eradication and promotion of equal access to information and therefore committed to delivering at least 25% of its services online by making computers affordable and improving national broadband connectivity (Dwivedi & Bharti, 2010).

The GoI has taken steps to setup institutions for making policy, managing and controlling deployment of e-Government and therefore enhancing the provision of effective and efficient services. These include: Information Technology Act (2000), Freedom of Information Bill,

Ministry of Information Technology (MIT), National Institute of Smart Government (capacity building), Centre for Electronic Governance and National e-Governance Projects (NeGP) to make all services available to the common man in his locality and instituting websites in almost all ministries (Madon, 2004; Dwivedi & Bharti, 2010; Monga, 2008).

Through state governments, India has implemented a number of successful e-government projects including Bhoomi, for automation of land records in the state government of Karnataka; Gyandoot in the state government of Madhya Pradesh for e-government services including online registration of applications, rural email facility and village auction site; Vahan & Sarathi for vehicle registration and driving license permit in the state government of Tamil Nadu; and Project Smart Government in the state government of Andhra Pradesh for paperless file processing system enhancing accountability, responsiveness and transparency (Dwivedi & Bharti, 2010; Monga, 2008; Bwalya, 2009; Alghamdi & Beloff, 2014).

2.4.6 Kenya

According to the United Nations global e-government survey (United Nations, 2014); Kenya is ranked position 119 out of 193 United Nations member countries with an e-readiness index of 0.38, which is below the world average of 0.47. Njuru (2011a) contends that the main reason for Kenya's poor performance is attributable to diminishing resources, poor ICT infrastructure and inadequate skilled labour. A country should be sufficiently e-ready to implement e-government effectively. This implies that the government will have to apply extra effort to grow this index in order to make it compete favourably with the leaders of e-government and increase the uptake of e-government services. Kenya has a strong, vibrant and literate workforce and is the economic hub for the region and therefore has a potential that it can use to leverage resources and expertise. Through Public Private Partnerships (PPP), the government launched an initiative to set up digital villages ('pasha' centres) to bridge the digital divide and promote Internet access in the rural areas. These centres provide a host of e-government services to the public including: police abstract forms, email, Internet access, tax returns and driving license application. The main objectives of these centres were to provide Internet access, e-government and other e-services to the public at the grassroots level through PPPs. The pasha centres were to be set up in all constituencies. Though this was not realized, some were very successful and have had a significant impact on the constituents.

The Government of Kenya (GoK) has spearheaded many e-government projects in an effort to embrace e-government in the local context. In 2004, the government established the Directorate of e-Government (DeG) under the Office of the President as an oversight body to galvanize all ICT projects within government with the aim of enhancing service delivery in all the ministries (Muganda, 2008) and in line with the Kenya Vision 2030 project. DeG worked closely with the Ministry of Information & Communications and the Kenya ICT Board (KICTB) to implement government strategy on e-government. The KICTB, DeG and Government Information Technology Services (GITS) were merged together in 2013 to form the Kenya ICT Authority (ICTA).

Njuru (2011a) portends that the main objectives of implementing e-government in Kenya were to enhance public service delivery, improve information flow to citizens, promote productivity among public servants, and encourage citizens' participation. According to IST-Africa (2013), Abdalla et al. (2015) and Khashorda (2009), some of the e-government services that government agencies provide include: Pasha Centres (Digital Villages); Community Learning Information Centres (CLIC); Kenya Open Data Initiative (KODI);Tracking of status of ID card processing; Government Shared Services including the Integrated Financial Management Information System (IFMIS) and Integrated Personnel and Payroll System (IPPS); Digitization of records at the Lands and High Court Registries, Driving License Registration, e-Citizen portal and establishment and operationalization of *Huduma Centre*s. Other services include: tracking of examination results by the Kenya National Examination Council (http://www.knec.ac.ke), student loan repayment by the Higher Education Loans Board (www.helb.co.ke), checking passport status (www.immigration.go.ke), applying for public jobs (www.psckjobs.go.ke), filing tax returns online (www.kra.go.ke) and reporting corruption (www.eacc.go.ke). Implementation of the National Digital Registry Service (NDRS) project, which intends to have all Kenyans issued with a unique Digital Identifier (DID) to replace all identification documents (except passport) will be a big boost to the e-government initiatives.

GoK has also established an e-citizens portal (https://www.ecitizen.go.ke) to facilitate access to online government services and an online portal through the Ministry of Information and Communications (http://www.information.go.ke) to provide its citizen with relevant information about the country and key services offered by the government and how to access these services. The site also contains links to majority of the ministries and state agency websites. However, Njuru (2011b) points out that an assessment of Kenyan e-government status shows that most ministries and agencies have websites that give access to information and downloadable forms but very few offer online transactions, meaning that Kenya is still at a low

e-government maturity stage according to the proposed e-government maturity models. In order to reap maximum benefits from e-government, the Kenyan government needs to provide more online transactions and integrated services for its citizens.

The Kenya Open Data Initiative (KODI) (https://opendata.go.ke) is another milestone made by GoK in improving governance by availing relevant information to the public in line with the provisions of the Constitution of Kenya on information access by the public. KODI was launched in July 2011 with the aim of making government data freely and easily available to citizens through an online portal. The website is divided into six sectors – education, health, energy, water and sanitation, population and poverty. Demographic, core government developmental, statistical, national and regional expenditure and information on key public services were some of the initial data to be made publicly available through this online portal. This is one of the most comprehensive portals in Sub-Saharan Africa. Kenya is one of the first countries in Africa to implement such an initiative, second to Morocco. KODI has been acclaimed globally as one of the key steps that Kenya has taken to improve e-government and implement the Constitution in line with the provision for access to public information.

Njuru (2011a) and Abdalla et al. (2015) argue that the Kenyan government has not adequately sensitized its citizens on the importance and benefits of e-government despite the many initiatives it has implemented. In spite of the fact that the sub-marine fibre optic cable has landed in Kenya and effort has been put to lay terrestrial backbone networks to provide affordable broadband connectivity, the penetration level and accessibility is still poor and particularly in the rural areas. However, the government can leverage on the high penetration level of mobile technology (Omwansa, 2012) to promote use of e-government services. Moreover, regardless of the fact that Kenya has a vibrant and energetic workforce, most of the citizens and government officials do not have adequate skills to implement and utilize ICT and e-government initiatives.

2.5 Implementation and Uptake of e-Government in Developing Countries

There are many benefits that can be realized from the implementation of e-government and these will only be achieved when citizens adopt and utilize e-government services. Poor uptake of e-government services will negatively affect the intended impact. Studies in adoption of e-government have gained tremendous popularity because of the significance of adoption of technology on the impact of these initiatives. It remains a key issue challenging successful implementation and impact of e-government projects (Alghamdi & Beloff, 2014; Savoldelli et al., 2012; Yonazi, 2010).

There are concerted efforts by governments to implement successful e-government projects through prudent project management. Despite the efforts in implementing e-government, previous studies present cases of failure and success in the implementation of e-government in different setups. This point is further emphasized by Kumar & Best (2006) and Heeks (2003) who categorize e-government success and failure into three different levels: total failure; partial failure; and success each with its own descriptive characteristics and indicators. The rate of failure of e-government projects even in developed countries is high. Approximately, 20-25% are never implemented or abandoned immediately after implementation and a further 33% fail partially (Chen et al., 2006). The rate of failure is alarming and higher in developing countries compared to developed countries (Otieno & Omwenga, 2015). Measures should be put in place to increase success rates, subsequent adoption and uptake of future projects.

Kumar & Best (2006) postulate that the reasons for failure of e-government projects include lack of regular monitoring and evaluation; design gaps; poor long-term sustainability plans; low commitment from political leadership and implementers of e-government; low engagement of stakeholders; lack of regular content update; and interactivity in e-service delivery.

E-government implementations are mostly deployed on the Internet, but with recent advances in technology they can be accessed using mobile and cloud technology among others. Alonso & Fitzgerald (2005) posit that the adoption of Internet technologies by SMEs follows systematic stages that can be described using suitable models. These models infer staged evolution of businesses from the basic use of Internet (emails and simple websites) to full integration of business systems. It is assumed that the higher the stage that a business reaches in adoption, the greater will be the impact (Alghamdi & Beloff, 2014).

Southern & Tilley (2000) argue that there are both exogenous and endogenous factors influencing the implementation, adoption and the successful management of ICT in an organization and both need to be addressed for successful implementation. Studies have shown that despite different environments having different characteristics, there are general principles that promote e-government service adoption and uptake by ordinary citizens (Carter & Belanger; 2004; Bwalya, 2009). It is worth mentioning from the discussion above that certain environments have unique characteristics, which may either impede or facilitate the adoption and uptake of e-government services and we should take cognizance of these as we implement e-government projects.

Iyanda & Ojo (2008) portend that an innovation is either adopted or not adopted by users or organizations depending on their motivations and beneficial expectations. Iyanda & Ojo (ibid)

also state that studies have been taken to explain ICT adoption by the conventional factors including perceived benefits, organizational e-readiness, external pressures, changes in organizational strategy and structure, management systems and human skills and openness to external sources of information.

It is also argued that timeliness, accuracy, relevance and completeness are significant qualities of information on websites that influence user adoption (DeLone & McLean, 1992). Carter & Belanger (2004) and Kumar et al. (2007) emphasize that the success and acceptance of e-government services is dependent on citizens' reception and willingness to adopt e-government services. The rate of adoption is influenced by several factors, including how a potential adopter perceives the performance, value and benefit of the innovation (Napoli et al., 2000).

From literature review, it is clear that a number of frameworks founded on the Theory of Reasoned Action (TRA) have been used to explain the consumer adoption of the Internet. TRA considers beliefs, norms and attitude as affecting behavioral intention to use a technology, which in turn affects the actual use. In a bid to explain how users accept and use technology, Davis developed the Technology Acceptance Model (TAM) basing his reasoning on the Theory of Reasoned Action (TRA). Many researchers have used TAM to study the theory of acceptance. TAM has several attributes such as Perceived Usefulness – PU (the degree to which a person believes that using a particular system would enhance their job performance); Perceived Ease of Use – PEOU (the degree to which a person believes that using a particular system would be free of effort) and the Subjective Norm – SN (the person's perception that most people who are important to him think he should or should not perform the behavior in question). In order to explain the adoption model of technology, the TAM was extended and called the Unified Theory of Acceptance and Use of Technology (UTAUT) by Venkatesh et al. (Bwalya, 2009).

Everett Rogers' theory of Diffusion of Innovations (DOI) within the framework of the diffusion approach aims to analyze the characteristics of technology adopters. In this model, adoption is the acceptance of innovation taking place in five steps: knowledge, persuasion, decision, implementation and confirmation (Yonazi, 2010).

Bwalya (2009) proposed an extension of the conceptual model proposed by Kumar et al. (2007) and concludes that limited ICT infrastructure, computer literacy levels, language barrier, lack of adequate trust, privacy issues and usability concerns are the main factors hindering adoption of e-government in Zambia. This model extends other existing models by introducing

the aspect of ICT infrastructure and cultural awareness, which were not in other models but relevant to the context of Zambia and Kenya to a larger extent.

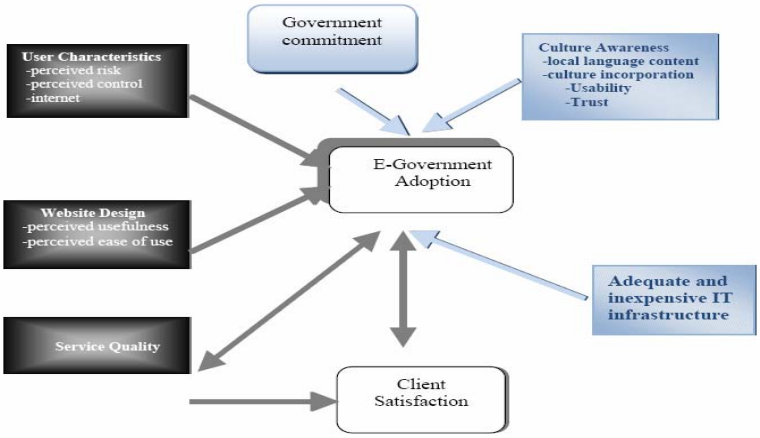


Figure 3: e-adoption model: adopted from Bwalya (2009)

There are several factors that affect adoption and implementation of e-government. These may vary across countries depending on the local context and include: lack of skilled workers, lack of political will, inadequate legislative framework, lack of e-government sustainability plans, and inadequate ICT infrastructure (Basant et al., 2006; Iyanda & Ojo, 2008; Chen et al., 2006; Karokola & Yngström, 2009; Yonazi, 2010; Shareef et al., 2012).

The adoption challenges facing developed countries will largely be different from those facing developing countries (Basant et al. 2006).This variation can be traced to a variety of factors including differences in pricing and government policy preferences – such as privatization, lowering of trade barriers and de-regulation that have tended to raise investment in communications sectors and to improve access to ICT technology.

2.6 Challenges in Implementation of e-government

The implementations of e-government projects face numerous challenges. However, developing countries face many more challenges compared to developed countries (Islam 2007; Chen et al. 2006). This is evident from the results of e-government readiness surveys carried out by the United Nations (UN) bi-annually where developing and least developed countries are usually at the tail end of the ranking. Otieno & Omwenga (2015) also allude to the fact that majority of the failed e-government projects are in developing countries. This appalling situation is attributable to the differences between developed and developing counties in terms of history, culture, literacy, technical skills and infrastructure as outlined by Chen et al. (2006). Results from

different studies show that ICT infrastructure, legal framework, literacy levels, ICT skills and awareness are some of the key challenges facing e-government implementation in developing countries (Otieno & Omwenga, 2015). These challenges should be addressed in the Kenyan context for e-government to realize the intended results.

One of the research objectives of our study was to identify the challenges faced by governments in the implementation and uptake of e-government and make recommendations. Our research questionnaire was designed to capture qualitative information on challenges experienced by citizens as they accessed e-government services at *Huduma* centres. The study revealed that citizens experienced numerous challenges while accessing services at *Huduma* centres. Some of the common challenges experienced by citizens include: slow service delivery speeds and long queues occasioned by slow network or system speeds and inadequate staff; lack of backup power resulting in downtime in case of power outages; low citizen awareness about services available at *Huduma* centres; most services are not fully automated from end-to-end and provide information only as opposed to providing transactional capabilities; inadequate customer care skills from the agents at the *Huduma* centres; inadequate ICT skills and high cost of e-government services.

Citizens also made various recommendations to address the identified challenges. Some of the recommendations that came out from this study are the engagement and involvement of citizens in the e-government processes and offering integrated e-government services that are citizen-centric (Islam, 2007; Chen et al., 2006) and based on life events[12]. The other recommendations made by citizens to address the identified challenges included: improvement of the ICT infrastructure at *Huduma* centres by increasing the Internet bandwidth, creating more reliable network connections and providing power backup by purchasing and installing standby generators; establishing more *Huduma* centres and spreading them across all counties; sensitize and create awareness among citizens on the services available at the *Huduma* centres; improve citizens' and *Huduma* centre operators' ICT skills; reduce e-government services costs; establish *Huduma* call centres and train *Huduma* centre staff on customer care.

In a pilot study which culminated with the publication of the paper (Otieno & Omwenga, 2015), some challenges were identified and recommendations made on how to address the challenges. The findings which are relevant to this study are summarized in the table 5.

[12] A major event that alters someone's status or circumstances, for example, birth, marriage, death and divorce

Table 5: Challenges in implementation of e-government: Source: Otieno & Omwenga (2015)

No	Challenge	Recommendation
1.	Poor ICT Infrastructure	- Government should initiate more ICT infrastructure development projects to expand coverage - Initiate and promote Public-Private Partnerships - Adopt a common ICT infrastructure for government
2.	Unreliable Internet connectivity	- Provide broadband connectivity to the counties - Supply clean and reliable power to citizens
3.	Insufficient political leadership and change management strategies	- Place e-government at a strategic level in government where decisions can be made and resources provided - Train implementers on change management strategies
4.	Ineffective strategy, policy and regulation on use of e-government services	- Develop robust e-government strategy and ICT master plan - Create a legislative framework to support e-government at local and regional level
5.	Low funding for development of e-government by government and donors	- Progressively increase funding and budget allocation for e-government projects - Engage donors and other partners to support e-government projects
6.	Mismatch between e-services required by citizens and those provided by government	- Conduct surveys to establish citizen needs before rolling out e-government projects - Engage citizens in government processes - Base e-government services on citizens' life events
7.	Low citizen awareness of existing services	- Develop communication and marketing strategy - Conduct campaigns to market existing services - Provide incentives to encourage use of e-government
8.	Low literacy and e-literacy skills among citizens	- Train citizens on ICT - Engage the private sector to support government initiatives - Develop applications that use multi-media
9.	High cost of Internet and e-government service	- Lower cost of Internet and e-government services
10.	High risks associated with Internet & e-services	- Provide secure online electronic platforms
11.	Low security and perceived trust of e-services	- Secure government systems and websites - Improve transparency of services by posting government procedures, rules and service delivery charter online - Educate government officials on importance of privacy & security - Continually evaluate government systems vulnerabilities
12.	Low citizen participation in government processes and cultural issues	- Promote local language and content - Engage citizens in government processes

It was proposed that the challenge of poor ICT infrastructure could be addressed by the government through initiating more infrastructure development projects in partnership with donors and the private sector through Public-Private-Partnerships (PPPs) and creating common or shared government infrastructure. The concern of poor Internet connectivity and especially

among the rural folks was also identified to be a great challenge that could be addressed by the government through provision of broadband connectivity and clean and reliable power supply.

It is also recommended that the government should base e-government on life events, engage citizens and conduct citizen surveys before rolling out e-government services and create awareness among the citizens for the already existing services in order to realize the intended impact. It was also established that ICT literacy among citizens was low and therefore there is need for the government to roll out programmes for training and enhancing ICT skills of citizens and *Huduma* centre agents. It is also imperative that the government puts in place the e-government function at a strategic level in government to give it more impact and visibility; lobby for common e-government action plans in Africa and the East African regions; improve security of the e-government systems; promote content in local languages; and reduce the cost of accessing e-government services to make them more affordable to citizens.

2.7 E-government Measurement and Benchmarking

2.7.1 Evaluation, Measurement, Assessment and Benchmarking

Savoldelli et al. (2013) posits that the contemporary literature on e-government is ridden with a lot of ambiguities, terminological and conceptual inconsistencies around concepts such as *evaluation*, *measurement* and *assessment*. Evaluation and measurement in e-government have been used interchangeably but apparently have different meanings. Although both consider input, output, outcomes and impact, its only evaluation in a strict sense that considers covariates (independent variables) and takes into account the effect of attribution and causality. Jukić et al. (2013) define evaluation as the systematic analysis of programmes and projects. Alalwany & Alahmari (2007) define Information System evaluation as the process of establishing the worth or value of an Information System by quantitative and/or qualitative methods. Therefore evaluation can be defined as the systematic process of analyzing and determining the worth of a project or programme.

On the other hand, measurement is the process by which attributes or indicators of a phenomenon are determined and counted (Savoldelli et al., 2013). The whole discipline of performance measurement, impact evaluation and related terminologies usually fall under the broader concept of *assessment*.

Roche (1999) defines *impact* as sustained and lasting changes in people's lives brought about by a particular intervention, policy, project or programme. Verdegem et al (2010) in the context of their framework for measuring e-government impact perceive *impact* as the results (direct or indirect) of e-government uptake. *Impact evaluation* is generally the valuation of change that is attributable to a particular policy, intervention, project or programme. Impact evaluation involves systematic analysis of the significant changes (direct or indirect; positive or negative) in people's lives brought about by an action or a series of actions.

Impact evaluation should not be confused with monitoring and evaluation as these two terminologies are distinct. Monitoring and Evaluation (M&E) involves identifying the goals and key indicators of a programme, execution, management and progress of interventions over time and establishing whether the intended targets have been achieved. Monitoring and evaluation is different from impact evaluation because of the concept of *causality*. Impact evaluation is associated with tracing causes to outcomes and is related to the concept of attribution – isolating the effects of an intervention from other factors and potential bias (Elementary, 1999; Khandkeret al., 2010).

It is important to appreciate the difference between impact evaluation, monitoring and evaluation. The differences can be summarized in table 6.

Table 6: Distinction between M&E and impact evaluation: Adapted from Roche (1999)

Issue	Monitoring	Evaluation	Impact Evaluation
Timing	Frequently	Periodically	Occasionally
Analytic level	Descriptive, recording inputs, outs and activities	Analytical and examines processes	Analytical and concerned with mid- or long term outcomes
Specifity	Very specific and compares plan with results	Specific and looks at processes	Less specific and considers external influences

Alalwany & Alahmari (2007) contends that there are three main challenges in developing e-government evaluation models: 1) evaluation requires investigation of different perspectives since it involves a number of stakeholders who have particular interests and values that should be considered when developing an evaluation framework 2) evaluation should include both quantitative methods that use tangible ('hard') benefits and qualitative methods that use intangible ('soft') benefits from human or organizational perspective and 3) evaluation should consider both social and technical context of use.

Khandkeret et al. (2010) states that the main aim of impact evaluation is to assist policy makers and implementers know whether the programmes being implemented are realizing intended effects, appreciate what works and what doesn't, promote accountability and valuation of changes that are attributable to a particular intervention.

It is observed that much of the evaluation that is conducted on e-government fails to provide evidence of benefit that is required to provide real impact as evidenced by the concept of 'e-government paradox' advanced by Savoldelli et al. (2012). Evaluation of e-government just like the evaluation of Information Systems has proven to be of great importance and equally complex in nature given that not all results of e-government are evidently visible (Savoldelli et al., 2013; Alalwany & Alahmari, 2007). The importance is attributable to the fact that there is enormous investment by government while the complexity is due to the fact that multiple perspectives are involved; it is difficult to quantify the benefits and the social and technical context of use (Alshawi & Alalwany, 2009; Alalwany & Alahmari, 2007).

E-government evaluation can be done *ex post*[13] or *ex ante*[14] (Bhatnagar & Singh, 2010; Victor et al., 2007; Jukić et al., 2013) and using quantitative or qualitative methods. Jukić et al. (2013) portends that *ex ante* evaluation involves analysis of potential alternative solutions (cost, benefits, effects and opportunities) and their effects before implementation while *ex post* tends to ascertain the effects of project implementation in terms of social, economic and organizational outcomes.

E-government in developed countries is usually guided by action plans and benchmarking at different levels. For instance, the European Commission, developed e-Europe 2003, e-Europe 2005 and i2010 action plans for funding and guidance of ICT projects in member countries. The American Customer Satisfaction Index (ACSI) and Accenture also carry out regular e-government surveys at international, supranational and national levels (Fitsilis et al., 2010). In the African context, the Kenyan government could benefit more if countries in the East African community could form a common e-government action plan for the region and also if African countries could be guided by a common action plan for member states of the African Union (AU).

[13] Ex post is a term used to mean based on actual results or post implementation

[14] Ex ante is a term used to mean based on forecast rather than the actual results

Studies on benchmarking, measurement and evaluation of the impact of e-government have been done at *macro*, *meso* and *micro* levels by developed nations. Each of the levels warrants a different approach and methodology. Macro level benchmarking and evaluation takes place at the global or international level for example eGEP (e-Government Economic Project) and European Index of Digital Inclusion (EIDI). *Meso* evaluation is done at the national level while micro level is at the organizational level (EGOV4U, 2012). Based on literature review, our study shall be guided by the fact that we are conducting our research on evaluation at *meso* level and also take into account the contextual variables that affect impact evaluation.

Heeks (2006) portends that e-government measurement; benchmarking and evaluation serve three main purposes: 1) retrospective achievement – evaluating achievement of previous projects and comparing them with other countries 2) prospective direction – assist policy formulation and making strategic decisions in respect to future projects and 3) accountability – help governments to be held accountable for resources invested in e-government.

Madon (2004), Codagnone & Undheim (2008), Bhatnagar & Singh (2010) and Verdegem et al. (2010) argue that though there are numerous e-government assessment frameworks that have been developed and used before; most of them concentrate on e-readiness, maturity levels, web-metrics and front office approaches. Few studies have been conducted on outcome and impact of e-government.

2.7.2 Approaches for E-government Assessment

a) E-readiness Approach

The existence and maturity of the right IT environment is important in determining successful implementation of e-government projects. E-readiness assessment help governments to evaluate their e-government progress, recognize opportunities and take appropriate measures for future improvement (Yonazi, 2010). E-readiness in this context is a measure of the extent to which stakeholders (government, businesses and citizens) have an enabling IT environment that supports them to participate in e-government. These factors relate to ICT infrastructure, awareness, IT literacy, strategy, policy and legal frameworks for e-government implementation and use (Kunstelj & Vintar, 2004; Alghamdi & Beloff, 2016). Yonazi (2010) portends that the progress of e-government, its successful implementation and uptake is closely related to e-government readiness index. Many developing countries have made little progress in the implementation of e-government initiatives as evidenced by the e-government readiness survey (United Nations, 2012; United Nations, 2014). This is attributable to their low level of e-

government development index in comparison to their counterparts in developed world. Therefore, it is important for governments in developing economies to improve their e-readiness level because it significantly affects their e-government progress.

b) Front Office Approach

The front office approach evaluates e-government from two perspectives: demand-side and supply-side. Supply-side approaches involve evaluating supply of e-government services from the government agency perspective. This approach generally investigates content, availability, accessibility, quality and other characteristics of individual e-government websites and portals as well as the e-government services offered (Kunstelj & Vintar, 2004; Peters et al., 2004). Public institutions use the Internet to provide information and offer services at different levels of sophistication. Though a complex process, it is possible to use government agency websites as a measure of the effectiveness and efficiency of e-government services. Website evaluation metrics can be classified into five major indicators: interface, navigation, content, reliability and technical (Peters et al., 2004). Each of these aspects is measured to give a composite score.

Demand-side approaches evaluate services from the user (citizen and business) perspective. They involve evaluation of the use and quality of services as perceived by users as well as evaluation of their perceptions, interests, delivery preferences, requirements and needs (Kunstelj & Vintar, 2004).The emphasis is to focus more on the user-centered approach, which reflects the effectiveness of e-government services. This position is corroborated by USA government adopting “citizen-centeredness” as one of its principles in the implementation of its e-government strategy (Chen et al., 2006). The argument has been to change orientation from supply-side (government) to demand side (citizen), bringing to fore the related paradigm shift of “from efficiency to effectiveness” (Codagnone & Undheim, 2008; Verdegem et al., 2010; Barbosa et al., 2013) and consequently emphasizing on the citizen-centric approach.

c) Maturity Level Approach

E-government is naturally an evolutionary phenomenon and e-government initiatives should accordingly be derived and implemented (Gupta & Jana, 2003). Markellos et al. (2007) and Jayashree & Marthandan (2010) also concur that e-government is not a one-stop and revolutionary but an evolutionary process involving multiple stages or phases. Different authors have developed different models of e-government to demonstrate how e-government is transformed by bringing out the purpose, objectives and expected outcomes of e-government.

To guide and benchmark e-government development, researchers and academia proposed different types of e-government growth models, the so-called maturity models. These models outline various stages that governments go through in e-government development (Karokola & Yngström, 2009). Some of the models that have been proposed to explain the evolution of e-government includes: Layne & Lee (2001), Baum & Di Maio, World Bank (2003), and the United Nations (Ronaghan, 2001) as discussed in section 2.2 above. Coursey & Norris (2008) summarized the main models as depicted in table 1.

d) Outcome and Impact Approach

It is evident from the extant literature that very few studies have focused on outcome and impact of e-government initiatives (Heeks, 2006). Examples of studies in this category that depict outcome and impacts include: eGEP (e-Government Economic Project), Verdegem et al. (2010) and Bhatnagar & Singh (2010).

Impacts are the direct or indirect results of e-government uptake on the target population (Verdegem et al., 2010). Approaches to outcome and impact assessment involve analysis of the effect of e-government on the economic, social and political processes such as cost-benefit analysis, effectiveness and efficiency of organizational processes and trust in government (Kunstelj & Vintar, 2004). The outcome and impact approach of e-government assessment can be viewed from the internal (government agency) or external (citizens and businesses) perspective.

2.7.3 Public Value

When evaluating the impact of e-government most researchers are tempted to apply methodologies and measurement indicators that emphasize economic value as viewed from the private sector perspective (Liu et al., 2008, Alshawi & Alalwany, 2009). On the other hand, others have attempted to apply technological value as viewed from the technology perspective. Technological value is derived from how well technology makes information and services accessible, its reliability and usability. It is imperative to note that while private enterprises are driven by the motivation to make money (economic value); government institutions and agencies are driven by public or social value, which is the need to serve the public.

Savoldelli et al. (2013) argue that public administration is aimed at producing value for citizens and therefore e-government by extension is a means of producing and delivering ‘public value’ through the use of ICT. Public value is defined as “the value created by government to citizens

through services, laws, regulation and other actions" (Heeks, 2006; Castelnovo& Simonetta, 2007; Kearn 2004; Savoldelli et al. 2013). Public value is an approach of evaluating the societal-level impact of e-government services. E-government initiatives are mostly driven by government agencies with the aim of serving the public and therefore should be driven by public value. Public value is determined by needs, demands and preferences of citizens. There are three important sources of public value: high quality services, outcomes and trust (Kearn, 2004).The argument have been to change orientation to focus on a citizen-centric perspective (Codagnone & Undheim, 2008; Verdegem et al., 2010).

It is important to develop a conceptual model that is citizen-centric meaning that it will geared towards evaluating impact from citizen's perspective and also support the concept of public value. This is attributable to the fact that although e-government benefits businesses and government, the greatest taxpayer and beneficiary is the citizen. Thus the focus of our study is on the impact of e-government from the citizen's perspective. E-government is also a means of introducing public reforms and enhancing public value and should therefore be viewed from the perspective of the citizen.

2.7.4 Frameworks for E-government Measurement and Benchmarking

Some studies (Alshawi & Alalwany, 2009) confirm that there is no single measurement or evaluation framework that will be applicable to all contexts and target groups and therefore the social, environmental and technical context of evaluation needs to be considered. Alshawi & Alalwany (ibid) also contend that there are challenges in determining and quantifying the precise benefits and impact of e-government. There are several e-government measurement and benchmarking models/frameworks that were identified and are discussed below:

The **UN Global E-government Survey** model uses the e-readiness approach in assessment of e-government. This survey provides a useful composite score for analyzing each of the UN member country's E-government Development Index (EGDI). It measures the willingness and capacity of public administration to use IT to deliver public services (UN, 2013). It is a composite index that assesses a state's web measure index, telecommunication infrastructure and human capital index. This index helps policy makers to know where their country stands in comparison to other countries and plan for future developments that would improve the index. It also highlights good national e-government practices identified throughout the world (Curtin, 2006; Fitsilis et al., 2010).

Accenture (2001) published a benchmarking report on ranking of the status of government websites in terms of the information and services they provide to citizens. The survey was based on supply-side, specifically on the typical services e-government should provide through the Internet to satisfy the needs of citizens and businesses. Two measures were used to determine the e-government maturity: quality of service maturity and delivery maturity. These were then combined to find the overall maturity. The survey assessed government websites to determine the quality maturity of services and level at which the government conducts electronic transactions. Quality of services maturity was categorized into three levels of maturity: publish, interact and transact which is based on Howard's three-stage e-government model: publish, interact and transact (Karokola & Yngström, 2009; Peters et al., 2004).

Cap Gemini, Earnest & Young (2002) benchmarking study focused on the supply-side of e-government based on the online front-office public service provision from government websites. The initial survey covered 17 countries comprising the 15 member states of the EU, Norway and Iceland. The objective of this benchmarking study was to measure progress in the development of e-government in participating countries and compare their performance. The European Commission defined a list of twenty (20) basic public services offered to citizens (G2C) and businesses (G2B) for which online sophistication had to be benchmarked. Twelve of the services are geared towards citizens (G2C) and eight towards businesses (G2B). The evaluation framework is based on a four-stage model: information, one-way interaction, two-way interaction and full electronic case handling.

Accenture (2005) used a different approach from Accenture (2001) and evaluated e-government performance of the public sector from a citizen-centric perspective. The research was based on four key elements: a) a citizen-centered perspective b) cohesive multi-channel service c) fluid cross-government service and d) proactive communications and education. From the research finding, high performers in the public sector base the value on two criteria: the outcomes they deliver (citizen focus) and cost-effectiveness they achieve (accountability and transparency) in offering services (Fitsilis et al., 2010). Accenture (2005) also uses the notion of shared services in public sector and defines it as "the consolidation of administrative or support functions (such as human resources, finance, information technology and procurement) from several departments or agencies into a single, stand-alone organizational entity whose only mission is to provide services as efficiently and effectively as possible".

eGEP (e-Government Economic Project) - The European Commission proposed the eGEP (2006) measurement framework for examining the different values in e-Government. The model is built around the three value drivers of efficiency, democracy, and effectiveness which relate to organizational, political and user values respectively. The model is elaborated in such a way as to produce a multidimensional assessment of the public value potentially generated by e-Government. eGEP was developed on the basis of review of MAREVA (Method of Analysis & Value Enhancement) and other frameworks. eGEP measurement framework is not restricted to quantitative aspects of impact but also incorporates some qualitative aspects (Bhatnagar & Singh, 2010). MAREVA evaluation methodology provides a detailed method of computing costs and gains for an institution or agency to calculate the expected Return on Investment (ROI) before a project is taken up. It is based on supply-side and on four success criteria for projects: strategic alignment; economic justification, risk adjustment and follow-up of expected results. However, it suggests four other parameters on which a project should be assessed based on necessity of the project: level of risk, benefits to employees and society, and concrete benefits to clients (Electronic Administration Development Agency & Bearing Point, 2005).

WiBe (Economic Efficiency Assessment) methodology is a framework used to assess the economic value of ICT projects. It is based on three main factors: profitability, investment & development costs and operating costs & benefits. It applies the economic concept of Net Present Value (NPV) and also mostly based on supply-side assessment with detailed templates for calculating cost and revenue (Bhatnagar & Singh, 2010).WiBe not only uses quantitative (monetary) measures but also uses limited qualitative aspects, which are detailed in the benefits analysis.

Victor et al. (2007) emphasizes the importance of post-implementation audit and evaluation of projects in e-government based on Key Performance Indicators (KPIs). The authors portend that such evaluation can provide useful information for feedback, lessons learnt and improvement of future projects. This model is based on CMM (Capability Maturity Model) and COBIT (Control Objectives for Information & related Technology) process maturity frameworks and does not define specific metrics or indices for evaluation (Fitsilis et al., 2010). It recommends that the balanced score card approach be applied when using the model. The model is largely based on supply-side approach, emphasizes good project management and root cause analysis approach to facilitate corrective actions. Evaluation is done *ex post* and based on Information Systems used to implement e-government.

Liu et al. (2008) proposed an e-government measurement framework based on Key Performance Areas (KPAs) and Key Performance Indicators (KPIs) for the various e-government stakeholders. The framework considers e-government strategy as an important evaluation dimension and therefore measures success against strategic achievement (Fitsilis et al., 2010). Public and private entities are driven by different motives and hold different value perspectives, the former being to create public value and the later economic value. Private ventures use sophisticated measures that include the following methods: turnover, cash flow, economic value added (EVA), net present value (NPV) and return on investment (ROI) which might not be relevant to e-government projects. This framework is broadly based on the concept of public value and looks at the returns from the citizen-centric perspective.

The framework is based on three level analyses: 1) value category 2) key performance areas (KPAs) and 3) key performance indicators (KPIs). It consists of four value categories, which include: financial, social, operational (foundational) and strategic (political) values. KPAs are defined for each value category and ultimately KPIs for each KPA.

E-governance Assessment Framework (EAF) is used for assessing e-government projects in various dimensions. EAF was developed with the objective of ensuring that the government gets value for money and ensuring successful implementation of current and future e-government projects. The framework assesses the services that the government offers to citizens both urban and rural (G2C), businesses (G2B) and government (G2G). The framework further categorizes projects by size of investment (small, medium, large) and whether they are initial or continuing projects. Since there are many parameters involved and the assessment may take a great deal of time and effort, assessment can be done in two tiers: Summary Assessment (SA) and Detailed Assessment (DA). This framework gives a provision of five key attributes to be evaluated: service orientation, technology, sustainability, cost-effectiveness and replicability; each with sub-indicators and assigns weights to the different attributes with service orientation being given the highest weight meaning that it is more citizen-centric. The framework also gives a detailed methodology to be followed for both SA and DA.

Table 7 summarizes the approaches and key concepts advanced by the frameworks:

Table 7: Analysis of e-government Evaluation Frameworks

Author/Framework	Key Concepts	Approach
UN, E-Government Development Index	- Benchmarking index for UN member countries - Composite score consisting of: Online index, telecommunications index and human capital index - Measures e-participation - Includes both quantitative and qualitative measures	- E-Readiness - Maturity Level
Accenture (2001)	- Based on typical services government should offer to citizens - Assessed government websites on their service maturity and delivery maturity - Services categorized into 3 levels: publish, interact & transact - Applies both qualitative and quantitative measures	- Front Office –supply-side - Maturity model
Cap Gemini, Earnest & Young	- Benchmarking of 15 EU member states, Norway and Iceland - Based on 20 basic services offered to citizens and businesses - Based on a four-stage model: Information, One-way Interaction, Two-way Interaction and Full electronic case handling	- Front Office –supply side - Maturity Level

Accenture (2005)	- Benchmarking of selected countries
	- Based on
	  - Citizen-centered perspective;
	  - Cohesive multi-channel service;
	  - Fluid cross-government service; and
	  - Proactive communications and education
	- Services categorized into 3 levels: publish, interact & transact
	- Applies notion of shared services
		- Front office-demand-side
		- Maturity Level

eGEP	- Key value drivers of efficiency, democracy and effectiveness - Uses both quantitative as well as qualitative indicators - Multi-dimensional assessment of public value - Derived from MAREVA	- Outcome and Impact (Citizen and Agency-centered)
WiBe (Economic Efficiency Assessment)	- Computes NPV, profitability, investment & development costs and operating costs and benefits - Computes cost and revenue using detailed templates - Mostly uses quantitative but has some qualitative aspects	- Outcome and impact (Agency-centered)
Victor et al. (2007)	- Post-implementation audit on IS project management - Provides feedback for future projects - Does not provide for specific indicators - Uses KPIs and based on CMM & COBIT maturity frameworks	- Front Office– supply side
Liu et al. (2008)	- Based on 3 levels of analysis: value category, KPAs, & KPIs - Value categories include: financial, social, operational and strategic values - Uses KPAs and KPIs for various stakeholders - Based on the concept of public (social) value	- Outcome and Impact (Citizen-centered)

E-governance Assessment Framework	- Based on 5 key attributes (service orientation, technology, sustainability, cost-effectiveness and replicability) each with specific sub-indicators & weights - Emphasizes more weight on citizen orientation - Gives detailed methodological approach - Has summary and detailed assessment - Assesses services offered: G2C, G2B and G2G	- Outcome and Impact (Citizen-centered)

A majority of the frameworks are based on maturity models and e-readiness and few are based on demand-side (citizen's perspective) as corroborated by Codagnone & Undheim (2008) and Savoldelli et al. (2013). Most of them use quantitative as opposed to qualitative indicators. In line with the emerging concept of public value which encourages participation and engagement of citizens, focus is shifting from supply-side to demand-side measurement and evaluation.

Most of the measurement and evaluation frameworks and especially those with supplier-side orientation and those carried out by consultancy firms (Accenture and Cap Gemini, Earnest & Young) have been criticized by many scholars for not being objective and lacking the rigour to present valid, transparent and comparable results that can be trusted (Verdegem et al. 2010;Codagnone &Undheim, 2008).

2.8 E-Government Impact Evaluation and Measurement

In spite of the implementation of e-government over a long period of time, there is little research that has been conducted in the context of developing countries to benchmark or evaluate the impact of e-government initiatives on the target groups and governance in general as established from literature review. The European Commission (2006) and Verdegem et al. (2010) concur that while there is a broad consensus on the fact that the introduction of ICT in government has spurred positive change, there is still a lot to be done to demonstrate economic impact and social acceptance of ICT technology.

Studies on adoption of ICT and e-government in particular have been carried out to a large extent. Basant et al. (2006) highlights some of the determinants of ICT adoption and impact of ICT investment. However, similar studies have not been conducted on the impact of e-government on the lives of citizens in developing countries. It is imperative to assess the impact of e-government projects to justify expenditure of public funds by government and guarantee public value and return on investment. Madon (2004), Bhatnagar & Singh (2010), Alshawi & Alalwany (2009) and Miyata (2011) also lament that there are few documented studies on the valuation of the social and economic impact of e-government projects and particularly in developing and least developed countries (LDC). This is corroborated by reports by the United Nations and the World Bank.

2.8.1 Frameworks for E-government Impact Evaluation

a) Kearn (2004)

Kearn (2004) advanced the concept of "public value" as proposed by Kelly et al. (2002) and argues that we should use this concept in relation to e-government. Public value is the value realized by citizens from the consumption of government services. This leads to improved quality of life and trust in government; better enforcement of law; and improved public services among others.

Savoldelli et al. (2013) argues that e-government is a means of public administration delivering required services and information to the citizens and should therefore be viewed as a means of the government adding public value. Over time, this concept has increasingly been used to evaluate the performance of public service as it provides an elaborative framework for evaluation (Karunasena & Deng, 2009).

Kearn (2004) argues that public value is derived from three important sources: a) delivery of high quality services; b) achievement of outcomes desirable by the public; and c) trust in public institutions. Delivery of high quality services is manifested through: availability of the service, user satisfaction, perceived importance of the service, fairness in its provision and its cost. The achievement of outcomes desirable by the public includes improvement in literacy levels, health, environment, employment and reduced poverty. E-government provides both opportunities and threats with relation to trust. Issues of confidentiality, privacy and security of citizens' information should be managed effectively to increase trust in government.

Kearn (2004) argues that when interpreted in the context of e-government, public value translates into a set of criteria against which success should be measured: delivery of high quality services; improved delivery of outcomes and high levels of trust between citizens and public institutions.

Kearn (2004) emphasizes that perception of *high quality services* are driven by five major factors that include:

i) **Availability of service** – citizens will usually derive benefits from the utilization of public services; however, services have to be available to add value. The level of uptake will usually give a good indication of whether the services add value or not.

ii) **User satisfaction**– satisfaction levels is a good indication of the quality of services offered. User satisfaction is driven by the following factors: quality of customer service, level of information available and the degree of choice on how to access and make use of the available services.

iii) **Importance of service** –it is assumed that there is a link between the perceived importance of a service and the satisfaction levels. For instance, high levels of satisfaction will be experienced with essential services such as security, education, health and transport.

iv) **Fairness of service provision** – most citizens concur that services should also target the less fortunate and particularly those in dire need of the service. This suggests that there is public value in fairness of service and on the progressive universal approach to deciding the terms of access to services.

v) **Cost** – The issue of cost in the provision and access of services plays a key role in adding public value. Citizens should have a perception that the cost of services are reasonable and commensurate to the range and quality of services provided.

The second source of public value is derived from achievement of outcomes desired by the public. The desired outcomes will cover areas such as: public health, peace and security, education, improved environment and reduced poverty. It may be difficult over time to identify which interventions contribute to a desired outcome hence bringing to fore the problem of causality.

The third source of public value is trust in public institutions. It is an important source of public value because a decline or total collapse in trust may erode the other outcomes achieved or diminish the capacity to add public value. This is attributable to the fact that trust is at the heart of state-citizen relationship. Trust is important in areas such as security and health. Some authors argue that citizen's trust in government is determined primarily by the government's effectiveness in delivery of public services.

Table 8: Sources of Public Value (Kearn, 2004)

Delivery of Quality Services	Achievement of outcomes	Trust
Availability of service	Improvement in: • health • environment • education • peace and security	Trust in public institutions
User satisfaction		Confidentiality
Perceived importance of service		Privacy and security
Fairness in service provision		
Cost of service	Reduced poverty	

Heeks (2006) developed a set of indicators for measuring public value from Kearns (2004). These are summarized as shown below:

Table10: Indicators for e-Government Public Value (Kearn's Approach): Source: Heeks (2006)

Value Domain	Indicator	Description
Quality Service Delivery	Take-up	The extent to which e-government is used
	Satisfaction	The level of user satisfaction with e-government
	Information	The level of information provided to users by e-government
	Choice	The level of choice provided to users by e-government
	Importance	The extent to which e-government is focused on user priorities
	Fairness	The extent to which e-government is focused on those most in need
	Cost	The cost of e-government information/service provision
Outcome achievement	Outcome	E-governments contribution to delivery of outcomes
Trust in public institutions	Trust	E-government's contribution to public trust

The fourth dimension of public value as advanced by Karunasena & Deng (2009) is "effectiveness of public organizations." Karunasena & Deng (2009) proposed a conceptual framework for evaluation of public value with the various indicators associated with each dimension as shown below:

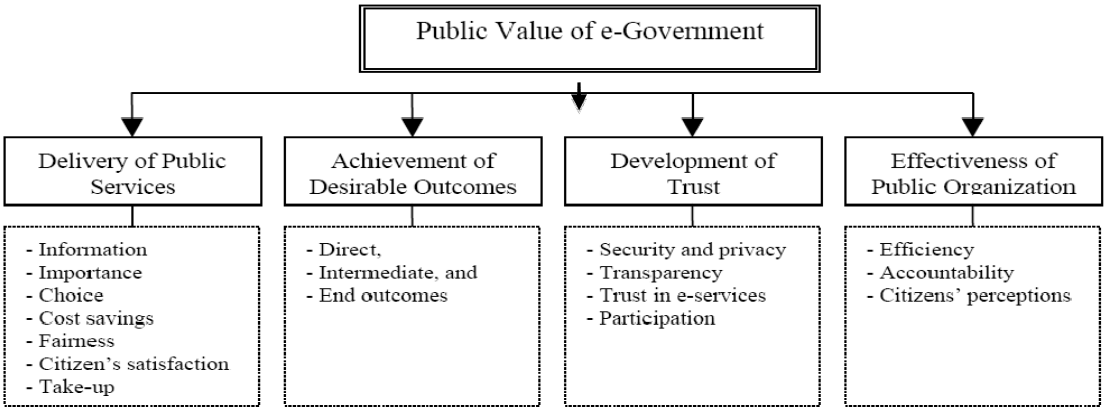


Figure 4: Framework for Evaluating Public Value: Adopted from Karunasena & Deng (2009)

Karunasena & Deng (2009) framework attempts to address some shortcomings of Kearns (2004) framework, which does not give indicators for measurement of public trust. However, our model is citizen-centric and therefore, the fourth dimension proposed by Karunasena & Deng (2009), which is based on effectiveness of public organizations, will not be appropriate in our context since our study is based on a citizen-centric perspective.

b) Wang & Liao (2008)

Wang & Liao (2008) adopted the updated Information Systems (IS) success model of DeLone & McLean (2003) for assessing success e-government projects and defined an evaluation framework for measuring the success of G2C Information Systems from the citizen's perspective. IS success is the dependent variable (DeLone & McLean, 1992) that is used to measure the effectiveness (influence) or *impact* of the implementation of Information Systems on the targeted user. The original IS success model developed by DeLone & McLean (1992) proposed six interdependent constructs for IS success: Information Quality, System Quality, Use, User Satisfaction, Individual Impact and Organizational Impact as shown below:

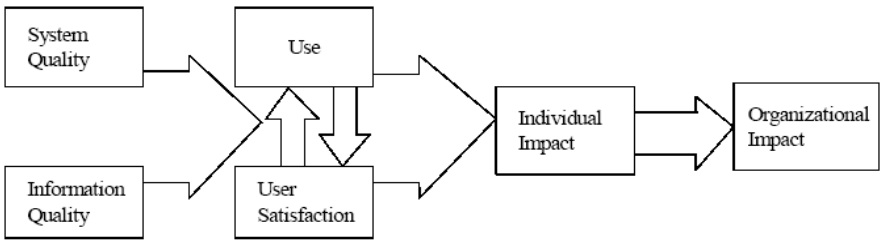


Figure 5: DeLone & McLean (1992) IS Success Model

From the study by DeLone & McLean (1992), it was established that there was a plethora of indicators identified from previous studies for measuring IS success but there was no consensus on which ones were appropriate in varied contexts. Therefore, there was need to synthesize, consolidate and reorganize this information into one single and coherent model to inform and guide future research. DeLone & McLean (ibid) made a successful attempt at consolidating these indicators by developing an appropriate taxonomy culminating in a model with six interdependent and interrelated constructs as shown in figure 5. It was also established that no single indicator or measure is better than the other and the choice is based on the objective of study, the organizational context, aspect of IS addressed by the study, independent variables of the study, research methods and unit of analysis (individual, organization or society).

From their model DeLone & McLean (1992) defined System Quality by the desired characteristics (such as reliability; accessibility; response time; flexibility and user friendliness) of an IS that will be used to produce the required information. Information Quality on the other hand is the required characteristics (such as accuracy, meaningfulness and timeliness) of the information produced by the IS. User Satisfaction and Use are measured by the extent of influence that the information produced by the IS has on user satisfaction and use of the IS by the users or decision makers. Use is measured by characteristics such as number of records accessed, frequency of access and regularity of use. Individual impact is influence that the information produced by an IS has on management decisions and is measured using decision quality, timeliness and effectiveness. Further, organizational impact is the influence that the information produced by the IS has on organizational performance and is measured using indicators such as reduced operational costs; increased sales and revenue; return on investment; and increased profitability.

DeLone & McLean (1992) in their assessment of measurement of impact for not-for-profit or government institutions argued on the use of productivity gains as a measure of organizational impact. The proposed five performance measures for productivity gains were: staff reduction, cost reduction, increased work volume, new information and increased effectiveness in serving the public which implies improved 'public value'. One point of caution given by DeLone & McLean (1992) was that their model was not empirically tested and required further development and validation. Therefore, researchers should use it to inform the development of a more comprehensive success construct rather than use it to support their chosen success construct.

DeLone & McLean (2003) proposed an updated model after review of ten years of published literature relating to their original model and in line with the introduction and widespread use of e-commerce. From the literature review, DeLone & McLean (2003) identified various dimensions of impacts such as work group, consumer, societal and industry impacts that had been suggested by different authors. The revised model introduced "Service Quality" and grouped all impact measures into a single impact measure called "perceived net benefits".

In the revised model, quality has three main dimensions: system, information and service quality. Service quality as variable of IS success is measured using indicators like responsiveness, reliability, assurance and empathy in the support offered by the service provider to the end-user. Instead of complicating the model by using the various dimensions

of impact, DeLone & McLean (2003) consolidated all these impact measures into a single measure called "*perceived net benefits* "to maintain model parsimony as shown in figure 6.

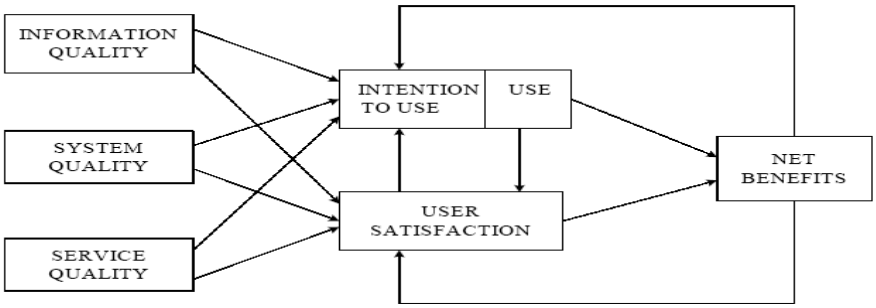


Figure 6: DeLone & McLean's (2003) Updated IS Success Model

Wang and Liao (2008) adopted the updated IS success model of DeLone & McLean (2003) for assessing success in e-government projects. E-Government projects use web-based Information Systems to provide the required e-government services to citizens (G2C) therefore making them amenable to DeLone & McLean (2003) IS success model. The model is citizen-centric (G2C) and uses six key dimensions: Information Quality, System Quality, Service Quality, Use, User Satisfaction, and Perceived Net Benefit (benefits from citizen's perspective).The feedback loops from 'perceived net benefits' to both use and user satisfaction were dropped to avoid complicating the model and maintain model parsimony. The research model used by Wang and Liao (2008) is represented below:

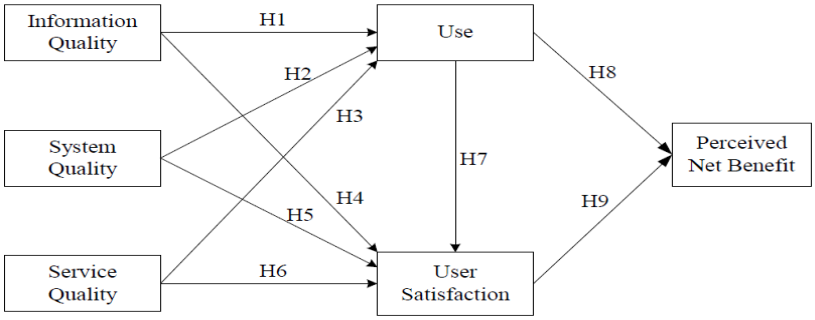


Figure 7: Wang & Liao Research Model

Wang & Liao (2008) identified and evaluated a number of factors that affect success of e-government services. Structural Equation Modeling (SEM) technique was applied to the data collected and the hypothesized relationships were marginally or significantly supported except for the relationship between system quality and use (H_2). From this model, it can be concluded that service quality, information quality, system quality, use, user satisfaction and 'perceived net benefits' are valid measures of e-government systems success.

However, it is observed that the model does not include economic and environmental factors that affect e-government success such as the cost of accessing the service, perceived importance or usefulness of the service, perceived trust of the service by citizens and facilitating conditions (e-government readiness).

c) Bhatnagar & Singh (2010)

Bhatnagar & Singh (2010) and Alshawi & Alalwany (2009) portend that although there are a lot of initiatives and investment in e-government, there are few studies that have been carried out to measure the impact of e-government on the target audience. This is attributable to the lack of appropriate frameworks and methodology for assessing the impact of e-government particularly in developing countries. Bhatnagar & Singh (2010) state that the objective of their study was to develop a methodology of assessment that was appropriate for developing countries to justify investment in e-government and to establish performance benchmark for future projects. The project was largely funded by the World Bank. The study aimed at measuring the impact of computerization of selected projects on e-government services delivery to the citizens and testing the applicability of the framework across the different projects.

In their paper, Bhatnagar & Singh (2010) propose an assessment methodology that identifies e-government service delivery as impacting on three groups of stakeholders: clients receiving the service; the agency that delivers the service; and the wider community consisting of citizens, businesses and civil society. The argument put across is that most previous studies have attempted to evaluate impact from government agency perspective and very few have done this from the citizen perspective. These studies have focused on financial indicators such as operating costs, return on investment, gained revenue, cost savings, benefits and improved efficiency (Jukić, et al.; 2013; Barbosa et al.; 2013).

The framework proposed by Bhatnagar & Singh (2010), however, emphasizes two public value drivers: 1) cost of accessing e-service and 2) perception by the public on the quality of service and governance with limited highlights on the financial cost-benefit impact on the government agency implementing the project. The assessment methodology emphasizes the concept of ‘public value’ and ‘citizen centricity’ as advanced by Kelly et al. (2002), Kearn (2004), Codagnone & Undheim (2008) and Karunasena & Deng (2009).

The study recognized that the previous studies on e-government evaluation could be categorized into two main approaches: 1) studies that were largely anecdotal and done in a piecemeal fashion with little prospect for generalization as the rigours of an objective research process were not followed 2) studies that were structured and more focused on developing frameworks for measurement of the different value components delivered to various stakeholders with the frameworks being applied to individual projects either *ex ante* or *ex post*.

A number of frameworks based on the second approach were identified including: eGEP (2006) measurement framework developed by the European Commission and is built around three value dimensions of efficiency (organizational value), democracy (political value), and effectiveness (user value); MAREVA (A Method of Analysis and Value Enhancement), developed by the French Electronic Administration Development Agency (ADAE) and Bearing Point (2005); WiBe Economic Efficiency Assessment methodology (Federal Ministry of the Interior, Germany, 2004) and the E-government Assessment Framework (EAF).

Majority of these measurement frameworks were developed and applied in the context of developed countries, which have a different setup and assumes *self-use* of computers to access e-government services as opposed to delivery through common service centres (one-stop-shop) and franchise outlets that are common in developing countries. Developing countries also grapple with the issue of payment of bribes when accessing government services and the framework attempted to address this aspect which is not common in developed economies.

The proposed framework focused on measurable outcomes and not long term impacts which may require longitudinal studies and may be difficult to isolate the impact that are attributable to the specific intervention. The framework applies both quantitative and qualitative indicators for measurement. Qualitative indicators like implication of e-government on governance and society in general though may appear subjective are important in gauging the level of impact on the different stakeholder groups.

The assessment framework borrows some ideas advanced by some frameworks discussed earlier of measuring value delivered to different stakeholders and identifying multiple components of value to be measured in different ways. Bhatnagar & Singh (2010) define indicators on which impact would be evaluated and a methodology suitable for developing

countries. The framework has the following aspects that are adopted and are relevant in the context of developing countries: costs of clients accessing service which utilizes *'assisted service centres* 'rather than *'self-use'* and includes cost of bribes and trips made when seeking service; detailed methodology on how to "assess the impact" on manual and computerized systems; and a method to capture the overall rating of a project based on qualitative assessment of certain factors.

The indicators for measuring value drivers for the different stakeholders as advanced by the proposed assessment framework are summarized below:

Table 9: Indicators for outcome dimensions: Adopted from Bhatnagar & Singh (2010)

Stakeholder	Key dimension of impact
Client	**Cost of accessing service measured directly** (tavel costs; estimates of wage loss due to time spent in travelling; total time elapsed before receiving service; amount paid as bribes or service charge to facilitate service)
	Quality of governance (extent of bribery in the working of the system; extent of accountability by officers; transparency of rules and procedures; availability of feedback mechanisms)
	Quality of service (Quality of interaction with officers providing service; satisfaction with complaint-handling and resolution mechanisms; perception about confidentiality & security of data; convenience of access & working hours)
	Overall assessment (preference of computerized system to the manual system; composite score by factoring attributes of service delivery that are seen to be important by users)
Agency	**Economic impact measured directly** (increase in revenue, reduce cost of office space, paper, manpower and travel)
	Quality of governance (Extent of corruption among employees; accountability of employees, transparency of decisions procedure and information for internal & external clients; employee participation in decision processes)
	Performance in key non-economic objectives (targeting of clients and equity in coverage)
	Process improvement (reduced employee workload, improved work environment & supervisory control)
Society/ Government as a whole	**Long-term impact on (Millennium Development Goals (MDG)**
	Image of the government

The elements used as indicators were identified by analyzing intended outcomes from a number of projects in developing countries, some frameworks developed by specialist from India and validated through consultations with a team of experts in e-government. The assessment framework was tested for applicability with a number of mature e-government projects in India and the results were positive.

The assessment methodology identifies and provides an elaborate tabulation of the variables used for measurement and is based on the context of a developing country. However, one of its shortcomings is that it a measurement framework and does not give a conceptual model of the causal relationships among the various constructs identified.

d) Verdegem et al. (2010)

Verdegem et al. (2010) developed an e-government evaluation model to investigate relationships between contextual variables and availability of e-services using a data-driven approach. The study was based on demand-side and not supply side approach to e-government which has been criticized by other scholars (Codagnone & Undheim, 2008; Bhatnagar & Singh, 2010). This measurement model is based on a previous study done by Codagnone & Undheim (2008) and is guided by the paradigm shift "from efficiency to effectiveness" which is closely related to shift from government agency to citizen orientation.

This study confirms that one of the greatest challenges in e-government is uptake in use of e-government services as also confirmed by Codagnone & Undheim (2008), Alshawi & Alalwany (2009), Kearn (2004) and Karunasena & Deng (2009). Verdegem et al. (2010) framework provides for specific measurement and evaluation indicators including contextual variables. Verdegem et al. (2010) argue that there are three key goals in public service delivery: efficiency, effectiveness and good governance. These are seen to affect three key stakeholders: government, citizens and the society respectively as also emphasized by the eGEP (2006) framework. Efficiency is the search for cost savings which is seen to affect the government agency while effectiveness is the search for quality services as seen from the citizen perspective and good governance is value for the society.

The basic question in e-government measurement and impact assessment has been what to measure and how to measure it (Heeks, 2006). Verdegem et al. (2010) building on the earlier works of Codagnone & Undheim (2008) developed a measurement framework with four components in the public service value chain: input, output, outcomes and impact. According to Verdegem et al. (2010), inputs are monetary and non-monetary costs for production of outputs leading to outcomes and impact. Output is seen as provision of the e-services (availability) from the government perspective therefore emphasizing traditional supply-side benchmarking. In the study, outcomes were perceived as issues preceding acceptance of e-government; uptake and usage of e-government whereas impact was perceived as the direct or indirect consequence of e-government uptake. Impact was further

grouped into four categories: impact on users, suppliers, economy and society as also corroborated by DeLone & McLean (2003) IS success model in the measurement of the 'perceived net benefit' dimension which comprised of various categories of impacts.

The input-output-outcome relation does not exist in a vacuum and is influenced by contextual variables mostly related to e-readiness and includes factors such as infrastructure, human skills, policy, politics and cultural issues. The proposed general framework for e-government impact assessment is shown below:

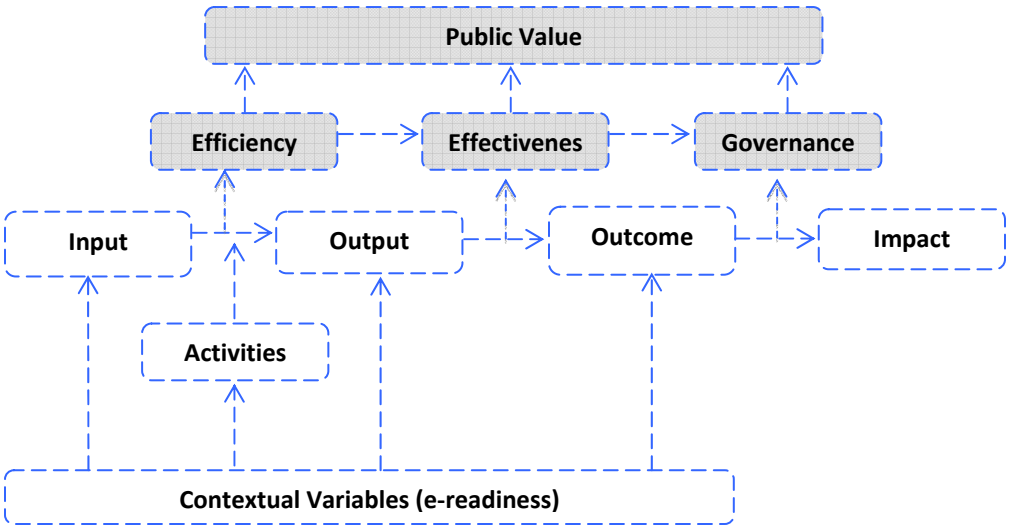


Figure 8: Framework for e-government impact Evaluation: Adopted from Verdegem et al. (2010)

In the study each of the domain areas was related to key indicators and sub-indicators that were used for measurement. In the study, a total of 830 e-government measurement and evaluation indicators were formulated corresponding with approximately 160 key indicators.

2.8.2 Analysis of Impact Evaluation Frameworks

Bhatnagar & Singh (2010) proposed a framework in which the impact measurement is based on the perceived and estimated difference between the manual and computerized system. The framework studies measurement from the perspective of three key stakeholders: clients using the service, agency delivering the service and the wider community. Since our proposed framework is citizen-centric, we narrow our focus to clients as the key stakeholders using e-service and focus on impact measure from their perspective. When analyzing impact evaluation frameworks, it important to consider aspects of efficiency, effectiveness and governance strictly from the citizens' perspective. When viewed from the citizen perspective; efficiency measures aspects of cost of accessing services; effectiveness measures perception of quality of service and governance measures citizen perception of governance, their trust in government and effect on corruption.

Kearn (2004) advances the concept of public value as proposed by Kelly et al. (2002) with three key dimensions: quality of service, achievement of outcomes and trust. The framework is enhanced by Karunasena & Deng (2009) by adding a fourth dimension of "effectiveness of public organizations" and developing elaborate measurement indicators for all the concepts.

Wang & Liao (2008) adopted the updated DeLone & McLean (2003) IS success model for assessing success in e-government systems. The model had six interdependent dimensions: information quality, system quality, service quality, use, user satisfaction, and perceived net benefit. Perceived net benefits as a dependent variable was defined as **impact** realized by different stakeholder groups including: individuals, work groups, organization, society and industry. Wang & Liao's e-government success model was applied to G2C systems therefore making it citizen-centric.

Codagnone & Undheim (2008), Bhatnagar & Singh (2010) and Verdegem et al. (2010) emphasize the concepts of efficiency, effectiveness and governance. Verdegem et al. (2010) in their study elucidate the key domains of: input, output, outcome and impact and explain the transformations from one level to the other. They explain that contextual variables consist of different categories of e-readiness indicators that have an indirect influence on the progress of e-government. These include: ICT infrastructure, literacy levels and ICT skills needed in accessing services as viewed from the client perspective. Legal framework and other factors such as regulation, policy & politics also affect uptake and utilization of e-government services.

2.9 Conceptual Framework

2.9.1 Background

A conceptual framework is defined as a network of linked concepts, which normally involve multidisciplinary bodies of knowledge and are derived from literature review. It summarizes the existing theories, concepts and parameters impacting on the outcome of these theories. It is a product of a qualitative process of theorization. A conceptual framework lays out the key factors, constructs or variables and presumes relationships among them. It is not merely a collection of concepts but a representation in which each construct plays an integral role. It also provides a starting point for observations and interview questions (Jabareen, 2009). The process of developing a conceptual model requires conceptual analysis with the following main issues addressed: identifying, reviewing and categorizing data sources; identifying, naming, categorizing and integrating concepts; synthesizing, re-synthesizing and validating the conceptual model.

The arguments and discussion in the preceding sections present important concerns for impact evaluation of e-government initiatives in developing countries and Kenya in particular. E-government projects are likely to fail and not realize the intended impact if these concerns are not addressed adequately. The discussion above lays the basis on which we can perform a theoretical framework analysis to help generate, identify and trace our phenomenon's major variables, concepts and relations among them, which together, will constitute our conceptual model (Jabareen, 2009).

There are numerous concepts and theories on evaluation of e-government impact that have been formulated. These could be seen from the perspective of businesses and citizens who benefit from the services and government agencies implementing e-government projects. Impact is directly or indirectly affected by the uptake of e-government initiatives (Alshawi & Alalwany, 2009; Codagnone & Undheim, 2008; Verdegem et al., 2010; Kearn, 2004; Karunasena & Deng 2009). Quality of service, user satisfaction, cost of service and trust (Kearn, 2004) also affect the uptake and consequently the impact of e-government services.

From client perspective, factors such as ease of access to information; reduced cost in bribery; reduction in time used to access services; and savings on money spent to access the government services have a bearing on the impact of e-government. From the government agency perspective, there is reduced operational cost, improved efficiency, transparency, accountability and achievement of goals and objectives. The uptake of these initiatives, which has a direct bearing on the impact, is affected by e-readiness factors such as literacy levels, technological skills of clients, Internet penetration and attitude towards use among others.

Study on lasting change of peoples' behavior as a result of implementation of e-government services may require significant time and would be done through longitudinal studies. It may also be difficult to isolate and attribute a certain change to a particular intervention. Our study will therefore not consider the long-term impact of e-government but the intermediate impact of e-government from the citizens' perspective and by use of measurement indicators that can be collected from citizens in a cross-sectional study. The proposed framework will therefore be based on cross-sectional study of uptake, measurable outcomes and intermediate impact as a result of e-government implementation.

2.9.2 Theoretical Framework Analysis

E-government provides governments with an opportunity to provide information and offer quality services to citizens. However, it requires huge investment that is derived from public funds. Citizens must get value for money and the government must account for such expenditure by ensuring that the desired impact is achieved (Heeks, 2006).

The review of e-government impact evaluation and measurement frameworks presented in section 2.9 above provides us with the basis on which to formulate an impact evaluation framework that is citizen centric and suitable in the context of a developing country like Kenya. It is important to note that from literature review, there are very few studies that have focused '*sensu stricto'* on e-government impact evaluation (Savoldelli et al., 2013) and therefore there are hardly any models for e-government impact evaluation. Majority of the models identified and discussed above have focused on benchmarking and impact measurement which is different from impact evaluation.

There are several emerging concepts that are important and relevant in our quest for a model for impact evaluation: public value; citizen centricity, quality of service and IS success. Public value is closely related to the concept of citizen orientation and satisfaction, which fosters uptake of e-services. The proposed model must demonstrate value proposition to the public and consider citizen's perspective since citizens are the greatest taxpayers and beneficiaries of e-government (Wang & Liao, 2008). Moreover, e-government projects are driven by public value rather than economic value (Verdegem et al., 2010; Liu et al., 2008; Heeks, 2006; Carter & Belanger, 2004). Consequently, we propose an evaluation framework that is citizen-centric and imparts value to the citizens.

Kearn (2004) applied the concept of public value as initially proposed by Kelly et al. (2002). Public value is derived from three main sources: high quality services, achievement of outcomes and trust. Karunasena & Deng (2009) proposed "effectiveness of public organizations" as the fourth dimension of public value. Kearn (2004) identified elaborate measurement indicators for quality of service. However, one of the main limitations of the framework was that it did not provide measurement indicators for the dimensions of achievement of outcomes and trust. Karunasena & Deng (2009) attempted to address these shortcomings in their framework. Furthermore, the framework does not depict the causal relationships among the various concepts identified in the framework. It is important to note that the concept of public value can be effectively used to support the evaluation of the performance of e-government projects (Savoldelli et al., 2013).

Wang & Liao (2008) adopted DeLone & McLean IS success model for e-government success evaluation. The model is citizen-centric and also advances a number of concepts that are relevant to e-government impact evaluation. The model provides an elaborate framework depicting the relationships between the different concepts of IS success leading to the depend variable which is referred to as 'perceived net benefits'. It is important to note that 'perceived net benefits' basically summarizes the various types of **impacts** that are derived by the various stakeholder groups (individual, organizational, industry, societal) in the IS value chain. The model also advanced the concept of user satisfaction and quality of service, which are pertinent to the creation of public value. However, the model did not include economic and environmental factors that affect e-government impact like cost of accessing service, perceived importance or usefulness of the service, perceived trust of the service by citizens and e-government readiness. Alalwany & Alahmari (2007) proposes the use of economic variable in evaluation of e-government including cost and time savings.

Bhatnagar & Singh (2010) measurement framework though considers three groups of stakeholders; it is largely focused on the clients (citizens) receiving the service and largely addresses issues that are pertinent to developing countries including use of common service centres which we have based our study on. One of the limitations of Bhatnagar & Singh's (2010) framework is that it does not include aspects of citizen trust that develop through e-government. Alghamdi & Beloff (2014), Karunasena & Deng (2009), Alshawi & Alalwany (2009), Alalwany & Alahmari (2007) and (Savoldelli et al., 2012) emphasize the importance of assessing the effect of trust (security and privacy) on the use of e-government. Kearn (2004) argues that trust is one of the three important sources of public value and without trust it will be difficult to promote e-government use and uptake (Alalwany & Alahmari, 2007).

In spite of the fact that Bhatnagar & Singh (2010) framework is suitable to the context of a developing country; provides an appropriate assessment methodology and an elaborate tabulation of the indicators used for measurement, it does not provide a conceptual framework of the causal relationships among the various concepts and variables identified in their framework.

Verdegem et al. (2010) developed an impact evaluation framework based on studies previously carried out by Codagnone & Undheim (2008) and eGEP (2006). The study was based on demand-side and not supply-side approach and was guided by the principle of "from efficiency to effectiveness" which is closely related to citizen-centricity. The study focused on the investigation of the relationships between contextual variables and availability of e-

services. This framework introduced a very important concept of contextual variables (e-readiness), which was not common with other frameworks (Bhatnagar & Singh, 2010; Kearn, 2004; Wang & Liao; 2008) but greatly affects provision of e-services especially in the context of developing countries. The framework proposed four main domains: input, output, outcomes and impact. However, we argue that the dimension of input looks at the investment of government agencies and their efficiency (search for cost savings) in the provision of services, which is not the focus of our study. The framework provides specific key measurement indicators and sub-indicators including contextual variables.

The concepts advanced by the Bhatnagar & Singh, Wang & Liao, Kearn, and Verdegem et al. that are relevant to our study are summarized in table 10.

Table 10: Analysis of Key e-government evaluation frameworks

Framework/Model	Key concepts	Shortcomings
Kearn (2004) **Karunasena & Deng (2009)**	1. Based on the concept of public value 2. Public value has four main sources: delivery of high quality services, achievement of outcomes, effectiveness of public organizations and trust in public institutions 3. High quality services measured through: service availability, satisfaction, significance of service, fairness and cost 4. Recognizes barriers to delivery of public values 5. Supports evaluation of e-government performance	1. Measures public value and not e-government impact 2. Does not provide conceptual framework with relationships among conceptual variables
Wang & Liao (2008)	1. Measures e-government systems success based on DeLone & McLean's model 2. Used to assess G2C systems thus citizen-centric 3. Provides elaborate evaluation model consisting of 6 key dimensions: Information, System & Service Quality; Use, User Satisfaction and Net Benefit 4. Net benefits is attributable to impact derived from different stakeholder groups including individuals, organizations, workgroups, society and industry	1. Use/Intention to use is not a measure of success but a behavior 2. Used to evaluate success and not impact of e-government systems 3. Does not include e-readiness and cost which affects impact of e-government systems
Bhatnagar & Singh (2010)	1. Based on measurable outcomes that could be directly linked to delivery of e-services and not long term changes/impact 2. Suitable to the context of a developing country as it uses common service centres; 3. Measures cost of accessing service through: travel cost, bribes, estimate of wage loss, number of trips and waiting time to complete transaction 4. Considers quality of service including convenience and satisfaction with service 5. Assessed manual and computerized systems	1. Not fully citizen-centric but looks at total value delivered to: clients, government agency and society 2. Does not include trust as part of measurement 3. Does not provide conceptual framework with relationships among conceptual variables

Verdegem et al. (2010)	1. Based on 5 key domains: input, output, outcomes, impact and contextual variables 2. Provides for contextual variables that include (reliability & availability of infrastructure, literacy levels and ICT skills) 3. Longitudinal data (collected over a long period) 4. Emphasizes paradigm shift from *"efficiency to effectiveness"*	1. Not fully citizen-centric – considers input from government agency 2. Considers input/output ratio (efficiency) which does not necessarily reflect client's perception of service

2.9.3 Proposed framework

From literature review, it is evident that e-government research is not just nascent; but there is sparse theory development and testing with the exception of adoption and measurement models (Alghamdi & Beloff, 2014; Coursey & Norris, 2008; Alalwany & Alahmari, 2007; Alshawi & Alalwany, 2009). Barbosa et al. (2013) also confirm that there are inadequate performance evaluation models and measurement indicators built from the perspective of citizens therefore limiting the capability of measuring the social and economic impact of e-government. The traditional evaluation models have been criticized for being based on tangible or 'hard' benefits while ignoring the intangible or 'soft' benefits (Alalwany & Alahmari, 2007; Jukić, et al.; 2013; Barbosa et al.; 2013). The proposed e-government impact evaluation model overcomes this by incorporating both 'hard' and 'soft' benefits.

The proposed conceptual model is based on Wang and Liao (2008) IS success model and adopts constructs from Bhatnagar & Singh (2010), Verdegem et al. (2010) and Kearn (2004) models. From Verdegem et al. (2010), the researcher borrowed the constructs: e-readiness (contextual variables), outcome and impact. Outcome and impact have been combined to form the construct: 'Intermediate Impact' which is equivalent to 'perceived net benefits' in Wang and Liao (2008) model. From Bhatnagar & Singh (2010) and Kearn (2004) we borrowed the concept of Cost of Services (CS) which has an effect on Intermediate Impact (IP) of e-government. The concept of E-readiness (ER) has some effect on the Intermediate Impact (IP) of e-government because lack of the right operating environment will inhibit the uptake of services and the eventually influence the impact achieved.

The researcher borrowed Service Quality (Perceived Quality of Service) and User Satisfaction (US) from Wang & Liao (2008). Perceived Quality of Service (QS) will influence User Satisfaction (US) which will eventually influence the Intermediate Impact (IP) as proposed by Wang and Liao (2008). Perceived Quality of Service also influences the Intermediate Impact of e-government. Service is a major function of e-government. Quality of service is very important

in e-government since one of the major functions of e-government is to offer quality services to citizens. In terms of e-government, service quality is a key measurement that is affected by system quality and information quality (Sun, 2009) as shown in figure 9. Information and system quality were therefore combined to service quality as proposed by Sun (2009).

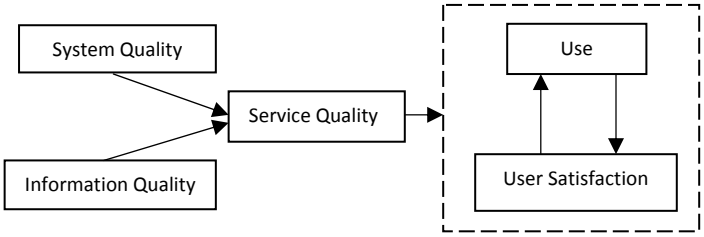


Figure 9: E-government Success Model: Adopted from Sun (2009)

The concept of Use was also dropped from our model because it is argued that use is not a measure of impact but a behavior (Rai et al., 2002). Perceived Trust (PT) and cost of service were both borrowed from Bhatnagar & Singh (2010) and Kearn (2004) as they have a significant effect on the uptake and consequently impact of e-government services and also emphasized by Alalwany & Alahmari (2007) in their proposed e-government evaluation framework. Perceived Trust (PT) in e-government will increase adoption, subsequent uptake of e-government services and eventually the intermediate impact of e-government.

Consequently, the following six concepts as defined in table 11 were identified as affecting the intermediate impact of e-government which is the complex dependent variable: cost of service, perceived quality of service, satisfaction, perceived trust and e-readiness.

Table 11: Concepts in Proposed Conceptual Model

Concept	Original name	Framework/Model
1. Cost of Service	Cost of accessing service	Bhatnagar & Singh (2010); Kearn (2004)
2. Perceived Quality of Service	Service Quality	Bhatnagar & Singh (2010); Wang & Liao (2008); Kearn (2004)
3. User Satisfaction	User Satisfaction	Bhatnagar & Singh (2010); Wang & Liao (2008); Kearn (2004)
4. Perceived Trust	Level of trust	Kearn (2004);Bhatnagar & Singh (2010)
5. E-readiness	Contextual Variables	Verdegem et al. (2010)
6. Intermediate Impact	Outcome	Verdegem et al. (2010); Kearn (2004)
	Impact	Verdegem et al. (2010); Wang & Liao (2008)

The detailed descriptions and proposed relations of the emerging constructs are given below:

1. Cost of Service (CS) – The cost incurred by users to access e-services. The cost of service will influence the Intermediate Impact of e-services. This concept was not captured in Wang & Liao (2008) and Verdegem et al. (2010) model but is reflected in the other two models discussed above.

2. Perceived Quality of Service (QS) – This is the quality of service as experienced by the citizens. This construct is derived from Service Quality as defined by Wang & Liao (2008) and emphasized by Sun (2009). Kearn (2004) and Bhatnagar & Singh (2010) also emphasize the significance of this construct. This construct will influence the Intermediate Impact. Moreover, it will also influence User Satisfaction (US), which will in turn influence the Intermediate Impact of e-services (Wang & Liao, 2008; Sun, 2009; Kumar et al., 2007).

3. Perceived Trust (PT) – This is the confidence that users will have when using e-services. The perceived level of security and confidentiality of the information users will exchange through the services will influence use of e-government services. Perceived Trust will influence the Intermediate Impact of e-services (Kearn, 2004; Bhatnagar & Singh, 2010).

4. E-Readiness (ER) – These are the contextual technological and environmental conditions that influence the utilization of e-services. This concept is captured by Verdegem et al. (2010) framework. E-readiness will influence the Intermediate Impact of e-services.

5. User Satisfaction (US)–This is the pleasurable experience that citizens get as a result of consuming an e-service (Kumar et al., 2007). This construct is emphasized in Bhatnagar & Singh (2010) framework, Kearn (2004) and Wang & Liao (2008).Citizen satisfaction will affect Intermediate Impact of e-services.

6. Intermediate Impact (IP) –These are the intended immediate results and benefits arising from uptake of e-services. Outcomes come before impact and since our study is looking at the short-term impact, we combine outcome and impact into immediate impact. This concept is advanced by Verdegem et al. (2010) and Wang & Liao (2008). It leads to sustained and significant changes in citizens' lives.

Moderating Variables

Baron & Kenny (1986) describe a moderator as a qualitative or quantitative variable that affects the strength and/or direction of relationship between an independent and dependent variable. Sometimes these are a set of socio-demographic variables that include: age, gender, internet experience, income level, education level and voluntariness of use (AlKhatib, 2013).

Previous studies on e-government systems success and adoption have considered a set of socio-demographic variables that moderate the success and adoption of e-government. The variables include among others: gender, age, voluntariness of use, education level and internet experience (AlKhatib, 2013; Weerakkody et al., 2009; Farooq & Basheer, 2015; Alshehri et al., 2012). Theories such as UTAUT, TRA and TAM have also applied most of these socio-demographic variables.

However, from literature review, UTAUT is one of the most established models and it has been used in numerous studies to establish the effect of the moderating variables gender, age, experience and voluntariness of use on adoption of technology. Weerakkody et al., (2009) conducted a citizen-centric study on adoption of e-government in Qatar. Socio-demographic variable influence rate of adoption and success of e-government systems and have been used on studies in related fields including: e-Commerce (B2C), e-learning, usage of computers and mobile phones (AlKhatib, 2013; Omwansa, 2012).

Njuru (2011b) conducted a study on perspectives of Kenyan students in the United States on e-government participation. The main research objectives of the study were to establish the relationship between: gender and frequency of e-government use; the level of education and perception of e-government; and the period of stay and the perceptions of e-government by Kenyan students living in the United States of America. The study established that gender, level of education and number of years lived in the United States of America have a significant relationship with the students perception regarding the use of e-government. In general, it was established that more female Kenyan students in the United States of America frequently use e-government than their male counterparts. It was also established that Kenyan students in the United States of America with higher education qualifications have a more positive perception of e-government compared to their counterparts with lower qualifications and the greater the number of years stayed in the United States of America, the better the perception about e-government.

Wang & Liao (2008) conducted a study on assessing e-government systems success using the DeLone and Mclean (2003) Model of IS success. Some of the moderating variables that were considered in the study included gender; age bracket (less than 20; 21-30; 31-40; 41-50; and greater than 50) and education level (high school; undergraduate and graduate). Although the finer details of the analysis and results of the moderating variables were not given in the study, our study was greatly informed by the type of moderating variables to consider and how to structure our data collection instrument.

Alghamdi & Beloff (2014) also conducted studies on adoption and utilization of e-government using their proposed E-government Adoption & Utilization Model (EGAUM). The model identified gender, age, education level, location and income as some of the factors affecting the adoption and utilization of e-government which consequently has an indirect influence on the impact of e-government. The model also identified Technical Factors (TF), Motivational Factors (MF) and Reliability Factors (RF) as independent variables having effect on the adoption and use of e-government.

Al-Shafi & Weerakkody (2010) conducted some study on the factors affecting adoption of e-government in the state of Qatar using UTAUT model and considered three moderating variables: gender, age and educational levels. The study was citizen-centric as the data was collected from citizens utilizing various e-government services.

Luk (2008) also conducted a study on the impact of e-government on the greater China; A Case Study of Hong Kong, Taiwan and Singapore. Some of the moderating variables considered during the study included: gender; age; education level and income. The study showed that all the other three moderating variables had some influence on impact of e-government except income therefore reinforcing our consideration for gender; age and education level as our moderating variables. It is also imperative from literature review that the age; gender and education are the most common moderating variables related to our study.

Based on the e-government studies conducted by Alghamdi & Beloff (2014), Njuru (2011b), Al-Shafi & Weerakkody (2010), Luk (2008), Wang & Liao (2008) and other research work on e-government adoption and success, the researcher identified and considered three moderating variables of interest that influence intermediate impact of e-government services: *age*, *gender* and *education level*. Figure 10 depicts hypothesis identifiers, constructs, mediating and moderating variables for the proposed conceptual model.

The relationships between the constructs are depicted in the proposed conceptual model below and the moderator hypothesis are represented by the arrow pointing downwards from the moderator variables gender, age and education in the order: H_{1a}, H_{2a}, H_{4a}, H_{5a}, H_{3a}, H_{6a}, H_{1b}, H_{2b}, H_{4b}, H_{5b}, H_{3b}, H_{6b}, H_{1c}, H_{3c}, H_{2c}, H_{4c}, H_{5c} and H_{6c},

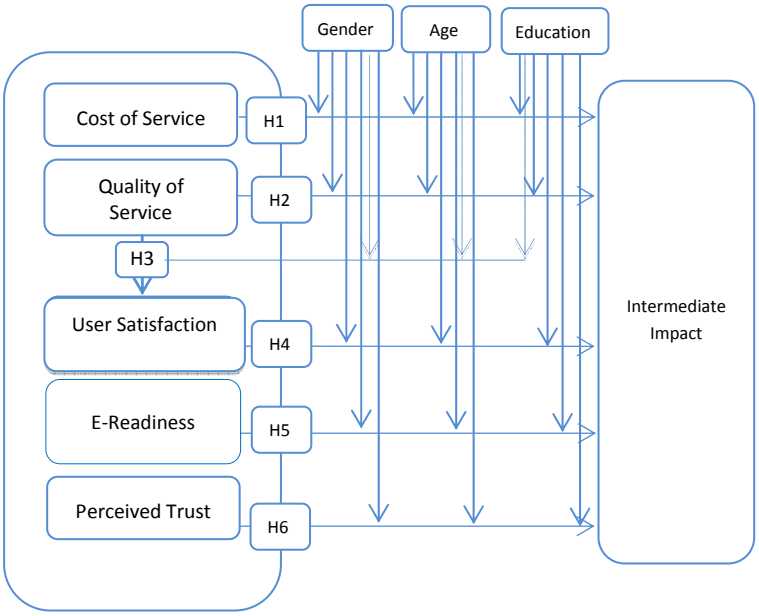


Figure 10: Proposed Citizen-Centric Conceptual Model for E-government Impact Evaluation

2.10 Hypothesis Formulation

Based on theoretical background and the proposed conceptual model, the researcher formulated hypothesis to test whether:

- QS, CS, ER, US and PT has a influence on IP; and
- QS has influence on the US

The following **null** hypotheses were consequently formulated:

- H_1– There is no significant relationship between CS and IP;
- H_2– There is no significant relationship between QS and IP;
- H_3 – There is no significant relationship between QS and US;
- H_4– There is no significant relationship between US and IP;
- H_5– There is no significant relationship between ER and IP; and
- H_6 – There is no significant relationship between PT and IP.

Our literature review identified three moderating variables that affect the intermediate impact of e-government: age, gender and education levels. The following null moderator hypotheses were also formulated to test our framework:

- H_{1a} – The effect of CS on IP is not moderated by gender;
- H_{1b}– The effect of CS on IP is not moderated by age;
- H_{1c} – The effect of CS on IP is not moderated by education;
- H_{2a} – The effect of QS on IP is not moderated by gender;
- H_{2b} – The effect of QS on IP is not moderated by age
- H_{2c} – The effect of QS on IP is not moderated by education;
- H_{3a}– The effect of QS on US is not moderated by gender;
- H_{3b}– The effect of QS on US is not moderated by age;
- H_{3c}– The effect of QS on US is not moderated by education;
- H_{4a}– The effect of PT on IP is not moderated by gender;
- H_{4b}– The effect of PT on IP is not moderated by age;
- H_{4c}– The effect of PT on IP is not moderated by education;
- H_{5a} – The effect of ER on IP is not moderated by gender;
- H_{5b} – The effect of ER on IP is not moderated by age;
- H_{5c} – The effect of ER on IP is not moderated by education;
- H_{6a} – The effect of US on IP is not moderated by gender;
- H_{6b} – The effect of US on IP is not moderated by age; and
- H_{6c} – The effect of US on IP is not moderated by education.

2.11 Literature Review Conclusion

From the literature review, we have focused on the significance of e-government, the stages that governments go through in implementation of e-government and the common frameworks/models for e-government evaluation. Some selected e-government initiatives that have been undertaken in several countries in Africa and Asia were also highlighted to give an indication of the uptake and implementation of e-government in developing countries. Common frameworks on adoption of technology and specifically for e-government were also reviewed.

E-government benchmarking, evaluation and measurement frameworks were also highlighted with the aim of developing and adopting a model that is citizen-centric and suitable in the context of a developing country. The available frameworks have not adequately addressed the concept of perceived trust, which is an important concept in e-government but our proposed model has attempted to address it.

The common theories, concepts and constructs advanced by e-government and particularly on measurement and impact evaluation were also identified and discussed. These included the concepts of efficiency and effectiveness, citizen centricity, ‘e-government paradox’, public value and the significance of demand-side evaluation of e-government services as opposed to supply-side evaluation. This culminated in the formulation of a citizen-centric conceptual model for e-government impact evaluation, which is suitable in the context of a developing country.

CHAPTER THREE - METHODOLOGY

3.1 Introduction

This chapter discusses the research philosophies that underpin our study, the research approach taken and the techniques used in undertaking our study in order to test our hypothesis. Data collection, analysis and reporting is guided by the Structural Equation Modeling (SEM) technique, which has the capability of modeling complex multivariate relationships among variables and the advantage of modeling both latent and observed variables simultaneously.

This chapter lays a firm foundation for subsequent data analysis and reporting by discussing issues relating to theory specification and tools used to facilitate data collection, validation, screening, analysis and management to guarantee reliability of our findings.

3.2 Research Philosophy

Research philosophies are perspectives that researchers possess in the process of knowledge formation and the nature of that knowledge. Research philosophies provide an understanding of the values and assumptions underlying a particular investigation (Yonazi, 2010). Research philosophy encompasses issues of ontology (reality), epistemology (knowledge), axiology (ethics) and methodology. It entails ideas, for example, about what form of knowledge can be obtained and how one can sort out what is to be regarded as “true” from what is to be regarded as “false” (Holden & Lynch, 2004). Saunders et al. (2009) categorize research philosophies into four main perspectives: pragmatism, realism, interpretivism and positivism. None of these research philosophies or perspectives is better than the other, but rather, the choice should be guided by the problem being solved and the research questions being addressed.

A researcher concerned with factual data created during scientific experiments will have a totally different perspective of the process of conducting research from that of a researcher concerned with attitudes and feelings of workers in a research laboratory. A researcher who believes in undertaking research using factual and quantifiable information and in a value-freeway as natural scientists do is said to use a *positivist* approach and the philosophy is *positivism*. On the other hand, research undertaken by a social scientist on the complex realm of human attitude and feelings and interpreting the consequent human actions is said to take an *interpretivist* approach and the philosophy is *interpretivism*. A researcher who believes that choosing either of the two positions is unrealistic and that the approach taken should be determined by the research question and problem being addressed is said to adopt a *pragmatic* approach and the

philosophy is *pragmatism*. The other epistemological position is that of *realism* where the researcher believes that what their senses perceive as the reality is the truth and objects have an existence free from the human mind.

The research philosophy that a researcher pursues contains important assumptions about their perspective of the world and will to a large extent determine the research path taken. The assumptions made will underpin the research strategy (case study, experiment, survey, ethnography etc.) and methods (qualitative, quantitative or mixed) that a researcher uses as part of strategy (Saunders et. al, 2009). It is the researcher's strong belief that there is no research philosophy that is better than the other and that whatever approach we take should be strictly guided by the problem being solved and research questions rather than by fixed ideologies. Consequently, the researcher's approach is *pragmatist* and the philosophy adopted is *pragmatism*. This research study will be guided by the proposed research questions in determining the appropriate approach to use and we will use mixed methods (both quantitative and qualitative data) to address our research questions. The research strategy adopted will be a case study.

Remenyi et al. (1998) emphasize the necessity to study the details of the situation to understand the reality or perhaps the reality working behind them. The extent to which a researcher is clear about the theory at the beginning of the research raises an important question concerning the design of their research. This is whether the research choice should use the *deductive process* (testing theory), in which they develop a theory and hypothesis (or hypotheses) and design a research strategy to test the hypothesis or the *inductive process* (building theory), in which they would collect data and develop theory as a result of the data analysis (Saunders et al., 2009). From our conceptual model, we have developed a theory, which we intend to test through a rigorous and systematic research process. Our research strategy is a *case study* of *Huduma* centres in Kenya and we use the *deductive process* to test our proposed theory as depicted in our conceptual model.

3.3 Research Design

3.3.1 Background

Research design normally contains the strategy and plan along the lines of which a study will be carried out. It defines the general plan of how the researcher will go about answering the research questions. Our research design contains clear research questions which were defined

in chapter one. We specified the sources from which we intend to collect data and also identified the constraints we might face in the process of conducting our research (Saunders et. al, 2009).

An exploratory study is a valuable means of finding out 'what is happening; to seek new insights; to ask questions and to assess phenomena in a new light' (Saunders et al., 2009). Our study was conducted using *exploratory research* which assisted in identifying specific issues, concepts and factors of interest to our study through literature review which culminated with a conceptual model defining hypotheses and theory to be tested. Specifically, we use the **Structural Equation Modeling** (SEM) technique to guide our data collection and analysis process. Unlike traditional statistical modeling techniques, SEM can model both latent and observed variables and can also be used to model complex multivariate relationships among variables as discussed in section 3.4 below.

SEM is a family of statistical models that seek to explain the relationships among multiple variables. It is a collection of methods that uses multivariate statistical techniques for representing, testing and analyzing the validity of hypothesized network of relationships between latent and observed variables (Hair et al., 2010; Kline, 2011; Teo et al., 2013; In'nami & Koizumi, 2013). SEM combines both the techniques of factor analysis and multiple regressions. The main goal of SEM is to understand the pattern of correlations/covariance among a set of variables and explain the variances within the specified model. It provides a mechanism for validating and determining a measurement model fit prior to applying data to the hypothesized structural model. It acts as a confirmatory approach for hypothesis testing and analysis of constructs or phenomenon (Lei & Wu, 2007).

In our study, as guided by theory, we proposed a set of constructs and relationships existing among them in the form of a conceptual model. It is imperative to establish the validity of our model to ensure that it is fit for the data we have collected and where necessary, in case of misrepresentation, modify the model based on theory to fit the data.

3.3.2 Traditional Statistical Methods

There are a variety of statistical theory testing and validation techniques that we could have used in this study; but among them SEM is the most advanced, comprehensive and flexible. The available statistical theory testing and data analysis techniques include: factor analysis; multiple regression; logistic regression canonical correlation; multivariate analysis of variance and covariance; and cluster analysis (Hox & Bechger, 1998; Hair et al, 2010; Kline, 2011).

Kline (2011) acknowledges that the origin of factor analysis is attributed to Charles spearman. Hair et al. (2010) describes *factor analysis* as a statistical method normally used to analyze relationships among a large set of variables and to explain the variables in terms of their common underlying characteristics. The main purpose of factor analysis is to condense and classify a large number of variables into a smaller set of factors with minimal loss of information in the process. Hox & Bechger (1998) explains that factor analysis assumes that the covariance between a set of measured variables can be explained by a smaller number of underlying latent factors.

Multiple regression technique is a statistical technique that is used in research cases where there is one dependent variable that is related to two or more independent variables and the purpose is to predict the effect of change on the dependent variable as the independent variables are varied using regression equations. The independent variables are normally assumed to be correlated (Hox & Bechger, 1998; Saunders et al., 2009; Hair et al., 2010).

Canonical correlation is seen as a logical extension of multiple regression technique involving both multiple independent and dependent metric variables. This means that there are multiple predictor and outcome variables involved. The objective is to simultaneously correlate the set of multiple dependent variables to the set multiple independent variables with the aim of maximizing the correlation between the two sets using linear combination of the two sets of variables (Hair et al., 2010; Kline, 2011).

Multivariate analysis of variance (MANOVA) is another statistical method of analysis that can be used to simultaneously explore relationships between several categorical independent variables or treatments and several metric independent variables using linear algebra operations (Hair et al., 2010; Kline, 2011). It is a logical extension of *univariate analysis of variance* (ANOVA). *Multivariate analysis of covariance* (MANCOVA) on the other hand is normally used together with MANOVA to eliminate the effect of any uncontrolled metric independent variables (known as covariates) on the dependent variables.

Finally, *cluster analysis* is a traditional statistical analysis method for creating valuable sub-groups of objects from a large sample. The main purpose of the cluster analysis technique is to classify a sample of entities into a smaller number of mutually exclusive groups based on similarities among the entities. The groups are usually not pre-defined and the technique is used to create the sub-groups.

3.4 Structural Equation Modeling

3.4.1 Background

SEM is not a single statistical technique but a family of related procedures. SEM is also sometimes referred to as *covariance structure analysis, covariance structure modeling* or *analysis of covariance structures* (Kline, 2011).

The Division of Statistics and Scientific Computation, the University of Texas at Austin (2012) defines SEM as an extension of General Linear Model (GLM) that allows researchers to test a set of regression equations simultaneously. In essence, it is a multivariate extension of multiple linear regression models.

Hox & Bechger (1998) assert that SEM has its roots in *path analysis* and structural equation models are graphically represented using *path diagrams* while the statistical model is represented in a set of matrix equations. It should be noted, however, that no statistical technique including SEM can be used to prove causality of a relation in a non-experimental design. However, Hair et al. (2010) emphasizes that we can treat independent relations as causal if covariance, sequence, non-spurious covariation and theoretical support are depicted in the SEM model. Our model has shown covariation both in the measurement and structural models, indicated the sequence of relations, ensured that there are no spurious relationships and based the model on theoretical support to the extent possible.

The application of SEM technique has increased in various research disciplines over the last couple of years since it was first conceived by geneticist Sewal Wright (Hox & Bechger, 1998; Teo et al., 2013). The most common disciplines where SEM has been used include marketing, genetics, education, sociology, econometrics, psychology and political science (In'nami & Koizumi 2013; Teo et al., 2013).

Kline (2011) contends that there are two broad categories of variables in SEM; *latent* and *observed*. Observed (indicator) variables are variables that you collect scores or data about and are captured in a data file. These variables are directly measured by the researcher. Observed variables are also sometimes referred to as manifest or measured variables. Latent (factors) variables, on the other hand, correspond to hypothetical constructs that are presumed to reflect a continuum that is not directly observable or measurable.

SEM requires that model specification be given a *priori* and therefore SEM can be viewed as a confirmatory technique. Kline (2011) asserts that SEM can be applied in three main ways: *strictly confirmatory*, *alternative models* and *model generation*. In *strictly confirmatory* application, the researcher has a single model which is either accepted or rejected based on the data without further considerations. *Alternative model* application is less strict and refers to a situation where more than one *priori* model is available and the one with acceptable correspondence to the data is accepted and the rest rejected. The third and most common application is *model generation;* a model that does not fit the data is modified based on theory and tested again with the same data to achieve an acceptable fit.

We will apply *model generation* in our study as a method of testing our model since we have only one model and it would be very expensive to abandon it in our research process simply because it does not fit the data whereas there would be a possibility of deriving another more suitable model based on theory.

The popularity of SEM has been enhanced by the advancement of software to support it. The software available to support SEM include: LISREL (Linear Structural Relations), EQS (Equations), AMOS (Analysis of Moment Structures) and Mplus (Teo et al., 2013).

3.4.2 Pros of Using SEM

SEM varies from other traditional multivariate statistical approaches. Nachtigall et al. (2003), Teo et al. (2013) and In'nami & Koizumi (2013) identified several differences between traditional multivariate statistical approaches and SEM. Our analysis reveals that SEM has the following characteristics that make it superior to traditional statistical methods:

- Highly flexible and comprehensive;
- Includes both latent and observed variables;
- Takes a confirmatory hypothesis testing (Confirmatory Factor Analysis) approach to data analysis by specifying relationships between variables and constructs *priori*;
- Provides explicit modeling and estimates of error variance parameters;
- Capable of modeling complex multivariate relations and establishing direct and indirect relationships of variables under study that is not easily implementable in other models;
- Can be used for experimental or non-experimental data and cross-sectional or longitudinal studies; and
- Graphical User Interface (GUI) software used with SEM provides a unifying framework for numerous statistical models, enhance intuition and boosts creativity.

3.4.3 Cons of Using SEM

SEM also has its short-comings when compared to other traditional statistical methods. Hox & Bechger (1998) and Nachtigall et al. (2003) reviewed the use of SEM and identified some of the shortcomings of SEM, including the following:

- Provides evidence of a poor model and not proof of a good one;
- SEM owes its popularity to the illustrative power of path diagrams;
- Proof of model fit can sometimes be empirically rather than theoretically driven;
- Assumes that researchers have excellent statistical skills and expertise;
- Requires a considerable sample size of at least 200 and least three indicators per latent construct for a model to be identified; and
- Assumes that the multivariate distribution of the data is normal and that the proposed model is properly identified.

3.4.4 SEM Models

Jewell (1980) in a comprehensive review of insurance models defines a model as "a set of verifiable mathematical relationships or logical procedures which are used to represent observed, measurable real-world phenomena, to communicate alternative hypotheses about the cause of the phenomena, and to predict future behavior of the phenomena for the purpose of decision making."A model is a hypothesized structure; an abstraction of a phenomenon from reality or a representation of theory. Theory is a systematic set of relationships that provide a comprehensive and consistent explanation of phenomenon (Byrne, 2013; Hair et al., 2010). Models can be classified into different categories including: physical, mathematical or simulation models. In'nami & Koizumi (2013) and Teo et al. (2013) assert that there are several types of SEM models found in literature including:

a) Path Analytic (PA) Models – The models are conceived in terms of observable variables. These models follow the same underlying SEM concepts of model testing and fitting.

b) Confirmatory Factor Analysis (CFA) Models – These models are commonly used to study patterns and interrelationships among constructs. One special feature of these models is that no directional relations assumed among constructs as they correlated with each other.

c) Structural Relation (SR) models – These are built on the CFA models by assuming specific explanatory causal relations among constructs. They are normally used to test or prove certain proposed theory involving relationships among latent variables.

d) Latent Change (LC) models – are used to study change over time.

Structural Equation Models will comprise of two subsets of models: a measurement and structural model (Lei & Wu, 2007; Hair et al., 2010; In'nami & Koizumi, 2013). A measurement model indicates the relationships among observed indicators and latent variables. The Structural model specifies the relations among latent variables and the regression of latent variables on observed variables. Our study will use Confirmatory Factor Analysis (CFA) and Structural Relation (SR) models to test our theory.

Testing the proposed theory (structural model) might not be meaningful unless the measurement model holds. Therefore, we will test and confirm our measurement model first before testing our structural model. Testing our measurement model will confirm that the proposed indicators for our construct measure the construct and if not then modify our proposed model based on theory before testing our structural model.

3.4.5 SEM Computer Programs

There are different computer programs that have been developed to assist with SEM analysis. These include: LISREL (LInear Structural RELations), EQS (Equations), AMOS (Analysis of Moment Structures), PRO CALIS and Mplus. LISREL, EQS and AMOS have Graphical User Interface (GUI) that can be use to specify the researcher's model (*path diagram*) interactively (Hair et al., 2010; Kline, 2011; Teo et al., 2013; In'nami & Koizumi, 2013). We have chosen to use AMOS for our modeling because it provides vast tools for performing analytics for most of the concepts advanced by SEM. It also comes as one of the modules within the latest versions of SPSS and provides a simple and easy-to-use GUI. Further, AMOS was one of the first computer programs to be used to teach SEM concepts.

3.5 Stages in SEM

There are six main steps in SEM analysis, which might be named differently by different scholars, but the principles and concepts are generally the same (Hair et al., 2010; Kline, 2011; Teo et al., 2013; In'nami & Koizumi, 2013). The six steps include:

1) Specify the model;
2) Evaluate model identification;
3) Select measures for constructs, collect, prepare and screen the data;
4) Estimate the model;
5) Re-specify the model;
6) Report the results.

The flow chart below adapted from Kline (2011) summarizes the steps followed in SEM:

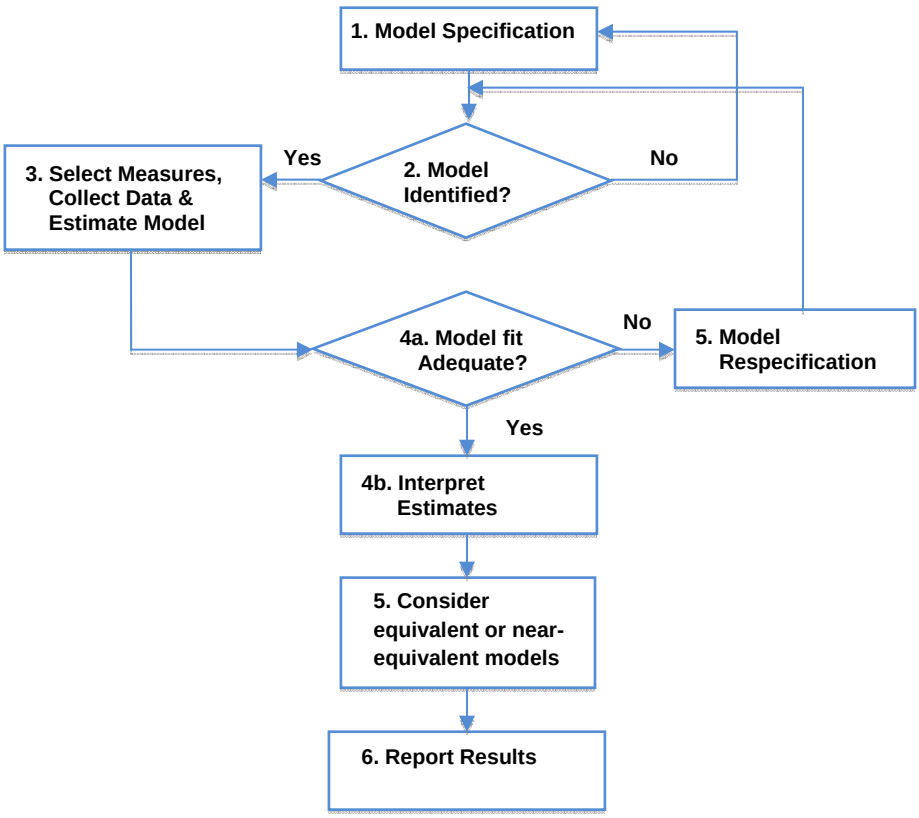


Figure 11: Flowchart for the steps of SEM: Adopted from Kline (2011)

Data collection and analysis for our study was based on these stages as discussed below:

3.5.1 Model Specification

The researcher first specifies a model based on theory. Model specification involves the representation of hypothesis in the form of a structural equation model (path diagram) as guided by the conceptual model and theory. This will normally be expressed in the form of a measurement and structural model.

a) SEM Notation

Computer programs use different conventions to represent constructs, indicators and relationships in what is referred to as a *path diagram*. A path diagram normally consists of the measured (indicator) variables, latent variables (constructs/factors), error terms as well as the relationships between them. Figure 12 depicts some notations used in SEM:

Figure 12: SEM Notation

Constructs can be categorized into two types: *exogenous* (independent variables) and *endogenous* (dependent variables). A construct with no dependence path or arrow pointing to it is an *exogenous* construct and a construct with arrow(s) pointing to it is referred to as an *endogenous* construct. A variable that acts as both an exogenous and endogenous variable is referred to as a *mediator* variable.

Constructs and error terms are normally depicted using ovals/circles and observed variables by rectangles/squares. There are two possible types of relations: *dependence* and *correlation* (covariance) relationships. In a dependence or causal relationship, an observed variable is associated to its respective construct using a straight single-headed arrow from the construct to the observed variable or straight single-headed arrow from one construct to another. Correlations between constructs, which have no causal interpretation, are represented using double-headed/bi-directional arrows. These are shown in figure 12.

b) Modeling Strategy

There are three distinct modeling strategies in SEM: *confirmatory modeling*, *competing modeling* and *model development* strategies. Confirmatory modeling strategy requires that the researcher specifies a model with a set of relationships and applies SEM to test how well the model fits the data. On the hand, competing modeling strategy is used to compare one model with other alternative equivalent models through overall model comparisons while model development strategy is based on improving a basic model framework through modifications of the measurement and structural model by applying empirical tests.

SEM will therefore be used for model development as a means of testing and confirming our proposed conceptual model as described above. SEM requires that all relationships be specified by the researcher a *priori* before the model can be estimated. A *path diagram* is used to depict the dependence and correlation relationships among the *exogenous*, *mediator* and *endogenous* variables.

In this stage, a model is formulated based on theory and literature review. We have undertaken a comprehensive literature review in chapter two culminating in the development of a conceptual model representing our proposed theory as depicted in figure 10 in chapter two. Our conceptual model identified exogenous, endogenous and mediator variables as shown in table 12.

Table 12: Summary of Model Constructs

Exogenous Constructs	Mediator Constructs	Endogenous constructs
Perceived Quality of Service	User Satisfaction	Intermediate Impact
Cost of service		
Perceived Trust		
E-Readiness		

The proposed relationships among constructs were specified and exogenous and endogenous variables were identified. Figure 13 represents our structural model:

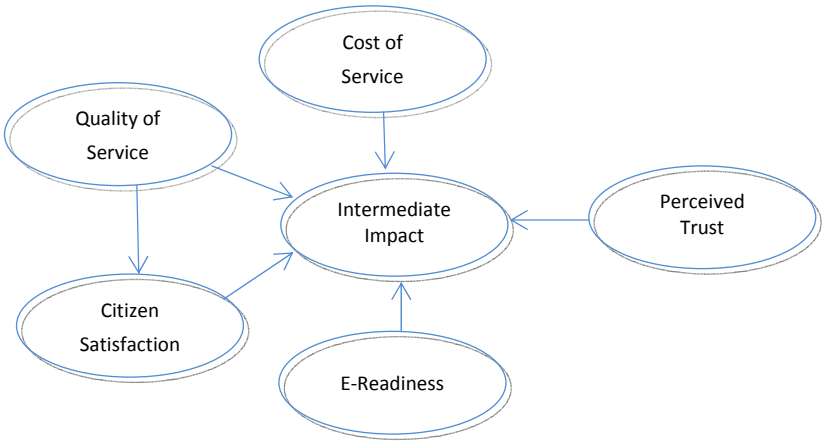


Figure 13: Proposed Structural Model for E-government Impact Evaluation

In SEM, it is at this stage that null, constant and varying relationships are also specified. The relationships among variables are specified by paths or parameters. These relationships can be *fixed*, *free* or *constrained*. Fixed paths are assigned a specific value, free paths are calculated by the computer program and constrained paths must meet certain specified conditions or criteria. Directional effects involve dependence relationships between observed indicators and latent variable and relationships between latent variables and other latent variables.

It is possible to conduct SEM with one observed variable assigned to a construct. However, good practice dictates that you have a minimum of three indicators per construct and preferably four to provide adequate identification and good fit for the model (Hair et al., 2010; Kline, 2011). In this study, three indicators were assigned for each construct as the prescribed minimum. Sometimes having more than three indicators may complicate the model which brings with it other challenges including identification problems.

Figure 13 shows relationships between the latent variables that were identified in our study. The model has one endogenous, one mediator and four exogenous latent variables with relationships as depicted in figure 13.

3.5.2 Model Identification

In model identification, the researcher determines whether a unique value can be derived from the observed data for every free parameter in the model whose value is unknown. Our measurement model specified fixed, constrained and free parameters whose values were unknown and had to be determined. We have retained a simple parsimonious model since complex models with a large number of parameters even though may be theoretically sound would usually have identification problems. We assigned our observed variables (indicators) a likert (metric) scale of 1 to 5 in our data collection instrument.

It is possible to have three model identification types: *just-identified*, *over-identified* and *under-identified*. A model is *just-identified* if all the parameters are determined with just enough information. If there is more information with more than one way of identifying a parameter, then the model is *over-identified*. If one or more parameters may not be identified because of lack of sufficient information then the model is *under-identified*. Our proposed model is over-identified and therefore can proceed to model estimation.

3.5.3 Model Estimation

Once our model is identified, the next step is to estimate the model. Model estimation involves estimating population parameters by minimizing the difference between observed and the model-implied variance/covariance (estimated) matrices. There are three estimation methods guided by the sample size and the multivariate normality of data. The three most common estimation techniques for estimating models include: Maximum Likelihood Estimation (MLE), Generalized Least Squares (GLS) and Weighted Least Squares (WLS). Our research has adopted Maximum Likelihood Estimation (MLE) which was guided by our sample size and the multivariate normality of our data.

3.5.4 Model Evaluation

Once we estimated our model parameters, our next step was to make decisions whether to retain or reject the proposed model. The main purpose of model evaluation or fit is to determine the degree to which data fits our model. We compared the estimated model covariance with the sample covariance matrix obtained from the data and reported on various fit indices used in our research. Fit indices fall into three main categories: *absolute*, *comparative* (incremental) and *parsimonious* fit. The researcher used eight fit indices with at least one absolute, one comparative and one parsimonious fit index as suggested by Hair et al. (2010) and Teo et al. (2013).

The absolute fit measures how well the specified model reproduces the data. That is, how well a researcher's theory fit the data obtained without comparisons and the extent to which the specified model reproduces the sample covariance matrix. In our study, we used the Goodness of Fit Index (GFI) which is an example of absolute fit index. In comparative fitting, the hypothesized model is assessed on whether it is a better than a competing baseline model. Normal Fit Index (NFI) and Comparative Fit Index (CFI) are the most widely used indices for comparative fit. In this study, the researcher used the Comparative Fit Index (CFI).

Parsimonious fit indices assess the discrepancies between the observed and proposed covariance matrix while taking into account the complexity of a model. A simple model with fewer estimated parameters will always have parsimony fit as opposed to a large and complex model. In this study, we used Adjusted Goodness of Fit Index (AGFI) as one of the parsimonious fit indices.

3.5.5 Model Modification

The research process may require model modification or re-specification depending on the results of the model fit evaluation. This is done to improve on the overall model-data fit by adding or deleting non-significant paths. In case the fit of the model is not good enough, then the hypothesis is adjusted, the model changed and tested once again. However, this process should be guided and backed by theory and not empirically driven to avoid introducing errors. In our study, there was no need for model modification as most of our indices were fairly good.

3.5.6 Report the Results

This is the final stage in which the researcher accurately and elaborately reports the SEM analysis process. The researcher documented the assumptions, processes and results of the all previous steps as mentioned above.

3.6 Data Management in SEM

In'nami & Koizumi (2013) and Hair et al. (2010) emphasize the importance of data screening before data is put through SEM. This will normally save time and lead to proper interpretation of results, though it may seem to take a while initially. The main aspects of data screening and management that was considered in our study include: sample size, data linearity, data normality, outliers and missing data.

3.6.1 Sample size

Teo et al. (2013) and In'nami & Koizumi (2013) contend that though SEM researchers have not reached consensus on the issue of sample size, some suggestions have been proposed in literature. There are several factors that determine the sample size: multivariate normality of data, estimation technique, model complexity and missing data (Hair et al., 2010). They state that as a guiding principle, the minimum sample size should be between 100 and 400 but ideally 200 participants and more if observed variables are not multivariate or normally distributed. Our model was not complex, univariate and joint distributions were normal and we used Maximum Likelihood Estimation (MLE) method which requires less sample size. Our sample size was approximately 250, which is above the minimum threshold and within the proposed range.

It is also recommended that the sample size should be greater than the elements in the correlation matrix with at least 10 participants per parameter. This implies that sample size is influenced by complexity of the hypothesized model. We had a total of 18 parameters and with at least 10 participants per parameter; we got a sample size of 180, which is below our sample size of 250.

3.6.2 Data Linearity

This issue arises when the measured indicators are too highly related. This is a problem because SEM uses related measures as indicators of a construct and if these are too highly related then they may affect the results of certain statistical tests. During our data screening we established that there was no high bivariate correlation of measured variables and therefore there was no need to exclude some of the variables from further analysis.

3.6.3 Data Normality

During data screening we tested whether the multivariate distribution of our data was normal, univariate distributions were normal and the joint distribution of any pair of the variables were bivariate normal. This is because the subsequent statistical tests and accuracy of our results would be affected by data normality.

3.6.4 Outliers

An outlier is very large or small value of a variable (univariate outliers) or a combination of the same or more variables (multivariate outliers) with a set of characteristics that are unique and distinctively different from others. Outliers may occur because of procedural errors, unique combination of values, extra-ordinary events or observations. The problem of outliers if not addressed would skew the results of analysis therefore giving false impression and affecting accuracy of results. The study tested for outliers from univariate, bivariate and multivariate dimensions using different combinations of the available variables (Hair et al., 2010; Kline, 2011; In'nami & Koizumi, 2013).

3.6.5 Missing Data

The ideal situation would be to collect a complete dataset of the respondents' responses but this will seldom happen in reality and we would have to deal with missing data depending on the extent of the missing data. Although this problem might be brought about by factors beyond the researcher's control, this issue has to be addressed depending on the extent and the gaps in the data. This will be especially if the missing data occurs in a systematic fashion and is in more than ten percent of total data collected. The driving factor is to identify the cause, patterns and relations underlying missing data in order to maintain distribution of data values when a remedy is applied (Hair et al., 2010; Kline, 2011). The problem of missing data was addressed through deletion of data and estimation of the missing data to fill the gaps.

3.7 Data Collection Instrument

Our conceptual model identified six constructs and three moderator variables that we collected data about. Hair et al. (2010) and Kline (2011) recommend at least three indicators (observed variables) to measure each of the constructs. Based on this guidance, we settled on having three indicators for each of the constructs. To assist with the development of our data collection instrument, we identified corresponding attributes that could be used to measure each construct. Table 13 depicts the constructs and specific attributes we used to measure our constructs.

The questionnaire attached as appendix 1 was used in our study to collect data. The questionnaire was developed and given an appropriate identification code (QEGOV/01). It consisted of ten main sections. The first section was used to collect bio-data from the respondents including moderator variables like gender, age and level of education. The second section addressed issues of access to services including the frequency of access, types of e-services accessed by the respondent and their general level of satisfaction with the services.

Table 13: Concepts and their Measurable Attributes

No	Construct	Attribute	Description
1.	**Cost of Service**	- Cost of service - Cost of bribes - Time saved	- Costs incurred in accessing service - Amount paid in bribes - Time saved in accessing service
2.	**Perceived Quality of Service**	- Convenience of service - Quality of information - Integration of services	- Ease and convenience of accessing service - Relevance and accuracy of information - Consolidation of services in a portal
3.	**User Satisfaction**	- Fairness - Choices available - Service requirements compliance	- Perceived level of fairness in service provision - Availability of multiple channels - Degree of meeting user service requirement
4.	**Perceived Trust**	- Privacy of personal data collected - Risk of transaction - Security concerns	- Extent of privacy of personal data collected - Perceived risks involved in e-transactions - Security concerns of data stored or in transit
5.	**E-Readiness**	- ICT infrastructure - Legislative framework - ICT literacy skills	- Availability of ICT infrastructure - Adequacy of legislation to support e-services - Level of ICT literacy skills
6.	**Intermediate Impact**	- Service delivery - Citizen participation - Citizen empowerment	- Extent of service delivery improvement - Adoption and participation in governance - Improved social & economic status

Section three to nine of the questionnaire was designed to collect data on the six identified constructs (as shown on table 13) with each having respective questions to gauge a respondent's perception on the various indicators associated with the particular construct. A likert scale of 1-5 was used to gauge respondents' perceptions on the identified indicators. Finally, section ten was used to collect qualitative data on the challenges faced by respondents in accessing e-government services and their recommendations on how to address some of the identified challenges.

The questionnaire was tested and validated through two pilot studies that were conducted at the Nairobi, General Post Office *Huduma* centre. The first pilot study involved testing parts of the questionnaire by collecting data that was used to author a paper titled 'Citizen-Centric Critical Success Factors for the Implementation of E-government: A Case Study of Kenya *Huduma* centers' that was presented at the IST-Africa 2015 conference in Lilongwe, Malawi and later published in IEEE explore.

The second pilot study was done on 15 respondents to test the suitability of the instrument and the feedback received was used to refine the questionnaire by rephrasing some of the questions, addressing any ambiguities and eliminating redundancies that were identified.

The questionnaire was designed using English as it was assumed that the few respondents who did not understand English would be guided through questionnaire with the help of the researcher and research assistants. The questionnaire is attached as Appendix A for ease of reference.

3.8 Data Collection

In this section we discuss the sampling techniques, data collection methods, validation and treatment of the data that was collected in the course of the study.

3.8.1 Sampling Technique and Unit of Analysis

The researcher collected data from citizens as they were accessing service at selected *Huduma* centres spread across various counties in the Country. Since our study is based on a case study of the intermediate impact of e-government in Kenya and focusing on citizen services at *Huduma* centres, our unit of analysis is individual.

Data sampling was done through purposive and random sampling techniques. There are 47 counties in the Republic of Kenya as defined in the first schedule of the Constitution of Kenya. The list of counties is attached as Appendix B. The study considered urban (city) and rural (non-city) counties. This was guided by the fact that the experience of e-government in rural set-up would be different from the experience in the urban setup since there are some differences in terms of the e-readiness (ICT infrastructure, internet penetration, ICT skills and literacy). Moreover, there could be some e-government services that are available in the urban centers and not available in the rural areas.

There are three (3) incorporated cities in Kenya, which are also considered as counties: Nairobi, Mombasa and Kisumu. We purposively sampled all of them. From the rural counties (non-city), we randomly selected three additional counties spread across the country. As at the time of the study, there were 11 *Huduma* centers in 9 Counties. The counties where *Huduma* centres had been set up were arranged in the order of their county codes as defined in the first schedule of the Constitution of Kenya with a sampling fraction of 2. Selecting number 1 randomly from sampling faction, the study identified Embu, Nyeri & Nakuru as other counties to be sampled.

Table 14: Counties in Kenya with Huduma Centres

No	Code	County	Former Province
Urban (Cities)			
1	1	Mombasa	Coast
2	42	Kisumu	Nyanza
3	47	Nairobi	Nairobi
Rural (Non-Cities)			
4	14	Embu	Eastern
5	16	Machakos	Eastern
6	19	Nyeri	Central
7	27	Uasin Gishu	Rift Valley
8	32	Nakuru	Rift Valley
9	37	Kakamega	Western

From each of the selected counties we had an estimated sample size of forty (40) respondents per centre. This gave a sample size of approximately 320 (since Nairobi has three *Huduma* centres). This sample size is above the recommended minimum threshold of 200 using SEM.

Table 15 shows the proposed sample sizes and responses received from the various Centers during data collection. The researcher could not be able to visit Embu *Huduma* centre because approval was granted for all other Centers except Embu. However, the sample size gathered was adequate and representative and therefore would not adversely affect the results of our analysis.

Table 15: Sampled Huduma Centres

No	County Code	County	Centre	Centre Code	Sample Size	Responses	Percentage
Urban (Cities)							
1	1	Mombasa	Mombasa	MSA	40	31	77.5
2	47	Nairobi	GPO	GPO	40	30	75.0
3	47	Nairobi	City Square	CSQ	40	43	107.5
4	47	Nairobi	Makadara	MAK	40	43	107.5
5	42	Kisumu	Kisumu	KSM	40	43	107.5
Rural (Non-Cities)							
6	14	Embu	Embu	EMB	40	0	0
7	19	Nyeri	Nyeri	NYR	40	42	105.0
8	32	Nakuru	Nakuru	NAK	40	42	105.0
TOTAL					**320**	**274**	**85.6**

3.8.2 Data Collection Methods

In this study, we collected both qualitative and quantitative data using a questionnaire that was administered to citizens as they accessed services at various *Huduma* centers. Our model is citizen-centric and therefore involved collecting data from citizens on their perceptions about the intermediate impact of e-government on their lives. Our study, which is based on SEM technique, required a substantial dataset for analysis in order to improve the reliability of our findings and make our findings more generalizable.

The researcher used assistants who were mainly staff from the *Huduma* centres. They were briefed on the purpose of the research and the structure of the data collection instrument. Citizens were also briefed on the purpose of the research prior to filling the questionnaire as they waited to be served. Those who voluntarily agreed to participate in the research were issued with the questionnaires and guided through the process of filling it. In few cases, where the respondents were not conversant with English, the researcher interpreted the questions in Swahili and assisted the respondent with filling the relevant sections. There were only two respondents who could not conversant with English and therefore had to do the interpretation for them. The researcher and his assistants administered the questionnaires to the first 40 citizens who voluntarily agreed to fill the questionnaires. Data collection process stopped in a particular centre immediately the threshold of 40 was achieved.

The data was collected through the use of questionnaires physically administered to citizens as they accessed services as this is the most effective method for collecting the required data and getting immediate feedback. The study also focused on document review and interview of *Huduma* centre staff and managers to corroborate our findings with the data collected from citizens and establish challenges that citizens face when accessing e-government services.

3.8.3 Data Validation

Validity of the qualitative and quantitative data collected was ensured through the use of triangulation method by interviewing Centre managers and other staff within the Centers. Additional data and insight was obtained through observation, review of websites, reports, strategy papers and legislative support documents.

The data collection process is summarized in table 15. The data collected was then entered into SPSS software to facilitate analysis. The data was validated and verified to confirm that it was accurate and within the acceptable limits. The data was then subjected to SEM using AMOS software which is one of the modules within the latest versions of SPSS software to evaluate the proposed model and establish its fit for the data.

3.8.4 Data Coding

The data collected was organized and captured into SPSS software as follows:

a) Gender was captured with 1 for male and 2 for female

b) Age was entered with the value 1 for below 20 years; 2 for between 20 and 29; 3 for between 30 and 39; 4 for between 40 and 49; 5 for between 50 and 59 and 6 for above 60

c) Highest level of education was entered with 1 for primary; 2 for secondary; 3 for tertiary; 4 for degree; 5 for masters; 6 for PhD; and 7 for others.

d) Level of ICT skills was captured with 1 representing none; 2 for basic; 3 for average and 4 for advanced.

e) The number of times citizens had access to services from *Huduma* centers within the last 12 months was entered with 1 for once; 2 for twice; 3 for thrice and 4 for more than thrice.

f) The service frequently accessed was captured with 1 for NHIF; 2 for NSSF; 3 for business name search; 4 for county services; 5 for student loan; 6 for KRA and 7 for ID card.

g) The observed variables for each of the latent constructs was captured as numbers between 1 and 5 representing a likert scale of 1 to 5 (1 – least extent; 2 – less extent; 3 – moderate extent; 4 – great extent and 5 – greatest extent) . The observed variables were labeled appropriately in SPSS.

3.8.5 Data Treatment

SEM emphasizes the importance of screening data to reduce the time taken for analysis and to ensure validity of results. In this study, the data collected was screened effectively through the following means:

a) Data Distribution

SEM assumes that the univariate and multivariate distribution of the data is normal and the joint distribution of any pair of the variables is bivariate normal. We used SPSS software to test the individual variables for univariate distribution before proceeding with our analysis. All variables were tested for univariate normality by plotting corresponding histograms and assessing the *kurtosis* and *skewness* of the normal distribution curve. Figure 14 shows histograms and normal curves for some of our variables: CS_1, US_1 and IP_3.

The result from the analysis of normality distribution shows a normal univariate distribution for all our variables. Hair et al. (2010) assert that multivariate distribution is more difficult to test and that in most cases assessing and achieving univariate distribution normality for all variables is sufficient and multivariate normality is tested only when critical.

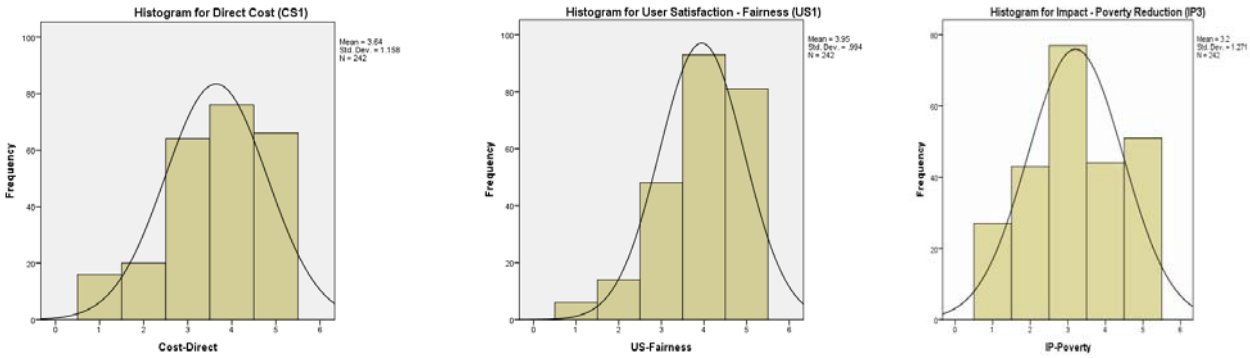


Figure 14: Histograms for Normality Distribution for some Variables from the Study

Critical values for *kurtosis* and *skewness* of the distribution curve are ±2.58 and ±1.96 at 0.1 and 0.05 significance levels respectively. If any variable exceeds the critical values then the distribution is non-normal and should be assessed further. In our data, there is no variable that exhibits non-normal values even at 0.05 level of significance meaning that our distribution is normal as indicated in table 16.

Table 16: Descriptive Statistics for Skewness and Kurtosis

Descriptive Statistics for Skewness and Kurtosis						
Variable	**N**	**Minimum**	**Maximum**	**Mean**	**Skewness**	**Kurtosis**
Cost-Direct (CS_1)	252	1	5	3.63	-0.60	-0.31
Cost-Bribe (CS_2)	252	1	5	3.22	-0.28	-1.49
Cost-Time (CS_3)	252	1	5	3.73	-0.77	-0.60
QoS-Convenience (QS_1)	252	1	5	4.02	-1.09	1.05
QoS-Accuracy (QS_2)	252	1	5	4.03	-0.87	0.39
QoS-Integration (QS_3)	252	1	5	4.19	-1.35	1.80
QoSUS-Ease (ST_1)	252	1	5	3.96	-0.94	0.84
QoSUS-Relevance (ST_2)	252	1	5	3.92	-1.06	1.39
QoSUS-Portal (ST_3)	252	1	5	4.07	-1.08	0.94
US-Fairness (US_1)	252	1	5	3.95	-0.86	0.44
US-Complaint (US_2)	252	1	5	3.77	-0.85	0.21
US-Channels (US_3)	252	1	5	4.00	-1.07	0.89
PT-Privacy (PT_1)	252	1	5	3.58	-0.50	-0.39
PT-Security (PT_2)	252	1	5	3.67	-0.48	-0.40
PT-Risks (PT_3)	252	1	5	3.18	-0.19	-0.95
ER-Infrastructure (ER_1)	252	1	5	3.71	-0.67	-0.22
ER-Legal (ER_2)	252	1	5	3.50	-0.40	-0.52
ER-ICT Skills (ER_3)	252	1	5	3.75	-0.75	-0.24
IP-Governance (IP_1)	252	1	5	4.10	-0.91	0.55
IP-Participation (IP_2)	252	1	5	3.72	-0.62	-0.17
IP-Satisfaction(IP_3)	252	1	5	3.80	-0.85	0.59

b) Sample size

Most researchers in SEM suggest that you should have a sample size of at least 200 and this may increase depending on the number of observed variables. Our model had a total of six constructs each with three indicators giving a total of 18 observed variables. SEM recommends at least 10 respondents for each observed variable, therefore, giving a minimum of 180 observations for our model. Our sample size was approximately 320 and out of this we got response from 274 respondents distributed across various centers, which is above the minimum threshold.

c) Outliers

Outliers are defined as observations with a unique combination or set of characteristics that are different from other observations. Outliers affect results of SEM and it is important to identify and deal with them effectively to ensure validity of findings. Mahalanobis (D^2) measures the distance of a case from the centroid (Hair et al., 2010; Kline, 2011; In'nami & Koizumi, 2013). An observation is a multivariate outlier if the probability associated with its D^2 is less than or equal to 0.001.The values computed by the SPSS software were within range and we therefore concluded that there were no outliers in our data.

d) Data Validation and Missing Data

It is usually extremely difficult in research to capture the complete dataset from all respondents. Missing data could be as a result of one or more invalid values, errors in data collection, variables not available for analysis or the respondents ignoring some parts of the questionnaire. The problem of missing data must be addressed to reduce the chances of skewing research findings. Missing data also has the practical implication of reducing the sample size available for analysis.

It is important to understand the reasons for missing data in order to select the most appropriate course of action. The main aim of addressing the issue of missing data is to identify patterns and relationship underlying the missing data so as to apply remedies that will maintain as close as possible the original distribution of values assuming the data was not missing. The extent of missing data and the randomness of their occurrence determines the type of remedy applied to address the issue of missing data. Some missing data are ignorable and others non-ignorable and must be addressed.

The research administered and collected a total of 274 questionnaires. Out of these, 8 respondents filled scanty information on their bio-data and left the rest of the parts blank and were therefore declared as non-responsive reducing the sample size to 266. Table 17 summarizes the missing data out of the 266 responsive respondents.

Table 17: Statistics of Variables with Missing Data

Missing Value Statistics				
No	**Variable**	**Observed Values**	**Missing Values**	**% Missing**
1	County Status	266	0	0.00
2	County	266	0	0.00
3	Centre	266	0	0.00
4	Gender	266	0	0.00
5	Age	266	0	0.00
6	Education Level	266	0	0.00
7	ICT Skills	265	1	0.38
8	Access-Times	266	0	0.00
9	Access-Service	266	0	0.00
10	Poverty-Level	259	7	2.63
11	Cost-Direct (CS_1)	263	3	1.13
12	Cost-Bribe (CS_2)	260	6	2.26
13	Cost-Time (CS_3)	264	2	0.75
14	QoS-Convenience (QS_1)	262	4	1.50
15	QoS-Accuracy (QS_2)	262	4	1.50
16	QoS-Integration (QS_3)	263	3	1.13
17	QoSUS-Ease (ST_1)	264	2	0.75
18	QoSUS-Relevance(ST_2)	264	2	0.75
19	QoSUS-Portal(ST_3)	264	2	0.75
20	CS-Fairness (US_1)	260	6	2.26
21	CS-Complaint (US_2)	260	6	2.26
22	CS-Channels (US_3)	260	6	2.26
23	PT-Privacy (PT_1)	259	7	2.63
24	PT-Security (PT_2)	259	7	2.63
25	PT-Risks (PT_3)	258	8	3.01
26	ER-Infrastructure (ER_1)	258	8	3.01
27	ER-Legal (ER_2)	257	9	3.38
28	ER-ICT Skills (ER_3)	258	8	3.01
29	IP-Governance (IP_1)	260	6	2.26
30	IP-Participation (IP_2)	259	7	2.63
31	IP-Satisfaction (IP_3)	264	2	0.75

A total of 24 cases (respondents) had missing data in one or more of the observed variables translating to 9% of all 266 cases. In total, there were 113 missing data values which are approximately 2% of total data values. A further analysis of the 24 cases with missing data suggested that the data was missing completely at random (MCAR) and only 8 cases had over 4 (12.9%) of the variables missing data as depicted in table 18. Hair et al. (2010) and Kline (2011) recommends that missing data that small percentage (5-10%) of an individual case can generally be ignored unless it occurs in a non-random fashion.

The 8 cases with over 12% of data missing were considered for deletion based on this observation. It is also recommended that cases with missing data for dependent variables are candidates for deletion. The remaining 16 cases had 6 such cases and were therefore deleted. Our study ended up with a total of 252 cases out of which 10 had to be imputed.

Table 18: Missing Data by Case

Case Summary: Missing Data			
No	**Case No**	**No Variables Missing Data**	**% Variables Missing Data**
1	110	1	3.23
2	144	1	3.23
3	182	1	3.23
4	203	1	3.23
5	29	3	9.68
6	33	3	9.68
7	83	3	9.68
8	84	3	9.68
9	85	3	9.68
10	88	3	9.68
11	108	3	9.68
12	121	3	9.68
13	149	3	9.68
14	228	3	9.68
15	35	4	12.90
16	69	4	12.90
17	251	8	25.81
18	57	9	29.03
19	94	9	29.03
20	98	9	29.03
21	184	9	29.03
22	234	9	29.03
23	236	9	29.03
24	252	9	29.03

There are two main methods of missing data imputation: *using only valid data* and *using replacement values*. Imputation *using only valid data* can further be categorized into *complete case approach* (*listwise* approach) where only observations with complete data are considered and *using all-available data* (*pairwise* approach) where you impute distribution characteristics or relationships from every valid value.

Imputation *using replacement values* can also be further categorized into *using known replacement values* (*hot* or *cold deck imputation*, *case substitution*) and *calculating replacement values* (*mean substitution* and *regression imputation*). Our study settled on *calculating replacement value* with *mean substitution* because the mean of any data is best single replacement value and gives values that don't distort the original distribution of the data.

3.9 Multiple Group Analysis

Hair et al. (2010) contend that there are several statistical applications that require simultaneous analysis of several groups of respondents to determine their invariance. Multiple group analysis is a SEM technique for simultaneously comparing two or more group samples using the same model. Multiple group analysis can be applied to both measurement and structural models. It is commonly used to test for the effect of moderating variables on the strength of the dependence relationship between two latent variables where the moderating variable forms the basis for grouping the data. Baron & Kenny (1986) explain that a moderating variable is a third variable that affects the zero-order correlation between two other variables but is however different from a mediator variable.

A moderating variable partitions a focal independent variable into sub-groups which might have varying effectiveness on the target dependent variable in terms of direction and strength of the relationship. In general, moderators are usually qualitative and include aspects like gender, race, age, experience and educational qualification (Baron & Kenny, 1986).

The process of multiple group analysis involves empirical analysis and comparison of group models starting with less stringent constraints and proceeding with more restrictive constraints and taking note of any emergent differences. The invariance among the groups can be tested by introducing equality constraints on parameters across the groups. The parameters in the comparison process includes: factor loading, residual variances, factor variances and covariances. The most common measure of difference is the chi-square difference (Hair et al., 2010; In'nami & Koizumi, 2013; Kline, 2011), however, since it is usually dependent on sample size, it may not suffice as the only test for overall fit of the model and other fit indices like CFI and RMSEA may be considered.

3.10 Assumptions and Biases

It should be noted that this study does not consider the long-term impact but the intermediate impact of e-government from the citizens' perspective using measurement indicators that can be collected from citizens in a cross sectional study. The study of long term impact may require significant time and would be done through longitudinal studies.

According to Castelnovo (2010) and Codagnone & Undheim (2008), it is assumed that the uptake and utilization of e-services is measured through the number of citizens accessing services and the frequency of use of the services would influence the impact of e-government.

Although the questionnaire administered to citizens did not capture personal details of the respondents and assured them of confidentiality, the researcher assumed that the citizens who were responding to the questionnaire were objective and honest with their responses. It is recognized that some citizens may have certain biases as a result of certain interests that they may have or single isolated past experiences. However, it is assumed that these would not have a significant impact on the results of our findings.

It is also assumed that the staff at *Huduma* centres who were interviewed to corroborate and confirm the findings from the questionnaire administered to citizens and data collected through observation gave honest and objective responses without any bias. It is recognized that these staff were interested stakeholders and may also have been biased towards indicating positive results than the situation could be on the ground.

3.11 Methodology Conclusion

This chapter has described the research approach taken, data collection process and the technique applied in undertaking the study. Specifically, the chapter highlights the Structural Equation Modeling (SEM) technique which was used to guide development of the data collection instrument, data collection process, validation and verification of the data. The chapter also gave an insight into the sampling techniques applied; data screening and management issues that ensure the preservation of the validity of final results. This chapter has laid a solid foundation for data analysis to generate results and findings that will be reliable and generalizable in other similar situations.

CHAPTER FOUR–RESULTS AND FINDINGS

4.1 Introduction

In this chapter we present results of our analysis conducted using SPSS Statistics and SPSS Amos. The Chapter begins by giving an elaborate descriptive statistics of the data collected based on the identified variables. It then discusses measurement and structural models based on the proposed conceptual model. The steps prescribed by Structural Equation Modeling (SEM) are described and applied in the context of this study. The measurement model is tested for identification, is estimated and then evaluated using various fit indices to determine whether our data fits the model. This is done with the aim of making necessary modification to our measurement model if required as guided by theory. The structural model is also tested to determine whether to reject or accept our hypotheses based on the statistical significance of our path estimates. This chapter ends with a brief discussion of our results and findings based on quantitative and qualitative data collected.

4.2 Descriptive Statistics

This study collected data from a total of seven (7) *Huduma* centers distributed across five (5) counties: Nairobi, Mombasa, Kisumu, Nakuru and Nyeri. These counties accounted for 41.7%, 11.1%, 16.7%, 15.1% and 15.5% of the total respondents respectively. Table 19 summarizes the distribution of our sample by county.

Table 19: Sample Distribution by County

County	Frequency	Percent	Valid Percent	Cumulative Percent
Nairobi	105	41.7	41.7	41.7
Mombasa	28	11.1	11.1	52.8
Kisumu	42	16.7	16.7	69.4
Nakuru	38	15.1	15.1	84.5
Nyeri	39	15.5	15.5	100
Total	**252**	**100**	**100**	

There were a total of 153 male and 99 female representing 60.7% and 39.3% of respondents respectively. This shows that gender representation at the centers was fairly distributed meaning that no gender over-dominated access to e-government services at the *Huduma* centres.

Majority of the respondents were in the age bracket between 20 and 49 years representing a total of 88.1% of the respondents meaning that majority of respondents accessing services at

the *Huduma* centres were youth seeking for registration and replacement of national identity cards and business name search as corroborated by Otieno & Omwenga (2015). Respondents below twenty (20) years and those above sixty (60) years represented 4% and 1.6% respectively. Table 20 summarizes the distribution of respondents by age bracket.

Table 20: Sample Distribution by Age Bracket

Age Bracket	Frequency	Percent	Valid Percent	Cumulative Percent
< 20	10	4.0	4.0	4.0
20-29	104	41.3	41.3	45.2
30-39	79	31.3	31.3	76.6
40-49	39	15.5	15.5	92.1
50-59	16	6.3	6.3	98.4
>=60	4	1.6	1.6	100.0
Total	**252**	**100.0**	**100.0**	

The questionnaire was designed to capture data on level of education of the respondents based on their highest level of education. As depicted in table 21, majority of the respondents accessing e-government services at *Huduma* centers are bachelor's degree holders at 42.5%, followed by tertiary, secondary school and primary school levels at 28.6%, 21.4% and 3.2% respectively. This implies that good proportions of the citizens accessing service at the centers are well-educated and are therefore well-equipped to utilize e-government services.

Table 21: Sample Distribution by Education Level

Education Level	Frequency	Percent	Valid Percent	Cumulative Percent
Primary	8	3.2	3.2	3.2
Secondary	54	21.4	21.4	24.6
Tertiary	72	28.6	28.6	53.2
Degree	107	42.5	42.5	95.6
Masters	7	2.8	2.8	98.4
PhD	2	.8	.8	99.2
Other	2	.8	.8	100.0
Total	**252**	**100.0**	**100.0**	

The level of ICT literacy skills affects access and utilization of e-government services. Based on the data collected, majority of respondents had 'average' ICT skills at 47.6%, followed by 23.4%, 22.2%, and 6.7% with basic, advanced and no ICT skills respectively. This shows that a good proportion of those citizens accessing government services at the Centers have modest ICT skills implying that they are not challenged in terms of using e-government services. Table 22 gives a summary of the distribution of ICT literacy skills among the respondents.

Table 22: Sample Distribution by ICT Literacy Skills

ICT Skills	Frequency	Percent	Valid Percent	Cumulative Percent
None	17	6.7	6.7	6.7
Basic	59	23.4	23.4	30.2
Average	120	47.6	47.6	77.8
Advanced	56	22.2	22.2	100.0
Total	**252**	**100.0**	**100.0**	

The questionnaire administered to respondents was also designed to capture the frequency of citizens' access to government services at the *Huduma* centres. A total of 115 of the respondents representing 45.6% of the total sample had accessed services more than thrice in the last twelve (12) months. Moreover, a total of 20.6% of the citizens had accessed the services once, 20.2% twice and 13.5% had accessed the services thrice. Table 23 summarizes the distribution of frequency of access to services by citizens.

Table 23: Sample Distribution by Frequency of Access

Access Frequency	Frequency	Percent	Valid Percent	Cumulative Percent
Once	52	20.6	20.6	20.6
Twice	51	20.2	20.2	40.9
Thrice	34	13.5	13.5	54.4
> Thrice	115	45.6	45.6	100.0
Total	**252**	**100.0**	**100.0**	

Huduma centres offer a wide range of services to citizens including NHIF and NSSF registration; business name search; county services; HELB loan to students in institutions of higher learning; KRA tax services and registration and replacement of ID cards. As shown in table 24, the most popular service is registration and replacement of national identity card at 31.6%, followed by business name search at 17.5% and NHIF registration at 8.3% respectively in that order. This corroborates the findings of Otieno & Omwenga (2015) that impute that most of the citizens accessing services at the *Huduma* centers are youth seeking for registration or replacement of their national identity cards, registration of new business ventures and NHIF registration.

Table 24: Sample Distribution by e-government Services

Service	Frequency	Percent	Valid Percent	Cumulative Percent
NHIF	21	8.3	8.3	8.3
NSSF	14	5.6	5.6	13.9
Business Name	44	17.5	17.5	31.3
County Service	21	8.3	8.3	39.7
Student Loan	13	5.2	5.2	44.8
KRA	25	9.9	9.9	54.8
ID Card	91	36.1	36.1	90.9
Other	23	9.1	9.1	100.0
Total	252	100.0	100.0	

The questionnaire administered also captured the general level of citizen satisfaction with the services offered at the Centres on a likert scale of 1-5 where one (1) is to the least extent and five (5) to the greatest extent. The mean citizen satisfaction level was 3.8 implying that majority of the citizens are satisfied with the e-government services at the centres to a great extent.

4.3 Measurement Model

It is important to note that no valid conclusion can be made in any research without reliable and valid measurement. Measurement plays a very important role in research and when using SEM, the researcher must specify the measurement model to be used. The researcher went ahead to propose a measurement model for testing the causal relationships among the identified latent and observed variables (indicators) with error terms for each observed variable.

Each of the six constructs identified was measured using three indicator variables (as discussed in section 3.7) each with its own error term giving a total of 18 indicators and 18 error terms. Our model is *congeneric* meaning that no single indicator loads onto more than one construct and with no between-construct and within-construct error covariances. We also assume covariance among the constructs as depicted in the measurement model in figure 15. This figure represents our measurement model and is supposed to be used in the Amos software to test whether the data collected for our research is consistent with our proposed model. It also tests construct reliability and validity.

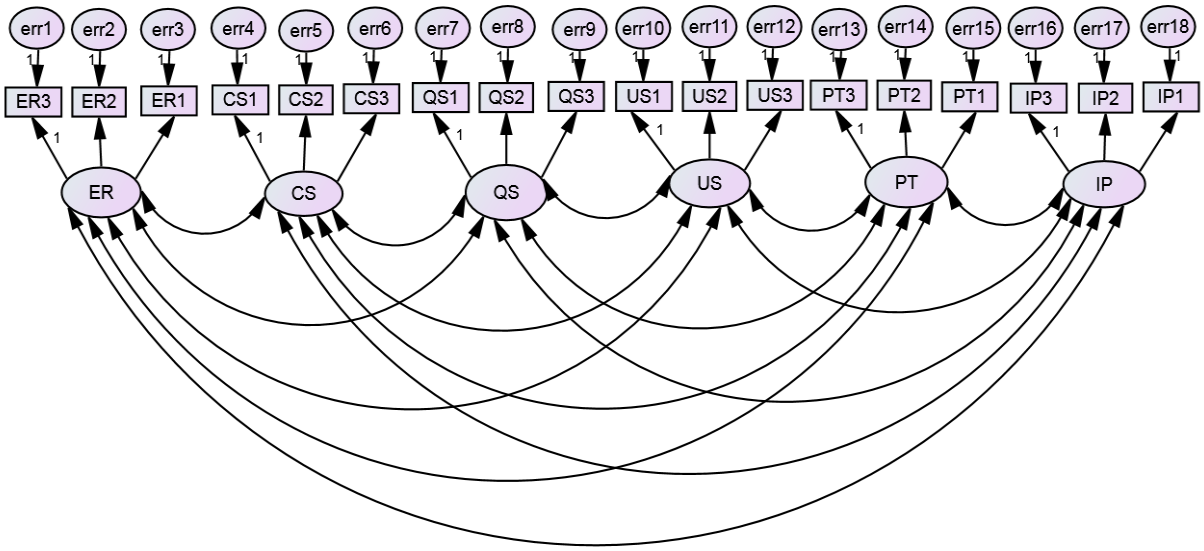


Figure 15: Proposed Path Diagram Representing the Measurement Theory

The goal of any research is to reduce measurement error as much as possible. Measurement error can be reduced using different ways. There are two important characteristics of measurement that a researcher can address to reduce measurement error: construct reliability and validity. The measurement model specified indicators for each construct and the researcher used them to test construct reliability and validity (measurement error). In our model, all measures are hypothesized as *reflective*, meaning that the direction of causality is from the latent construct to the observed variable.

4.3.1 Construct Reliability

Hair et al. (2010) explains that construct reliability measures the extent to which the indicators of a latent construct are internally consistent in their measurement and that the indicators measure the true value and are error free. Reliability is necessary but not sufficient condition for validity. *Construct validity* is considered only if reliability is assured. A researcher enhances reliability by ensuring that the values obtained from the research are accurate and they are free from errors. This study employed multivariate measurements to minimize measurement error and improve reliability by having at least three indicators combined into a composite measure to represent each construct. The objective was to use several variables as indicators to represent a construct instead of using a single variable and placing total reliance on that variable.

Internal consistency between the multiple variables used to measure a construct in a summated scale also ensures construct reliability. One of the ways of measuring internal consistency is the reliability co-efficient which measures consistency of the entire scale. *Cronbalch's alpha* is the most widely used measure for internal consistency between the multiple variables (Hair et al., 2010; Kline, 2011). The Cronbalch's alpha for our model after running the data through SPSS software was established to be 0.88 as indicated in Appendix E. Reliability estimate measures of a value of 0.7 or higher suggest good reliability and reliability measure between 0.6 and 0.7 may be acceptable, provided that other indicators of the models construct validity are good.

4.3.2 Construct Validity

Hair et al. (2010) and Kline (2011) describe construct validity as the extent to which a measure or a set of measures accurately represent the theoretical concept they intend to measure. This is primarily done by the researcher asking the correct question(s) to ensure that the right data is collected. The researcher may get accurate data; but if that data is not representing the right construct then it would still be an invalid measure. The most common forms of validity measures include content, convergent, discriminant, and nomological validity.

Content validity relates to the assessment of the correspondence of the multiple indicators to be used to measure a concept and the concept itself. Content validity is ensured through rating by domain experts, pretest with sub-populations (pilot study) and any other available means. In this study, construct validity was ensured through two ways: a pilot study that culminated in the publication of a paper titled: "Citizen-Centric Critical Success Factors for the Implementation of E-government: A Case Study of Kenya *Huduma* centers" that was presented at IST-Africa 2015 conference and later published in IEEE explore; and from literature review where different authors suggested various indicators and scales for measuring different constructs.

Convergent validity measures the extent to which two measures of the same concept are correlated. The researcher identifies alternate measures of a concept then correlates them with the summated scale. The alternate measures should have a high correlation indicating that they measure the same concept.

Discriminant validity is the extent to which two conceptually similar constructs are distinct. It measures the degree to which a construct is truly distinct from other constructs both in terms of how much it correlates with other constructs and how distinctly measured variables represent only this single construct. The summated scale is correlated with the similar, but conceptually distinct measure to establish their relation. The correlation in this instance should be low to confirm that the measures are measuring distinct concepts.

Nomological validity on the other hand is the extent to which the summated scale makes accurate predictions of other concepts in a theoretically based model. Nomological validity examines whether correlations between constructs in the *measurement theory* make sense. It normally involves identification of theoretically supported relationships from previous research and assessing whether the scale has corresponding relationships.

In summary, content validity will ensure that variables used to measure a construct relate that that construct; convergent validity will confirm that indicators are known to be measures of the concept; discriminant validity ensures that a concept is sufficiently different from similar concepts to be distinct; and nomological validity establishes whether the scale demonstrates the existent relationships based on theory or prior research (Hair et al., 2010; Kline, 2011).

4.3.3 Measurement Model Validity

Hair et al. (2010) and Kline (2011) suggest that one of the ways of assessing the measurement model validity is by use of standardized residuals. Standardized residuals of less than |2.5| do not suggest any problems whereas those greater than |4.0| suggest a potentially unacceptable degree of error and may call for deletion. From the Amos output generated after running our model, all our standardized residual from the standardized residual covariance matrix are within the acceptable range as depicted in Appendix D, suggesting no problem with our standardized residuals.

Hair et al. (2010) also proposes that standardized loading estimates for indicators should be 0.5 or higher, and ideally 0.7 or higher to confirm convergent validity. In our model, all the standardized loading estimates for the indicators used were greater than 0.5 with the lowest being 0.54 as depicted in figure 16, therefore suggesting convergent validity.

Average Variance Extracted (AVE) is usually calculated as the mean variance extracted for indicator loading on a construct and is a pointer of indicator convergence. AVE is normally computed as the total of all squared standardized factor loadings divided by the number of indicators. An AVE of 0.5 or higher is usually considered good enough and suggests adequate convergence.

Composite Reliability (CR) is also an indicator of measurement model validity. It is computed from the squared sum of factor loadings and the sum of standardized error variance terms for each construct. A composite reliability estimate of 0.7 and above suggests a good measure.

Table 25 summarizes the AVE and CR for our constructs with all of them having a statistically significant AVE of 0.5 or higher except Cost of Service (CS) which is at 0.43 and CR of over 0.7 with the least being Cost of Service (CS) at 0.75. We retain the Cost of Service since despite having a low AVE as the CR is above 0.7.

Table 25: AVE and CR for Constructs

No	Construct	Description	AVE	CR
1	ER	E-Readiness	0.52	0.86
2	CS	Cost of service	0.43	0.75
3	QS	Perceived Quality of service	0.55	0.91
4	US	User Satisfaction	0.56	0.90
5	PT	Perceived Trust	0.54	0.87
6	IP	Impact	0.53	0.88

4.3.4 Model Identification

Model identification is normally determined by the degrees of freedom (df) of the model; where the degrees of freedom is the total sample moments less the parameters to be estimated. A negative degree of freedom indicates that the model is *under-identified*; a positive value indicates that it is *over-identified* and a model with zero value means it is *just-identified*. A good model should be over-identified. Table 26 summarizes the computation for the degrees of freedom for our measurement model.

$df = {}^{1}/_{2}[p(p+1)] - k$ where p is total no of observed variables and k is number of free parameters

Number of distinct sample moments = ${}^{1}/_{2}[p(p+1)]$ where $p = 18$ and $k = 51$

Table 26: Measurement Model Degrees of Freedom

Description	Value
Number of distinct sample moments:	**171**
Number of distinct parameters to be estimated:	51
Degrees of freedom (171 - 51):	**120**

Our measurement model is *over-identified* meaning that it can be estimated and allow testing of hypothesis on relationships among the variables and observes the three-indicator rule (Hair et al., 2010; Kline, 2011) requiring each construct to be defined by at least three indicators.

4.3.5 Model Estimation

This study applied the *Maximum Likelihood Estimation* (MLE) method to perform model estimation using the Amos software. Our choice of the estimation method used was guided by many factors including: data normality, sample size and number of categories in indicator variables. MLE is an iterative estimation method, which means that initial posited values are taken through a series of iterative calculations that continues until the best value is obtained.

Measurement model shows correlations between the various identified constructs and is used to test the match of our model and the data collected. The model also specifies indicators for each construct and is used to establish whether the indicators reliably measure the constructs they are supposed to measure. Figure 16 summarizes the results of our model estimation using the MLE method. The observations made on the diagram as relates to our results are discussed in section 4.3.6 below.

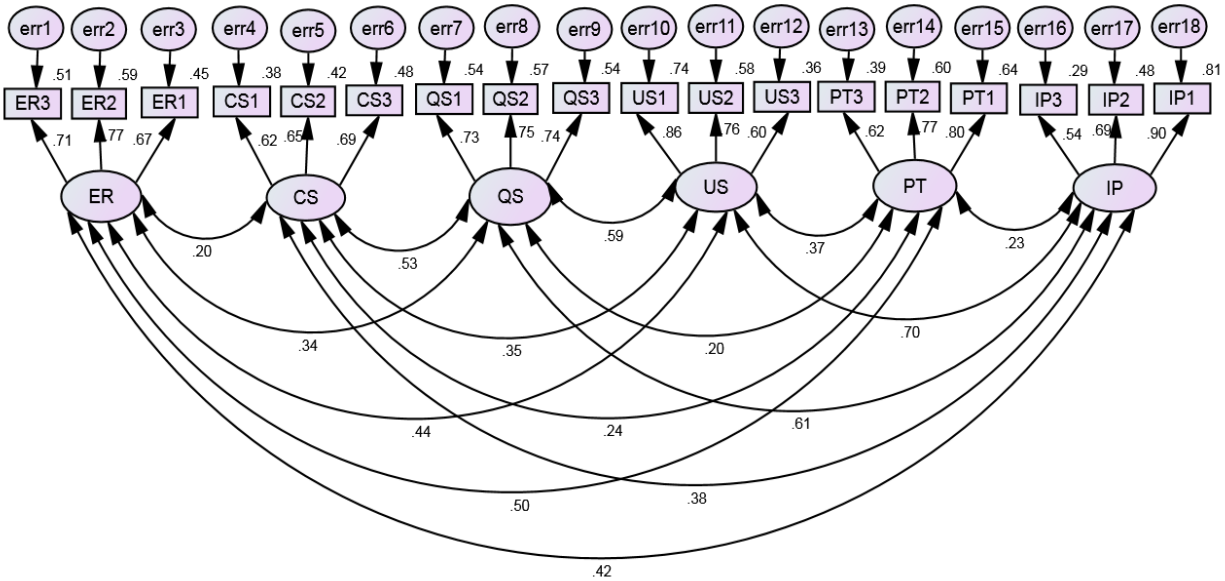


Figure 16: Standardized Estimates of Measurement Model using MLE

4.3.6 Model Evaluation

SEM guidelines specify that factor loadings for all indicators should be at least 0.5 and ideally 0.7 or higher. In our model, the factor loading range between 0.538 and 0.859 as depicted in table 27, meaning that all our indicators measure their respective constructs reliably.

Table 27: Standardized Regression Weights for Measurement Model

Construct	Indicator	Estimate
CS	CS1	0.619
CS	CS2	0.647
CS	CS3	0.692
ER	ER1	0.673
ER	ER2	0.765
ER	ER3	0.712
IP	IP1	0.9
IP	IP2	0.692
IP	IP3	0.538
PT	PT1	0.8
PT	PT2	0.772
PT	PT3	0.624
QS	QS1	0.734
QS	QS2	0.753
QS	QS3	0.736
US	US1	0.859
US	US2	0.759
US	US3	0.598

The model was run through the AMOS software using MLE technique. 28 summarizes the results of our evaluation using the various fit indices and applying the guidelines for a good model fit. It should be noted that these are guidelines and not rules or magic values that would guarantee an appropriate model.

Table 28: Fit Indices for Measurement Model

No	Fit Index	Expected N >250)	Result	Remarks
Chi-square = 220.764	**Degrees of freedom = 120**			
Absolute Fit Measures				
1	Goodness of Fit (GFI)	> 0.9	0.911	Acceptable
2	Root Mean Squared Error of Approximation (RMSEA)	0.03 < x < 0.08	0.059	Within acceptable range
3	Root Mean Residual (RMR)	-4 < x < +4	0.068	Within acceptable range
4	Normed Chi-square (χ^2:df)	< 1:3 (ratio)	1:1.85	Ratio acceptable
Incremental Fit Indices				
5	Comparative Fit Index (CFI)	> 0.934	0.936	Acceptable
6	Tucker-Lewis Index (TLI)	> 0.92	0.916	Slightly lower but acceptable
Parsimony Fit Indices				
7	Adjusted Goodness-of-Fit (AGFI)	-	0.874	Acceptable
8	Parsimony Normed Fit Index (PNFI)	-	0.682	Acceptable

Table 28 suggests that our measurement model achieves overall acceptable fit measures for the various proposed and tested fit indices, therefore, suggesting that our measurement model is acceptable. Hair et al. (2010) and Kline (2011) suggest that using three to four fit indices would provide some assurance of model fit. However, the chi-square value is still high despite the fact that the normed chi-square value is acceptable.

4.3.7 Model Modification

It is rare that a model will fit the data the first time it is specified. Therefore, the research process may require model modification or re-specification depending on the results of the model fit evaluation. This is done to improve on the overall model-data fit by adding or deleting non-significant paths. In case the fit of the model is not good enough, then the hypothesis is adjusted, the model changed and tested once again. However, this process should be guided and backed by theory and not statistically or empirically driven to avoid introducing errors.

Amos software provides modification indices (MI) to help with model re-specification. Modification Index depicts the level of chi-square change for a path covariances and variances. There were no regression weights with significant modification indices, therefore, suggesting no changes in regression weights.

In the Amos output, the largest covariance modification index values were established as shown in table 29 and the major regression weight modification indices were established as shown in table 30. Since our model is *congeneric*, we did not modify our model based on the high modification indices for the residual error terms. The modification indices for the factor loadings were not significant and therefore did not warrant any changes in our model.

Table 29: Modification Indices for Co-variances

Covariance			M.I.
err9	<-->	err11	8.851
err12	<-->	QS	8.549
err16	<-->	QS	8.221
err17	<-->	err6	7.861
err2	<-->	err18	7.567
err5	<-->	err3	6.721
err10	<-->	err6	6.608
err8	<-->	err17	6.42

Table 30: Modification Indices for Regression Weights

Regression Weight			M.I.
CS1	<---	IP3	9.318
IP3	<---	QS1	9.164
IP3	<---	CS1	8.492
US2	<---	QS3	7.913
US3	<---	QS3	7.32
CS3	<---	IP2	6.961

Since the results of our model fit evaluation suggests a good model fit giving us confidence that our questionnaire captured our key constructs well, we proceed to the next phase of testing the structural model without any further adjustments to our measurement model.

4.4 Structural Model Analysis

Once the measurement model has been evaluated and confirmed to have a good model fit, the next step is to evaluate the structural model to test our theory. The structural model in figure 17 represents the causal relationships among the identified latent and observed variables (indicators) with error terms for each endogenous and observed variable. Structural model focuses on the strengths of the causal relations between the constructs as established from theory unlike the measurement model that focuses on testing how well the indicator variables measure the constructs.

The model below depicts our structural model which shows the relationships among our latent variables and also assumes covariance among the exogenous variables. This model represents our conceptual model as represented in figure 10 and will be used to test our hypothesis. It also depicts observed variables and their respective error terms.

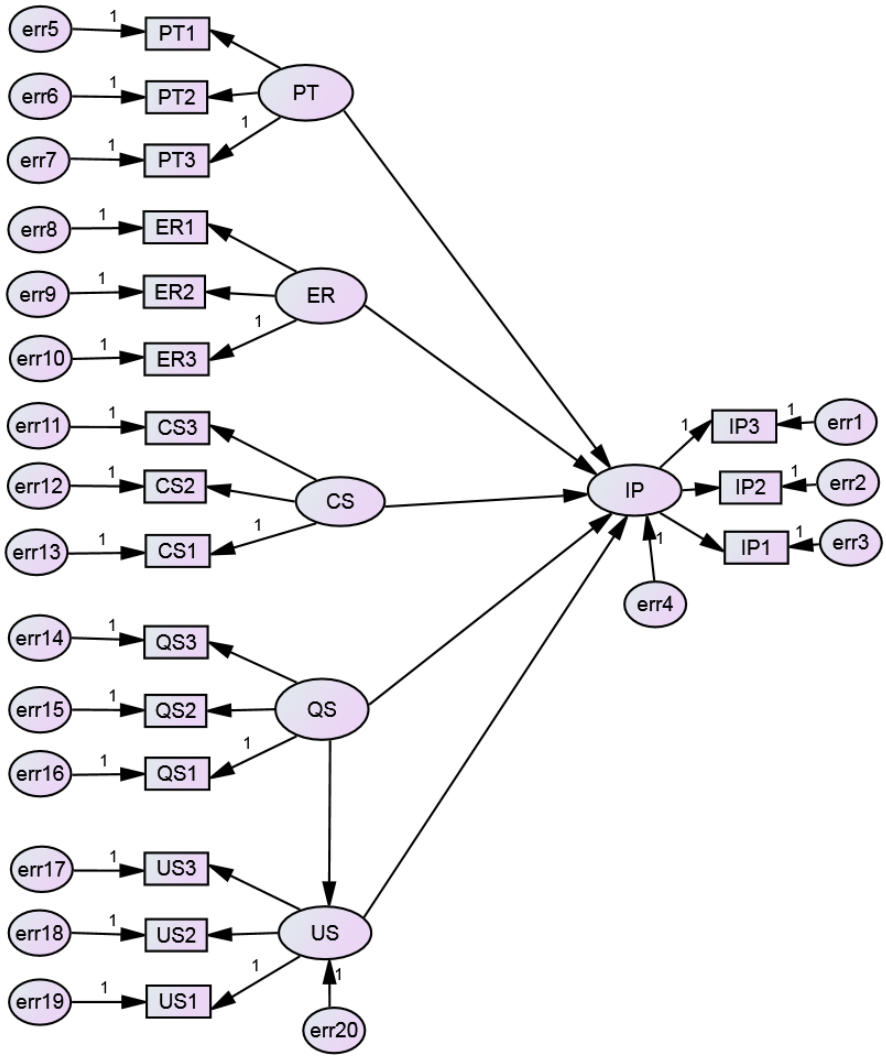


Figure17: Proposed Path Diagram Representing the Structural Model

The number of distinct parameters to be estimated in a structural model is usually smaller compared to the measurement model because the number of indicators does not change but there are fewer correlation relationships among constructs. The structural model is usually identified if the measurement model is identified. Table 31 summarizes the degrees of freedom for our structural model in comparison to the measurement model.

Table 31: Structural Model Degrees of Freedom

Description	Structural Model	Measurement Model
Number of distinct sample moments:	171	171
Number of distinct parameters to be estimated:	48	51
Degrees of freedom (171 - 51):	123	120

In Amos software, any latent variable predicted by another variable or a set of variables must have a residual error value. SEM also proposes correlations among exogenous constructs which might not be part of the relations in the original structural model. Structural model estimation was done using MLE method in Amos software and figure 18 summarizes the results of our structural model estimation. The observations made on the diagram as it relates to the results achieved are discussed below.

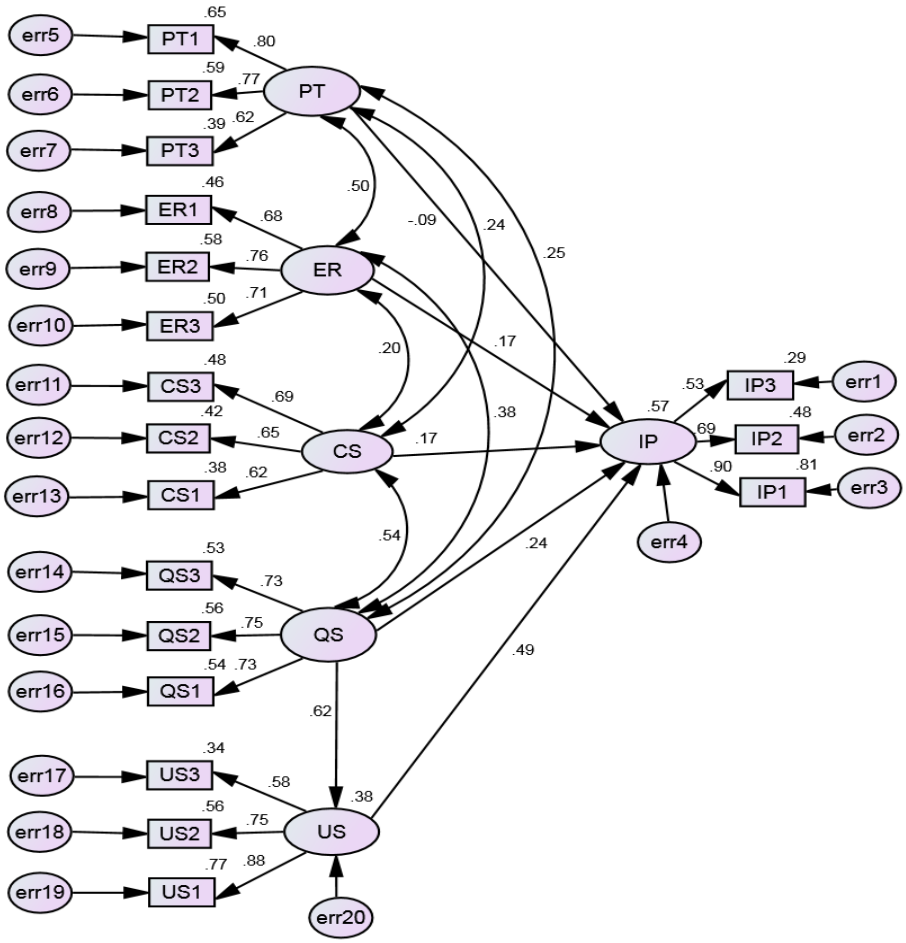


Figure 18: Standardized Estimates of Structural Model using MLE

The same measures of model fitness as done in the measurement model were performed to evaluate the model. SEM guidelines specify that factor loadings for all indicators should be at least 0.5 and ideally 0.7 or higher. In our model, the factor loading range between 0.535 and 0.879 as depicted in table 32 meaning that all our indicators measure their respective constructs reliably. The difference between the estimates in the structural and measurement models is minimal meaning that there is no *interpretational confounding*. This implies that the estimates for the constructs are not being significantly affected by the pattern of the relationships in the models.

Table 32: Standardized Regression Weights for Structural Model

Construct	Indicator	Measurement Model Estimate	Structural Model Estimate
CS	CS1	0.619	0.619
CS	CS2	0.647	0.647
CS	CS3	0.692	0.692
ER	ER1	0.673	0.68
ER	ER2	0.765	0.764
ER	ER3	0.712	0.707
IP	IP1	0.9	0.9
IP	IP2	0.692	0.69
IP	IP3	0.538	0.535
PT	PT1	0.8	0.804
PT	PT2	0.772	0.77
PT	PT3	0.624	0.623
QS	QS1	0.734	0.734
QS	QS2	0.753	0.746
QS	QS3	0.736	0.728
US	US1	0.859	0.879
US	US2	0.759	0.747
US	US3	0.598	0.582

Table 33 summarizes the results of our evaluation using the various fit indices and applying the guidelines for a good model fit. It should be noted that these are guidelines and not fixed rules or magic values that would guarantee an appropriate model.

Table 33: Fit Indices for Structural and Measurement Model

No	Fit Index	Expected N >250)	Measurement Model	Structural Model	Remarks
Chi-square = 240.458	**Degrees of freedom = 123**				
Absolute Fit Measures					
1	Goodness of Fit (GFI)	> 0.9	0.911	0.904	Acceptable
2	Root Mean Squared Error of Approximation (RMSEA)	0.03 < x < 0.08	0.059	0.062	Within acceptable range
3	Root Mean Residual (RMR)	-4 < x < +4	0.068	0.088	Within acceptable range
4	Normed Chi-square (χ^2:df)	< 1:3 (ratio)	1:1.85	1:1.95	Ratio acceptable
Incremental Fit Indices					
5	Comparative Fit Index (CFI)	> 0.92	0.936	0.93	Acceptable
6	Tucker-Lewis Index (TLI)	> 0.92	0.916	0.905	Slightly lower but acceptable

Parsimony Fit Indices					
7	Adjusted Goodness-of-Fit (AGFI)	-	0.874	0.866	Acceptable
8	Parsimony Normed Fit Index (PNFI)	-	0.682	0.690	Acceptable

Table 33 suggests that our structural and measurement models achieve overall acceptable fit measures for the various proposed and tested fit indices, therefore, suggesting that our structural model is also acceptable. Hair et al. (2010) and Kline (2011) suggest that using three to four fit indices would provide some assurance of model fit.

It is important to measure the structural model estimates and compare the results with the hypotheses made in our conceptual model. Our structural model was meant to test the following hypotheses:

- H_1– There is no significant relationship between CS and IP;
- H_2– There is no significant relationship between QS and IP;
- H_3 – There is no significant relationship between QS and US;
- H_4– There is no significant relationship between US and IP;
- H_5– There is no significant relationship between ER and IP; and
- H_6 – There is no significant relationship between PT and IP.

The results of the structural model estimates are summarized in table 34.

Table 34: Standardized Regression Weights for Constructs

Hypothesis	Construct 1	Relation	Construct 2	Estimate	CR	P	Supported?
H_1	IP	<---	CS	0.171	0.838	0.042	Yes
H_2	IP	<---	QS	0.239	2.149	0.032	Yes
H_3	US	<---	QS	0.617	7.772	***	Yes
H_4	IP	<---	US	0.495	4.84	***	Yes
H_5	IP	<---	ER	0.173	2.074	0.038	Yes
H_6	IP	<---	PT	-0.09	-1.195	0.232	No

Hypothesis are normally accepted or rejected based on the significance of the p-value. The most common values of acceptance are $p< 0.01$, $p< 0.05$ and $p< 0.1$ meaning that the values are highly significant, significant and marginally significant respectively. In our case we take $p< 0.05$ to be acceptable as the sample size was not very large and this is a moderate value compared to the other two. It should be noted that a p-value column with three asterisks (***) indicate that a path is significant at $p< 0.01$. It can therefore be interpreted from table 34 that based on our null hypothesis H_3 and H_4 are strongly rejected. H_1, H2 and H_5 have p values of <

0.05 and are therefore are rejected. Consequently, five of the six null hypotheses have significant p values and are therefore rejected as indicated by the p-values implying that our model has rejected H_1 to H_5 whereas H_6 is supported and the standardized regression weight for the relation is negative. This is attributable to the fact that the e-government services provided at *Huduma* centres are at the low end of the e-government models maturity continuum and therefore do not offer transactional services which offer more security challenges and privacy concerns and would therefore be more sensitive to the issues of trust. Moreover, apart from the limited personal information required for identification purposes, the e-government services offered at *Huduma* centres do not store or provide access to very sensitive personal citizen information like health and finance. There has also been no major incident of misuse of citizen personal information kept by government and accessed through *Huduma* centres and therefore trust in e-government services may not be an issue at the moment. However, trust is at the heart of state-citizen relationship and once broken may erode the other outcomes achieved.

4.5 Moderator Effect Analysis

The proposed conceptual model as depicted in figure 10 identified three variables that have a moderating effect on the relationships between various identified constructs. According to studies conducted by Njuru (2011b) and Wang & Liao (2008), and other researchers in the field of e-government adoption and success, the researcher identified three moderating variables that were part of the demographic characteristics that influence impact of e-government services. The three moderator variables of interest were: age, gender and education level.

SEM provides multiple group analysis to facilitate the exploration of the moderating effect induced by different segments of respondents on the model under consideration. The main purpose of multiple group analysis is to compare and establish the difference between two or more groups of respondents (acting as moderating variables) and the effects of each group on the paths between different constructs on the proposed path diagram or model. The first step involves establishing whether the groups have the same path diagram. The second step after establishing that the groups share the same path diagram is to determine the effect of each group on specific paths of the path diagram (Hair et al, 2010). It was observed that there are few studies that have been conducted on moderating effects of e-government impact.

Our conceptual model based on figure 10 clearly identifies the three moderator variables of interest: age, gender and education level. Our multiple group analysis was based on the measurement and structural models as depicted on figures 15 and 17 respectively.

4.5.1 Gender

The main issue of concern in this section is to determine to what extent gender influences the impact of e-government services on citizens with respect to the identified constructs. The perception that the citizens may have as to the extent of the impact of e-government on their lives may vary between the genders. The gender distribution in our study was 153 male and 99 female representing 60.7% and 39.3% respondents respectively.

The first step was to determine whether group data from both genders are represented by the same path diagram. This was done by comparing the various model fit indices for both genders as depicted in table 35.

Table 35: Gender Moderator Fit Indices

MODEL	CMIN (χ^2)	df	CMIN/df	CFI	TLI	PCLOSE	RMSEA
Male	209.56	123	1.704	0.898	0.873	0.043	0.068
Female	235.06	123	1.911	0.872	0.855	0.001	0.096

It can be seen from the results achieved that both the male and female groups had a fairly good fit index indicating that the data collected fits both group models. The male group fit index, however, was slightly better than the female probably because of a bigger sample size.

The strengths of the various paths as depicted in our path diagram were analyzed for both gender groups and the results tabulated in table 36.

Table 36: Summarized Comparisons of Gender Moderator

PATH			MALE			FEMALE			Z-Score
			Estimate	CR	P	Estimate	CR	P	
US	<---	**QS**	0.838	5.926	***	0.532	4.65	***	-1.684*
IP	<---	**US**	0.301	3.395	***	0.307	3.48	***	0.046
IP	<---	**ER**	0.127	1.765	0.078	0.046	0.582	0.56	-0.761
IP	<---	**QS**	0.108	0.992	0.321	0.235	2.264	0.024	0.846
IP	<---	**PT**	-0.067	-1.203	0.229	-0.014	0.132	0.895	0.452
IP	<---	**CS**	-0.045	-0.598	0.550	0.246	1.938	0.052	1.975**

In multiple group analysis, a moderator's effect on a relationship path is determined to be significant based on the **z-score value**. It should be noted that a z-score column with one asterisk (*), two asterisks (**) and three asterisks (***) indicate that a path is significant at $p< 0.01$, $p< 0.05$ and $p< 0.1$ respectively. In our model, we accept z-scores with any of the three levels of significance because of the reduced sample size as a result of group segregations. Our analysis

reveals that the relationships between US ← QS and IP ←CS are affected by the gender moderator owing to the significant levels of their z-scores.

4.5.2 Age

Our proposed conceptual model also postulated that age influences the perceived impact of e-government services on citizens. From literature review, it is expected that citizens from different age groups will respond differently to the consumption of e-government services as postulated by Njuru (2011b) and Wang & Liao (2008). The age moderator variable was divided into six groups and the distribution of the respondents is as show in table 37.

Table 37: Age Distribution

Age	Respondents	Percent
Below 20	10	4.0
20-29	104	41.3
30-39	79	31.3
40-49	39	15.5
50-59	16	6.3
Over 59	4	1.6
TOTAL	**252**	**100.0**

As depicted in table 37, majority of the respondents were aged between 20 and 49 years accounting for 88.1% of respondents meaning that the very young and old were not active users of e-government services. The responses from the age groups below 20 years; between 50 - 59 years and over 59 years were not significant for each category and therefore could not be run through the AMOS SEM software as a result of inadequate sample size. The study therefore proceeded with the analysis of the three other responsive groups as demonstrated below.

First and foremost, it is important to determine whether data from all age groups were represented by the same path diagram. This was done by comparing the various model fit indices for all age groups as depicted in table 38.

Table 38: Age Moderator Fit Indices

MODEL	CMIN (χ^2)	df	CMIN/df	CFI	TLI	PCLOSE	RMSEA
20-29	196.63	123	1.6	0.868	0.836	0.02	0.076
30-39	225.262	123	1.831	0.798	0.749	0.000	0.103
40-49	186.233	123	1.514	0.846	0.808	0.003	0.116

It is apparent from the results achieved, that all the three age groups had a fairly good fit index indicating that the data collected fits all the three models. The age group between 20 – 29 years had the best fit index because of the larger sample size, and the age group between 30 – 39 years had the worst. The strengths of the various paths as depicted in our path diagram were analyzed for all the three age groups and the results tabulated in table 39.

Table 39: Summarized Comparisons of Age Moderator

PATH			20-29			30-39			40-49			Z-Score
			Estimate	CR	P	Estimate	CR	P	Estimate	CR	P	
US	<---	QS	0.572	4.741	***	0.767	4.078	***	1.157	4.999	***	2.254**
IP	<---	US	0.307	3.165	0.002	0.250	2.681	0.007	-0.120	-0.474	0.636	-1.582
IP	<---	ER	0.190	0.911	0.362	-0.013	-0.249	0.803	0.219	1.788	0.074	1.757*
IP	<---	QS	0.190	1.653	0.098	0.121	1.188	0.235	0.581	1.418	0.156	1.096
IP	<---	PT	-0.221	-0.896	0.37	-0.041	-1.014	0.311	-0.145	-1.369	0.171	-0.926
IP	<---	CS	0.089	0.758	0.449	-0.087	-0.849	0.396	0.140	1.274	0.203	1.516

From table 39, our analysis reveals that the relationships between US ← QS and IP ←ER are affected by the age moderator owing to the significant levels of their z-scores.

4.5.3 Education Level

It was also hypothesized in our proposed conceptual model that the perceived impact of e-government services on citizens is influenced by education level. It is evident from our literature review that citizens with different education levels will perceive the impact of e-government differently (Njuru, 2011b; Wang & Liao, 2008). The education level moderator variable was divided into seven groups and the distribution of the respondents is as show in table 40.

Table 40: Education Level Distribution

Level	Respondents	Percent
Primary	8	3.2
Secondary	54	21.4
Tertiary	72	28.6
Degree	107	42.5
Masters	7	2.8
PhD	2	0.8
Other	2	0.8
TOTAL	**252**	**100.0**

As depicted in table 40, majority of the respondents were secondary, tertiary and degree qualifications holders accounting for 92.5% of the respondents. The responses from primary; masters, PhD and other education qualification accounted for the remaining 7.5% and were not significant for each of the category and therefore could not be run through the AMOS software

as a result of insufficient sample size. The study therefore proceeded with the analysis of the three other responsive groups as demonstrated below.

It is important first and foremost to determine whether data from all educational level groups are represented by the same path diagram. This was done by comparing the various model fit indices for all three groups as depicted in table 41.

Table 41: Education Level Fit Indices

MODEL	CMIN (χ^2)	df	CMIN/df	CFI	TLI	PCLOSE	RMSEA
Secondary	185.799	123	1.511	0.863	0.829	0.008	0.098
Tertiary	184.206	123	1.498	0.868	0.836	0.021	0.084
Degree	197.881	123	1.609	0.888	0.861	0.020	0.076

From the results achieved, it is apparent that all the three education level groups had a fairly good fit index indicating that the data collected fits all the three models. The group at the degree level had the best fit index, and the tertiary level group had the worst fit index. The strengths of the various paths as depicted in our path diagram were analyzed for all the three education-level groups and the results tabulated in 41.

Table 42: Summarized Comparisons of Education Level Moderator

PATH			Secondary			Tertiary			Degree			Z-Score
			Estimate	CR	P	Estimate	CR	P	Estimate	CR	P	
US	<---	**QS**	1.063	2.575	0.01	0.522	3.507	***	0.639	5.611	***	0.624
IP	<---	**US**	0.294	2.685	0.007	0.605	3.846	***	0.185	2.241	0.025	-2.368**
IP	<---	**ER**	0.196	1.238	0.216	-0.115	-1.129	0.259	0.175	1.663	0.096	1.978**
IP	<---	**QS**	0.339	1.227	0.22	0.154	1.067	0.286	0.208	1.96	0.05	0.302
IP	<---	**PT**	-0.128	-0.998	0.318	0.245	1.736	0.083	-0.148	-1.388	0.165	-2.221**
IP	<---	**CS**	-0.002	-0.01	0.992	-0.006	-0.054	0.957	0.232	1.907	0.056	1.489

From table 42, our analysis reveals that the relationship between IP ←US, IP←ER and IP ←PT are affected by the education level moderator owing to the significant levels of their z-score values.

From the detailed analysis of the individual hypothesized moderator variable effects, the results of our findings indicate that the effect of:

- H_{1a} – The effect of CS on IP is **moderated** by gender;
- H_{1b}– The effect of CS on IP is **not** moderated by age;

- H_{1c} – The effect of CS on IP is **not** moderated by education;
- H_{2a} – The effect of QS on IP is **not** moderated by gender;
- H_{2b} – The effect of QS on IP is **not** moderated by age
- H_{2c} – The effect of QS on IP is **not** moderated by education;
- H_{3a}– The effect of QS on US is **moderated** by gender;
- H_{3b}– The effect of QS on US is **moderated** by age;
- H_{3c}– The effect of QS on US is **not** moderated by education;
- H_{4a}– The effect of PT on IP is **not** moderated by gender;
- H_{4b}– The effect of PT on IP is **not** moderated by age;
- H_{4c}– The effect of PT on IP is **moderated** by education;
- H_{5a} – The effect of ER on IP is **not** moderated by gender;
- H_{5b} – The effect of ER on IP is **moderated** by age;
- H_{5c} – The effect of ER on IP is **moderated** by education;
- H_{6a} – The effect of US on IP is **not** moderated by gender;
- H_{6b} – The effect of US on IP is **not** moderated by age; and
- H_{6c} – The effect of US on IP is **moderated** by education.

In summary:

a) cost of service on intermediate impact is moderated by gender;
b) perceived quality of service on intermediate impact is **not** moderated by age, gender and education;
c) perceived quality of service on citizen satisfaction is moderated by age and gender;
d) perceived trust on intermediate impact is moderated by education;
e) e-readiness on intermediate impact is moderated by age and education; and
f) citizen satisfaction on intermediate impact is moderated by education

Therefore, from our analysis, it is only relation between the perceived quality of service and intermediate impact that is not moderated by any of the moderating variables.

4.6 Discussion of Findings

The structural model in figure 18 depicts the causal relationships among the latent and observed variables as defined by our theory in the conceptual model. The model also proposed to test a number of correlations between constructs to gain insight, though these were not necessarily defined and hypothesized in the conceptual model that summarized our theory. The results of the analysis show that there is a strong correlation between perceived trust (PT) and e-readiness (ER) with a regression weight of 0.5 and between perceived quality of service (QS) and cost of service (CS) with a regression weight of 0.54.

The strong correlation between perceived trust and e-readiness is attributable to that fact that trust in e-government services by citizen is also dependent upon the availability of a reliable ICT infrastructure and a conducive legislative framework governing and supporting e-government services. The strong correlation between perceived quality of service and cost of service would be attributable to the fact that the perception that citizens may have towards quality of service is also determined to a great extent by the cost of the service. These two strong correlations could be investigated in future studies to confirm causal relationships between these constructs.

The results of analysis show that most of the hypothesized relationships in our model were tested and proven to hold. It is also observed that there are some interesting findings emerging from our structural model that call for further discussion. Table 34 summarizes our findings with respect to the hypothesized relationships among the identified constructs of interest to our study.

The emerging findings from our study are summarized below:

- **H_1**–The first **null** hypothesis of our study proposed that there is no significant relationship between the cost of service and intermediate impact. This hypothesis was rejected though with a marginal value. The relationship between the two constructs is not very strong because the cost of e-government services offered at *Huduma* centres is not significantly different from the cost of using traditional channels. The cost in terms of time spent in aessing e-government services from *Huduma* centres has also been compromised by the time spent in queues as a significant number of citizens complained of long queues experienced during access to service therefore defeating the very intention of time reduction when accessing e-government services. The experience in Huduma centres is different from the kind of experience that

citizens would have, for instance, when using the Kenyan e-citizen portal[15] where services are accessed and the transactions paid for online.

Alshawi & Alalwany (2009) in their study of a holistic framework for e-government evaluation identified economic issues such as cost and time savings as being important in e-government evaluation. Their study went ahead to empirically test prove that cost and time savings were relevant for evaluation as also established in our study. Carter & Belanger (2004) in their model for determining factors affecting citizens' intention to use e-government services empirically established that 'relative advantage' affects citizens' intention to use e-government which in turn affects the impact of e-government. In their study, 'relative advantage' is determined by such factors as citizens' perception of reduced cost and time savings in using e-government services. This result also corroborates the findings of our study.

Bhatnagar & Singh (2010) in their study to measure the impact of computerization of government services in the context of a developing country developed an evaluation framework that included cost as one of the measurement indicators for e-government impact. The study went ahead to establish through application of the impact measurement framework on eight mature projects in India that the implementation of e-government had a significant impact on cost of services in line with our findings. The cost elements considered in the study included savings on waiting time, reduced cost of bribes and trips made to service centres.

H_2 – The second **null** hypothesis of our study proposing that there is no significant relationship between the perceived quality of service and intermediate impact was rejected owing to the fact that quality of services as viewed by citizens had greatly improved compared to the traditional 'motor' and 'brick' services offered by respective government ministries, departments and agencies from their respective service points. Consequently, the perceived quality of service had a strong correlation effect on the intermediate impact of e-government services. The integration of several e-government services by the *Huduma* Secretariat into a 'one-stop-shop' also improved the quality of services by reducing the need for citizens to visit several geographically dispersed locations in search of government services. The improvement in quality of service is also attributable to the fact that *Huduma* centres have a sharp focus on citizen-centered services and are committed to quality service delivery.

[15] This is a Kenyan government portal that offers G2C services that can be paid for online using debit/credit cards, mobile money or e-citizen agents.

In a similar research to measure the impact of computerization of government services in the context of a developing country, Bhatnagar & Singh (2010), developed an evaluation framework that included quality of service as one of the indicators to measure the impact of e-government. Quality of service indicators included quality of interaction with operators at the service centres, convenience of service, error in documentation, and complaint handling mechanisms. The study went ahead to reveal through application of the measurement framework on eight mature projects in India that the implementation of e-government had a significant improvement on quality of services in line with our findings.

Alghamdi & Beloff (2015) conducted a study on determinants of adoption and use of e-government in the business sector in Saudi Arabia. The study was based on the E-government Adoption and Utilization Model (EGAUM) developed earlier (Alghamdi & Beloff, 2014). The study analyzed the effect of quality of service on intention to adopt and use e-government and it was established that there was empirical evidence of correlation between quality of service and adoption of e-government services in line with the results of our study.

- **H_3** – The third **null** hypothesis of our study proposed that there is no significant relationship between the perceived quality of service and citizen satisfaction was also rejected. This relation was strong with the highest regression weight owing to the fact that quality of services as viewed by citizens had drastically improved and consequently affected their satisfaction with e-government services offered at the *Huduma* centres. The study also shows that perceived quality of service is mediated by citizen satisfaction in influencing the intermediate impact.

  The strong relation was attributable to the fact that citizens had a strong perception that *Huduma* centres made it easier, faster and convenient for them to access several government services from a common service point. The use of ICT at the centres also made it possible to process and access accurate and up-to-date information stored in government databases across different ministries, departments and agencies. This made access to information and services easier and convenient for citizens.

  In studies by Wang & Liao (2008) and Abdelsalam et al. (2012) that adopted the DeLone & McLean IS success model to measure the success of e-government projects in Taiwan and Egypt respectively; it was hypothesized that there is a relation between quality of service and user satisfaction. In line with our results, the hypothesized relationship was empirically tested and shown to be supported though marginally. A study by Bhatnagar & Singh (2010) described above also revealed a strong correlation between the quality of service and citizen

satisfaction with e-government services. In a study conducted by Kafaji (2007) to evaluate the role of service quality as a mediator of user satisfaction in e-government applications in Saudi Arabia, it was established that the value perceived from service quality affected user satisfaction with e-government services as also confirmed from our study.

A study by Alghamdi & Beloff (2015) on the effect on quality of service on user satisfaction also produced positive results confirming that there was a strong correlation between quality of service and user satisfaction. This study was based on the EGAUM model as mentioned above and considered factors that affect adoption and utilization of e-government services in the business sector. A study by Fan & Yang (2015) on e-government service quality also established that service quality has a positive correlation with citizen satisfaction.

H_4– The fourth **null** hypothesis of our study proposing that there is no significant relationship between citizen satisfaction and intermediate impact was also rejected. The strong relation was attributable to the fact that citizens' satisfaction with e-government services had greatly improved compared to the traditional services offered by respective government ministries, departments or agencies from their respective service points. Consequently, citizen satisfaction had a positive effect on the intermediate impact of e-government services. The improvement in citizen satisfaction with e-government services was attributable to the fact that perceptions in terms of the fairness in provision of government services and handling of the citizen complaints from *Huduma* centres has improved compared to the traditional methods of service delivery.

A study by Wang & Liao (2008) had also hypothesized a relation between user satisfaction and net benefits. The hypothesized relationship between user satisfaction and net benefits was empirically tested and shown to be strongly supported in line with our findings. A study was conducted by ELX (2011) on an adoption model for e-government services in Malaysia. The study hypothesized that citizen satisfaction will positively influence the benefits of e-government. The study also shows empirical evidence of a positive correlation between citizen satisfaction and benefits of e-government as hypothesized in our study. A similar study by Kumar et al. (2007) also proposed a correlation between user satisfaction and adoption of e-government service. The study established that user satisfaction has effect on adoption of e-government services.

H_5– The fifth **null** hypothesis of our study proposing that there is no significant relationship between e-government readiness in the prevailing environment and intermediate impact was rejected. The relationship between the two constructs was not very strong owing to the fact that

citizens did not interact directly with the systems that were used to offer the services and therefore some may not fully appreciate the importance of the infrastructure in service access. Moreover, though some citizens may be aware of the legal, policy and regulatory framework in access to e-government services, there are not many legal, policy and regulatory challenges that citizens have encountered in the process of access to e-government services from the *Huduma* centres. ICT literacy skill which is an important factor in access to e-government services when using self-service is also not coming out very strongly because citizens are not interacting directly with the systems but are served by agents at various service points.

In the study by Alghamdi & Beloff (2015) which considered the effect of access to e-government services, policy and regulation (which are part of e-readiness) on adoption and utilization of e-government services, it was established that e-readiness has a significant correlation to adoption and utilization of e-government services. This is in line with the results of our findings because adoption and utilization of e-government will directly affect the impact of e-government services.

H_6 –The sixth and final **null** hypothesis of our study proposing that there is no significant relationship between the perceived trust and intermediate impact was supported and the relationship between the two constructs had a negative regression weight. The support of this null hypothesis in our study is attributable to the fact that the e-government services provided at *Huduma* centres are at the low end of the e-government models maturity continuum and therefore do not provide transactional services which offer more security challenges and privacy concerns and would therefore be more sensitive to the issues of trust. Savoldelli et al. (2012) affirm that when services are offered at transactional level then they are deployed together with privacy and security measures that support the transactions. Moreover, apart from the limited personal information required for identification purposes, the e-government services offered at *Huduma* centres do not store or provide access to very sensitive personal citizen information like health and finance. There has also been no major incident of misuse of citizen personal information kept by government and accessed through *Huduma* centres and therefore trust in e-government services may not be an issue at the moment. However, trust is at the heart of state-citizen relationship and once broken may erode the other outcomes achieved.

The support of this null hypothesis is also corroborated by the finding of Carter & Belanger (2004) in their model for establishing the intention of citizens' to use e-government services. The model revealed that trust in e-government does not determine citizens' intention of using e-

government services which has a direct effect on impact of these services. However, a study by Alghamdi & Beloff (2015) which also studied the effect of perceived trust on adoption and use of e-government services by the business sector (using EGAUM) confirmed that perceived trust had a statistically significant effect on the adoption and use of e-government which also has an effect on impact. Moreover, a study by Colesca & Dobrica (2008) for adoption and use of e-government services in Romania also shows empirical evidence that perceived trust is a statistically significant factor in determining citizen adoption of e-government services. These were contrary to the results of our findings

Moderator Effect

The study also shows that some relationships between various constructs are moderated by age, gender and education. These are summarized below:

- H_{1a} – The effect of CS on IP is **moderated** by gender;
- H_{1b}– The effect of CS on IP is **not** moderated by age;
- H_{1c} – The effect of CS on IP is **not** moderated by education;
- H_{2a} – The effect of QS on IP is **not** moderated by gender;
- H_{2b} – The effect of QS on IP is **not** moderated by age
- H_{2c} – The effect of QS on IP is **not** moderated by education;
- H_{3a}– The effect of QS on US is **moderated** by gender;
- H_{3b}– The effect of QS on US is **moderated** by age;
- H_{3c}– The effect of QS on US is **not** moderated by education;
- H_{4a}– The effect of PT on IP is **not** moderated by gender;
- H_{4b}– The effect of PT on IP is **not** moderated by age;
- H_{4c}– The effect of PT on IP is **moderated** by education;
- H_{5a} – The effect of ER on IP is **not** moderated by gender;
- H_{5b} – The effect of ER on IP is **moderated** by age;
- H_{5c} – The effect of ER on IP is **moderated** by education;
- H_{6a} – The effect of US on IP is **not** moderated by gender;
- H_{6b} – The effect of US on IP is **not** moderated by age; and
- H_{6c} – The effect of US on IP is **moderated** by education.

Our findings show that eleven (11) out of the eighteen (18) **null** moderator variable hypotheses hold. It is also observed that it is only the relationship between IP ←QS that is **not** moderated by any of the three moderating variables. This means that the effect of quality of service on e-government impact is perceived the same way by citizens irrespective of their age, gender and level of education. This is attributable to the fact that perceived quality of service affects citizens in the same manner irrespective of other factors.

Njuru (2011b) studied the behavior of Kenyan students living in the USA in terms of their participation in use of e-government based on gender, level of education and period of stay in the USA. The results of the study show that the participation and use of e-government is to a great extent determined by gender and level of education.

Alghamdi & Beloff (2015) conducted a study on adoption and utilization of e-government in the business sector in Saudi Arabia. The study considered demographic factors such as age, gender, education level, level of income and location. The study also empirically established that perceived trust was moderated by education level in line with our study. Another study by Al-Shafi & Weerakkody (2010) also confirmed that education level moderates the adoption rate of e-government with citizens with undergraduate degrees constituting the largest group of adopters and those with post-graduate and below secondary levels being poorer adaptors. This is also in line with the findings from our study.

Al-Shafi & Weerakkody (2010) conducted a study on the factors affecting citizen adoption of e-government services in the state of Qatar. The study considered all the three moderating variables in our study: gender, age and education levels. The study established that gender moderates the adoption of e-government and that more male citizens are likely to adopt the use of e-government than female citizens. This could also be attributable to social-cultural factors that determine the behavior of the different gender groups. The study also established that age is an important moderator of e-government adoption with increase in adoption as the age increases. However, the adoption rate decreases after the age bracket of 30-34 years. The younger age group of below 18 years and the older age group of over 50 years were found to be poor adopters. This was in line with our finding that age moderates a number of the hypothesized relationships.

A study by Colesca & Dobrica (2008) for adoption and use of e-government services in Romania considered age, gender, education, income and years of Internet experience as some of the demographic factors that influence adoption of e-government. It was also established from the study that education level played the most significant role in determining adoption and use with

more educated people finding it easier to adopt and use e-government. It was also established that younger people find it easier to use and adopt e-government systems compared to the elderly. This finding was consistent with the previous research which found that age was a major determinant in adoption of e-government services. However, the study does not show evidence on the influence of gender on adoption of e-government services.

4.7 Chapter Summary

In this chapter, we discussed in details the descriptive statistics of the data collected for the various variables used in the study. The proposed measurement model was then used to confirm that the data collected for our study was consistent with the model before subjecting it to further tests and evaluation in the structural model. The results of the measurement model tests and fit indices were discussed in details. The structural model was then used to test the various hypothesized causal relationships between the identified constructs and the results indicated that majority of the hypothesized relationships hold except for the relation between perceived trust and intermediate impact. The moderating effects of the various identified variables were also tested and reported. The chapter concluded with a detailed discussion of the results and findings of the study

As established from our findings, the relationship Perceived Trust (PT) and intermediate impact has been dropped from the conceptual model and the other moderating variables that were proved not to hold. The revised conceptual model as informed is depicted in figure 19.

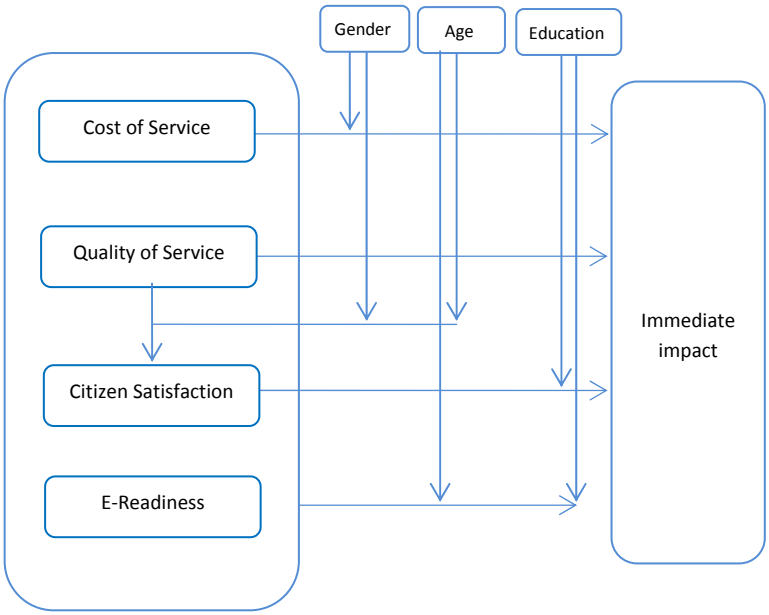


Figure 19: Revised Citizen-Centric Conceptual Model for E-government Impact Evaluation

CHAPTER FIVE – ACHIEVEMENTS, CONCLUSIONS AND RECOMMENDATIONS

5.1 Introduction

In this chapter, we start by presenting the achievements of our research by systematically reviewing the research questions stated at the onset of the study. The section evaluates how our research process addressed each of the research questions and highlights some outcomes that show how the objectives of our research were met. The chapter then gives the final submission and conclusion arising from our findings. The chapter proceeds to narrate the contributions of our research to theory and practice, highlights some recommendations for further work and gives limitations of the study. It goes ahead to give a synopsis of the process applied in the course of study, from problem statement, literature review, methodology, design, analysis and results to conclusions and finally ends with an evaluation of the research process.

5.2 Achievements

This study went through a rigorous process of literature review that was documented to form a rich repository that can be used by other researchers for the advancement of knowledge. The research also generated three relevant papers that were presented in conferences and published. These papers played a significant role in dissemination of the knowledge generated by our research.

The research process was guided by research questions that were defined at the onset. Research questions are useful in guiding the research process and appraising the researcher on whether the specified research outcomes or objectives have been met. The pertinent research questions to be addressed by this study were meticulously stated at the onset in chapter one. The study specified one overall research question that was broken down into specific research questions. There were a total of five specific research questions. The essence of this section is to elaborate the achievements of the study, to confirm whether these questions were satisfactorily addressed during the research process and the objectives of the research met.

The five research questions were:

1. What are some of the challenges faced by developing countries in the implementation and uptake of e-government and how can we address these challenges?

2. What is the level of implementation and uptake of e-government in developing countries compared to developed countries and how can we explain the difference?
3. Why do we have the 'e-government paradox'?
4. What are the available models for the measurement and evaluation of e-government in both developing and developed countries and what are their short-comings?
5. What model can we adopt in the context of a developing country to effectively evaluate the intermediate impact[16] of e-government initiatives from a citizen perspective?

5.2.1 Research Question One

What are some of the challenges faced by developing countries in the implementation and uptake of e-government and how can we address these challenges?

The implementation of e-government in both developing and developed countries faces multiple challenges. However, developing countries face more serious challenges than the developed countries as demonstrated by the large number of failed projects in developing countries compared to developed countries (Otieno & Omwenga, 2015). It is also evident from the results of the bi-annual e-government readiness benchmarking surveys conducted by the United Nations (UN) that most developing countries perform dismally in the ranking. In an attempt to explore the challenges faced by developing countries and identify critical success factors for implementation of e-government, the researcher carried out a study and published a paper (Otieno & Omwenga, 2015). The paper describes in details the challenges that developing countries face, makes recommendations on how to address the challenges and identifies some of the factors that are critical for successful implementation of e-government. Some of the factors identified were key in informing the development of our conceptual model.

It is apparent from the study that citizens in developing countries face numerous challenges in the process of accessing e-government services as corroborated by Chen et al. (2006). Our analysis revealed that citizens face the following key challenges when accessing services from *Huduma* centres: slow service delivery speeds and long queues occasioned by slow network or system speeds and inadequate staff; lack of backup power resulting in downtime in case of power outages; low citizen awareness of the existing services; inadequate customer care skills from the agents serving citizens at the *Huduma* centres; inadequate ICT skills from both the citizens and operators at *Huduma* centres and high cost of e-government services.

[16] Intermediate impact is the short term results that are realized from implementation of e-government

Our study also revealed that the key challenges faced by governments in the implementation of e-government projects include: poor ICT infrastructure; unreliable internet connectivity; poor leadership and change management; inadequate legal and policy framework; low level of citizen awareness, low literacy and e-literacy skills; high cost of services and low citizen participation in government processes (Otieno & Omwenga, 2015; Alghamdi & Beloff, 2016). It was proposed that the government should initiate more infrastructural development projects through Public-Private-Partnerships (PPP); provide clean reliable power and broadband connectivity especially to the rural population. It was also recommended that the government should engage citizens before rolling out e-government projects; create incentives; and train citizens to improve their ICT literacy skills. The challenges faced in the process of e-government implementation and the corresponding recommendations to address these challenges were identified and discussed in section 2.3 above.

5.2.2 Research Question Two

What is the level of implementation and uptake of e-government in developing countries compared to developed countries and how can we explain the difference?

It is evident from our research that the level of implementation and uptake of e-government in developing countries is relatively low compared to that of developed countries (Alshawi & Alalwany, 2009; Islam, 2007). The study reviewed the implementation of e-government initiatives in six developing countries: Tanzania, Botswana, South Africa, Kenya, Egypt and India. One of the main issues arising from the review was the low uptake of e-government services as a result of the adverse operating conditions in these countries as described by Chen et al. (2006) and Kumar et al. (2007). Chen et al. (2006) specified five key governance, resource and cultural issues that differentiate developed and developing countries. These include: maturity in government and culture; technical skills capacity; robustness of infrastructure; access to the Internet; and appreciation of e-government by government officers.

The difference between the operating environments in developed and developing countries is noticeable and worrying. The difference in operating environment definitely affects the implementation of e-government as exemplified by the low e-government development index (EGDI) ranking of developing countries as compared to that of developed economies. This part of the study helped in informing the development of conceptual framework by considering and isolating factors that affect implementation of e-government and that are relevant in the context of a developing country. Our study reveals that the United States of America (USA), Australia,

Canada and United Kingdom (UK) are among the leading implementers of e-government in the world and have reaped significant benefits (Chen et al., 2006; Monga, 2008). These countries have put in place robust infrastructure; their citizens have high IT skills; have good Internet penetration; and have developed good policy frameworks to support e-government. Moreover, they have political stability and mature democratic governments which are elusive in most developing countries.

The review of the implementation of e-government in developing countries also reveals that most of the emergent and existing e-government services are at the lower end of e-government models growth continuum. This means that most e-government services in developing countries are not fully automated from end to end. The implication is that most e-government services that have been implemented only provide information and not transactional processing services therefore leading to low uptake of the services as compared to level of uptake in developed countries (Alshawi & Alalwany, 2009; Islam, 2007).

This study also revealed that the rate of failure of e e-government projects in both developed and developing countries are high as affirmed by Heeks (2003) and Chen et al. (2006). However, the rate of failure in developing countries is higher because of the differences in operating environments (Otieno & Omwenga, 2015; Alghamdi & Beloff, 2014).

The outcome of addressing this research question informed the development of our conceptual model which takes into account the e-government implementation context. There are many studies that have been conducted in developed countries with respect to e-government benchmarking, measurement and evaluation. However, their context is different from that of developing countries and it is important to take this into perspective in order to develop homegrown solutions that are relevant and pertinent to the implementation context.

5.2.3 Research Question Three

Why do we have the 'e-government paradox'?

This study observed that much of the measurement and evaluation of e-government implementation does not indicate strong evidence of benefit that is required to provide substantial impact on the stakeholders. However, there is strong evidence of huge investment in e-government projects in both developing and developed countries (Alshawi & Alalwany, 2009; Bhatnagar & Singh, 2010). The low impact is attributable to the low uptake and utilization of the e-government services.

Savoldelli et al. (2012) used the concept of 'e-government paradox' to signify the disparity between the level of investment and the impact achieved in e-government projects. The 'e-government paradox' has come about as a result of the fact that most e-government projects do not identify specific measurable objectives and intended impact of projects on the targeted stakeholders at the onset. The projects are also executed without due consideration on how the delivered services are adopted and utilized by citizens (Carter & Belanger, 2004). Moreover, the problem is compounded by the fact that theory on measurement and evaluation of e-government is still at the nascent stages of development (Alghamdi & Beloff, 2014; Savoldelli et al., 2013; Alalwany & Alahmari, 2007; Alshawi & Alalwany, 2009; Kearns, 2004; Coursey & Norris, 2008) and may take some time before it matures to provide a solid basis on which e-government measurement and evaluation can be done. This complexity in measurement leads to the "measurement error" as described by Savoldelli et al. (2012) is brought about by the fact that most indicators for e-government impact are intangible and are not evidently visible.

The 'e-government paradox' has also come about as a result of mismanagement of e-government by projects managers leading to high rates of failure. The rate of failure of e-government projects in both developed and developing countries are high as affirmed by Alghamdi & Beloff (2014), Heeks (2003) and Chen et al. (2006). The main reason for failure of these projects is disregard of stakeholder requirements during design and deployment of e-government services (Otieno & Omwenga, 2015; Carter & Belanger, 2004). The other reasons for failure include: poor monitoring and evaluation; low citizen participation, low commitment from leadership, lack of sustainability plans, low trust in government, security and privacy concerns, low engagement of stakeholders and lack of regular content upload (Kumar & Best, 2006; Reffat, 2006; Carter& Belanger, 2004; Savoldelli et al., 2012).

The 'measurement error', high rate of failure and subsequent low uptake of e-government projects as described above have significantly contributed to the 'e-government paradox'. It is on this basis that the researcher set to carry out a study to partly address the 'e-government paradox' and also published a paper (Otieno, et al. 2016) on this topical issue that was presented at the IST 2016 conference in Durban, South Africa.

5.2.4 Research Question Four

What are the available models for measurement and evaluation of e-government in both developing and developed countries?

Our study identified and reviewed a number of models/frameworks that have been used for benchmarking, evaluation and measurement of e-government projects. One of the outstanding issues emerging from the literature review was the ambiguity and confusion arising in the use of the terms: evaluation, measurement and assessment (Savoldelli et al., 2013). Our study unearthed and clarified the differences between these terminologies. Another important aspect arising from the review of models for evaluation and measurement of e-government was the concept of 'public value'. Savoldelli et al. (2013) argue that public administration is aimed at creating value for citizens and therefore e-government by extension is a means of producing and delivering 'public value'. The implication is that e-government projects should be viewed from the perspective of creating value for citizens therefore backing our argument for developing a citizen-centric e-government impact evaluation model.

Our literature review revealed that most of the existing models address the aspects of e-government benchmarking and measurement and very few address the aspect of impact evaluation. The researcher summarized and presented the identified e-government benchmarking, measurement and evaluation frameworks in a paper (Otieno & Omwenga, 2014) that was presented at the IST-Africa Conference 2014, in Port Louis, Mauritius.

Our literature review also established that despite the fact that there were a couple of studies on benchmarking, measurement and evaluation of e-government in developed countries, there were very few studies conducted in developing countries (Madon, 2004; Bhatnagar & Singh, 2010; Kumar & Best, 2006; Karunasena & Deng, 2009). Further, there was no evidence of models that had been developed '*sensu stricto'* in the context of a developing country and used for evaluating impact from a citizen-centric perspective taking into account the effects of attribution and causality in the identified constructs. The frameworks for e-government benchmarking, measurement and evaluation are astutely described in section 2.8 and 2.9 above. Section 2.8 describes the models/frameworks for e-government benchmarking and measurement while section 2.9 describes frameworks for impact evaluation. The insight gotten from the review of the existing models played a crucial role in identifying concepts that were relevant to our proposed conceptual model.

5.2.5 Research Question Five

What model can we adopt in the context of a developing country to effectively evaluate the intermediate impact of e-government initiatives from a citizen perspective?

One of the main achievements of this study was the development of a citizen-centric model for evaluating the intermediate impact of e-government in the context of a developing country taking into account the effects of attribution and causality in the identified constructs. This study undertook a comprehensive literature review that culminated with the development of a citizen-centric conceptual model for e-government impact evaluation that is appropriate in the context of a developing country as described in section 2.10 above. Our conceptual model was developed through the process of conceptual analysis by recognition, categorization, synthesis and integration of key concepts identified during literature review. The emergent conceptual model comprised of five concepts that were identified as affecting the intermediate impact of e-government, which is the complex dependent variable. The five concepts include: cost of service, perceived quality of service, citizen satisfaction, perceived trust and e-readiness.

The model hypothesized causal relationships among the identified constructs that were moderated by age, gender and education level as depicted in figure 10 in section 2.10 above. The model guided the development of the instrument used for data collection. SEM technique was used to guide the process of data analysis and hypothesis testing. Data was collected from citizens as they accessed services at *Huduma* centres spread across various counties in the country. The data collected was validated and captured in SPPS software and analysis and testing of the hypothesis done using Amos software that supports SEM. The model hypothesized relationships between the identified constructs which were empirically tested and most of them proven to hold.

Our findings revealed that most of the hypothesized relationships hold except for the relationship between perceived trust and intermediate impact. The moderating effects of the identified variables were also advertently tested and reported. The final revised citizen-centric conceptual model for e-government impact evaluation is presented as figured 19 in section 4.7.

5.3 Research Contributions

Morrison & Smit (2004) explains the relationship between theory and knowledge and argues that theory building is an essential component in knowledge development. Knowledge development is not an accidental process but rather a systematic and purposeful process of creating new understanding through the development and testing of theory. Morrison & Smit (2004) argues that a theory must have some utility value that is derived through its applicability to solve real life problems. The purpose of research, therefore, is to make contributions to the body of knowledge, the industrial, social, economic and technological development of a country and the

society through application of knowledge. This study has made significant contributions in the field of e-government impact evaluation by creating new knowledge through the development of an e-government impact evaluation model. The model is relevant in the context of developing countries and to some extent in developed countries as well.

Whetten (1989) in his seminal paper described what constitutes a theoretical contribution and his arguments were further emphasized by Morrison & Smit (2004) and Friedman (2003). Whetten (1989) argues that a complete theory must contain four essential elements: 1) what – which are essentially the factors (variables, constructs, concepts) that logically describe our phenomenon of interest taking into account comprehensiveness and parsimony of the factors 2) how – having identified the factors of interest, the researcher should then establish the causal relationships between and among these factors and possibly depict them graphically using formal models to enhance understanding and interpretation 3) why – what are the underlying reasons that give justification for selecting the identified factors and causal relationships among them? A theory is not complete without explaining the underlying assumptions and logical reasoning. Morrison & Smit (2004) also emphasizes the importance of explaining and giving reasons for derived conclusions, inclusions and exclusions in theory development. 4) who, where and when – these conditions place limitations and boundaries on the generalizability and replicability of the research findings based on context, population affected and time constraints therefore delimiting the scope and applicability of the findings.

It is argued that altering an existing model by adding or subtracting variables does not necessarily constitute a theoretical contribution. Theoretical insights are gained by explaining how the addition or subtraction of variables significantly alters understanding of the phenomenon in ways that challenge the existing thinking and rationale. In order to avoid inane discussions, a theory should be well-grounded on the 'why' as well as the 'what' and 'how'. The 'who', 'where' and 'when' delineates the applicability of the results in terms of the surrounding or locality of the research, the people it affects and whether the theoretical propositions will vary over time because of the effect of time-dependant variables. Udo-Akang (2012) complimented Whetten's argument by proposing that theory development comprises of the following nine constructs: a) descriptive ability, b) explanatory powers, c) heuristic value, d) testability, e) integration, f) parsimony, g) clarity, h) comprehensiveness, and i) delimitation.

The development of new knowledge in research creates capacity for altering action or initiating new action in practical real life situations. The *utility* value of research is therefore of fundamental importance in knowledge discovery process as argued by Morrison & Smit (2004).

A study is considered to make significant theoretical contribution if it can demonstrate that all the four factors that constitute a theoretical contribution have been met as posited by Whetten (ibid). It is observed that this study went through a detailed literature review process that was well grounded and documented. A detailed review of e-government implementation in developing countries was conducted and various frameworks/models used for benchmarking, measurement and evaluation of e-government were discussed in detail and particularly from the context of a developing country. The documented review informed the development of our conceptual model and forms a rich repository that would be useful to researchers who may be interested in pursuing similar or related field of study in future.

This study conducted a comprehensive literature review which culminated in the development of a conceptual model for evaluating the intermediate impact of e-government. The resultant model comprised of five concepts that were identified as affecting intermediate impact of e-government, which is the complex dependent variable. The five concepts include: cost of service, perceived quality of service, citizen satisfaction, perceived trust and e-readiness. The relationships among the constructs were identified together with the moderating variables and these were summarized in our conceptual model as depicted in figure 10 in section 2.10. The study also identified variables used to measure the identified constructs together with their associated error terms and summarized the relationships in a structural model depicted in figure 17 in section 4.4.

It is evident from review of the extant literature that e-government research is not just nascent; but there is sparse theory development and testing with the exception of adoption and measurement models (Alghamdi & Beloff, 2014; Coursey & Norris, 2008; Alalwany & Alahmari, 2007; Alshawi & Alalwany, 2009) that have been developed in the context of developing countries. Barbosa et al. (2013) also confirm that there are inadequate performance evaluation models and measurement indicators built from the perspective of citizens therefore limiting the capability of measuring the social and economic impact of e-government. Furthermore, there are virtually no models that have been developed '*sensu stricto*[17] in the context of a developing country for evaluating impact of e-government from a citizen-centric perspective taking into account the effects of attribution and causality in the identified constructs.

[17] In a strict sense

This study reviewed e-government benchmarking, measurement and evaluation frameworks/models. Several concepts were identified during the study including the concepts of: public value; citizen-centricity; efficiency and effectiveness; 'e-government paradox', e-readiness; cost of service; user satisfaction; perceived trust; achievement of outcomes; perceived quality of service; impact; uptake of service; and quality of governance. There were many factors that were relevant to our study, but to maintain model parsimony while at the same time ensuring comprehensiveness (Whetten, 1989; Morrison & Smit, 2004; Friedman, 2003), the study settled on six key concepts and three moderating variables. Section 2.10 explains in details which factors were considered from each framework/model and why some were dropped and others adopted in our conceptual model.

This study was based on the concepts of public value and citizen-centricity because most of the previous studies had dwelt on evaluating the impact of e-government from the government agencies' (supply-side) rather than the citizens' perspective (Barbosa et al., 2013; Verdegem et al. 2010; Codagnone & Undheim, 2008; Savoldelli et al., 2013; Otieno & Omwenga, 2014). It is argued that e-government which is a means of reforming and enhancing public administration through the use of ICT aims at creating public value for citizens (Savoldelli et al., 2013). Citizens form the largest segment of taxpayers and are the greatest beneficiary of e-government (Wang & Liao, 2008) and therefore e-government impact should be evaluated from their perspective.

The measurement indicators (and their associated scales) and moderating variables used in the data collection instrument were derived from literature review with emphasis on what other researchers had done in similar or related fields. The process of data collection, analysis and reporting was guided by the SEM technique. The discussions of the findings of the study in section 4.7 explains in detail why certain observations were made from the study and compared the findings with similar findings derived by other researchers in the field.

One of the major contributions of this research is the development of a citizen-centric conceptual model for e-government impact evaluation that is appropriate in the context of a developing country. The study developed a theory that was summarized in the form of a conceptual model as depicted on figure 10 in section 2.10. The model identified constructs that influence the intermediate impact of e-government from a citizen perspective and in the context of a developing country. The proposed conceptual model hypothesized the causal relationships among the identified constructs based on theory derived from literature review. It was proposed that some of the relationships were moderated by age, gender and education levels. The model went through a rigorous hypothesis testing process using the SEM technique.

The outcome of our study revealed that majority of the hypothesized relationships hold except for the relationship between perceived trust and intermediate impact which was not supported. The moderating effects of the various identified variables were also advertently tested and reported. The proposed model was reviewed based on the findings and a revised model was presented as depicted on figure 19 in section 4.7. The developed model contributes to the body of knowledge and particularly in the field of e-government impact evaluation. It provides an ideal opportunity for researchers to conduct further research, critique and propose enhancements on the proposed model based on research.

5.4 Conclusions

Despite the fact that this study was conducted in the context of a developing country, the results are also generalizable to some extent in the context of developed countries. The entire research followed a rigorous, sound and systematic process and applied a methodology that guaranteed the validity and reliability of our findings. The sample size of the data used for analysis was above minimum threshold set for SEM technique. The sampling criteria were carefully chosen to assure validity and reliability of our results (Saunders et al., 2009) and the measurement model confirmed consistency with the data collected. Therefore, we can confidently conclude that the findings of this research are generalizable to a great extent in the context of a developing country since the factors collated, synthesized and analyzed were relevant to the context of a developing country. This includes conducting the study in the setup of common citizen service delivery points (Huduma centres) and taking into consideration factors such as e-readiness (contextual variables) and cost of bribes which are relevant in the context of developing countries. However, although the study was conducted in the context of a developing country, it has a wider practical application and the results are generalizable to some extent in the context of developed countries as well.

It has been established that the implementation of e-government projects in developing countries face more challenges than developed countries as a result of the differences in operating environments (Islam 2007; Chen et al., 2006). This is attributable to the fact that e-government implementation in developing countries experience more adverse operating conditions and challenges than developed countries because of the low levels of e-readiness and maturity of the governance systems. Therefore, there is need to address the adverse operating conditions by improving the e-readiness index of these countries and addressing most of the challenges identified and documented in our study. It is also important to implement some of the recommendations made in this study to address the challenges. This will lead to

improvement in the design, development, implementation and rollout process of e-government projects in these countries. It is also observed that engagement of citizens and elicitation of their requirements during design and development of e-government services is important. Similarly, engaging citizens during rollout of e-government services is critical for success of e-government projects and increases their awareness (Otieno & Omwenga, 2015; Alghamdi & Beloff, 2014).

One of the objectives of our study was to partly address the 'e-government paradox' by developing an appropriate e-government impact evaluation model that would address the 'measurement error'. We conclude from the result of our study that we partly addressed the 'e-government paradox' by developing a citizen-centric conceptual model for evaluating the intermediate impact of e-government that is appropriate in the context of a developing country. The study confirmed that five of the six proposed hypotheses hold except for the relationship between perceived trust and intermediate impact. The model that we developed is specifically adapted to the context of a developing country as it studies citizen's access to e-government services from common citizen service delivery points common in developing countries and also considers factors such as e-readiness and cost of service (including bribes).

The study also tested and revealed that certain relationships between various constructs are moderated by age, gender and education. It was established that the effect of cost of service on intermediate impact is moderated by gender; perceived quality of service on citizen satisfaction is moderated by gender and age; perceived trust on intermediate impact is moderated by education; e-readiness on intermediate impact is moderated by age and education and citizen satisfaction on intermediate impact is moderated by education. Moreover, the effect of perceived quality of service on intermediate impact is not moderated by age, gender and education level. This study evaluated the research process and reviewed the research questions set out at the onset and established that all of them were adequately addressed and the research has met its objectives.

5.5 Recommendations

The section below discusses some proposed further work, application of the results of the study in practice and limitations of the study.

5.5.1 Further Work

It was observed during the review of implementation of e-government initiatives in developing countries that the e-government development index (EGDI) which is a bi-annual benchmarking ranking index produced by the United Nations (UN) had some correlation with the Corruption

Perception Index (CPI) of a country. It was observed that developing countries with a high CPI (least corrupt) tend to have high EGDI. Although this observation was made, the correlation was not empirically tested and proven to hold and may therefore require further investigation.

This study was specifically geared towards evaluating the impact of e-government projects from citizens' perspective (G2C) whereas there are other stakeholders in the supply chain who benefit from implementation of e-government projects, including: businesses (G2B), government (G2G) and employees (G2E). This gives an opportunity for researchers to conduct studies that are specifically geared towards addressing other stakeholder groups in different contexts and particularly businesses (G2B) and government (G2G) as also proposed by Wang & Liao (2008).

SEM proposes the use of both a measurement and structural model. The measurement models tests for consistency between the data collected and the model and whether the measurement indicators are appropriate, while the structural model tests for the proposed hypotheses. The measurement and structural models used for this study are depicted in figures 15 and 17 respectively. The structural model proposed to test a number of correlations between constructs that were not necessarily defined in the conceptual model that summarized our theory. The results of the analysis showed that there is a strong correlation between perceived trust (PT) and e-readiness (ER) and between perceived quality of service (QS) and cost of service (CS). It is proposed that further work can be done to test these two correlations that appeared to come out strongly from our analysis.

Finally, our conceptual model proposed that perceived trust (PT) would significantly affect the intermediate impact of e-government (IP). However, this hypothesis was rejected from the results of the study. Our literature review shows that this hypothesis should have been supported (Kearn, 2004; Bhatnagar & Singh, 2010). Therefore, there is need to conduct further detailed investigation to establish whether this hypothesis is supported in different e-government service delivery setup apart from common service delivery points as was the case for this particular study; considering that trust may not be an issue in this setup because citizens don't interact directly with the systems. Moreover, the services offered are at the lower end of the e-government models maturity continuum and transactions are not processed online.

5.5.2 Practice

This study went through a rigorous research and theory development process. The theory proposed some hypotheses which were tested and most were proven to hold. The resultant

conceptual model gives insight on the various factors that influence the impact of e-government implementation from a citizen perspective. It is apparent from this study that the cost of service (H_1); perceived quality of service (H_2), citizen satisfaction (H_4) and e-readiness (H_5) directly affect the intermediate impact of e-government and perceived quality of service (H_3) affects citizen satisfaction.

Morrison & Smit (2004) argues that *utility* of research is important in the knowledge discovery and development process. Research is not just theoretical but also practical in nature. The creation and development of new knowledge in the research process should create capacity for the application of new or better action in practical real life situations. The knowledge developed from research should be able to have a direct impact on the social, economic, political and technological development of an industry, a country, society and the world at large.

This study has made significant contributions that would be utilized by scholars, policy makers, civil society, donors and sponsors. Scholars will benefit from the new knowledge generated by this research. The recommendations made on how to address the identified challenges will be of great benefit to implementers of e-government, policy makers, civil society and community-based organizations. Government agencies like the Kenya ICTA (ICT Authority) and the Ministry of Devolution and Planning which is responsible for the implementation and rollout of the *Huduma* Kenya Programme will directly benefit from the results of the study. The conceptual model for evaluation of e-government will also help donors and sponsors in identifying the factors to consider when evaluating the impact of projects that they support. It will also facilitate justification of investment by facilitating donors, sponsors and government to appreciate whether they are realizing good return on investment. This research was conducted from the perspective of a developing country; therefore, although the findings may not entirely be generalizable in developed countries, they have a wider practical application.

Morrison & Smit (2004) posits that apart from a theory having *utility*, it must also have *falsifiability*. This means that a theory should be developed in such a way that it is open to challenge and disconfirmation. This study has developed a theory which has been empirically tested and confirmed, but it is also open for scholars to confirm, extend or challenge the findings based on logical reasoning. Therefore, it provides scholars with opportunity to extend the frontiers of knowledge in the field of e-government.

Most e-government projects target citizens as the key stakeholders of e-government. It is however argued that most of these projects are undertaken without due consideration of

citizens' need and their willingness to accept and take up these initiatives (Carter & Belanger, 2004; Kumar et al., 2007; Islam, 2007). It is also apparent from our study that there are several factors that affect the impact of e-government projects on citizens. It is important for e-government implementers and policy makers to take note of these factors and apply them during design, development, implementation and rollout of e-government projects.

E-government projects require huge investments (Bhatnagar & Singh, 2010; Alshawi & Alalwany, 2009; Savoldelli et al., 2012) which are sometimes supported by donors or sponsors. It is in the interest of donors/sponsors to appreciate whether their investment has been put into good use and the intended results of these projects realized. The application of the resultant model to evaluate the impact of e-government projects on citizens will assist donors and sponsors to review their investment in e-government projects and decide whether to support future projects or not. Similarly, e-government projects are funded by the government using taxpayers' money and it would be in the interest of civil society and community based organizations to appreciate whether the government is prudent in its investment on e-government projects and citizens are getting value for money. The practical application of the resultant model and recommendations made to address the identified challenges would assist the government to scale the impact and results of e-government.

This research also identified and elaborated the challenges faced by e-government implementation in developing countries and made recommendations to address these challenges. The recommendations made are relevant for application by e-government implementers and policy makers as they will help in addressing most of the challenges experienced by governments and prevent e-government projects from falling into the same pitfall resulting in failure. This will contribute to a reduction of the failure rates of e-government projects particularly in developing countries.

5.5.3 Limitations of Study

This study was conducted in the context of a developing country using common service delivery points referred to as *Huduma* centers which may not be common in developed countries. This limits the generalizability and broad application of our findings especially in the context of developed countries which may have a different setup. However, Alalwany & Alahmari, (2007) also argue that no single evaluation approach is applicable in all situations but is dependent on the context.

There are many stakeholders in the e-government implementation process including citizens (G2C), businesses (G2B), government agencies (G2G) and government employees (G2E). This study was delineated to the impact on citizens because they are considered to be the largest segment of taxpayers and the major beneficiary of e-government implementation. This limits the application of our finding to impact evaluation from the perspective of citizens.

Although the sample size used in this study meets the proposed minimum SEM threshold of 200 cases, it was not substantially large. The sample size was restricted by financial and time constraints. Collecting larger samples across the country would require more time and financial resources that were not at the disposal of the researcher. It should also be noted that although it is the Kenyan government desire to have *Huduma* centres across all counties in the country, by the time of conducting this research this had not been realized and there were a total of only 11 *Huduma* centres in 9 counties.

It was also established during the study that citizens were not interacting directly with the systems and most of the services offered at the *Huduma* centres were not fully automated from end-to-end. Most of the services offered were still at the first two stages of e-government development models as described by Coursey & Norris (2008). The interactions and perceptions that citizens would have on systems that are fully automated from end-to-end with transactional capabilities would be different from those partially automated as was the case at the *Huduma* centres. It would therefore be interesting to conduct studies on services at the higher end of the e-government models maturity continuum.

5.6 Research Summary

The number of e-government projects with huge investments undertaken in both developing and developed countries has been on the rise over the last couple of years. However, it is observed that the uptake and impact of these projects on the target population has been very low compared to the level of investment. Some authors have used the term ‘e-government paradox’ to denote the mismatch between the level of investment and the uptake and impact of e-government projects (Savoldelli et al., 2012; Castelnovo, 2010; Otieno et al., 2016).

Savoldelli et al. (2012) argues that the main cause of the ‘e-government paradox’ is the “measurement error”. This is as a result of the inadequacy of the existing measurement tools to effectively evaluate and report the results of e-government. The problem is compounded by the fact that e-government development is still nascent and there are few studies that have been

undertaken on evaluation of e-government projects and particularly from a citizen-centric perspective (Alghamdi & Beloff, 2014; Savoldelli et al., 2013; Barbosa et al., 2013; Kunstelj & Vintar, 2004; Alshawi & Alalwany, 2009). Consequently, there is need to develop robust e-government measurement and evaluation models to address the "measurement error".

The other factor contributing to the 'e-government paradox' is the mismanagement of e-government projects by project managers. This is partly due to the fact that few projects define the objectives and intended impact of projects on government processes and stakeholders at the onset. These projects are also sometimes executed without due consideration of how the emergent services are adopted and utilized by citizens (Carter & Belanger, 2004). The mismanagement of IT projects has led to the high rate of failure of e-government projects. Studies have shown that approximately 60% of e-government projects fail completely or do not realize the intended results (Heeks, 2003; Jukić et al., 2013).

Alghamdi & Beloff (2014), Savoldelli et al. (2013) and Alalwany & Alahmari (2007) confirm that in spite of the importance of e-government evaluation, theory on measurement and evaluation of e-government is still at the nascent stages of development. However, studies on measurement and evaluation of e-government in developed countries are at a more advanced stage compared to developing countries. The level of uptake and utilization of e-government in developed countries is also higher compared to developing countries (Alshawi & Alalwany, 2009; Islam 2007). Despite the fact that there is a lot that developing countries can learn from these studies, the implementation context is different and there is need to develop home grown solutions that are relevant in the local context. It is on this basis that we set out a study to partly address the 'e-government paradox'. The main goal of this study was to develop a citizen-centric e-government impact evaluation model that is relevant in the context of a developing country.

After identifying and stating the research problem, the study went ahead to specify the research questions to be addressed by the study. The details of achievements and how the research questions have been addressed are discussed in section 5.2 above. Justification for conducting the research, scope and assumptions made in the research process were meticulously outlined in chapter one. The study went ahead to conduct a detailed literature review to appreciate what other researchers have done particularly in the area of e-government impact evaluation.

Our literature review reveals that e-government growth models have been used to illustrate the multiple stages that e-government implementation go through in the e-government models maturity continuum. Researchers have defined different models to illustrate the maturity growth

levels of e-government services; from providing citizens with information to providing e-government transactional services that are integrated and fully automated from end-to-end. In this study, it was revealed that most of the services offered at *Huduma* centres are partially automated. Consequently, the findings of this study may vary from similar studies where e-government services are fully automated from end-to-end.

The study went ahead to review e-government initiatives in developing countries including: Tanzania, Botswana, South Africa, Kenya, Egypt and India. One of the main issues arising from this review was the low uptake of e-government services in developing countries mostly as a result of the adverse operating environment as described by Kumar et al. (2007), Chen et al. (2006) and Islam (2007). The second concern was the low E-Government Development Index (EGDI) ranking of these countries compared to countries in the developed world; and the correlation between EGDI and Corruption Perception Index (CPI) of a country. It was observed that countries with a high CPI (least corrupt) tend to have high EGDI. This calls for further study to establish the cause of the correlation and the effect that CPI has on the EGDI of a country.

The third issue arising from the review of the e-government initiatives in developing countries was the challenge of e-government implementation in these countries. The challenges identified included: ICT infrastructure; human resource; policy; regulatory framework; awareness; culture; and political leadership facing majority of these countries as posited by various authors (Otieno & Omwenga, 2015; Bwalya, 2009; Chen et al., 2006; Karunasena & Deng, 2009). The fourth issue arising from the review was the fact that most countries had developed e-government strategies or action plans that were at different stages of implementation (Bwalya, 2009).

The final observation coming out of the review of the implementation of e-government in these countries was the fact that of most of the e-government services offered at delivery points were at the low end of the e-government models growth continuum. This means that most of the e-government projects were providing information to citizens rather than transactional services that are automated from end-to-end. It was also observed that some of the countries including Egypt, India and Kenya offered e-government services through common citizen service centres. This is a big departure from the *self-use* of e-government services through portals as applied by most citizens in developed countries (Abdalla et al., 2015; Monga, 2008; Bhatnagar & Singh, 2010).

Our literature review also highlighted the various frameworks that have been developed and used for benchmarking, measurement and evaluation of e-government projects. Our review

established that there is ambiguity and confusion arising out of the use of the terms evaluation, measurement and assessment. It was revealed that most of the previously developed models were addressing aspects of e-government benchmarking and measurement and not the aspect of impact evaluation. The researcher published a paper (Otieno & Omwenga, 2014) that summarized the various e-government assessment frameworks.

Literature review established that there were very few studies conducted in developing countries on e-government benchmarking, evaluation and measurement. Furthermore, there were no models that had been developed '*sensu stricto'* in the context of a developing country for evaluating impact of e-government from a citizen-centric perspective taking into account the effects of attribution and causality in the identified constructs.

Savoldelli et al. (2013) and Alalwany & Alahmari (2007) conclude that evaluation of e-government just like evaluation of Information Systems has proven to be of great importance and equally complex in nature given that not all results of e-government are evidently visible. Our literature review culminated with the development of a citizen-centric conceptual model for e-government impact evaluation that is appropriate in the context of a developing country. The model hypothesized causal relationships among the various identified constructs that were moderated by age, gender and education level. The model guided the development of the instrument used for data collection.

Chapter three discussed in detail the methodology used to conduct our study. Structural Equation Modeling (SEM) technique guided the process of data collection; analysis; testing of hypothesis and reporting of findings of our study. SEM was used because of its ability to simultaneously model both latent and observed variables and its capacity to model complex multivariate relationships among variables. SEM proposes the use of a measurement and a structural model. The measurement model was used to establish whether the data collected for the study was consistent with our conceptual model and whether the measurement indicators were appropriate in measuring the constructs they represent. The structural model was used to test various hypothesized causal relationships between the identified constructs. A pilot study that culminated with the publication of a paper (Otieno & Omwenga, 2015) was conducted.

SEM proposes a minimum of 200 respondents to attain valid and reliable results. The study administered a total of 274 questionnaires to citizens as they accessed e-government services in seven *Huduma* centres spread across the country. The study ended up with a total of 252 valid cases after the data collected was coded, screened and verified. Triangulation and

validation of the data was done through interviews with *Huduma* centre managers and staff from the *Huduma* secretariat. The validated data was captured and analyzed in SPSS software and the SEM process conducted using Amos software.

The measurement model was used to test the consistency of our data and the model before proceeding with testing the structural model. It was advertently established that the data fitted the measurement model with no need for model re-specification. The structural model was then used to test the various hypothesized causal relationships between the identified constructs.

The results revealed that majority of the hypothesized relationships hold except for the relationship between perceived trust and intermediate impact which was not supported. The moderating effects of the various identified variables were also advertently tested and reported. The detailed discussions of our findings are described in section 4.7 above. The final outcome of the process was a revised citizen-centric model for e-government impact evaluation as presented in figure 19 in section 4.7 above. The study also identified and summarized the challenges experienced by citizens as they accessed e-government services at the *Huduma* centres and gave recommendation on how to address the challenges. Details of the findings are discussed in section 2.3 above.

5.7 Evaluation of the Research

Whetten (1989) in his seminal paper, “What constitutes a theoretical contribution”, described the essential elements of a theoretical contribution and the process by which research with scientific contribution is evaluated for consideration for publication. This follows from the four elements that were identified as essential in defining a complete theory. We systematically use the process as prescribed by Whetten to evaluate our research process.

5.7.1 What are the New Contributions?

One of the significant contributions from the study was the development of a citizen-centric model that could be used for e-government impact evaluation borrowing from the previous works of other researchers in the field of e-government assessment. The research also made other significant practical contributions which have been outlined in details in section 5.3 above.

5.7.2 Will the Theory Alter Practice of E-government Evaluation?

The results of the study will definitely alter research and practice of e-government evaluation by guiding researchers and practitioners on what factors to consider when evaluating the impact of

e-government. This study has created utility by assisting governments in developing counties with retrospective evaluation, given prospective direction and facilitated accountability in the implementation of e-government projects as proposed by Heeks (2006).

The challenges identified and recommendations made will also be useful particularly to researchers, policy makers and implementers of e-government to guide the practice of design, development and implementation of e-government projects. Specifically, the results would be used to guide the rollout and implementation of *Huduma* centres in the counties. Section 5.5.2 above outlines some of the practical applications of the research and how it will alter the practice of e-government evaluation.

5.7.3 Is the Logic and Supporting Evidence Compelling?

This study was supported by evidence derived from literature review, sound and rigorous methodology, empirical testing of our hypothesis and justification given where choices were made. The assumptions made during the study were also elaborated. The research process explained which variables were considered for our conceptual model and from which frameworks/models they were derived and why the researcher believed they were important in the evaluation process. The rationale for their inclusion was given taking into account the fact that the model was citizen-centric and relevant in the context of a developing country. The rationale for considering citizens' perspective and context of a developing country was explicitly stated. Section 2.10 elaborated the details of which factors were considered from each framework/model and why some were dropped and others considered in our conceptual model. The rationale for using SEM technique for data collection, analysis and reporting was explicitly stated. The findings of the study were discussed and explanations for certain observations were highlighted in detail in section 4.6. Comparison of the findings of this study with similar findings by other researchers in the field of e-government was made and any variances explained.

5.7.4 Does the Research Convey Completeness and Thoroughness?

This study applied a sound methodology and went through a comprehensive process that demonstrated completeness and thoroughness as summarized in section 5.6 above.

5.7.5 Is the Research Well Written?

The study was well-thought and the thesis well-written, logically flowing and with justifiable arguments. The thesis starts with table of content showing the layout of the thesis to guide the reader. The introductory section gives the background of the study including problem statement,

research questions, scope and assumptions of the study. The second chapter delves into literature review where relevant theories and frameworks/models are explored and documented culminating with the development of a conceptual model summarizing the theory of our study. The third chapter outlines the methodology used for the study taking into account the prescribed steps and issues to consider when using SEM. In the fourth chapter, we report and discuss the results of the study and conclude in the final chapter with achievements, research contributions, conclusions and recommendations. Our thesis was designed to logically flow and use concise statements to convey our message even to non-experts in the field of e-government.

5.7.6 Is the Research of Contemporary Interest to Scholars?

Most of the traditional tools used for benchmarking and evaluation of e-government measure the tangible gains whereas there are numerous intangible gains that are not evidently visible. Moreover, implementation of e-government is geared towards enhancing public value and not necessarily economic value as viewed by many organizations in the private sector. Our study addresses this complexity and will be of great interest to scholars in the e-government field. The practical application of the results of this study will be of interest to a number of stakeholders including scholars as outlined in section 5.5.2 above.

5.7.7 Who is Interested in the Research?

This study will be of great interest to many stakeholders including scholars, donors, sponsors, e-government implementers and policy makers. The practical application of the results of this study including the stakeholders who would be interested in this research is highlighted in section 5.5.2 above.

REFERENCES

1. Abdalla, A, Kiragu, J., Waswa, F., Ono, F., Kariuki, J. W., & Ikua, D. M., 2015. Effect of *Huduma* Centers (One Stop Shops) in Service Delivery–A Case Study of Mombasa *Huduma* Centre. International Journal of Academic Research in Business & Social Sciences, 5(6), 102-117.

2. Abdelsalam, H. M., Reddick, C. G., & El Kadi, H. A., 2012. Success and failure of local e-government projects: lessons learned from Egypt. Dig Democr: Conc, Method, Tools, Appl, 3, 183. Available at: http:// login2egypt.idecision.org/ICEGOV/SuccessandFailureofLocalEGovernmentProjects.pdf (accessed 12 Sep 2014).

3. ADF IV, 2004. Fourth African Development Forum, Governance for a Progressing Africa, 11-15th Oct 2004, Addis Ababa, Ethiopia. Available: http://213.55.79.31/adf/adfiv/adf_4_report_final_sml.pdf

4. Aikins, S.K., 2012. Managing E-government Projects: Concepts, Issues and Best Practices. IGI Global Snippet.

5. Alalwany, H. and Alahmari, A., 2007. E-Government evaluation factors: Citizen's perspective. In Proceedings of European and Mediterranean Conference on Information Systems 2007, June 24-26, 2007, Polytechnic University of Valencia

6. Alghamdi, S., & Beloff, N., 2014. Towards a comprehensive model for e-Government adoption and utilization analysis: The case of Saudi Arabia. In Computer Science and Information Systems (FedCSIS), 2014 Federated Conference on (pp. 1217-1225). IEEE. Available at: https://fedcsis.org/proceedings/2014/pliks/146.pdf

7. Alghamdi, S., & Beloff, N., 2015. Exploring determinants of adoption and higher utilization for e-Government: A study from business sector perspective in Saudi Arabia. In Computer Science and Information Systems (FedCSIS), 2015 Federated Conference on (pp. 1469-1479). IEEE: Available at: https://fedcsis.org/proceedings/2015/pliks/257.pdf

8. Alghamdi, S., & Beloff, N., 2015. Innovative Framework for e-Government adoption in Saudi Arabia: A Study from the business sector perspective. International Journal of Advanced Computer Science & Applications, 1(7), 655-664. Available: http://sro.sussex.ac.uk/59544/

9. Al-Hashmi, A. and Darem, A.B., 2008. Understanding phases of E-government project. New Delhi: Retrieved from http://www. csi-sigegov. org/emerging_pdf/17_152-157. pdf.

10. AlKhatib, H., 2013. E-government systems success and user acceptance in developing countries: The role of perceived support quality (Brunel University Brunel Business School, PhD Theses). Available: http://bura.brunel.ac.uk/bitstream/2438/7471/1/FulltextThesis.pdf

11. Alonso F. M., Fitzgerald G., 2005. Theoretical Approaches to Study SMEs e-Business Progression. Journal of Computing and Information Technology - CIT 13, 2005, 2, pp.123–136. Available: http://hrcak.srce.hr/file/69322

12. Al-Shafi, S., & Weerakkody, V., 2010. Factors affecting e-government adoption in the state of Qatar. European and Mediterranean Conference on Information Systems 2010, April 12-13 2009, Abu Dhabi, UAE. Available: https://core.ac.uk/download/files/14/336865.pdf

13. Alshawi S., Alalwany H., 2009. E-Government Evaluation: Citizen's Perspective in Developing Countries. Information Technology for Development, Vol. 15 (3) pp. 193–208 available online:www.interscience.wiley.com

14. Alshehri, M., Drew, S., Alhussain, T., & Alghamdi, R., 2012. The Effects of Website Quality on Adoption of E-Government Service: An Empirical Study Applying UTAUT Model Using SEM. arXiv preprint arXiv:1211.2410

15. Azab N. A., Kamel S. and Dafoulas, G., 2009. A Suggested Framework for Assessing Electronic Government Readiness in Egypt. Electronic Journal of e-Government Volume 7 Issue 1 2009, pp. 11 - 28, available online at www.ejeg.com

16. Barbosa, A. F., Pozzebon, M., & Diniz, E. H., 2013. Rethinking e-Government Performance Assessment from a Citizen Perspective. Public Administration, 91(3), 744-762.

17. Baron R. M., Kenny D. A., 1986. The moderator–mediator variable distinction in social psychological research: Conceptual, strategic, and statistical considerations. Journal of personality and social psychology, 51(6), 1173.

18. Basant R., Commander, S., Harrison, R., Menezes-Filho, N., 2006. ICT adoption and productivity in developing countries: New firm level evidence from Brazil and India. IZA Discussion Paper No. 2294, Germany.

19. Baum, C., Di Maio, A., 2000. Gartner's four phases of e-government model. Gartner Group.

20. Bhatnagar, C. S., Singh N., 2010. Assessing the Impact of E-Government: A Study of Projects in India. Information Technologies & International Development Journal, 6(2), summer 2010

21. Bryjolfsson, E., 1993. The productivity paradox of information technology. Communications of the ACM, 36(12), 66-77.

22. Brynjolfsson, E., Hitt, L., 1998. Beyond the productivity Paradox: Computers are the catalyst for bigger changes. Communication of the ACM.

23. Bwalya, K.J., 2009. Factors affecting adoption of E-government in Zambia. The Electronic Journal on Information Systems in Developing Countries (2009) 38, 4, pp. 1-13

24. Bwalya K.J., Healy, M., 2010. Harnessing e-Government Adoption in the SADC Region: a Conceptual Underpinning. Electronic Journal of e-Government Volume 8 Issue 1 2010, pp23-32

25. Byrne, B. M., 2013. Structural equation modeling with AMOS: Basic concepts, applications, and programming. Routledge (2013).

26. Carter L., Belanger F., 2004. Citizen Adoption of Electronic Government Initiatives. System Sciences, 2004.In: proceedings of the 37th Hawaii (USA) International Conference on System Sciences on 5-8 January2004.

27. Castelnovo W.,Simonetta M., 2007. The Evaluation of e-Government projects for Small Local Government Organizations. The Electronic Journal of e-Government Volume 5 Issue 1, pp 21 - 28, available online at: www.ejeg.com

28. Castelnovo, W., 2010. Is there an e-Government Paradox? In Proceedings of the 10th European Conference e-Government (p. 90). Academic Conferences Limited (2010).

29. Chen Y. N., Chen H. M., Huang W., Ching R. K. H., 2006. E-Government Strategies in Developed and Developing Countries: An Implementation Framework and Case Study. Journal of Global Information Management, 14(1), pp 23-46, January-March 2006

30. Cloete F., 2012. E-government lessons from South Africa 2001–2011: Institutions, state of progress and measurement. African Journal of Information and Communication, Issue No 12, 2012, pp. 128-142

31. Codagnone C., Undheim T.A., 2008. Benchmarking e-Government: tools, theory, and practice. European Journal of e-Practice, Issue No 4, August 2008 ·

32. Colesca, S. E., & Dobrica, L. (2008). Adoption and use of e-government services: the case of Romania. Journal of Applied Research and Technology, 6(03).

33. Coursey D., Norris F.D., 2008. Models of E-Government: Are They Correct? An Empirical assessment. Public Administration Review, Vol. 68-3, pp. 524-536, 2008

34. Curtin G.G., 2006. Issues and Challenges in Global E-Government/E-Participation Models, Measurement and Methodology. In: Workshop on E-Participation and E-Government: Understanding the Present and Creating the Future, Budapest, Hungary 27-28 July 2006

35. Dwivedi S.K., Bharti, A.K., 2010. E-Governance in India – Problems and Acceptability. Journal of Theoretical and Applied Information Technology, 17(1), July 2010, pp. 37-38.

36. EGOV4U, 2012. E-Government for You: Impact Evaluation Framework, European Union, Competitiveness and Innovation Framework (CIP).

37. Electronic Administration Development Agency (ADAE) & Bearing Point, 2005. MAREVA methodology guide: Analysis of the value of ADELE projects. Paris: OECD. Retrieved September 19, 2013, fromhttp://www.dsg.ae/portals/0/Conferences/Day%201/France_MAREVA_20070312%20OCDE-MENA%20English.pdf

38. ELX, P. B. E., 2011. An adoption model of electronic government services in Malaysia: electronic labor exchange (ELX). Journal Pengurusan, 33, 87-97.

39. European Commission, 2006. e-Government Economics Project (eGEP): Measurement framework final version. Brussels: European Commission. Retrieved September 18, 2013, from: http://www.epractice.eu/files/media/media1299.pdf

40. Ezemenari K., Rudqvist A.,Subbarao K., 1999. Impact Evaluation: A Note on Concepts and Methods. Poverty Reduction and Economic Management Network (PRMPO), The World Bank January 1999

41. Fan, J., & Yang, W. (2015). Study on e-government services quality: The integration of online and offline services. Journal of Industrial Engineering and Management, 8(3), 693.

42. Farooq A.K., Basheer A., 2015. Factors Influencing Electronic Government Adoption: Perspectives of Less Frequent Internet Users of Pakistan.

43. Fitsilis P., Anthopoulos L., Gerogiannis V.C., 2010. An Evaluation Framework for E-Government Projects. In: Reddick C.G, 2010. Citizens and E-Government: Evaluating Policy and Management. Citizens and E-Government: Evaluating Policy and Management, IGI Global, pp 69-90.

44. Friedman, K., 2003. Theory construction in Design Research: Criteria: Approaches, and Methods. Design Studies, 24(6), 507-522. Retrieved from: https://design.osu.edu/carlson/id785/friedman.pdf

45. Government of Botswana, 2011. Botswana National e-Government Strategy 2011-2016, June 2011.

46. Government of Tanzania, 2012. Tanzania National e-Government Strategy 2012-2017, September 2012.

47. Hair J.F., Black W.C., Babin B.J., Anderson R.E., 2010. Multivariate Data Analysis 7/e. Pearson Prentice Hall.

48. Heeks, R., 2001. Understanding e-Governance for Development. Institute for Development Policy and Management (IDPM), University of Manchester, UK

49. Heeks R., 2003. Achieving Success/Avoiding Failure in e-government Projects. Institute for Development Policy and Management (IDPM), University of Manchester. Available online: http://www.egov4dev.org/success/sfdefinitions.shtml

50. Heeks, R., 2006. Understanding and measuring e-Government: International benchmarking studies. Institute for Development Policy & Management (IDPM), University of Manchester, UK

51. Hiller, J.S. and Belanger, F., 2001. Privacy strategies for electronic government. E-government, 200, pp.162-198.

52. Holden M. T., Lynch P., 2004. Choosing the Appropriate Methodology: Understanding Research Philosophy (RIKON Group). The Marketing Review, 4. pp. 397-409.

53. Hox J.J., Bechger T.M., 1998. An Introduction to Structural Equation Modeling. Family Science Review, 11, 354-373. Available online: http://joophox.net/publist/semfamre.pdf

54. In'nami Y., Koizumi R., 2013. Structural Equation Modeling in Educational Research: A Primer. In: Khine M.S., 2013. Application of Structural Equation Modeling in Educational Research and Practice, Sense Publishers, 2013, pp 23–51.

55. Islam, P., 2007. Citizen-centric E-Government: The Next Frontier. Kennedy School Review, 7, 103-109.

56. Iyanda O., Ojo S.O., 2008. Motivation, influences, & perceived effect of ICT adoption in Botswana organizations. International Journal of Emerging Markets Vol. 3 No. 3, 2008, pp. 311-322

57. IST Africa, 2013. Current ICT Initiatives and Projects in Kenya. Retrieved from: http://www.ist-africa.org/home/default.asp?page=doc-by-id&docid=5181

58. Jabreen Yosef 2009. Building a Conceptual Framework: Philosophy, Definition and procedures. International Journal of Qualitative Methods 2009, 8(4), pp 49-62.

59. Jansen, A., 2005. Assessing E-government progress–why and what. NOKOBIT, 1504-1697.

60. Jayashree, S., G. Marthandan, 2010. Government to E-government to E-Society. Journal of Applied Sciences, 10(19), p. 2205-2210.

61. Jewell, W. S., 1980. Models in Insurance: Paradigms, Puzzles, Communications and Revolutions (No. ORC-80-10). California University Berkeley Operations Research Center.

62. Jukić, T., Vintar, M., Benčina, J., 2013. Ex-ante evaluation: Towards an assessment model of its impact on the success of e-government projects. Information Polity, 18(4), 343-361.

63. Kafaji, M. A., 2007. Evaluating the Roll of Service Quality as a Mediator on User Satisfaction in e-Government Applications.

64. Karunasena K., Deng H.,2009. A Conceptual Framework for Evaluating the Public Value of e-Government: A Case Study from Sri Lanka. ACIS 2009 Proceedings. http://aisel.aisnet.org/acis2009/8

65. Karokola G., 2012.A Framework for Securing e-Government Services: The Case of Tanzania. PhD Thesis, Stockholm University, Sweden (2012)

66. Karokola G., Yngström L., 2009. Discussing E-Government Maturity Models for the Developing World - Security View. In: proceeding of: Information Security South Africa Conference 2009, School of Tourism & Hospitality, University of Johannesburg, Johannesburg, South Africa, July 6-8, 2009

67. Kashorda M., 2009. Electronic/mobile government in Africa: Progress made and challenges ahead. UN Public Administration Program, 1-33. Retrieved fromhttp://unpan1.un.org/intradoc/groups/ public/documents/un/unpan033670.pdf.

68. Kearn I., 2004. Public value and e-government, Institute of Public Policy Research, London, available at: http://www.centreforcities.org (accessed 25 March 2014).

69. Kelly G., Mulgan G., and Muers, S., 2002. “Creating Public Value: An Analytical Framework for Public Service Reform,” Cabinet office, UK.

70. Khandker S. R., Koolwal G. B., Samad H. A., 2010. Handbook on impact evaluation: quantitative methods and practices. World Bank Publications.

71. Kline, R. B., 2011. Principles and Practice of Structural Equation Modeling (Third Edition). Guilford Press.

72. Kumar R., Best M.L., 2006. Impact and Sustainability of E-Government Services in Developing Countries: Lessons Learned from Tamil Nadu, India. The Information Society, 22: pp. 1–12, 2006

73. Kumar V., Mukerji B., Butt I., Persaud A., 2007. "Factors for Successful e-Government Adoption: a Conceptual Framework" The Electronic Journal of e-Government Volume 5 Issue 1, pp 63 - 76, available online at www.ejeg.com

74. Kunstelj M., Vintar M., 2004. Evaluating the progress of e-government development: A critical analysis. Information Polity, Volume 9 Issue 3,4, December 2004 pp. 131-148

75. Layne K., Lee J., 2001. Developing fully functional E-government: A four-stage model. Government Information Quarterly 18 pp. 122-136, 2001

76. Lei P., Wu Q., 2007. Introduction to Structural Equation Modeling: Issues and Practical Considerations. Instructional Topics on Education Measurements (ITEMS) fall 2007.

77. Liu J., Derzsi Z., Raus M., Kipp A., 2008. E-Government Project Evaluation: An Integrated Framework. Government Lecture Volume 5184, 2008, pp 85-97

78. Löfstedt U., 2005. E-Government – Assessment of Current Research and Some Proposals for Future Directions. International Journal of Public Information Systems, Vol. 2005:1, pp. 39-52

79. Luk, S. C. Y., 2008. The Impact of E-government in Greater China: Case Studies of Hong Kong, Taiwan, and Singapore. In 17th Biennial Conference of the Asian Studies Association, Australia, July 2008.

80. Madon, S., 2004. Evaluating the Development Impact of E-governance Initiatives: An Exploratory Framework. The Electronic Journal on Information Systems for Developing Countries (EJISDC), 20(5), pp. 1-13.

81. Markellos, K., Markellou, P., Panayiotaki, A. and Stergianeli, E., 2007. Current State of Greek E-Government Initiatives. Journal of Business Systems, Governance and Ethics, 2(3), pp.67-88

82. Matavire, R., Chigona, W., Roode, D., Sewchurran, E., Davids, Z., Mukudu, A. and Boamah-Abu, C., 2010. Challenges of e-Government Project Implementation in a South African Context. The Electronic Journal Information Systems Evaluation Volume 13 Issue 2 2010, (pp153 - 164)

83. Miyata M., 2011. Measuring impacts of e-government support in least developed countries: a case study of the vehicle registration service in Bhutan. Information Technology for Development, 17:2, 133-152

84. Monga A., 2008. E-government in India: Opportunities and challenges. Journal of Administration & Governance, Vol. 3. No. 2, 2008

85. Morrison, J. M., Smit, E., 2004. A Contribution to Scientific Knowledge. University of Stellenbosch Business School. Retrieved on December 28, 2015 from: www.usb.ac.za/Common/Pdfs/ Working_paper%5B1%5D.pdf

86. Muganda N.O., 2008. Public Sector E-Government Conceptualization in the Context of a Developing Country. 4th International Operations Research Society of Eastern Africa (ORSEA) Conference, 2008 at the University of Nairobi, Kenya on: The Role of Operations Research in Public and Private Sector Management

87. Napoli J., Ewing M.T., Pitt L.F., 2000. Factors Affecting the Adoption of the Internet in the Public Sector. Journal of Nonprofit & Public Sector Marketing, Vol. 7(4) 2000, pp 77-88

88. Nachtigall, C., Kroehne, U., Funke, F., & Steyer, R., 2003. Should we use SEM? Pros and cons of structural equation modeling. Methods of Psychological Research Online, 8(2), 1-22.

89. Ndou V., 2004. E-Government for developing Countries: Opportunities and Challenges. The Electronic Journal on Information Systems for Developing Countries (EJISDC), 18(1), pp.1-24.

90. Ng'aru, S.W., Wafula M.K., 2015. Factors Influencing the Choice of *Huduma* Centers' Services: A Case study of Mombasa *Huduma* Centre. International Journal of Scientific and Research Publications (IJSRP), Volume 5, Issue 6, June 2015 Edition. Retrieved on October 15, 2015 from http://www.ijsrp.org/research-paper-0615/ijsrp-p4270.pdf

91. Njuru J.W., 2011a. Implications of E-Government on Public Policy and Challenges of Adopting Technology: The case of Kenya. Journal of Global Affairs & Public Policy Volume 1, No. 1, 2011

92. Njuru J.W., 2011b. Perspectives of Kenyan Students in the United States on E-government and Citizen Participation. Journal of Global Affairs & Public Policy Volume 1, Number 1, 2011

93. Nkwe N., 2012. E-Government: Challenges and Opportunities in Botswana. International Journal of Humanities and Social Science Vol. 2 No. 17; September 2012

94. Odoch J., 2012. Framework for Utilization of E-government services in Kenya. MSc University of Nairobi (2012).

95. Omwansa T.K., 2012. Modeling Adoption of Mobile Money by the Poor in Nairobi, Kenya, PhD, University of Nairobi.

96. Organisation for Economic Co-operation and Development (OECD), 2013.E-Government Studies: Egypt 2012, OECD Publishing. Available: http://dx.doi.org/10.1787/9789264178786-en

97. Osman, I. H., Anouze, A. L., Irani, Z., Al-Ayoubi, B., Lee, H., Balcı, A., Weerakkody, V., 2014. COBRA framework to evaluate e-government services: A citizen-centric perspective. Government Information Quarterly, 31(2), 243-256.

98. Otieno I., Omwenga, E., 2014. Towards the Development of a Citizen-Centric Framework for Evaluating the Impact of e-Government: A Case Study of Developing Countries: In IST-Africa Conference Proceedings, 2014 (pp. 1-9). IEEE.

99. Otieno I., Omwenga, E., 2015. Citizen-Centric Critical Success Factors for the Implementation of E-government: A Case Study of Kenya *Huduma* Centres: In IST-Africa Conference Proceedings, 2015 (pp. 1-9). IEEE.

100. Otieno I., Omwenga, E., Waema T., 2016. The e-government Paradox: Is it Real and How can it be Resolved? In IST-Africa Conference Proceedings, 2016.

101. Pardo T., 2000. Realizing the Promise of Digital Government: It's more than building a Web Site. Center of Technology in Government. University of Albany, 2000.

102. Peters R.M., Janssen M., Van Engers T.M., 2004. Measuring e-Government Impact: Existing Practices and Shortcomings. In Proceedings of the ICEC'04, Sixth International Conference on Electronic Commerce, ACM

103. Rai A., Lang S.S., Welker R.B., 2002. Assessing the Validity of IS Success Models: An Empirical Test and Theoretical Analysis. Information Systems Research 13(1):50-69. http://dx.doi.org/10.1287/isre.13.1.50.96

104. Rao T.P.R., Rao V.V., Bhatnagar S.C., Satyanarayana S.J., 2004. E-governance Assessment Frameworks (EAF Version 2.0). Department of Information Technology, GoI, May 2004.

105. Reffat R. M., 2006. Developing a Successful e-government. University of Sydney. Retrieved from http://faculty.kfupm.edu.sa/arch/rabee/publications_files/03Reffat_eGov.pdf, on 12, Sep, 2013

106. Remenyi D., Williams, B., Money, A. and Swartz, E., 1998. Doing Research in Business and Management: An Introduction to Process and Method. In the proceedings of the Symposium on e-Government: Opportunities and Challenge, Muscat Municipality, Oman, pp. IV1-IV13.

107. Reynolds, M. and Regio, M, 2001. E-Government as a Catalyst in the Information Age. Microsoft E-Government Initiatives, E-Government 2001

108. Roche, C., 1999. Impact Assessment for Development Agencies: Learning to value change. Oxford: Oxfam, 1999.

109. Ronaghan, S.A., 2001. Benchmarking e-Government: A Global Perspective – Assessing UN Member States. New York: United Nations Division for Public Economics and Public Administration and American Society for Public Administration, May 2002

110. Saunders M., Lewis P., Thornhill A., 2009. Research Methods for Business Students (Fifth edition), Pearson Education Limited

111. Savoldelli, A., Codagnone, C., & Misuraca, G., 2012. Explaining the e-Government paradox: An analysis of two decades of evidence from scientific literature and practice on barriers to e-Government. In Proceedings of the 6th International Conference on Theory and Practice of Electronic Governance (pp. 287-296). ACM.

112. Savoldelli, A., Misuraca, G., & Codagnone, C., 2013. Measuring the Public value of e-Government: The eGEP 2.0 model. Electronic Journal of e-Government, 11(1)

113. Shareef S. M, Jahankhani H., Dastbaz M., 2012. E-Government Stage Model: Based on Citizen-Centric Approach in regional government in developing countries. International Journal of Electronic Commerce Studies Vol.3, No.1, pp.145-164, 2012

114. Sigwejo A., 2013. Report on: 'Enhancing the Adoption of Transactional level of e-government in Tanzania'. Tanzania Country Level Knowledge Network (TCLKNet), February 2013

115. Singh, V. B., 2012. E-Governance: Past, Present and Future in India. International Journal of Computer Applications (0975 – 8887) Volume 53– No.7, September 2012, pp. 36-48

116. Southern, A., Tilley, F., 2000.Small firms and information and communication technologies (ICTs): toward a typology of ICTs usage. New Technology, Work and Employment, Vol. 15 No. 2, pp. 138-154

117. Stefanie A., Claudio C., 2011. The Economic and Social Impacts of E-government. Freiburg University, Switzerland, November, 2011

118. Sun, L., 2009. A study on e-government success framework based on is success model, IEEE, 2009.

119. Teo T., Tsai L.T., Yang C., 2013. Applying Structural Equation Modeling (SEM) in Educational Research: An Introduction. In: Khine M.S., 2013. Application of Structural Equation Modeling in Educational Research and Practice, Sense Publishers, 2013, pp1–22.

120. The Division of Statistics + Scientific Computation, the University of Texas at Austin, 2012. Structural Equation Modeling Using AMOS: An Introduction, August, 2012. Available at :https://stat.utexas.edu/images/SSC/Site/AMOS_Tutorial.pdf

121. The Presidency, Republic of South Africa (RSA), 2007. Policy Framework for the Government-wide Monitoring and Evaluation System, November, 2007.

122. Transparency International, 2014. The 2014 Corruption Perception Index: Retrieved from: http://www.transparency.org/cpi2014, 26 Jan, 2015

123. Trusler, J., 2003. South African E-Government Policy and Practices: A Framework to Close the Gap. Electronic Government. Proceedings 2nd International Conference EGOV2003, Prague, Sep 2003. Lecture Notes in Computer Science, Springer-Verlag: Berlin, 2003, pp.504-507.

124. Udo-Akang, D., 2012. Theoretical Constructs, Concepts, and Applications. American International Journal of Contemporary Research, 2(9), 89-97. Retrieved on December 27, 2015 from http://aijcrnet.com/journals/Vol_2_No_9_September_2012/11.pdf

125. United Nations, 2012. United Nations E-Government Survey 2012: Retrieved from: http://unpan1.un.org/intradoc/groups/public/documents/un/unpan048065.pdf, 26 Nov., 2013

126. United Nations, 2014. World Economic Situation and Prospects Retrieved from www.un.org/en/development/desa/policy/wesp/wesp_current/2014wesp_country_classification.pdf

127. United Nations, 2014. United Nations E-Government Survey 2014: Retrieved from: http://unpan3.un.org/egovkb/Portals/egovkb/Documents/un/2014-Survey/E-Gov_Complete_Survey-2014.pdf, 12Jan, 2015

128. Verdegem, P., Stragier, J. and Verleye, G., 2010. Measuring for Knowledge: A Data-Driven Research Approach for e-Government. Electronic Journal of e-Government Volume 8 Issue 2 2010, (pp227-236), available online atwww.ejeg.com

129. Victor G.J., Panikar A.,Kanhere V. K., 2007. E-government Projects–Importance of Post Completion Audits. In: Foundations of e-government book, of the 5thInternational Conference of e-government (ICEG, 2007).

130. Wang Y., Liao Y., 2008. Assessing E-Government Systems Success: A Validation of the DeLone and McLean Model of Information Systems Success. In: 11th Annual Conference of Asia Pacific Decision Sciences Institute, Hong Kong, June 14-18, 2006, pp. 356-366

131. Wescott, C.G., 2001. E-Government in the Asia□pacific region. Asian Journal of Political Science, 9(2), pp.1-24.

132. Weerakkody, V., Al-Shafi, S., Irani, Z., & Lee, H. (2009). E-government adoption in Qatar: An investigation of the citizens' perspective.

133. Whetten, D. A., 1989. What constitutes a theoretical contribution? Academy of Management Review, 14(4), 490-495.

134. Yadav N., Singh, V. B., 2012. E-Governance: Past, Present and Future in India. International Journal of Computer Applications (0975–8887) Volume 53–No.7, September 2012, pp. 36-48.

135. Yonazi, J.J., 2010. Enhancing adoption of e-Government initiatives in Tanzania. PhD Thesis, University of Groningen, Netherlands

136. Yonazi, J., Sol, H., Albert Boonstra, A., 2010. Exploring Issues Underlying Citizen Adoption of e-Government Initiatives in Developing Countries: The Case of Tanzania. Electronic Journal of e-Government Volume 8 Issue 2 2010, (pp176-188), available online athttp://www.ejeg.com

APPENDICES

Appendix A: Questionnaire

This appendix is for the instrument that was used to collect data from citizens as they accessed services from Huduma Centres. The data collected was used to empirically test our conceptual model.

QEGOV/01

QUESTIONNAIRE

A Citizen-Centric model for Evaluating Impact of E-government

The Government has been offering e-government services to Citizens at strategic locations including *Huduma* Centres. The government continues to be committed to improving service delivery through business process re-engineering (BPR). The purpose of this survey is to identify the citizen population currently accessing e-government services and the impact of e-government from a Citizen's perspective. You have been identified as a key stakeholder whose views would be necessary to facilitate this process. We are therefore requesting you to take a few minutes and fill in all the sections of this questionnaire. All responses will be treated with utmost confidentiality.

Section 1: Bio-Data

1. Please provide your bio-data by ticking on the appropriate box

1.1 Gender Male ☐ Female ☐

1.2 Age (Yrs) Below 20 ☐ 20-29 ☐ 30-39 ☐ 40-49 ☐ 50-59 ☐ Above 60 ☐

1.3 Highest Level of Education Primary ☐ Secondary ☐ Tertiary ☐ Degree ☐ Masters ☐ PhD ☐ Other ☐

1.4 Level of ICT Skills None ☐ Basic ☐ Average ☐ Advanced ☐

2. **Section 2: Access to Services**

Please tick appropriate option for the questions below:

2.1 How many times have you accessed e-government services from *Huduma* Centers within the last 12 months including this time?

Once [ ] Twice [ ] Thrice [ ] More than Thrice [ ]

2.2 Which e-service(s) do you frequently access at *Huduma* Centre(s)? Tick all that apply

NHIF[ ]NSSF [ ] Business Name Search [ ]County Services [ ] Student Loan [ ]KRA [ ] ID card [ ]

Others (Specify).....

2.3 On a scale of 1 to 5 (where 1 is to the least extent and 5 is to a great extent), please indicate your general level of satisfaction with e-government services at *Huduma* Centers?

1 Least Extent	**2** Less Extent	**3** Moderate Extent	**4** Great Extent	**5** Greatest Extent
☐	☐	☐	☐	☐

3. **Section 3: Cost of Access to Services**

On a scale of 1 to 5 (where 1 is to the least extent and 5 is to a great extent), please indicate your perception on the extent to which implementation of **e-government** has affected the **cost** of access to government services in the aspects listed below:

No.	**Issue**	**1** Least Extent	**2** Less Extent	**3** Moderate Extent	**4** Great Extent	**5** Greatest Extent
Implementation of e-government has reduced the:						
a)	Direct cost of access to government services	☐	☐	☐	☐	☐
b)	Amount of bribe paid to access government services	☐	☐	☐	☐	☐
c)	Time spent in accessing government services	☐	☐	☐	☐	☐

4. **Section 4: Quality of Service**

On a scale of 1 to 5 (where 1 is to the least extent and 5 is to a great extent), please indicate your perception on the extent to which **Quality** of e-government services affects utilization and uptake of services in the aspects listed below:

No.	**Issue**	**1** Least Extent	**2** Less Extent	**3** Moderate Extent	**4** Great Extent	**5** Greatest Extent
E-government services will:						
a)	Facilitate easier and convenient access to government services	☐	☐	☐	☐	☐
b)	Enhances access to accurate, relevant and up-to-date information	☐	☐	☐	☐	☐
c)	Integrate and make it easier to access multiple services from common portals	☐	☐	☐	☐	☐

5. **Section 5: Quality of Service and User Satisfaction**

On a scale of 1 to 5 (where 1 is to the least extent and 5 is to a great extent), please indicate your perception on the extent to which **Quality of Service** affects **User Satisfaction** with e-government services in the areas indicated below:

No.	Issue	1 Least Extent	2 Less Extent	3 Moderate Extent	4 Great Extent	5 Greatest Extent
Citizen satisfaction in e-government services is improved through:						
a)	Easy and convenient access to e-government services	☐	☐	☐	☐	☐
b)	Access to accurate, relevant and up-to-date information	☐	☐	☐	☐	☐
c)	Access to multiple services from a common portal	☐	☐	☐	☐	☐

6. **Section 6: User Satisfaction**

On a scale of 1 to 5 (where 1 is to the least extent and 5 is to a great extent), please indicate your perception on the extent to which **User Satisfaction** with e-government services will bring a positive impact in the areas indicated below:

No.	Issue	1 Least Extent	2 Less Extent	3 Moderate Extent	4 Great Extent	5 Greatest Extent
E-government implementation has improved:						
a)	Fairness in provision and access to government services	☐	☐	☐	☐	☐
b)	Complaint handling and resolution mechanisms	☐	☐	☐	☐	☐
c)	Provision of government services using multiple channels (mobile, web, call centers)	☐	☐	☐	☐	☐

7. **Section 7: Perceived Trust**

On a scale of 1 to 5 (where 1 is to the least extent and 5 is to a great extent), please indicate your perception on the extent to which **trust** in electronic transactions has affected **utilization** of e-government services?

No.	Issue	1 Least Extent	2 Less Extent	3 Moderate Extent	4 Great Extent	5 Greatest Extent
The access and utilization of e-government services is affected by:						
a)	Privacy concerns on personal data collected	☐	☐	☐	☐	☐
b)	Security concerns of stored data or data in transit	☐	☐	☐	☐	☐
c)	High risks in conducting electronic transactions	☐	☐	☐	☐	☐

8. **Section 8: Facilitating Conditions**

On a scale of 1 to 5 (where 1 is to the least extent and 5 is to a great extent), please indicate your perception on the extent to which **facilitating conditions** affects access and impact of government services?

No.	Issue	1 Least Extent	2 Less Extent	3 Moderate Extent	4 Great Extent	5 Greatest Extent
The access and utilization of e-government services is affected by:						
a)	Availability of reliable ICT infrastructure	☐	☐	☐	☐	☐
b)	Existence of relevant Legal Framework	☐	☐	☐	☐	☐
c)	Level of ICT literacy skills	☐	☐	☐	☐	☐

9. **Section 9: Impact**

On a scale of 1 to 5 (where 1 is to the least extent and 5 is to a great extent), please indicate your perception on the extent to which **e-government** has brought immediate benefit and impact on the social, political and economic status of citizens'?

No.	Issue	1 Least Extent	2 Less Extent	3 Moderate Extent	4 Great Extent	5 Greatest Extent
E-government has generally improved:						
a)	Governance and service delivery to citizens	☐	☐	☐	☐	☐
b)	Citizens' empowerment and participation in governance issues	☐	☐	☐	☐	☐
c)	Social and economic status of citizens and reduced poverty levels	☐	☐	☐	☐	☐

10. **Section 10: Challenges and Recommendations**

Are there any challenges that you face when accessing e-government services?

_____

_____

_____

What action(s) would you recommend to address the challenges?

_____

_____

_____

THANK YOU

Appendix B: Schedule of Counties in Kenya

This appendix represents the list of counties in Kenya as defined in the Constitution together with their respective codes. The appendix was used to determine the counties to be sampled for data collection

263. This Constitution shall come into force on its promulgation by the President or on the expiry of a period of fourteen days from the date of the publication in the *Gazette* of the final result of the referendum ratifying this Constitution, whichever is the earlier. Effective Date.

264. The Constitution in force immediately before the effective date shall stand repealed on the effective date, subject to the Sixth Schedule. Repeal of previous constitution.

SCHEDULES

FIRST SCHEDULE (*Article* 6 (1))

COUNTIES

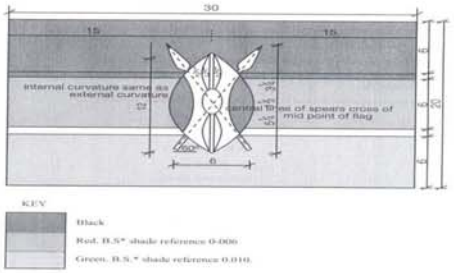
1. Mombasa
2. Kwale
3. Kilifi
4. Tana River
5. Lamu
6. Taita/Taveta
7. Garissa
8. Wajir
9. Mandera
10. Marsabit
11. Isiolo
12. Meru
13. Tharaka-Nithi
14. Embu
15. Kitui
16. Machakos
17. Makueni
18. Nyandarua
19. Nyeri
20. Kirinyaga
21. Murang'a
22. Kiambu
23. Turkana
24. West Pokot
25. Samburu
26. Trans Nzoia
27. Uasin Gishu
28. Elgeyo/Marakwet
29. Nandi
30. Baringo
31. Laikipia

32. Nakuru
33. Narok
34. Kajiado
35. Kericho
36. Bomet
37. Kakamega
38. Vihiga
39. Bungoma
40. Busia
41. Siaya
42. Kisumu
43. Homa Bay
44. Migori
45. Kisii
46. Nyamira
47. Nairobi City

SECOND SCHEDULE (*Article* 9 (2))

NATIONAL SYMBOLS

(a) THE NATIONAL FLAG



Note— All dimensions given do not necessarily represent any particular measurement and are merely proportional.

Description—

Three major strips of equal width coloured from top to bottom black, red and green and separated by narrow white strips, with a symmetrical shield and white spears superimposed centrally.

Appendix C: List of Services Offered at Huduma Centres

This appendix represents the list of services which are offered to citizens at Huduma Centres. A few of them were mentioned in the thesis but this appendix gives the comprehensive list.

1) Issuance of Duplicated National Identity Card
2) HELB – Student Loan Application and Repayments
3) Registration of Welfare Groups.
4) Issuance of Police Abstracts
5) Single Business Permit
6) NSSF -Member Registration, Statement and Claims
7) Community Policing – Nyumba Kumi
8) Search and Registration of Business Names
9) NCC Seasonal Parking Tickets
10) Stamp Duty Assessment and Payment
11) NSSF – Member Registration, Statement and Claims
12) Stamp Duty Franking
13) Birth and Marriage Certificates
14) NHIF – Member Registration Claims and Benefits
15) Procurement Complaints and Reviews
16) Ministry of Health
17) Motor Vehicle Log Book Search
18) Renewal of Drivers licenses and Status check
19) Status of Pension Claims
20) EACC – Reporting Corruption and Certification
21) Commission on Administrative Justice
22) PPOA Filing reviews and or addressing complaints in procurement and disposal

Retrieved from http://naibuzz.com/2014/08/04/services-offered-huduma-kenya-centers-nairobi-kenya/

Appendix D: Standardized Residual Covariances

Appendix D represents the assessment for the validity of the measurement model by use of standardized residuals.

Standardized Residual Covariances

	IP3	PT1	US3	QS1	CS1	CS3	ER3	PT3	US1	IP1	ER1	IP2	ER2	PT2	US2	QS3	QS2	CS2
IP3	0																	
PT1	1.703	0																
US3	0.249	0.524	0															
QS1	2.605	0.005	0.758	0														
CS1	3.253	0.648	1.302	-0.311	0													
CS3	1.258	0.146	0.556	0.685	-0.419	0												
ER3	0.874	-0.911	0.265	-0.271	1.128	0.324	0											
PT3	0.513	-0.051	1.724	0.673	0.684	0.733	0.347	0										
US1	0.105	-0.849	0.454	0.655	1.454	-1.338	-0.202	0.057	0									
IP1	-0.02	-0.354	-0.457	0.185	1.464	-0.613	0.185	-0.871	0.414	0								
ER1	0.531	-0.125	1.872	0.119	1.19	0.324	0.036	0.942	-0.541	0.808	0							
IP2	-1.239	-1.041	0.733	0.388	1.041	-2.02	0.267	0.227	0.237	0.191	0.078	0						
ER2	0.091	-0.591	1.228	0.689	0.002	-0.905	0.098	2.013	-0.325	-1.059	-0.144	0.479	0					
PT2	1.545	0.238	0.548	0.036	1.573	-0.391	-0.19	-0.489	-0.679	0.345	-0.414	0.83	0.505	0				
US2	0.791	0.291	0.15	-0.629	1.659	0.595	0.559	1.169	0.182	-0.689	-0.956	-0.914	0.377	0.997	0			
QS3	1.144	0.398	1.826	-0.112	-0.289	1.09	-1.381	0.65	-0.068	-0.376	0.945	-0.665	-1.139	-0.192	-1.785	0		
QS2	1.939	-0.7	1.907	-0.115	-0.003	-0.495	-0.23	0.298	-0.379	-0.61	0.956	0.837	0.503	-0.282	-0.251	0.216	0	
CS2	-0.019	-1.445	-0.64	-0.502	0.13	0.278	0.142	1.155	-1.128	-0.773	-1.51	-0.346	-0.097	-1.559	-0.212	0.132	-0.522	0

Appendix E: Cronbalch Alpha

Appendix E represents the results of the Cronbalch's alpha test that is the most widely used measure for internal consistency between the multiple variables. The cronbalch alpa for our variables was 0.88.

```
GET
  FILE='C:\Users\Director-ICT\Documents\Huduma Validated - 15-Oct-2015.sav'.
DATASET NAME DataSet1 WINDOW=FRONT.
RELIABILITY
  /VARIABLES=CS1 CS2 CS3 QS1 QS2 QS3 QSU1 QSU2 QSU3 US1 US2 US3 PT1 PT2 PT3 ER1 ER2 ER3 IP1 IP2 IP3
  /SCALE('Cronbalch Alpha') ALL
  /MODEL=ALPHA.
```

Reliability

Notes

Output Created		26-MAR-2016 11:59:08
Comments		
Input	Data	C:\Users\Director-ICT\Documents\Huduma Validated - 15-Oct-2015.sav
	Active Dataset	DataSet1
	Filter	<none>
	Weight	<none>
	Split File	<none>
	N of Rows in Working Data File	252
	Matrix Input	C:\Users\Director-ICT\Documents\Huduma Validated - 15-Oct-2015.sav
Missing Value Handling	Definition of Missing	User-defined missing values are treated as missing.

	Cases Used	Statistics are based on all cases with valid data for all variables in the procedure.
Syntax		RELIABILITY /VARIABLES=CS1 CS2 CS3 QS1 QS2 QS3 QSU1 QSU2 QSU3 US1 US2 US3 PT1 PT2 PT3 ER1 ER2 ER3 IP1 IP2 IP3 /SCALE('Cronbalch Alpha') ALL /MODEL=ALPHA.
Resources	Processor Time	00:00:00.02
	Elapsed Time	00:00:00.03

[DataSet1] C:\Users\Director-ICT\Documents\Huduma Validated - 15-Oct-2015.sav

Scale: Cronbalch Alpha

Case Processing Summary

		N	%
Cases	Valid	252	100.0
	Excluded[a]	0	.0
	Total	252	100.0

a. Listwise deletion based on all variables in the procedure.

Reliability Statistics

Cronbach's Alpha	N of Items
.880	21