PUBLIC VALUE OF e-GOVERNMENT INVESTMENTS IN THE DEVELOPING COUNTRIES

Empirical Exploration of the Public Sector in Kenya

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Thesis submitted for the Degree of

DOCTOR OF PHILOSOPHY

In the Department of Information Systems

UNIVERSITY OF CAPE TOWN

November 2016

DEDICATION

To the three special ladies who have affectionately charted the course of my life:

Abeth nyar Asego

who sadly departed too soon, *mama* was strict and selfless,

nurtured me well during childhood - the days of my unmatched stubbornness;

Ruth nyar Got,

for her unceasing confidence in me and her love over the years. The mere thought of her patience amidst many life challenges made each passing day a priority;

Kayla nyar Asego,

my sweet little *chief* comrade and a source of *trouble* during many a long nights of writing, thought of which often reminds me that when it is too dark, the dawn too is nigh.

ACKNOWLEDGEMENTS

Foremost, glory to God – my *El-Shaddai* and *Adonai* – the Master of all Technology and Philosophy, without whom it would have been nigh impossible to think of this pursuit.

I say 'Thank You' to my supervisor, Professor *Michael Eddie Kyobe,* who took the risk of bringing me back to a taste of inferential modeling at another difficult stage of my career, for the patience throughout this academic sojourn. Professor *Kyobe* offered part of his research fund to ensure that I finish without many hiccups, in time and with quality. The reflections on the *many, many* track changes would make me entertain the thought of exiting the stage. However, I am glad to have worked under his guidance and the valuable comments enhanced my storyline. I am also indebted to Professor *Irwin Thomas Joseph Brown* and Professor *Ojelanki K. Ngwenyama* for their extensive knowledge and experience in information systems research. Their courses on the philosophy of science and advanced research methodologies offered a practical insight and a theoretical foundation upon which the thesis is anchored. In addition, the University of Cape Town deserves a *'Thank You'.* Firstly, through the Department of Information Systems, not only for providing me with the opportunity to undertake a Degree of Doctor of Philosophy, but also to attend valuable University seminars and meet so many interesting people who have influenced my perspective of life, and secondly, through the Postgraduate Centre & Funding Office, for providing me with part financial support to cover research-related expenses during this academic pursuit.

Further, I am indebted to my immediate family – *Baba, Atieno, Caro, Mercy, Emma and Boyi* – their faith in me and their thoughtful prayers have been effective in keeping me focused on this thesis. This is just one more! To all my classmates, including *Calisto, Mungai, Akinlolu, Yasser, Mampi, Mluleki, Akuku, Lucy, Sibusisiwe* and *Carrington,* who shared a lane with me in the peculiar world of science, I recognize their blend of academic wealth, their assistance and treasures of cross-cultural experiences that theirs added to my *resume*. Gratitude is also extended to the Kenyan community in Cape Town, with special appreciation to *Paul Mungai, Kenneth Babu* and their esteemed families for the support they offered me during this research journey. Special thanks go to *Jamie-Lee Swartz, Kelly van der Vent and Samantha Alexander,* all of the Faculty; to the research assistants and all the research respondents whose willingness to take part in the study informed the thesis in one way or another. Their effort, in supporting the transformative causes in the public sector space in the developing economies and beyond, is duly recognized. Lastly, apologies are due to many others who have markedly challenged my thinking process over the course of the PhD programme. Their absence from the roll is more likely attributable to a failing memory rather than anything else.

DECLARATION

I, …………………………………………………………., hereby declare that **Public Value of e-Government Investments in the Developing Countries: Empirical Exploration of the Public Sector In Kenya** on which this Degree of Doctor of Philosophy Thesis is based is my original work, both in the concept and in the execution – except where acknowledgements indicate otherwise – and that neither the whole nor a part of it has been, is being, or is to be submitted for an academic degree in this or any other University.

Signed by candidate

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KENNEDY ODIWUOR OKONG'O

18 November 2016

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DATE

ABSTRACT

In private and public sectors, Information Communication Technologies (ICTs) have become a phenomenal asset of resource in strategic management. In developed countries, ICTs are critical tools in the public sector strategy. In specific, Electronic Government has been identified as one of the major competencies required to re-invigorate governance, enhance performance and reduce red-tape bureaucracies in the public sector, e-Government being the use of ICTs in the transformation of public organizations towards efficient service delivery. Though information systems as a discipline has offered some research outputs on the value and the effects of ICTs in the private sector, similar focus on the public sector or e-Government is relatively thin. While the few existing researches have had a relatively weightier focus on developed countries, the evidence-based empirical studies in information systems that have focused on developing countries have produced contradictory results, hence the need for further research to attempt a re-alignment in this sub domain of e-Government. Therefore, this pursuit departs from most past researches by delving into the effects of e-Government investments using theoretical lenses drawn upon disciplines that are outside the mainstream information systems domain. These include public administration, political sciences and public economics. Using a mixed methods approach, a balanced panel data of Kenya's key ministries for a 10-year period of 2004 to 2014 following the launch of e-Government strategy of 2004, audited national government ministries' expenditures, census data, e-Government spending, consumer price indices, gross domestic products, parameters on governance and other data on public services, this research sought to examine the nature and dimensions of public values that the developing countries derive as a consequence of investment in e-Government. The study consisted of three major components and it applied a multi-disciplinary theoretical approach. Firstly, informed by the model of public value management drawn upon public administration discipline, the study sought to identify the nature and dimensions of the public values, if any, that result from investment in e-Government. Based on the factors identified, a framework of public value of e-Government was hypothesized and tested on data collected through a survey of 1 176 citizens across Kenya. This was aimed at obtaining a validated public value model of e-Government through structural equation modeling. The analysis resulted in a well-fitted e-Government value model. Secondly, informed by the model of a multi-product firm drawn upon public economics discipline and a model of bureaucratic control under asymmetric information drawn upon political science discipline, the study set out to establish the extents of operational efficiency resulting from investments in e-Government. Though insignificant in statistical terms, the results established that 1 per cent increase in per capita investments in e-Government reduces the per capita recurrent expenditure of the government by 5.15 per cent. The research concluded that this model is significant on the basis of Wald Chi-square (χ^2) tests on its overall implication. Thirdly, informed by the model of legislative 'rent seeking' and the model of bureaucratic control under asymmetric information drawn upon political science discipline, the research estimated the association between investments in e-Government and the size of the public sector. In this, a significant relationship was found. In terms of numerals, the study found that 1 per cent increase in the intensity of investment in e-Government leads to 0.295 per cent reduction in the size of the public sector. These results formed the main contribution in the research. At a theoretical level, by integrating suitable theories drawn from multiple disciplines, complementing secondary with primary data, and cognizant of the multi-faceted nature of e-Government, the study presents a robust model that explains the e-Government value logic. The integral approach supports the development of full-bodied policies by viewing the investments in the multi-faceted nature of e-Government and the interrelationships thereof from numerous vantage points. This has aided to explain the central drivers as well as the incentives which may inform the use or fear of use of e-Government among various actors in the digital ecosystem. The integrative thinking revealed that while the value effects of e-Government may address the needs of the general public on one hand, they may effectively counter the bureaucrats' self-interestedness, an ideology which seems to thrive in a world of information asymmetry within the space of the public sector. At a methodological level, the study demonstrated the place of mixed methods as a methodology in information systems research. Considering the socio-technical facets of e-Government, the deployment of mixed methods led to a new comprehension of the interface between these facets in the process of information integration upon e-Government infrastructure. It was critical to understand the unique perceptions of public value of investment in e-Government for each of the sub-samples representing varied segments of the population; it is evident from the findings that focusing on each of these in seclusion may result in a narrower understanding of the whole. In addition, it was imperative that the results be verified and negotiated to lend more credence before publication. The 'user conference' approach enabled group reflections that generated a richer picture of e-Governance that was not easily evident through quantitative analysis. At a practical level, the estimated models show the magnitude of influence of investments in e-Government amidst various intervening factors. These present a suitable frame of reference to guide the formulation and reconfiguration of integrated policies in e-Government, in the developing countries and beyond. Though the thesis presents a positivist view of evidence of the effects of e-Government investments on the public value, cost efficiency and the size of the public sector, it is imprecise on whether the evident effects enhance or deteriorate the quality of public service; therefore, in the thesis, the avenues for possible future lines of the research are discussed.

Key words: Developing Countries, e-Government, Information Systems, Investment, Kenya, Management, Models, Panel Data Analysis, Public Sector, Public Value.

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LIST OF ABBREVIATIONS

AMOS	Analysis of Moment Structures
BP	Breusch & Pagan
BVR	Biometric Voter Registration
CAK	Communications Authority of Kenya
CIA	Central Intelligence Agency
CIO	Chief Information Officer
CoK	Constitution of Kenya
CPI	Corruption Perception Index
CPI	Consumer Price Index
EAC	East African Community
EAP&TC	East African Post and Telecommunications Corporation
EASSy	East African Submarine Systems
e-Gov	Electronic Government
e-Government	Electronic Government
eI	e-Government Investments
e-Learning	Electronic Learning
ERS	Economic Recovery Strategy
FE	Fixed Effects
G2B	Government to Business
G2C	Government to Citizen
G2CS	Government to Civil Society
G2G	Government to Government
GDP	Gross Domestic Product
GIS	Geographical Information System
GNP	Gross National Product
GoF	Goodness of Fit
GoK	Government of Kenya
ICT	Information Communication Technology
IFMIS	Integrated Financial Management Information System
IMF	International Monetary Fund
InfoDev	Information for the Development Program
IPS	Im-Pesaran-Shin
IS	Information Systems
IT	Information Technology
ITU	International Telecommunications Union
KE	Knowledge Economy
KICTA	Kenya ICT Authority
KP&TC	Kenya Post and Telecommunications Corporation
LLC	Levin-Lin-Chu
LM	Langrange Multiplier

LMIS	Land Management Information System
M&E	Monitoring and Evaluation
MDG	Millennium Development Goal
MoICT	Ministry of ICT
MTP	Medium Term Plan
NCS	National Communications Secretariat
NGO	Non-Governmental Organization
NNFI	Non-Normed Fit Index
NOFBI	National Optic Fiber Backbone Infrastructure
NPM	New Public Management
NSDI	National Spatial Data Infrastructure
OE	Operational Efficiency
OECD	Organization for Economic Co-operation and Development
OLS	Ordinary Least Squares
OPA	Old Public Administration
OGP	Open Government Partnership
PASW	Predictive Analytics Software
PBO	Parliamentary Budget Office
PI	Performance Impact
PI	Productivity Index
PIS	Personnel Information Systems
PPP	Public-Private Partnership
PRS	Public Sector Reforms
PV	Public Value
PVM	Public Value Management
QoG	Quality of Governance
RE	Random Effects
RoE	Return on Equity
RoI	Return on Investment
SAP	Structural Adjustment Program
SDG	Sustainable Development Goal
SEM	Structural Equation Modeling
SPSS	Statistical Package for the Social Sciences
SSA	Sub-Saharan Africa
SWOT	Strengths, Weaknesses, Opportunities and Threats
TCIP	Transparency and Communications Infrastructure Program
TEAMS	The East African Marine System
UN	United Nations
USA	United States of America
USAC	Universal Service Advisory Council
USF	Universal Service Fund

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1. CHAPTER ONE: INTRODUCTION

A journey of a thousand miles begins with one step

-Lao Tzu

In the last two decades, new Information and Communication Technologies (ICTs) have emerged. A substantial growth in such ICT investments is evident in both developed and the developing countries (Mutula, 2013; Nkohkwo & Islam, 2013; Bollou & Ngwenyama, 2008; Meyer *et al.,* 2015). A range of research output has attempted to establish whether such investments are resulting in the envisaged returns, and a relatively adequate focus has been on the private sector (Kanwal *et al.,* 2014; Brynjolfsson & Saunders, 2010). Either ways, evidence exists that ICT enhances operational efficiencies at an organization level (Brynjolfsson & Yang, 1996; Brynjolfsson *et al.,* 2011; Cava *et al.,* 2011). Indeed, these infrastructures have had a fundamental impact on the strategic management and governance practices as well as peer interactions (Ondego & Moturi, 2016). In the public sector, Guma (2013) observes that the traditional portrait, synonymous with massive bureaucracies and cost inefficiencies is gradually fading. Probably in an attempt to validate Guma's (2013) arguments, Chemengich (2013) observes a range of ICT-driven public sector reforms.

Though Malungu and Moturi (2015) and Mtingwi and Van Belle (2013) argue that high costs are involved in developing such infrastructure in developing countries, Mimbi and Kyobe (2012), Rose *et al.* (2015) and Choueiri *et al.,* (2013) postulate that the ICT-driven public sector reforms are due to the recognition of the potential of e-Government as a tool to re-invent governance. Indeed, e-Government involves the use of ICTs to transform service delivery in the public sector towards efficiency (Safeena & Kammani, 2013; Limba & Gulevičiū tė , 2014). In any case, public sector performance is evaluated in terms of the resulting 'public values' (Moore, 1995; Savoldelli *et al.,* 2013), through the use of a performance framework (Ha, 2016).

For instance, in an attempt to improve the efficiency in public service delivery, Kenya has had various reforms (Huka, 2011; Kilelo *et al.,* 2015). Though, the reforms have achieved minimal results (Achoch *et al.,* 2014; D'Arcy & Cornell, 2016), the efficacy has gone low (Government of Kenya: Parliament, 2013) and the state bureaucracy has performed sub-optimally (Hope, 2012; Gakuru & Mungania, 2016; Wamitu, 2016). The reform agenda has been lacking in accountability (Huka, 2011; Maina *et al.,* 2016), the service quality has deteriorated (Achoch *et al.,* 2014) and the sector has experienced increased 'red tape' bureaucracy and corruption (Buuri, 2013; Sihanya, 2012; Kilelo *et al.,* 2015). In addition, the government continues to invest in misplaced priority projects (Huka, 2011). The exorbitant public sector expenditure is still seen in wastage and corruption (Mwangi, 2014), two issues that have been a trending topic for scholars, politicians and journalists since antiquity. These have led to reduced funds for national development flagship projects (Namunane, 2014; Anyanzwa, 2014), despite the fact that e-Government is a cost efficiency tool (Aydemir, 2013; Al Salmi & Hasnan, 2016). It can re-invent the public sector towards efficiency (Brynjolfsson *et al.,* 2011; Wirtz & Nitzsche, 2013).

Cognizant of Moore (1995)'s argument that the nature of public value must match the citizens' desires, Mackenzie (2011) and Rose *et al.* (2015) contend that research has been slow in exploring the nature of resulting public values created through e-Government investments. Additionally, the focus has been less extensive in the public sector in comparison to the private sector (Basamh *et al.,* 2014). Therefore, this research aimed at presenting a rigorous examination of the nature and dimensions of the public values (PV). In addition, the research examined the operational efficiencies (OE) in terms of cost optimality and performance impacts (PI) in terms of the control on the cost of public service as a consequence of investment in e-Government. This is done in the background of intervening and jointly acting factors in a developing country context considering Kenya's public sector governance order.

1.1 Background of the Research

1.1.1 E-Government in Africa

There are a number of dynamics that have influenced the formation and the structure of the ICT sector in sub-Saharan Africa. These include the colonial powers' need for a sound telecommunication infrastructure (Bourgault, 1995), ICT as a prerequisite infrastructure for Africa's economic integration (Pfister, 1999) and a control over the former colonies' resources (Greitens, 2013).

Therefore, with Africa's continued investment in the ICTs, e-Government as an infrastructure has sprung up with varying conspicuousness in various countries (Munyoka & Manzira, 2013; Amagoh, 2015). Nkohkwo & Islam (2013) attribute this to the recognition of its potential to renew governance. For instance, in sub-Saharan Africa, Botswana is one of the upcoming digital technology powerhouses (Bwalya, 2009; Nkwe, 2012). Though it trails South Africa and even Tanzania, this is attributed to inadequate e-Government policies. Lack of trust in the infrastructure is the most cited cause (Nkohkwo & Islam, 2013). Otieno *et al.,* (2013) in a study of the East African context, contend that e-Government can contribute in the reformation of the public sector, in terms of enhancing accountability and civic participation. Though Guanghua (2009), while looking at the case of China, views the investment in e-Government as a catalyst of public sector reforms, he argues that there is a need to appreciate public sector efficiency, especially amidst the financial crises that have lately bedeviled public services. This can be through rejuvenating the administrative systems that have placed African governments into focus (Burke, 2012; Serfontein & De Waal, 2015; Yeboah-Assiamah *et al.,* 2016).

For instance, in 2010 Kenya introduced a new political order of governance of devolved public sector. Among other prominent justifications for the new dispensation is that decentralization would lead to improved efficiencies, optimized information ﬂ ows and reduced transaction costs (Nyanjom, 2011; PriceWaterhouseCoopers, 2013). However, the resulting public sector expenditure has been threatening to cripple national development (KIPPRA, 2013; Koki *et al.,* 2011; Adam, 2015; Gakuru & Mungania, 2016). This happens despite e-Government, which Kenya launched in its strategy paper of 2004, being a strategic tool in enhancing public sector productivity in the developing nations (Masrom *et al.,* 2013). In general, countries in sub-Saharan Africa (SSA) have been slow at restructuring their government bureaucracies (Ngulube, 2007; Kaaya, 2011; Inderjeet, 2014). Most African governments are still lacking in accountability and transparency (Mue, 2013). Public servants still relate with the masses to a major extent on a manual paper-based basis (Amagoh, 2015), despite the opportunities ICTs present in government operations.

1.1.2 Public Sector in Africa

Though a 'public sector' may be broader than a core government, the public sector services as used in this research encompass the services of publicly funded agencies and entities, including government ministries or sectors (World Bank, 2012). With regard to public governance, Guma (2013) argues that the African public sector management is founded upon old models. These are rooted in the Western management theories (Inyang, 2008). The European colonies that form the majority in Africa such as Congo, Rwanda, Uganda, Lesotho, Kenya, Botswana, Ghana, Malawi, South Africa, Tanzania and Ghana simply derived a *'Westminster-Whitehall'* model of governance (Olum, 2011). The western values were *'indigenized'* without consideration of uniqueness of post-independent Africa *(ibid)*.

Though the model had its core features in the Weberian approach of modern public service (Guma, 2013), it was characterized by strict hierarchical bureaucracies (Hughes, 1998), centralized power and a myriad of dysfunctions that have become a common feature in Africa's public sectors (Guma, 2012). The criticisms led the model to gain a negative connotation as being rigid in theory and also in its practice (Guma, 2013; Olaiya, 2016). This prompted the search for efficiency (Kelly, 2014), with an interest in modernizing the public sector (Caiden, 1991; Olaiya, 2016). Hence governments started to recognize the concepts of decentralization and e-Governance as critical in enabling efficiency (Lucas *et al.,* 2013). So, in the 1980s need arose for public sector reforms (Basu *et al.,* 2012). Olum (2011) observes that most African countries have since undertaken reforms seeking to make the governments leaner and functionally decentralized (Mutahaba & Kiragu, 2002). This has mainly been driven by the need for transparency, accountability and citizen participation. In Uganda and Zambia, the reforms have aimed at optimum-sized and more efficient public sectors (Olum, 2011; Islam, 2015).

In Kenya, despite some reforms, cost inefficiencies and sizes of the bureaucracies are still a challenge. The sector expenditure has continued to rise (Institute of Economic Affairs, 2006; KIPPRA, 2013; World Bank, 2013; Omolo, 2010; Kilelo *et al.,* 2015) while parallel efforts have continued to attempt to improve the sector performance (Isahakia, 2010; Muluka, 2014). The executive has been indicating an intention to rationalize the public sector to improve its performance by optimizing its size in terms of the cost of public service (Presidential Strategic Communication Unit, 2013). This is also geared towards addressing efficiency challenges (Bwire, 2015). In all these, e-Government has come to focus as having the capacity to aid in re-engineering the sector (Government of Kenya: Parliament, 2013; Khanh *et al.,* 2014; Ondego & Moturi, 2016).

1.2 Statement of the Problem

Previous researches present e-Government as having the capacity to re-invent the public sector (Brynjolfsson *et al.,* 2011; Wirtz & Nitzsche, 2013). In addition, developing countries have been making an effort to enhance service delivery in the public sectors (Olum, 2011) while citizens continue to press upon their governments to present values for their taxes (Onyango-Oboo, 2014). Cognizant of the experienced shortage of theoretical perspectives of the value of e-Government research from a developing country's perspective (Karunasena & Deng, 2012; Garg & Choeu, 2015) and developing countries' inefficient administrative systems that have placed sub-Saharan African governments into focus (Burke, 2012; Yeboah-Assiamah *et al.,* 2016), this study was conceived. Therefore, this empirical research unpacked these complexities to determine not only 'what is', but also 'what could be' the public value. Further, this study explored the extents of the consequences of investment in e-Government in terms of its cost productivity and the resulting expenditures in the public sector.

For instance, in Kenya the excessively large public sector threatens to cripple national development programmes (Nation, 2014; Kilelo et al., 2015). Bergh & Henrekson (2011) argue for a need to restructure the public sector expenditure to address such challenges. Considering the capacity of e-Government to contain public sector cost (Wirtz & Nitzsche, 2013), this calls for a need to match the investments in e-Government with certain facets of public values desired by citizens. However, considering the social and technical facets of e-Government (Jones, Hackney, & Irani, 2007), such linkages motivate the need to understand and explain these relationships from a broader multi-disciplinary perspective.

Though a range of quantitative empirical researches on the impact of e-Government exists (Ha, 2016), much of the debates has left out the African economies' perspectives despite the existent of inefficient African administrative systems that have placed most sub-Saharan African governments into focus (Burke, 2012; Yeboah-Assiamah *et al.,* 2016). In addition, the research focus has not been as extensive in public sector as in private sector (Basamh *et al.,* 2014). However, these complex linkages among investments in ICTs, performance and operational efficiency still continue to draw research and policy debate among scholars. Some scholars have argued that there is a direct linear relationship (Liao, 1996; Savoldelli *et al.,* 2013). Other scholars have advanced a theory that the relationship between any of the two variables depends on a third-level variable as GDP, while some have introduced moderators as management philosophies into the bivariate relationships (Gatautis *et al.,* 2015). These have led to inconsistent and contradictory results (Yao & Liu, 2016; Rose *et al.,* 2015). In turn these evidences have held conflicting implications for the theoretical, the methodological and the practical approaches in e-Governance. Therefore, the crux of the study sought to re-align this.

1.2.1 General and Specific Research Questions

The general concern for the research is 'What public value (s), if any, result following investment in e-Government in Kenya? Considering the investment levels in e-Government, what is the direction of the relationship and the extents thereof?'

This was the general question that aimed at providing a confirmatory insight into whether developing countries derive any public value as a result of Investment in e-Government (e-Gov). Given the contradictions identified, the research further intended to systematically measure the direction and the extents of some of the public values, if any, to justify such investments. To achieve this, three major interwoven specific research questions were formulated as follows:

1 What public value(s) result from investments in e-Government in Kenya?

This question's focus was mainly at a theoretical level. It aimed at identifying within the literature, the nature of public values. It then hypothesized the dimensions of public value(s). This was then tested, in a confirmatory manner, using the data collected through primary survey to obtain a validated e-Government public value model.

2 What is the operational efficiency resulting from investments in e-Government in Kenya?

This question's focus was at an empirical level. It aimed to estimate the operational efficiency in terms of cost efficiency and productiveness in the public sector considering the investment in e-Government in Kenya. It developed a hypothesis and further tested it, in an exploratory manner, using the data collected through document review to obtain a validated cost efficiency model of e-Government. The causal linkages were explored and attempts were made to relate them to the existing theoretical perspectives of the value of e-Government. This is discussed into details in Section 3.3 in Chapter Three.

3 What performance impacts result from investment in e-Government in Kenya?

This question's focus was at an empirical level. It examined the performance in terms of size of the government or public sector, consequent to investment in e-Government. It therefore formulated a hypothesis and further, in an exploratory manner, tested the hypothesis using the data collected through document review to obtain a validated performance model of e-Government.

Though research question III explored the extent of the performance impacts following investment in e-Government in Kenya, it was noted that a number of performance measures exist (Kim S. , 2009; Srivastava & Teo, 2010; Candiello *et al.,* 2011). Thus in addressing this question, reasonable boundaries were established. Emphasis was placed on performance in the context of the persistent debate of public expenditure containment measures in Kenya. In this light, Barro (1991) and Oni *et al.*, (2014) observe that the structure of government expenditure influences national development, an influence that is substantially determined by its size (Dizaji, 2012; Shumaila & Qayyum, 2014; Kaseb *et al.,* 2014). Dzhumashev (2014) contends that in developing economies, increases in public sector expenditure due to their sizes lead to dissipations in rents and a rise in inefficiencies. It is in this regard that a special focus was made on the *size of government* as a measure of performance impact for this research. This is discussed into details in Section 3.4 in Chapter Three.

Further, two specific research sub-questions were also formulated for exploration. These are *(4a)* what influence does the quality of governance *(QoG)* have on the relationship between the operational efficiency and investment in e-Government in Kenya? This question's focus was at an empirical level. It aimed to re-examine the research question *(3)* on the relationship between operational efficiency and investments in e-Government while controlling for the quality of governance. Thus, a hypothesis was formulated and tested, in an exploratory manner, using the data collected to obtain a validated correlation matrix.

Further, the quality of governance is argued to influence the performance of ICTs in organizations (Gatautis *et al.,* 2015). Indeed, there has been a wave of international efforts attempting to establish performance of countries in terms of quality of governance (Erkkilä & Piironen, 2014). The main drive is that governance is a vital factor in national development (Fritz *et al.,* 2009). Thus sub-question *(4b)* is presented as 'what direction of influence does investment in e-Government have on the quality of governance *(QoG)* in Kenya? This question's focus was also at an empirical level. It aimed to explore the possible relationship between general standards of governance and investments in e-Government. A hypothesis was formulated and tested, in an exploratory manner, using the data collected to obtain a validated correlation matrix.

1.2.2 Objectives of the Research

Considering the specific research questions in section 1.2.1, the major research objectives were designed as follows: -

1. To identify the nature and dimensions of public value (s), if any, that result (s) from investment in e-Government in Kenya.
2. To determine operational efficiencies that results from e-Government Investment in Kenya.
3. To determine the performance impacts that result from e-Government Investment in Kenya.

The specific research sub-question also led to the design of the sub objectives. These are *(4a)* to determine the intervening influence of quality of governance on the relationship between the operational efficiency and e-Government Investment in Kenya, and *(4b)* to determine the directional effect of e-Government Investment on the quality of governance in Kenya.

1.2.3 Research Nomological Net

The concept of nomological network originates from the seminal works of Cronbach and Meehl (1955). This is a representation of the constructs of interest, observable manifestations, and causal influences on the phenomena of interest (Benbazat & Zmund, 1999; Zhang, 2013). The network does not just present a philosophical foundation in establishing construct validity but also the central concepts of the research. Bailey's (2009) inference is that a concept in the net is validated when a network statement presents an evidence of a predicted relation among observables. However, this is dependent on the postulations of a theory *(ibid)*. Though Shepard's (1993) crux is that in social science it is not reasonable to assume that humans are guided by the laws of natural science, Cronbach and Meehl (1955) appear to agree that the net is a just a theoretical model. A rigorous chain of inference is called for *(ibid)* to achieve the empirical and theoretical support for a particular interpretation (Hovorka *et al.,* 2013; Straub, 1989). In that regard, Figure 1-1 presents the nomological net for the research:

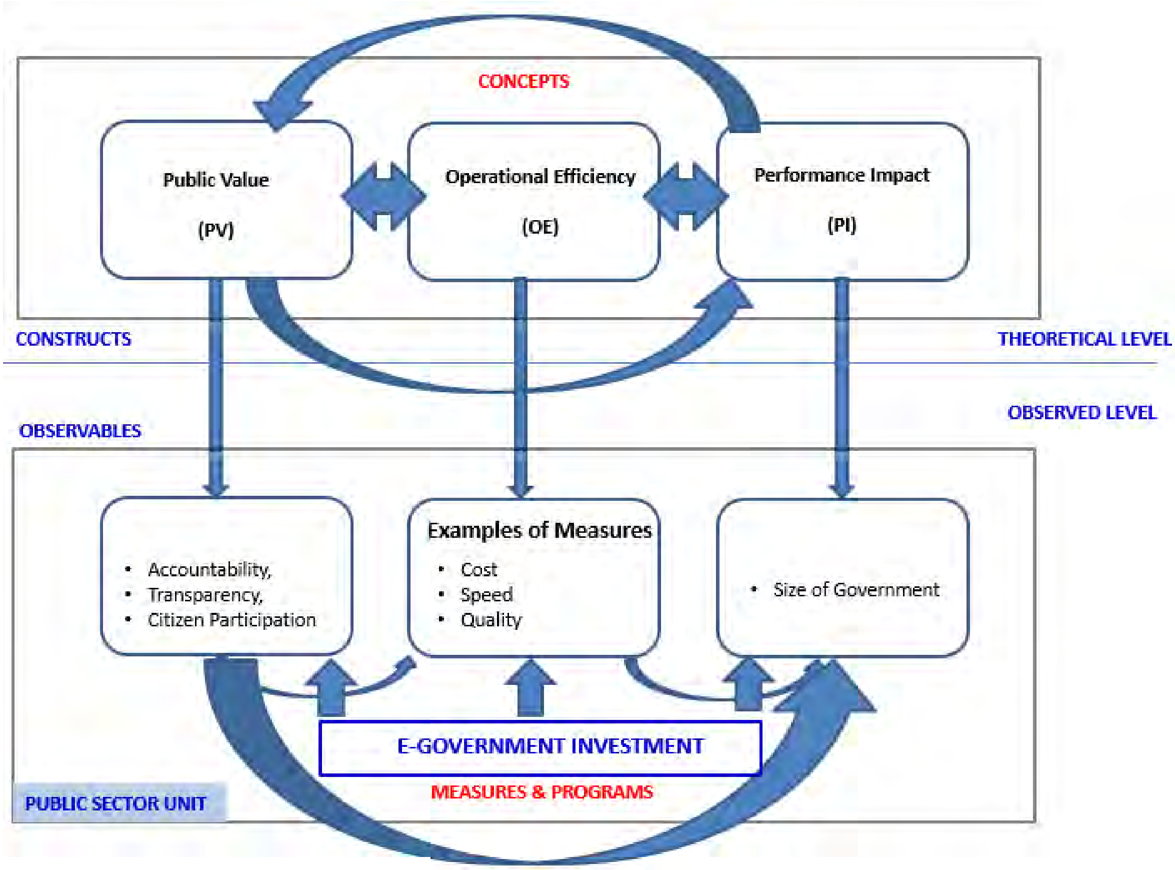


Figure 1-1: Nomological Net for the Research

In adopting the net, the research takes a *'big picture'* of the multifaceted fronts influencing the public values that follow e-Government investments in the context of a developing economy.

Since the nomological network is just a system of laws, any meaning of a theoretical construct is informed by its position in the network (Borsboom & Mellenbergh, 2004). In this public value of e-Government research, the meaning of 'public value' and 'operational efficiency' can be fixed by the network to 'transparency' and 'cost' respectively. This is to bring to an agreement the nomological network, the theory and the empirical data. Therefore, the causal forces shaping the generation of the public values as a result of investment in e-Government in Kenya was discovered through a systematic observation, for instance, of trends in cost expenditure, to create a reliable, an organized and a tested knowledge (Richards & Morse, 2013).

1.3 Delimitations of the Research

In this research, delimitations applied, and so certain research territories were expressly excluded. This could be because the territories were *'not interesting', 'not directly relevant', 'too problematic' or 'not feasible'* (Shunmuganathn, 2012). Therefore, the delimits encompassed the understanding of existing and relevant literature *in context*, conceived gaps and uncertainties *in context*, as well as the clarification of research definitions and conceptualization within literature *in context* (Armstrong *et al.,* 2011). This is because the research had to be manageable both in the factors and in the constructs (Matseketsa & Mapolisa, 2013).

1.3.1 The Scope

The scope of the research was divided into *foreground* and *background*, to represent both the fundamental concepts and the contextual interests of relevance.

The foreground reviewed the development of a multi-tiered theoretical framework and concepts to systematically identify the public value(s), if any, that result from investment in e-Government from a broader theoretical, rational and strategic perspective. This dominant part of the research focused on the *'public values', 'operational efficiencies', 'performance impacts'*. The operational efficiency and performance impact were in terms of *cost efficiency* and *size* respectively. These formed as a set of products resulting from investment in e-Government in the public sector. To a limited and narrow extent, the thesis focused on the effects on the *for-profit* domain to better understand the unique context of the public sector. Selected theories drawn upon public management, public economics and political science were reviewed and integrated to position the e-Government value study within the domain of information systems (IS), and specifically the sub-domain of e-Governance.

On the contrary, the background scope reviewed the contextual issues, made of empirical and situational aspects associated with a developing country's public sector, more especially in the sub

Saharan Africa with a special focus on Kenya. Further, attempts were made to avoid the deep contextual and irrelevant complexities due to international and cross boundary aspects of e-Government initiatives. This was done carefully to avoid production of variable results due to the socio-cultural and interpretive difficulties (Dunleavy *et al.,* 2006; Turpin & Alexander, 2014; Jönsa & Freytag, 2016).

1.3.2 Definitions of Research Terms

Placing a research in the perspective of a developing country may present descriptions that differ from those used in extant academic literature. It was therefore imperative to present clear definitions, understandings and meanings of the central concepts as adopted in this research.

Regardless of what *'e-Government'* is intended to communicate, whether it is *'electronizing'* the government or *'electronics'* in government, the ultimate goal is to remodel service delivery in the public service (United Nations, 2012; Limba & Gulevičiū tė , 2014; Ondego & Moturi, 2016). Therefore, *'e-Government'* was used to mean the usage of ICTs in the public sector with the ultimate understanding that this pursuit creates public values to transform the public sector. In this definition, a *'public sector'* encompasses an assemblage of publicly funded sectors, departments and ministries that provide services on behalf of the government, which is run using public taxes (Gailmard & Patty, 2013). In view of this, the *'public value'* was used to refer to a means for evaluating service delivered by the public sector (Moore, 1995). Lindgren (2013) lends credence to this understanding that while private e-services can be evaluated against the experiences of the user and resulting profits, public e-services are evaluated on the basis of public value (Lindgren & Jansson, 2013; Lindgren, 2013; Ha, 2016).

This research also used the broader term *'Information Communication Technologies'* (ICTs). The World Bank (2013) defines *ICT* as '*hardware, software, networks and media that facilitate the capture, storage, processing and display as well as related services by electronic means.*' Frenzel and Frenzel (2003) define *ICT* as a tool that can radically alter the balance between institutions and the people through the management, the storage, the sharing and the dissemination of information. Though the World Bank's (2013) definition focuses on the general meaning of the artifacts, Frenzel and Frenzel's (2003) mind the fact that *'information is power'*. In the research, the two definitions were integrated, and hence *ICT* was considered as a tool that not only intends to alter the balance of power among the institutions or the persons but also enhances the information dissemination towards improved service. The logic was to integrate the unique socio-political and economic needs to understand pertinent causations and outcomes of using ICTs (Quan-Haase *et al.,* 2016).

Further, '*governance*' is the process, through which decisions are taken, implemented, monitored and evaluated (Misuraca *et al.,* 2011). This is conditioned by underlying societal values and organizational models (Misuraca, 2010). In a broader public sector sense, governance entails the exercise of political authority to manage and direct government activities and affairs (Jessop, 2016). In this light, *governance* as a term was used to refer to the quality of this exercise of power, as informed by the quality and standards of public services rendered to citizens (Steen *et al.,* 2016).

Therefore, this *information systems* domain research addressed subjects related to governance, information, communication, technologies and human aspects in an organizational context (Hirschheim & Klein, 2012), through a systematic analysis of the phenomenon, causal relationships and outcomes associated with e-Government's facilitative and integrative power.

1.4 Limitation

For any given research, there are underlying assumptions and limitations (Creswell, 2011), and this forms a critical component of a viable research proposal (Leedy & Ormrod, 2010). Matseketsa & Mapolisa (2013) define these limitations as impediments that may prevent the researchers from achieving defined research goals. Thus, explicitly stating the limitations is a vital component in the replication of research (Creswell, 2011). Therefore, few limitations were foreseen and strategies put in place to attempt addressing them.

For instance, Kenya's e-Government strategy paper (2004), that led to the adoption of e-Government as a transformative tool in public sector, as largely referenced in this research has not been updated since first drafted in 2004, despite rapid developments in the new and modern technologies. Thus, as had been explained in section 1.3.2, a broader definition of 'ICT' was adopted to take care of the challenge. Secondly, the overall research focus is on sub-Saharan Africa. Though a choice of Kenya was made for data collection purposes, this can be seen to pose some limitations while generalizing the results to the wider focus. However, this decision was made to avoid practical complexities associated with data collection across the entire region (Dunleavy *et al.,* 2006; Jönsa & Freytag, 2016).

Thirdly, there was a challenge in the enrolment of the research respondents. This was occasioned by a need for an informed consent on the part of the respondents prior to the interviews, as part of the ethical requirements in social science researches. Though it is a requirement at the University of Cape Town to seek approval from Ethics in Research committee; a clear monitoring procedure was considered critical and this was observed and employed as presented in details in Chapter Five.

1.5 Intended Value of the Research

The utmost goal of any research endeavor is to generate a new knowledge (Lindgren, 2013). Goldkuhl (2011) classifies the knowledge as descriptive, explanatory, prescriptive, critical or normative. The *'descriptive'* knowledge in the research aimed at obtaining a deep contextual situation that result following investment in e-Government in Kenya and selected developing economies. The *'explanatory'* knowledge envisaged to explain the causal linkages and nature of public value resulting from investment in e-Government. While this was conducted using multi-disciplinary theories, the *'prescriptive'* knowledge was envisaged to offer guidelines for policy action in the practice of e-Governance. This can be understood as methodological knowledge on weightages to use in the allocation and apportionment of public sector resources to create particular value propositions, considering the contextual factors. The *'critical'* knowledge in the research sought to scrutinize the phenomenon of 'public value'. This provided an elucidation of the evidential, conceptual, methodological, criteriological or contextual considerations upon which a strategic judgment or decision may or may not be based. The *'predictive'* aspect was envisaged to aid in exploratory forecasting of the resulting operational efficiencies and performance impacts through examination of the situated effects, considering a given level of investment in e-Government. Lastly, the *'normative'* knowledge refers to the knowledge about the desirables *(ibid)* – the *'ought to be'*. Indeed, this domain has become an implication for both theory and practice (Wilkin & Chenhall, 2010), and hence it attempted to predict the impact of e-Government investment using defined formulaic and mechanistic approaches (Olum, 2011).

From the above illustrations, the intended, and possibly the unintended value of this research can be looked at under three broad categories – Theoretical, Methodological and Practical.

1.5.1 Theoretical

There has been a substantial debate on the theoretical and philosophical implication of ICTs across social sciences, public administration included. Fundamental concern is the notion that the rapid changes in social relationships or management may be expected from new technological capabilities between those who do and those who do not adopt and use the ICTs (El-Sofany *et al.,* 2012; Benington, 2011; O'Neill, 2009). The research, underpinned by a positivistic philosophy unpacked the research problem through an identification of broader situated facets of e-Government to establish a formulaic relationship between the facets and relate them to the e-theoretical perspectives of the value of e-Government in a developing country context. In this regard, the research innovatively advanced the integration and use of theories, considered foreign to information systems, drawn upon public administration, public economics and political sciences as the epistemological starting points to understand, explain and provide evidence on how investments in e-Government interact and influence resulting public values, operational efficiencies and performance in government, considering the situated effects.

The multi-theoretically informed models formed the main value contribution to the existing body of knowledge. In fact, Williams and Shearer (2011) are concerned by some academic works that are markedly a surfeit of exhortation and domain-specific theories. Therefore, the multi-disciplinary theoretic models were meant to fill in the described gap.

1.5.2 Methodological

Informed by positivism as a philosophical stance, the research was envisaged to explore a multi-methods approach. In this respect, the quantitative and qualitative approaches were pooled to corroborate findings and enhance research insights for a richer conclusion (Creswell, 2008). This triangulation was intended to increase the validity by incorporating multiple viewpoints and methods (Yeasmin & Rahman, 2012) as well as providing a multi-theoretical integration of methods beyond the statistical computations to form a more rigorous result. This methodological approach enhances the existing base of positivist-empirical researches in information systems.

1.5.3 Practical

Electronic government (e-Government) can make a valuable contribution in the operations in public service (Al-Mamary *et al.,* 2014; Ondego & Moturi, 2016). Therefore, the management of information systems is strategic in the delivery of public service. There is inevitable need for a research in ICTs to better point to such benefits in terms of policy and practice (Saeed *et al.,* 2011). Therefore, the consequences of this research were intended to invoke a radical thinking towards the policy changes in the investments that governments make on behalf of the public in the developing countries.

This study was seen as significant for the Kenyan context for several reasons. Firstly, to the best of researcher's knowledge it is one of the early researches in Kenya to attempt to measure the performance of e-Government since e-Government paper of 2004 was adopted, with a focus on the value to the entire mass. The research was envisaged to aid in addressing the persistent question about the unsustainable size of the public service in the background of e-Government potential. This in turn could offer a practical policy advisory towards an optimal size of public sector (Hope, 2012). In addition, in the e-Government Strategy (2004) and National ICT Policy of 2006 for Kenya, the monitoring and evaluation (M&E) aspect is mentioned as critical; however, no systematic and scientific study of rigor has been conducted aimed at exploring the public values so far generated or envisaged, despite the massive investments in e-Government initiatives that Kenya has made. Kariuki (2014) and Tache (2011) argue that evaluation is an extension of social research, and so deferring it may result in difficulties in reaching the envisaged performance (Rossi *et al.,* 2004; Tarhini *et al.,* 2015).

1.6 Thesis Outline

CHAPTER ONE presents an introduction. The research problem and the questions are reviewed against a brief contextual background of developing countries with Kenya as a special focus. Further, the chapter outlines the scope, intended value and limitations of the research.

CHAPTER TWO presents the contextual scope. In this, appropriate documents are identified for critical analysis; amongst them are the instruments used for translating policy into the practice of e-Governance in Kenya. This chapter motivates for a model-based manner of attempting to address the research problem. In closing, the research problem is conceptualized and related to the empirical setting.

CHAPTER THREE reviews the extant literature to provide theoretical and empirical level arguments to position the research problem. It delineates various theoretical and empirical positions in a concept centric manner to constitute an argument for the research problem. The chapter closes with the description of the conceptualized problem.

CHAPTER FOUR details the theoretical foundations, their appropriateness and congruence to the research objectives. This is to ensure that researcher' biases are uncovered, understood and minimized. It motivates the use of the theoretical models to structure the research hypotheses in preparation for testing. It closes with a presentation of a conceptual framework.

CHAPTER FIVE describes the underpinning research methodology, philosophies, design and approaches of chosen research methods. Issues of validity, reliability, transferability, credibility and ethics in the study are discussed.

CHAPTER SIX presents data analyses. The inferential models and correlation matrices of public values, cost efficiency and performance of e-Government investments as underpinned by the theories and research methodology chosen are presented. The results obtained using the multi-theoretical approaches are presented.

CHAPTER SEVEN presents the discussions and conclusions. The summary of the results and the findings in forms of reflections, originality, theoretical, methodological and practical implications are presented, before possible limitations and interesting avenues for future lines of the research are suggested.

The thesis organization is represented in Figure 1-2:

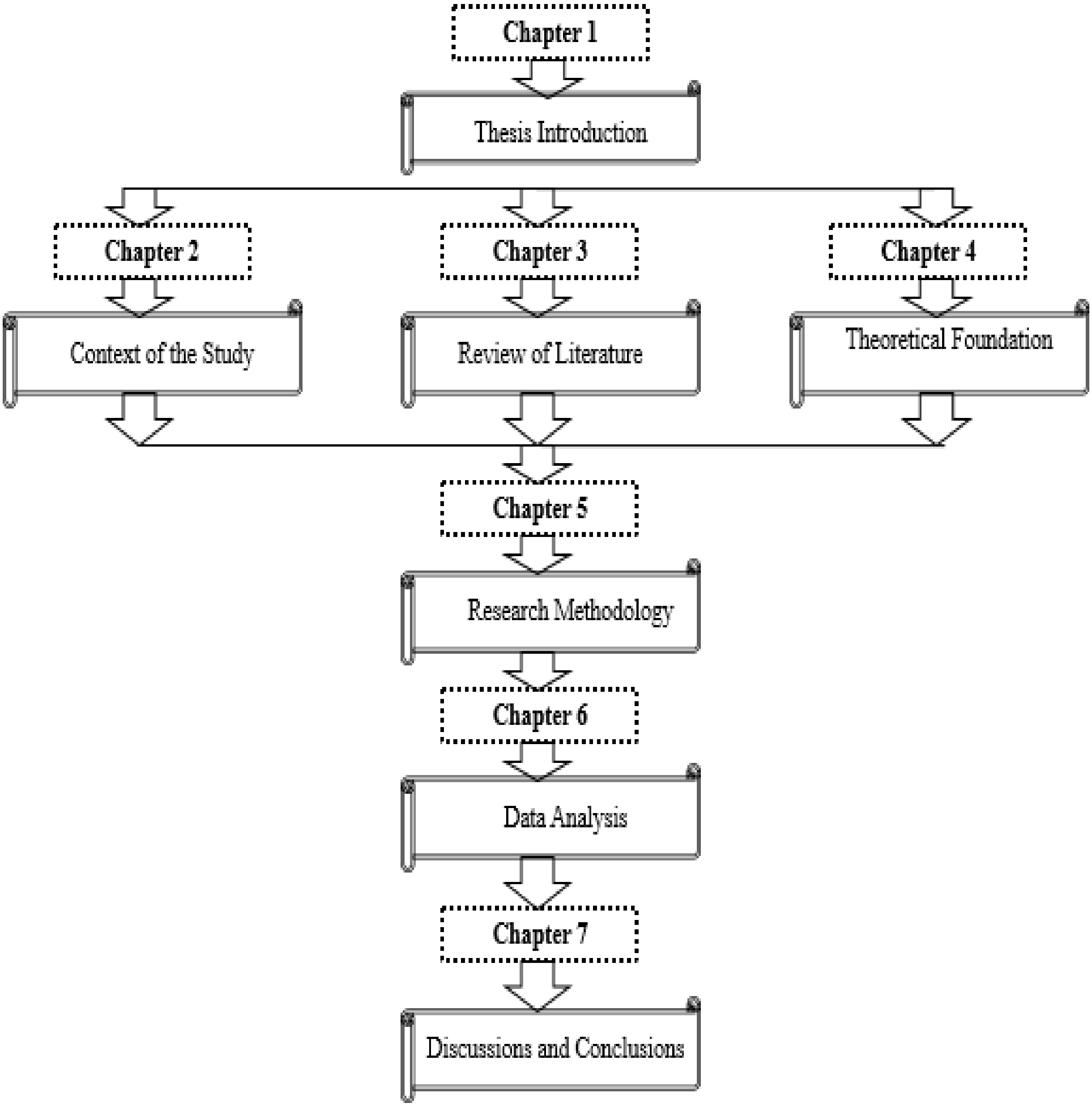


Figure 1-2: Organization of the Thesis

2. CHAPTER TWO: THE CONTEXT OF THE STUDY

You cannot understand the view without the point of view

-Noam Shpancer

This chapter presents the *point of view* of the research. Kenya is used as an empirical setting to understand the theoretical *view*. In this chapter, appropriate instruments used for translating policy into the practice of e-Governance in Kenya are reviewed. The chapter closes with a conceptualized research problem, which is then related to the practical implication of the research.

2.1 The Situation of Kenya

2.1.1 Geographic Focus

Kenya, which has an area of about 582,646 square kilometres, is geographically positioned in East Africa. It borders Sudan to the North West, Uganda to the West, Tanzania to the South, Ethiopia to the North and Somalia to the East, with more than 536 kilometres of the Indian coastline. Its coastal port serves its land-locked neighbors. Figure 2-1 represents Kenya in its spatial relation to other sub-Saharan Africa countries.

Figure 2-1: Kenya and the Neighbours in sub-Saharan Africa

Source: (B-SLAGlobal10, 2014)

Besides Kenya being a primary ICT hub in East Africa (World Bank, 2013; World Bank, 2015), it offers a link to Africa and the rest of the globe *(ibid).*

2.1.2 Economic Focus

Kenya's economic mainstay is Agriculture, which is the single prime sector contributor to the Gross Domestic Product (GDP) (Alila & Atieno, 2006; Kinuthia, 2009; Kimenyi & Kibe, 2014; World Bank, 2015). Though the population of the country is approximated at 43 million persons, the last official census of the Year 2009 estimated it at 38 610 097 (GoK: KNBS, 2010), out of which about 32.3 per cent live in the urban areas.

Considering 47 per cent of 850 million inhabitants live on approximately USD 1 a day, sub-Saharan Africa (SSA) is characterized by one of the lowest GDP per capita in the world (Winther & Henriksson, 2013; Akobeng, 2016). GDP is a quantitative monetary measure of the finished goods and services produced in a given period (Callen, 2014).

African population is mainly the young (Kabiru *et al.,* 2013), which may explain the witnessed technology exuberance (Kizza, 2013) in countries like Kenya. Unlike Eurasia – the regions with a potentially solid influence of ICT – Africa has a thin integration of ICT to the global value chain (Rohman, 2012; Garg & Choeu, 2015) and lowest levels of ICT diffusion (Brown & Brown, 2009; Soremekuna & Malgwib, 2013). In part, this may explain the limited impact of ICT on economic productivity (Aker & Mbiti, 2010)

Specifically, Kenya is a member of a regional economic bloc, the East African Community (EAC). The membership includes Tanzania, Uganda, Burundi and Rwanda. Though Uganda, Tanzania and Kenya have had socio-economic and political ties dating back to the 20th century, Rwanda and Burundi joined the membership in 2009. According to the World Bank (2016), Kenya has maintained a relative stability even in the face of fiscal pressures and public sector reforms. It achieved a mean progression rate of 5.6 per cent in 2015, while it is estimated to have grown by 5.3 per cent in 2014 and 6.1 per cent in 2011 (GoK: KNBS, 2016). However, the rates are still below the target line of Vision 2030 which is 10 per cent, considering that her East African Community (EAC) and sub-Saharan Africa peers' average at 6 per cent. However, the International Monetary Fund (IMF) projects a stronger medium term, majorly from performance of manufacturing and agriculture sectors *(ibid)*. In 2015, the sectors contributed 30 per cent and 10.3 per cent respectively to GDP. ICTs being one of the lowest contributors did 0.9 per cent. Indeed, ICT sector which has driven substantial growth in the past few years has weakened (World Bank, 2016), the competition for power resources has increased pressures on public resources; but the macroeconomics remain relatively stable *(ibid)*.

Though Kenya settled on a three-year precautionary facility from IMF of USD 750 million (World Bank, 2016), aimed at boosting the international reserves and to reduce public debt burden, the economy remains vulnerable to external shocks (Bonfrer & Gustafsson-Wright, 2016). This undermines its prospects to national development (Onyango, 2013; Percy *et al.,* 2014; Chea, 2016) and may be remedied by increasing both domestic and foreign savings (Aduda *et al.,* 2014; World Bank, 2013). Further, Kenya's public debt has remained above 45 per cent of GDP. This is expected to come further under burden due to the emerging fiscal pressures of new devolved system of public sector governance (Nyanjom, 2011).

2.1.3 Political Focus

Kenya attained independence on 12 December 1963 from the British, becoming a republic under a unitary state system. It has a parliamentary system founded upon multi-party democracy as a model of governance (Damdinjav *et al.,* 2013) with Uhuru Kenyatta as the current (2016) President, having been sworn-in on 9 April 2013. During his quest for political leadership, Uhuru positioned himself as a *'digital leader',* thus the catch phrase *'digital government'*.

Kenya's legislature is two-tier, comprising a National Assembly and a Senate, each serving a 5-year term. Article 95 of the Constitution of Kenya (CoK, 2010) establishes a National Assembly of 290 elected members, 12 nominated members and the Speaker. On the other hand, Article 98 of the Constitution created a Senate of 47 elected members, 16 nominated women members; 2 members - one man and one woman, representing the youth; two members, - one man and one woman, representing persons living with disabilities; and the presiding Speaker. It is noteworthy that parliamentary politics in Kenya is highly competitive (Bosire, 2010) and the cost of managing the elections is one of the most expensive on the continent (Njanja, 2016).

2.1.4 Social Focus

Though the World Bank (2016) points out that Kenya's average poverty level has dropped from 47 per cent in 2005 to approximately 38 per cent in 2013, Kenya's economic updates highlight widespread inequalities (World Bank, 2013; World Bank, 2016). However, being underscored is the fact that an average Kenyan is healthier, more educated and enjoys improved infrastructure than in 2003 *(ibid),* despite having a large portion still in fragile conditions.

Though Kenya's reduction in poverty imitates the experiences of other sub-Saharan African (SSA) economies, the World Bank (2016) observes that this is high compared to its neighbours, Tanzania (approximately 36 per cent) and Uganda (approximately 31 per cent). The situation is particularly critical in the Northern Kenya where exposure and vulnerability is highest (Silale & Nyambegera, 2014), with the Gini coefficient, an estimation of the inequalities within a populace (Damgaard & Weiner, 2000), approximated at 39 per cent in the countryside and 49 per cent in the cities in 2013 (World Bank, 2016).

2.1.5 Development Focus

Though the critical test for Kenya now is to implement the new devolved governance structures (World Bank, 2016), Mwenzwa & Misati (2014) observe that most development bottlenecks were presented by the International Monetary Fund (IMF)/World Bank's structural adjustment programmes (SAPs) of 1970s and 1980s. Though SAPs had value, they also formed part of the experienced difficulties and problems *(ibid)* alongside inadequate civic engagements and public mal-administration (Mwenzwa & Misati, 2014). Thus, Kenya developed an Economic Recovery Strategy for Wealth and Employment Creation (ERSWEC) 2003-2007 policy and its successor, the Kenya Vision 2030 to address the drawbacks. Mwenzwa and Misati (2014) observe that Vision 2030 has assumptions that must hold for it to be achieved. These include stable macro-economics, sustained governance reforms as well as leveraging on innovative technologies. However, the World Bank (2016) contends that concerns abound in the areas of public sector governance. For instance, financial indiscipline is not strange to Kenya (Sasaka *et al.,* 2014). The phenomenon has been institutionalized to the detriment of developmental welfare (Mwenzwa & Misati, 2014). This is in addition to red tape bureaucracies that have considerably disillusioned the public (Buuri, 2013; Mwenzwa & Misati, 2014; Sihanya, 2012; Kilelo *et al.,* 2015). In fact, Badaso (2014) and Ondego and Moturi (2016) argue that, used appropriately in Kenya, e-Governance can offer faster process flow, increased transparency and better cost control if Kenya is to refocus its development strategy.

The next table is a representation of the situation of Kenya in a nutshell.

Table 2-1: Kenya in a Nutshell

		Male	Female
Age Structure:	00-14 (42.16%)	9,572,641	9,512,607
	15-24 (18.66%)	4,280,499	4,289,960
	25-54 (33.17%)	7,700,801	7,530,526
	55-64 (3.76%)	784,775	944,041
	65 & over: (2.85%)	568,784	740,667
Urbanization:	25.6% of Total Population		
Literacy (age ≥15 can read & write):		81.1%	74.9%
GDP	USD$63.4 billion		
Labour Force:	18.21 million		
	Agriculture Sector: 75%		
	Industry & Services: 25%		
Unemployment Rate:	40%		
Population below poverty line:	43.4%		
2G Network Coverage	94.4%		
3G Network Coverage	78%		
Telephone Lines:	82,456		
Mobile Cellular:	38.3M		
Internet Users:	37.4M		
Broadband Subscription	7.9M		

CIA: World Fact book (2016), GoK: Communication Authority (2016)

2.2 Towards e-Governance in Kenya

This section presents an analysis of the motives, drivers and interactions among interest groups in Kenya's ICT landscape and relevant political undertones in adopting an e-Government strategy (2004) and a national ICT policy (2006) as generally summarized by Bowman (2010).

2.2.1 Pre-Independence Experience (1888-1963)

In Aduda and Ohaga (2004), it is reported that the first submarine telecommunications network, laid by the Eastern and Southern African Telegraph Company, linked Kenya to the rest of the world in 1888. In the 1920s, British colonial administrations in East Africa became linked through a common network. In 1961, Kenya installed the first computer in the public sector (Bowman, 2010). Kenya's experience under colonial masters, though short-lived, changed the country in countless ways (United Nations, 2005), from a backward region like any other sub-Saharan country (Robinson et al., 2012).

2.2.2 Post-Independence Experience (1963-2014)

In 1963, Kenya achieved independence. Following the exit of the colonial masters; Kenya, Tanzania and Uganda invested together and formed the East African Common Services Organization (EACSO), the predecessor to the East African Community (EAC). EACSO managed the then East African Post and Telecommunications Corporation (EAP&TC) serving as the sole ICT service provider. EAP&TC's ownership and management resorted under the three independent governments.

Specific to Kenya, Klopp (2001) advances that policymaking under the founding President Jomo Kenyatta was on the basis of 'particularistic patronage', determined in the capital of Nairobi and disseminated outwards. Lansner (2012) characterized the regime by a systematic corruption, economic mismanagement and respect for a few civil liberties. Though Kenyatta boasted of having the best infrastructure and a robust economy, in her study, Bowman (2010) observes that Kenya's democracy and infrastructure weakened in 1980s and 1990s. Ndavula and Mberia (2012) posit that by the end of the 1960s the political leadership was ready to bar the use of the media to facilitate democratic spaces. Though citizen participation is vital to democracy (Michels, 2011), the media in Kenya then served parochial interests (Ndavula & Mberia, 2012).

In 1977, due to divergent political and development orientations (Tyler *et al.,* 1994), EAP&TC collapsed. Kenya Post and Telecommunications Corporation (KP&TC), a creation of an Act of Parliament, became a monopoly-country provider of ICT services. Later, the Kenyan government imposed reprisal fiscal conditions in the ICT sector. Aduda and Ohaga (2004) observe that, in relation to the importation of computers, the measure was justified by a belief that computers might lead to unemployment. The regime viewed ICT with political suspicion (Bowman, 2010). The policy concerns driven by the private sector needs went a notch higher. The central concern was about the reformation of the sector to make ICT a tool of efficiency in business and an enabler in the economy in line with global industry trends. Bowman (2010) points out that, to keep pace with globalization, the idea to write an ICT policy in Kenya came to the fore in 1980s. The public policymakers started paying attention to civil societies and interest groups (Ruxin, 2006).

In the 1990s, the privatization of KP&TC, initiated by the International Telecommunications Union (ITU), was made a condition for the progression of foreign aid talks (Etta & Elder, 2005).

KP&TC Act Cap 411 was severally repealed by Kenya Communications Act number 2 of 1998, number 1 of 2009 and number 41A of 2013 providing the present ICT regulatory framework.

In 2002, when President Moi's regime came to an end, Bowman (2010) observes that with President Kibaki at the helm, the private sector became more assertive. The first five years (2002 – 2007) of Kibaki saw ICT positioned as a crosscutting pillar in the development strategies (Government of Kenya, 2003). A formal ICT policy-making process was initiated based on a Common Market for Eastern and Southern Africa ICT Protocol (COMESA-ICTP), subsequently launching an e-Government Strategy Paper (2004) and adopting the official framework of National ICT Policy (2006). Unfortunately, after the challenged and contested results of the 2007 elections, growth in the ICT sector almost slowed to a crawl *(ibid)*.

In August 2010 Kenya ratified a new Constitution. The new order challenged the information hegemony (Sihanya, 2012). The political implication was to enhance transparency and cost efficiency riding on e-Government potential to spur cross-sector collaborations and improve efficiency in public services. In 2013, Kenyans voted in a government christened *'digital government'* under Uhuru Kenyatta, son of the founding President Jomo Kenyatta. Though his first 'digital promise' of Laptop for each Class One child is yet to become a reality in 2016, he is quoted at the 'Transform Africa Summit' in Kigali, Rwanda in 2013, that he was determined to ensure that 'people fully benefit from the advantages of ICTs'. He underscored the fact that ICT is a crucial tool in reducing the cost of doing business (Presidential Strategic Communication Unit, 2013).

2.3 Towards Public Sector Reforms

2.3.1 Pre-colonial System

Regarding governance, Guma (2013) argues that the African public sector management is founded on the old models, rooted in the Western management theories (Inyang, 2008). Though, this research did not dwell much on the pre-colonial systems due limited technologies of focus during the period, public governance system in Kenya is largely related to the pre-colonial systems of governance (Mair, 1962).

2.3.2 Post-colonial System

The immediate post-colonial public service was inherited from the British. Chepkilot (2012) observes that the structure is modeled along the Westminster–Whitehall tradition (Hyden, 1999; Olum, 2011). By choice or sheer force, African countries adopted the British bureaucratic practices (Gaskins, 2013), in spite of conflicting norms relating to the organization of bureaucracies (de Sardan, 1999). The adoption was fraught with issues of illegitimacy and mistrust (Cohen, 1980). However, other authors argue it was meant to enhance impartiality and effectiveness (Odhiambo-Mbai, 2003). Despite the standards, it remained racially constituted. To address the anomaly, the independent government adopted the strategy of *Africanisation (ibid).*

In 1963 upon attainment of independence, Aseka (2002) notes that there was no significant transformation as government directed its efforts at the *Kenyanization* policy aimed at replacing the exiting colonial masters with the locals. This led to a rapid increase in the size of the public service and a resultant high bill of wages (Aseka, 2002; Omolo, 2010; Chepkilot, 2012; Government of Kenya: Parliament, 2013). The government adopted a state-led and centralized development strategy, and Nzioka (1998) observes that the public sector employment grew by about 5.5 % per year between 1963 and 1991, resulting to 85 persons for each civil servant. This translated to a per capita employee count of 0.012.

Though it was still the desire of the government to maintain a ratio that enhances efficiency and performance as had been spelt out in Sessional Paper No.1/1986 on *'Economic management for renewed growth'* policy, Sessional Paper No.1/1992 on *'Development and employment in Kenya'* policy and Sessional Paper No.1/1994 on *'Recovery and sustainable development to year 2010'* policy, the public service continued to expand in size and complexity (Government of Kenya: DPM, 2000; Government of Kenya: Parliament, 2013; Omolo, 2010) leading to unfavorably skewed recurrent spending *(ibid)* overstretching resources – resulting to poor performance, inefficiencies and low productivity. The government became the largest employer as well as the *'employer of last resort'* (Omolo, 2010), based neither on the needs nor productivity, but as a way of supporting the newly trained Kenyans. In addition, the central government absorbed staff of the defunct East African Community (EAC), further expanding the public service to irrationality.

In 1990, the government started experiencing expenditure pressures (Government of Kenya: Parliament, 2013), an overstaffed public service, unsustainable public sector salaries and a drop in efficiency (Aseka, 2002; Institute of Economic Affairs, 2006; Government of Kenya: Parliament, 2013). Though, Huka (2011) advances that the public service is anchored on a management culture that focuses on results and efficiency, Mbua and Ole Sarisar (2013) argue that in a broader sense the Kenyan public sector does not discourage inefficient resources' utilization. There is a need for a system of governance that advocates for openness, a sense of responsibility and adherence to the rule of law to constitute an integral part of the public sector reform agenda (Government of Kenya: The Presidency, 2013; Government of Kenya: Office of Prime Minister, 2008).

Following the negative consequences bordering on the sector performance, the government embarked on a series of public sector reforms. The programmes were aimed at rationalizing the size of the public sector towards lean management (Hope, 2012; Omolo, 2010; Huka, 2011). However, the reforms have achieved minimal results (Achoch *et al.,* 2014; Wanyama, 2013). The efficiency has gone low (Kilelo *et al.,* 2015), the state bureaucracy has performed sub-optimally (Hope, 2012), the service quality has deteriorated (Huka, 2011; Ondego & Moturi, 2016), but {red tape} bureaucracy and corruption has increased (Buuri, 2013; Huka, 2011; Sihanya, 2012). On the flipside, the government continues to invest in misplaced priorities (Huka, 2011; Ondego & Moturi, 2016).

Under the *'Civil Service Reform Programme and Action Plan'*, Nzioka (1998) and Omolo (2010) observe a number of research efforts focusing on size and configuration of the public sector. Huka (2011) summarizes the Three-Tier Public Sector Reforms (PRS) as follows:

- ❖ PHASE 1 (1993-1998): Cost containment and staff reduction measures through retirement of staff, freezing of recruitment and use of an Integrated Payroll and Personnel Database (IPPD).
- ❖ PHASE II (1998-2001): Performance improvement focused on rationalization of functions and staff-right sizing along core operations.
- ❖ PHASE III (2002-): Refinement, consolidation and sustenance for the reform achievements to realize improved performance in the public sector.

Though over 25 000 vacant posts were abolished and recruitment for over 34 000 frozen by end of 1994, a number of constraints were and are still being encountered in the implementation of the 1992 public sector reform (PRS) strategy. Firstly, the reforms were conducted before undertaking an analysis to determine staffing levels, probably due to lack of sound analytical tools. Secondly, lack of sound redeployment procedures contributed to uneven staff distribution. Thirdly, due to inappropriate Personnel Information System (PIS), employee records were neither accurate nor timely executed. Fourthly, natural attrition of employees amidst suspended employment implied additional workload on staff, reducing operational efficiencies (Huka, 2011). In fact, e-Government is argued to be helpful in streamlining such operations towards re-engineering the public sector (Government of Kenya: Parliament, 2013).

Despite the Three-Tier public sector reforms, the public sector wage bill has continued to balloon (Institute of Economic Affairs, 2006; KIPPRA, 2013; World Bank, 2013; Omolo, 2010; Adam, 2015) as the leadership still grapples with improving public sector performance (Isahakia, 2010; Muluka, 2014). In fact, in January 2014, following a recommendation of the Parliamentary Budget

Office (PBO), the Presidency issued a statement planning to rationalize the public sector by laying off of over 200 000 public servants (Presidential Strategic Communication Unit, 2013). This cuts across the main stream civil service, state-owned agencies and independent commissions. This is besides the proposed law on the *'Wage of Public Sector'* to be tabled in Parliament in 2016, whose main concern is that over 50 per cent of the country's total revenue is consumed by the public wage bill. This is higher than the internationally accepted ratio of the Wage Bill to Revenue of 30 to 40 per cent and the Wage Bill to GDP of 7 per cent (Government of Kenya: Parliament, 2013). This is above neighboring Tanzania (6.3 per cent), Uganda (3.9 per cent) and Rwanda (3.9 per cent). Burundi is doing worse in the EAC block (11.3 per cent) (Africa Economic Outlook, 2012; Nation, 2014; Holmes, 2013).

Further, analysts argue that the exorbitant public wage bill is not in the salaries only but in wastage and corruption (Mwangi, 2014), ignorance among citizenry to demand public value (Onyango-Oboo, 2014), existence of ghost workers in the government payroll system (Wanzala, 2014), and duplication of roles (Gaitho, 2014; Maina & Kwasira, 2015). These have led to reduced funds for critical national flagship projects (Namunane, 2014; Anyanzwa, 2014).

On 17 March 2014, the former Prime Minister, Raila Odinga, while being interviewed on Jambo Boston, an online Radio station in the United States of America (USA), was quoted saying there is a 'need {for} a comprehensive strategy to deal with the issue of ballooning wage bill. Cutting salaries alone won't amount to much without seriously tackling issues like wastage and corruption' (Wamalwa, 2014).

2.4 Governance of ICT

Prior to 2004, the responsibility for the management of ICTs was not structured. Following World Bank-driven restructuring, the overall sector policy responsibility has been resident in a dedicated State Department or a fully-fledged Ministry. In 2016, this is under the Ministry of Information and Communications Technology (MoICT). The Communications Authority of Kenya (CAK) is the sector regulator and the National Communications Secretariat (NCS) is an internal ICT policy advisory arm of the government. The Universal Service Advisory Council (USAC) provides strategic advisory on the management of the Universal Service Fund (USF) and Kenya ICT Authority (K-ICTA) co-ordinates the infrastructural development as well as marketing Kenya as an ICT hub.

In the next section is a presentation of the instruments, policy papers and strategies used for translating policy into the practice of e-Governance in Kenya.

2.4.1 Kenya e-Government Strategy of 2004

Kenya is among sub-Saharan African countries that have been driving e-Government implementation in the public sector. It launched the e-Government strategy paper in 2004, with an objective to enhance information flow, citizens' participation and service delivery (Government of Kenya: e-Government, 2011; Njuru, 2011). These objectives are not unique to Kenya but are global (Al-Nuaim, 2011; Makoza, 2013; Welch *et al.*, 2005; Franco *et al.,* 2016).

Kenya's e-Government framework adopted the Organization for Economic Co-operation and Development's (OECD) guiding principles (Yimbo, 2011). These include inter-agency collaboration, citizen engagement, integration, accountability and access, as pillar beacons for measuring success of investing in e-Government. These principles are central for effective e-Governance (Etta & Elder, 2005; OECD: E-government, 2013). The policy measures are meant to enhance good governance (Yimbo, 2011).

Though e-Government Strategy of 2004 has been in place for over a decade, there seem to be challenges in meeting policy objectives as defined. There have been limited technical capacities, citizen perception, corruption and institutional structures in place. These have impeded effective service delivery (Ochieng & Gichoya, 2013; Omariba & Okebiro, 2015).

2.4.2 Kenya ICT Policy of 2006

Kenya published an official framework of National ICT Policy on 31 March 2006 with the aid of the World Bank through the Information for the Development Program (InfoDev) (Martin, 2012). Prior to this, the writing process was participatory and the intention was to refocus ICT to position Kenya globally as a competitive information economy (Okongo & Sakwa, 2012; Ondego & Moturi, 2016). While the policy paper envisions 'a prosperous ICT - driven Kenyan society', the mission is aimed at 'improving the livelihoods of Kenyans by ensuring accessible, efficient, reliable and affordable information services'.

The next section contains a SWOT analysis on the national ICT Policy (2006) in the background of the stated mission:

- ❖ The *'Policy, Legal and Regulatory'* framework was given prominence. This could be because of the role of Knowledge Economy (KE) in the attainment of the development goals as was later espoused in Kenya's blue print, Kenya Vision 2030. Though this framework has facilitated some growth, criticism has been leveled in its intrusive nature, some bordering on human rights. This has driven several amendments including the Kenya Communications Amendment Act of 2008, 2009, 2010, 2013 and the Media Bill of 2014.

- On *'Infrastructure of ICT',* Kenya has shown some commitment to deliver on the pillar. It has three major submarine cables, namely, 17,000km SEACOM with capacity of 1.28 terabytes per second; 5 000km The East African Marine System (TEAMS) with a capacity of 1.2 terabytes per second and 10 000km East African Submarine Systems (EASSy) cable with capacity of 1.4 terabytes per second. Kenya continues to expand its National Optic Fiber Backbone Infrastructure (NOFBI). Since this commitment is dependent on other complimentary sectors, emphasis needs to be placed on provision of support infrastructure such as energy. In fact, in an investigation of investments in West African countries, Ngwenyama *et al.,* (2006) observed a complex relationship between investments in ICTs and other sectors. To harness benefits, these investments must be rightly combined (*ibid;* Ngwenyama & Morawczynski, 2009). This may impact on the performance of ICTs as well as derivation of public values.
- On the front of *'Human Resources'*, the government has set up an e-Government capacity building division. In addition, it has been pursuing collaborations with tertiary institutions. However, the demand far exceeds the supplies. Government is attempting further collaborations with private sector (Government of Kenya: ICTA, 2012). Nokia and Google, who are part of the ICT ecosystem, intend to build technical and business skills of Kenyan mobile start-ups in collaboration with local universities and innovation hubs. However, Dr Kilemi Mwiria, former Assistant Minister for Higher Education, says some of these are *'bogus'* institutions (Mzalendo, 2009), taking advantage of ignorance and the citizens' thirst for education, offering them inadequate training. There is need for tighter regulations to achieve the envisaged values.
- In the pillar of *'e-Learning'*, Patel and Wachira (2013) recommend a need for more funding to spur the e-Learning sector in Kenya. The sector policy envisages that the development of relevant 'content' to encourage web presence. Webometric (2015) define 'web presence' as a measure of the total number of web pages hosted in the main web domain as indexed by the largest search engine - Google *(ibid)*. To contextualize this, top visited sites in Kenya are presented:

Table 2-2: Top web contents visited in Kenya

Top 10 Visited Sites	Top 10 Local Sites	Top 10 Public Sector Sites	Rank of Public Sector sites Among all Visited
Google.com	Standardmedia.co.ke	Knec-portal.ac.ke	50
Facebook.com	Nation.co.ke	Kra.go.ke	52
Youtube.com	The-star.co.ke	Ecitizen.go.ke	73
Standardmedia.co.ke	Citizentv.co.ke	Uonbi.ac.ke	85
Nation.co.ke	Google.co.ke	Ku.ac.ke	119
Yahoo.com	Sde.co.ke	Kpa.co.ke	150
Sportpesa.com	Ghafla.co.ke	Kenyalaw.org	155
The-star.co.ke	Jumia.co.ke	Tsc.go.ke	157
Twitter.com	Mpasho.co.ke	Knec.ac.ke	181
Citizentv.co.ke	Blogspot.co.ke	Jkuat.ac.ke	210

Source: (Alexa, 2016)

It is evident from the above that public sector web contents do not appear among the top 10 visited websites in Kenya. However, among the top public sectors of interest, educational institutions are the majority.

- ❖ Further, there is also a disproportionate distribution of ICTs across Kenya. This is hampering the policy objectives of *'Universal Service'* and *'Universal Access'*, due to high costs of operation, lack of support infrastructure and high licences for services (Apoyo Consultoria, 2011; Tarus *et al.,* 2015). In 2013, an Act of Parliament was amended to articulate the mandate of Universal Service Advisory Council to provide strategy policy guidance for the administration of Universal Service Fund to ensure access to informational services in un-served and underserved areas to address the inequities. Though the government acknowledges that this would spur uniform growth and accelerate the development of e-Governance services (Government of Kenya: MoICT, 2013), the impacts are yet to be evident.
- ❖ In terms of *'Public-Private Partnerships'* (PPP), the public sector has been dominating public policy making space most probably due to the reluctance of previous regimes to consider inputs from the private sector. Things have definitely been

getting more positive; notable is the joint PPP investment model in the ownership of the East African Marine System (TEAMS).

- For the case of *'e-Government'*, the strategy paper has been in place since 2004. The main policy thrust is improving service delivery. This has been presented into details in section 2.4.1.
- In the *'e-Commerce'* sub-sector, first steps have been achieved through an amendment of the Kenya Communications Act of 2008 to anchor the sub-sector in law. The uptake is envisaged to slowly shift upwards. Ngereza and Iravo (2013) note that the challenge is cost, lack of accessible and reliable infrastructure.
- Other areas of prominence include the need for an '*ICT champion'* in the public sector, *engendering ICTs* and involving the *Youth* in related policy issues. Though the policy recognizes that youth have the largest representation in the population, the challenge remains the engagement model. Indeed, Cava *et al.,* (2011) point out that engaging the youth in transformative aspects is the only way to make their eventual use of the technology productive.

Currently (2016), the national ICT policy is under review to bring the guidelines in tandem with the new Constitution (2010), technological dynamics and Vision 2030 objective of transforming Kenya into a Knowledge Economy (KE). Table 2-3 presents key indicators reflecting the relative level of Kenya's maturity in terms of ICT policy in comparison with Finland, which is ranked the best in the capacity to exploit ICT opportunities:

Table 2-3: Relative Level of Maturity of Kenya's ICT Policy

			SCORES					
			Finland	Kenya	Finland	Kenya	Finland	Kenya
Index	Sub-Index	Pillars	2012 - 2013	2012 - 2013	2012 - 2013	2012 - 2013	2012 - 2013	2012 - 2013
Network Readiness	Environment	Regulatory	5.80 - 5.84	3.38 - 3.49	5.56 -5.59	3.55 - 3.63	5.81-.98	3.51 -.54
		Business	5.32 - 5.34	3.73 - 3.76				
	Readiness	Infrastructure	6.82 - 6.87	2.90 - 2.84	6.50 -6.51	3.68 - 3.68		
		Affordability	6.17 - 6.22	3.43 - 3.81				
		Skills	6.51 - 6.45	4.70 - 4.39				
	Usage	Individual Usage	6.15 - 6.40	2.19 - 2.08	5.66 -5.97	3.23 - 3.38		
		Business Usage	5.96 - 5.97	3.65 - 3.62				
		Government Usage	4.88 - 5.55	3.87 - 4.43				
	Impact	Economic Impact	5.84 - 5.99	3.41 - 3.46	5.5 -5.86	3.59 - 3.47		
		Social Impact	5.17 - 5.74	3.77 - 3.47				

Sources: (World Economic Forum, 2013)

2.4.3 The Millennium Development Goals

A set of eight international objectives were arrived at in a summit of the United Nations in 2000. The then UN Secretary-General, Kofi Annan, in a report on the Millennium Development Goals (MDGs), stressed that the new technology-based solutions that did not exist prior to the endorsement of the goals be leveraged upon (UNCTAD, 2010). Thus, Target 18 of the MDGs suggested availing the benefits of ICT-related solutions through private participation (Watkins & Tacchi, 2008).

On the global level, in 2012, 15 out of 20 countries[1] which made impressive progress on the MDGs were from sub-Saharan Africa (United Nations, 2013). Though Kenya started implementation of MDGs in September 2002, the Economic Recovery Strategy policy (ERS) (2002-2007) addressed some goals. Overall, the sub-Saharan governments, including Kenya's case, still recognize that e-Governance can drive the MDGs (Dzidonu, 2010; Mue, 2013; Oye, 2013; Mwai, 2015). In fact Kenya's new decentralized governance dispensation is seen as the current driving force for the MDGs (Mailu, 2013).

Post-2015, Sustainable Development Goals (SDGs), an ambitious set of 17 goals, replaced MDGs. Though SDGs appear more encompassing as a successor to MDGs, the programme acknowledges the successes of MDGs (Solberg, 2016). While none of the 17 goals is specific on ICTs, the goals refer to ICTs as having an essential characteristic to advance the global interconnectedness to accelerate human progress. SDGs position ICTs at the centre of the vision (Erumi, 2016). In specific, e-Government is considered as capable of reaching its full potential, if measurable targets are set to ensure its universal access. This is to ensure accountability as more citizenry is engaged in decision making (Hillenius, 2016). In addition, the public sector is urged to become more public centric using e-Government (United Nations, 2016).

2.4.4 Ministry of ICT Strategic Plan 2013 - 2017

The mandate of Ministry of ICT is derived from the Executive Order Number 2 of 2013. This includes the development of e-Governance policies. The overarching mission is to position Kenya as a 'globally competitive knowledge-based economy' (Government of Kenya: MoICT, 2014).

The Ministry's strategic plan recognizes the potential of such digital infrastructure in enhancing good governance and public service delivery. It exhibits governance through the commitment to create an enabling environment for public information access as provided for in the Constitution

[1] Benin, Mali, Ethiopia, Gambia, Malawi, Rwanda, Uganda, Ghana, Kenya, Burkina Faso, Togo, Gambia, Burundi, Niger, Guinea

of Kenya Chapter 35 (1) (CoK, 2010). On the flipside, the Ministry still faces drawbacks. This includes the challenge of harnessing the benefits of e-Governance, the establishment of a public sector framework to enhance citizenry participation and provision of an integrated cost effective infrastructure backbone. However, Government of Kenya: MoICT, (2014) argues that budgetary constraints have delayed the extension of information resources, hindering service delivery.

2.4.5 Kenyan Vision 2030

This is the long-range blueprint spanning a period from 2008 to 2030. The intention is to ensure a high standard of living for every Kenyans through to the year 2030 (Government of Kenya: Vision 2030, 2014). The strategy for this goal is anchored on Economic, Social and Political pillars. In the social pillar, Kenya seeks to achieve social equity. Thapliyal (2013) contends that e-Government can promote social equity. It can universalize access to government (Majdalawi *et al.,* 2015)

Through Vision 2030, Kenya commits to eliminating discretionary public service decision-making and encouraging an open democratic society. However, it does not state the means to these ends. Though ICT is mentioned as a basis informing the economic plans in the Vision's Medium Term Plan (MTP); there are a number of challenges. This includes the financial, technological, political and organizational challenges (Government of Kenya: Vision 2030, 2014).

2.4.6 ICT Master Plan 2013-2017

The Master Plan was developed to operationalize the Sessional Paper Number 10 of 2012. Though the main vision is not clearly brought out, the plan appears to be 'working towards a society built on knowledge' with an objective to have 'every individual connected'. It intends to ensure an all-inclusive access to public services. In the launch of the master plan, the Cabinet Secretary for ICT observed that information access is crucial and e-Government has a potential to empower citizens and enhance service delivery' (Government of Kenya: MoICT, 2014). In this regard, to show government's commitment, a 'citizen service portal' is a proposed critical flagship project for customer centricity in the public sector.

2.4.7 Open Government Partnership Action Plan 2016 - 2018 for Kenya

In 2011 Open Government Partnership (OGP), an international public effort was launched. This committed states and governments to address the concerns of governments' openness, accountability and responsiveness to citizens. It presents an interactive platform for actors in the public and private spaces. Indeed, Kenya is among the countries[2] that joined OGP.

In this, Kenya's endeavor is to enhance transparency, fiscal prudence and public participation in governance. However, the challenges still faced are effective collaboration amongst the actors. In addition, resourcing and sustainability challenges abound. Despite all these, Kenya OGP still intends to enhance openness, improve service delivery, and promote public integrity and transparency in governance at the national and county levels (Government of Kenya: MoICT, 2014). Kenya proposes to conduct institutional reforms, including establishing web based channels for citizen's engagement and interaction against some timelines.

2.5 Sector Expenditure in Kenya

Kenya has been attempting to emerge as a champion of the transformative ICT use in East Africa. The sector is becoming the main driver of regional economics, expanding annually by an average of 20 per cent (World Bank, 2013).

In 2011, Government of Kenya: MoICT (2014) reports that the sector expenditure was about USD 860 000 000. The public sector spent 0.3 percentiles on e-Government as a proportion of the overall spend. This is 20 times less than the public sector industry average of 6.5 percentile, against a global benchmark of 18 percentile *(ibid)*. In the 2015 financial year, the Government of Kenya allocated approximately USD 114 000 000 to the Ministry of ICT for ICT infrastructural projects including e-Government and other informational services (Government of Kenya: National Treasury, 2015). The argument advanced is to contain administrative costs as well as minimize revenue leakages *(ibid)*.

Further, in an exploratory empirical research, Peake (2013) found that overall spending on the entire ICT sector – private and public segments – in Kenya during 2010 was USD 3.5 billion *(*approximately*),* with telecommunication services accounting for USD 2.7 billion *(*approximately*)*. ICT, which in this case considered the hardware, software and IT services totaled to USD 746 million *(*approximately*)*. In fact, International Data Corporation estimates that ICT sector

[2] Albania, Argentina, Armenia, Australia, Azerbaijan, Bosnia and Herzegovina, Brazil, Bulgaria, Capo Verde, Canada, Chile, Colombia, Costa Rica, Côte d'Ivoire, Croatia, Czech Republic, Denmark, Dominican Republic, El Salvador, Estonia, Finland, France, Georgia, Ghana, Greece, Guatemala, Honduras, Hungary, Indonesia, Ireland, Israel, Italy, Jordan, Kenya, Latvia, Liberia, Lithuania, Malawi, Malta, Mexico, Moldova, Mongolia, Montenegro, Netherlands, New Zealand, Norway, Panama, Papua New Guinea, Paraguay, Peru, Philippines, Romania, Serbia, Sierra Leone, Slovak Republic, South Africa, South Korea, Spain, Sri Lanka, Sweden, Tanzania, The Former Yugoslav Republic of Macedonia, Trinidad and Tobago, Tunisia, Turkey, Ukraine, United Kingdom, United States and Uruguay.

experienced an annual compounded progression rate of 15.5 per cent to reach USD 1.5 billion *(*approximately*)* in 2015 *(ibid),* and between 2001/02 and 2009/10, USD 3.2 billion *(*approximately*)* was invested in mobile services, USD 3 billion *(*approximately*)* in fixed telephone services and investment in three-fibre optic cables estimated at USD 700 million *(*approximately*)*. Some USD 60 million *(*approximately*)* was invested in data services between 2006 and 2010.

In addition, Peake (2013) found out that the top five vertical sectors contributing to ICT expenditure in 2010 were communications (20.5 per cent), consumer (14.9 per cent), government (14.7 per cent), finance (12.9 per cent) and manufacturing (7.2 per cent). The communications and finance sectors are strong in Kenya. This may be explained in part due to Kenya's strategic position as a major transportation, communication and financial hub in Eastern and the Horn of Africa (Central Intelligence Agency, 2014).

However, even with the mobilization of the significant financial and technical resources, Kenya's public sector seems not to realize the productivity gains of ICTs (Achoch *et al.,* 2014; Owuoth & Mwangangi, 2015). Therefore, given the increasing importance pegged on ICTs in public sector, it is imperative to provide an evidence based understanding on whether and how these spending generate value for the public.

2.6 Conceptualized Research Problem

The *points of view* above present the situation of Kenya and its public sector and to a limited extent those of other developing nations in sub-Saharan Africa. The challenges are multi-facetted - technological, social, financial, economic or political. There seem to be a complex causation, that is, many factors coming together at the individual, societal, technological and political level as well as the interaction of technology and its use by humans to produce the context. This background informed the research questions for the study that sought to establish whether the massive investments in e-Government are for rational and measurable strategic public value (s). Figure 2-2 presents the conceptualized research focus:

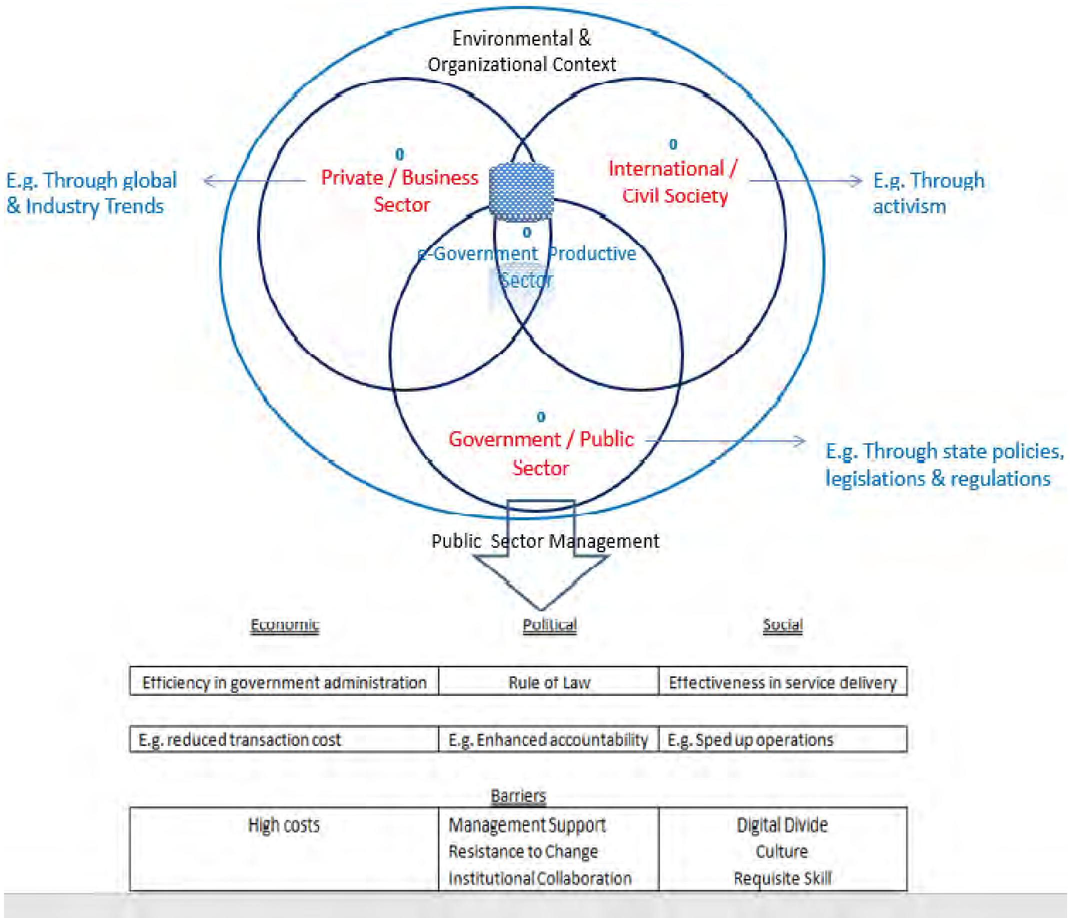


Figure 2-2: Conceptualized Problem and the Empirical Setting

In general, it evident that there is a need for tested concepts or arguments to base the decisions regarding investment in e-Government in a context of a developing economy, if the intention is to achieve desired results considering the complex interactions of factors. From the existing literature the author found that no rigorous research study or a PhD-level research has been conducted in Kenya aimed at exploring the public values created through the huge investments that have been made in e-Government (Ie) since the adoption of the e-Government Strategy of 2004.

Therefore, considering the multi-faceted nature of e-Government as a phenomenon, this research intended to present a deductive multi-theoretic examination of public values (PV), resulting operational efficiencies (OE), and performance impacts (PI), as a result of investment in e-Governance (Ie). The multi-theoretical research draws upon selected public management theories, public economics theories and political science theories, with the empirical setting chosen as Kenya in the background of the intentions of new constitutional order of governance.

2.7 Rationale of the Research

Following the contextualization and conceptualization of the study objects, the rationale can now be summarized.

In 2010, Kenya introduced a new constitutional order of governance of devolved public sector comprising a national government under the President and 47 county governments under Governors. The preponderant justifications for the new dispensation are improved efficiencies, optimized information flows and reduced costs of running government (Nyanjom, 2011; PriceWaterhouseCoopers, 2013). However, the resulting public sector expenditure is still a threat to national development (Koki *et al.,* 2011; Adam, 2015), despite e-Government, which Kenya launched in 2004, being a performance and efficiency tool in public sector management (Masrom *et al.,* 2013). Kyobe (2011) argues that understanding and measuring how such contexts and characteristics interplay may influence how a social phenomenon is perceived. This is an important step in designing effective policies *(ibid).* Therefore, the study was motivated to understand this complex interplay of various factors. From a broader practical perspective, the research envisaged to provide a knowledge base for policymakers to make informed decisions through a more accurate understanding of the propositions of public values of e-Government. The study measured the causal relationships between different interactive and intervening variables contingent upon investment in e-Government (Ie) in an attempt to inform public administrative system towards competitive and efficient models for a context of a developing country as Kenya.

2.8 Conclusion

This chapter has presented relevant contextual spaces in the research, extended the description of the situation of the public sector, positioned possible e-Government role in Kenya's public sector. It has also provided an overview of the role of various actors in ICT policy making in Kenya. Further, a critical review of the policy documents, instruments and evidence that the ICT policy-decisions have been shifting from individuals to a situation where an assembly of actors introduce propositions – of course, a number through straits of politics – are presented. The chapter closes with a conceptualized research problem, which is linked to the practical and contextual rationale of the research.

3. CHAPTER THREE: REVIEW OF LITERATURE

We are like dwarfs sitting on the shoulders of giants. We see more,

not because our sight is superior, but because they raise us up,

and by their great stature add to ours

– Bernard of Chartres

This chapter provides the foreground issues of the research. The chapter illustrates the theoretical developments of public values resulting from the investment in e-Government, contextualizing these for a developing country which is the general focus of the thesis and present relevant exemplars to illustrate the study's main arguments in a concept centric manner.

3.1 Value in Public Sector

Referring to the public sector, Moore (1995) defines 'value' as an equivalent of private sector' value of shareholders. The public sector does not respond to the interests of a single citizen, but an entire public within the confines of restrictive government policies and legislations *(ibid)*. Further, Moore (1995) provokes the orthodox thinking of the role of government as *(1)* a rule-setter, and a service-provider. He argues that the public sector creates the public value within the confines of socio-political, economic and cultural paradigms; *(2)* an inward-looking bureaucracy with a *'restless value-seeking imagination'*; *(3)* application of the techniques needed for consistency in public sector to address the changing material and socio-political conditions. Since these thoughts work in partnership with other actors to ensure that good choices are made in the public interest (Hassan, 2015), Blaug *et al.,* (2011) refer to this as the political calculus of public value.

The efforts listed above ensure that public policies address the defined needs and result in value-laden outcomes (Kelly *et al.,* 2002; Thacher & Rein, 2004; Hassan, 2015). In this respect, the public sector echoes the sentiments of citizens who need efficient service delivery (O'Flynn & Alford, 2012), that should be provided en masse (Hajkowicz *et al.,* 2012).

3.1.1 Evolution of Value Theory

In his seminal work on public value management (PVM), Moore (1995) contends that public value creation is the core engagement of the public sector. To secure public value, Hefetz and Warner

(2004) argue that managers should not only steer the market process, but balance the technical and political interests (Stoker, 2006). This school of thought emerged in response to the much critiqued New Public Management (NPM) of the 1980s (Connelly, 2013). In fact, NPM also emerged to address the perceived limitations of Old Public Administration (OPA).

The OPA model largely relied on a Weberian perception of the world (Stoker, 2006). It postulated that the party political leadership and the bureaucracy (Held, 1987) are the central institutions to deal with public governance. It is characterized by a bureaucratic and paternalistic model of top-down service provision in the form of command and control (Stoker, 2006), where bureaucrats interests dominate *(ibid)*. It is more concerned with the strict rules that lose sight of the overall goal or mission of a public sector (Petrescu *et al.,* 2010). Though the post-bureaucratic New Public Management (NPM) models attempted to address the inefficiencies of OPA, it was critiqued for taking a market-orientated approach (Bonina & Cordella, 2009).

The NPM models pursue economic targets at the expense of democratic processes and broader notions of public value (Bonina & Cordella, 2009), increasing complexities in bureaucracies and accountability (Blaug *et al.,* 2011; O'Flynn & Alford, 2012). Needham (2003) and Dunleavy *et al.,* (2006) argue that NPM encourage the depolitisation and consumerisation by viewing individuals as customers rather than citizens. The NPM approach does not cure the challenges in public service (Engida & Bardill, 2013). The hoped potential of NPM failed due to the narrower approach (Lauri & Poder, 2013; Musset, 2012), hence the need to shape new contextual relationships (Engida & Bardill, 2013), which informed the emergence of a newer model.

Indeed, Public Value Management (PVM) model informs the public managers' efforts in achieving the performance targets, managing an assembly of public value producers as well as responding to the collective public value preferences (O'Flynn & Alford, 2012; Savio & Nikolopoulos, 2010). PVM expresses a focus on what is considered objective values in the public sector (Connelly, 2013), accounting for the nature of societal networks (Bevir, 2011). These empower citizens and communities informing the success of a whole system *(ibid)*. The model enhances collaboration instead of competition (Engida & Bardill, 2013). However, it depends on the nature of the mediations (Bevir, 2011).

In line with the new constitutional order in Kenya (CoK, 2010), PVM focuses on public value creation through a collective public deliberation (Stoker, 2006). This reduces hierarchical top-down decision-making that is a characteristic of previous models (O'Flynn & Alford, 2012; Hills & Sullivan, 2006; Stoker, 2006). Considering that the public sector needs to steward the country's interests into posterity (Ssewakiryanga, 2007) as well as highly centralized government processes which limit performance in most sub-Saharan African countries (Vyas-Doorgapersad, 2011), any effort to make public apparatus citizen-centric, efficient, and decentralized are welcome (Omoyefa, 2008; Sow & Razafimahefa, 2015). This would encourage a much more proactive creation of public value (Knoll, 2012; Sow & Razafimahefa, 2015).

Table 3-1 summarizes the characteristics of the public management models:

Table 3-1: Features of the Public Sector Management Models

Features	**Old Public Administration**	**New Public Management**	**Public Value Management**
Character	Bureaucratic	Post-bureaucratic, Competitive	Post competitive
Goal	Responds to Political Direction	Achieves agreed Performance Targets	Responds to Citizens' Preference, Renew Mandate and Trust
Public Interest	Politicians and Bureaucrats	Consumer Choices	Public Deliberation
Performance Objectives	Politically provided, services monitored through bureaucratic oversight	Ensures Economy and responsiveness to Consumer;	Service Output, Satisfaction, Outcomes, Trust and Legitimacy
Accountability Model	Upwards : Department To Politicians Through Parliament	Upwards via Performance Contracts, outwards to Customer via Market Mechanism	Multiple: Citizens are customers, funders and overseers.
Public Participation	Restricted to Electing Representatives	Limited but supplemented with Customer Satisfaction Surveys	Crucial - multifaceted, Customer, Citizens and Key Stakeholders Participate
Preferred Delivery System	Hierarchical	For profit sector and / or strict supervision of an agency of the public sector.	Public sector, private companies and Joint Ventures

3.1.2 Theoretical Perspectives of the Value of E-Government

The value concept in the public sphere is a normative theory used to measure the public sector performance (Moore, 1995; O'Flynn & Alford, 2012). Bozeman and Sarewitz (2011) point out that these measure the context-specific citizens' preferences. In line with PVM philosophy, the underscored principle is that the values preferred by the citizens need to guide the production in the public sector (Moore, 1995; Karunasena & Deng, 2012), given the uttermost intention of implementing e-Government is to generate public value (Meynhardta & Metelmanna, 2009).

In their research, Jørgensen and Bozeman (2007) developed a portfolio of 72 classes of public value on the basis of over 200 studies in North America and Europe. In related research, Kernaghan (2003) examined 32 classes of public value in a Westminster-Whitehall model style of governance. Considering the fact that most African countries' public sectors are modelled on the Westminster-Whitehall tradition (Hyden, 1999), the findings of these two research studies are important. The values, found in the two sets of research, include *quality, openness, efficiency, user orientation, democracy*, *responsiveness, equity, environmental sustainability and citizens' self-development.*

With reference to the public values, *openness* is the transparency in public administration (Jørgensen & Bozeman, 2007). Though *efficiency* refers to the productivity of the operations by gauging the outcomes against the cost of inputs, Berce *et al.,* (2006) emphasize that this should be *'more for the same or the same for less'.* In fact, e-Government presents a capacity to collaborate in data sharing, which in essence aids in strategically cutting costs as well as empowering less-funded agencies (Nkwe, 2012). The *user-orientation* entails the public service provision in a user-preferred manner (Jørgensen & Bozeman, 2007). The public sector online services should be user-friendly, comprehensive and non-technology-savvy (Walther *et al.,* 2016). In addition, trust in government information portals is critical. The public expect the information to be credible and adhere to privacy rules anchored on existing legal structures (Kearns, 2004). The *participatory democracy* indicates willingness in the public sector to listen to the public opinion during policy formulation (Jørgensen & Bozeman, 2007). This includes citizen participation on online policy discussions (Xu, 2012). In terms of equity, there is need to protect the marginalized and those living with special needs (Khetarpal, 2014). The perception of the public on public sector ICTs should be in compliance with the standards needed to achieve equity *(ibid).* For the case of *environmental sustainability*, a clean place with a controlled depletion of non-renewable resources and a concern for future generations is a focus. E-government can save energy through the reduction in the use of paper resources and recycling of consumables (Masud & Malik, 2012). Aleksic (2014) argues that future trends in the ICT sector present an urgent need for a significant improvement in energy efficiency.

All in all, Jørgensen and Bozeman (2007) and Samaratungea and Wijewardenaa (2009) acknowledge that the meanings and understanding of the classes of public value differ from setting to setting. The value systems are capable of malfunctioning unless adjusted to respond to a context in focus (Moore, 1995).

In summary, a number of e-Government programmes have been witnessed in the past decade around the globe (Nasim & Sushil, 2010; Hassan *et al.,* 2011; Zhao *et al.,* 2012). Though in different contexts, there is still an appreciation that e-Government can create public values (Karunasena & Deng, 2012). Since public management aims at value generation for the citizens, the application of e-Government augments the value (Casalino & Bednar, 2015). Through e-Government, people can define preferences and governments can enhance capacities (UNCTAD, 2010), to deliver the values (Zhao et al., 2012).

3.2 E-Government and E-Governance

Though first used in the US (Heeks & Bailur, 2007), *'e-Government'* encompasses the use of ICTs to transform both the back-end and the front-end government processes. This is to enhance efficiency and democracy (Meynhardta & Metelmanna, 2009), by availing public information (Fang, 2002; Jaeger, 2003; Metaxiotis & Psarras, 2004). This phenomenon has transited the global society towards an electronic model of the world. Bashar *et al.* (2011) argue that the traditional public sector is slow, bureaucratic and characterized by an enormous amount of paperwork, which is often confusing; hence the offer of web-based services to engage the citizens in a platform for interaction. The main thrust is to improve the service quality and to reduce the cost of administrative bureaucracy. Bashar *et al.* (2011) observe that bribery, for example, is common in an ordinary bureaucratic government. This is because opportunists seek loopholes in the law *(ibid).*

However, e-government also presents some limitations. It can be very expensive and hence, might not be cost-effective (Kečo, 2014). Further, there has been concerns that people who live outside cities or who are illiterate do not draw the benefits. In most cases, these sectors of the society are least aware of the advantages of e-Governance *(ibid).* Figure 3-1 presents a diagrammatic exemplar of a platform of e-Government:

Source: Heeks & Bailur (2007)

Figure 3-1: e-Government Platform

Although Meng *et al.* (2011) contend that consensus has not been achieved on the meaning of e-Government as yet, it can mean the use of a mobile online service to access government information, otherwise known as IT-government (Carter & Belanger, 2004) or using online systems to govern (Alghamdi *et al.,* 2011), at the end e-Government offers a platform of interaction for citizens with their representatives (Gulati *et al.,* 2011). This structure of government is citizen-centric and cost-optimal (Safeena & Kammani, 2013; Mohammed & Ibrahim, 2015).

Therefore it can be seen that conceptions of e-Government have evolved from technical artifacts to social system perspectives (Gulati *et al.,* 2011). While from a technical perspective, it has been the utility of the power of internet to deliver government information (United Nations, 2012; Gudavalli *et al.,* 2014), from a relational perspective, it transforms relations (Adejuwon, 2012; Morgeson III *et al.,* 2011). Hence, e-Government still creates public values for citizens (Limba & Gulevičiū tė , 2014; Bai, 2013). This is through the improvement of public administrative processes (e-administration), connection of citizens through electronics (e-citizens) and conducting external interactions with the civil society (e-society) (Siau & Long, 2005).

3.2.1 E-Government Platforms

Although there are various classifications of e-Government platforms, Chen (2010) classifies the platforms on the basis of interaction levels (Chen, 2010). This classification better presents the focus of the research. This includes *'informational',* where only information is presented on the website. In this, content, quality and usability are critical. There exists no other interaction between the bureaucrats and the citizens. Second is the *'interactive'* platform. Though seen as a one-way service, the information is more structured as documents may be available for download on websites. Thirdly, *'collaborative'*. These are a two-way support platform where citizens or the private sector may submit or receive public documents. Fourthly, there is '*transactional*' where transactional services support online remittances that a citizen can make with the government.

Indeed, the recently introduced e-Citizen (https://www.e-Citizen.go.ke/), a Government to Citizen (G2C) portal in Kenya attempts to present public services, in a transactional manner, on an electronic platform. These services include business name registration, registration of marriages, driving licenses, land searches, passport or visa applications. The portal presents citizens with options to sign up, apply for government services and conveniently pay using mobile money, credit cards, debit cards or online banking. Further, the platform enables users to receive emails and SMS notification on the status of the transaction. However, the major challenges still remain network connectivity and power failures. This presents a challenge in making the access to the transactional services a universal phenomenon (Ondego & Moturi, 2016).

To note is that the development of e-Government follows defined phases (Layne & Lee, 2001). Though various authors (Basu, 2004; Cloete, 2012; Layne & Lee, 2001) describe the stages in varied ways, all models tend to agree that the sets of phases involve a transitory process from the basis of papers to the integration of digital technologies in public services (Cloete, 2012).

On the flipside, governance is a process, through which decisions are taken, implemented, monitored and evaluated (Misuraca *et al.,* 2011). These decisions are conditioned by underlying societal values and organizational models (Misuraca, 2010). This broad framework captures a co-evolution of various stakeholders, forming a multi-dimensional construct that addresses the role of government in relation to public value creation (Meng *et al.,* 2011). In this research, as argued by Whittal (2011), it encompasses the institutional and procedural aspects of e-Government whose aim is to transform government processes and service offerings to achieve a broad set of societal values and goals.

Therefore e-Government transforms the relationship between governments and its key stakeholders (World Bank, 2011), leveraging ICTs to enhance services to citizens (G2C), businesses (G2B), non-governmental organization (NGOs) (G2N) and other government agencies (G2G) (Sangita & Dash, 2005) for a convenient, transparent and inexpensive interaction *(ibid),* otherwise known as e-Governance.

3.2.2 Value Investment in ICT

In developed and developing nations, substantial finances have been put in ICTs and related investments (Mutula, 2013; Shirazi, 2010; Meyer *et al.,* 2015). This has been a key area of research focus in information systems (IS), examining whether such investments have led to greater value or achieved competitive advantages (Brynjolfsson *et al.,* 2011; Meyer *et al.,* 2015). In this light, some empirical evidence has shown that investment in ICTs have led to positive impact on performance. This evidence has been presented in terms of profits, rate of production or resulting market value (Bharadwaj *et al.,* 1999; Anderson *et al.,* 2003; Lim *et al.,* 2011). In other research studies, a higher investment in such has been associated with smaller sizes of manufacturing sector but larger sizes of service sector (Wood *et al.,* 2008). On the contrary, in a multi-business entity with a shared IT infrastructure, a direct increase in firm performance and indirect improvement in cross business-unit knowledge management competence has been evident (Tanriverdi, 2006).

Though there are divergent definitions to such investments, where such investments are defined in terms of equipment, applications, services and the technologies (Keen, 1995; Schniederjans *et al.,* 2004), in this IS domain research that attempted to address a variety of subjects related to human aspects, and the phenomenon of e-Government in an organizational context (Hirschheim & Klein, 2012), the investment encompassed the components of personnel, software and hardware (Schniederjans *et al.,* 2004; Hendarti *et al.,* 2011).

On the flipside, despite the significant increase in ICT investment, some empirical researches reveal conflicting results on the relationship between performance and the investment (Liao, 1996; Al-Dhaafri & Al-Swidi, 2014). Some studies present a productivity paradox (Pilat, 2004). Some investments have been justified by increased cost benefits, while others are largely for sociological reasons (Gimlin *et al.,* 2000; Stoel & Muhanna, 2008). Though scholars have argued that the public sector increases the returns through cost efficiencies (Osborne & Gaebler, 1995; Savoldelli *et al.,* 2013), Gulati *et al.,* (2011) argue that the returns of e-Government can be broken into the tangible benefits such as cost saving and intangible benefits such as making interactions less bureaucratic. To note also is that such investments may sometimes translate into efficiency gains only after a time lag (Gatautis *et al.,* 2015).

In addition, though some researches have argued that ICT investment is driven by efficiency demonstrated by methods of economics such as return on investment (RoI) or on equity (RoE) and productivity indices (PI) (Liao, 1996), this perception has led to a mind-set that adopting ICT leads to increased value (Liao, 1996; Brynjolfsson & Saunders, 2010). This is more common in a public sector that is the main focus of the study. However, measuring returns on such investment need a comprehensive conceptualization of the rational processes as well the context (Carratta *et al.,* 2006). Gatautis *et al.* (2015) conjecture is that no single or basic set of methodologies presents an ideal solution to public sector managers facing such investment decisions. In addition, though common similarities exist among a range of models, some evaluate such investments as a collection of projects as opposed to the for-profit sector approach measuring financial returns of a single entity (Savoldelli et al., 2013). In fact, in the 1990s some researchers found what they called a 'productivity paradox'. This showed that such ICT investments present a nil or inverse return (Dehning & Richardson, 2002). Brynjolfsson and Yang (1996) had earlier tried to unpack the paradoxical situation. This attempt took cognizance of the possible limitations in the measurement of outcomes against inputs, learning adjustment lags, and the general governance of ICTs *(ibid)*. The first two approaches are informed by shortcomings in methodological stance to measure returns on investment, while the last approach can be explained by management shortcomings.

3.2.3 Value Returns on e-Government

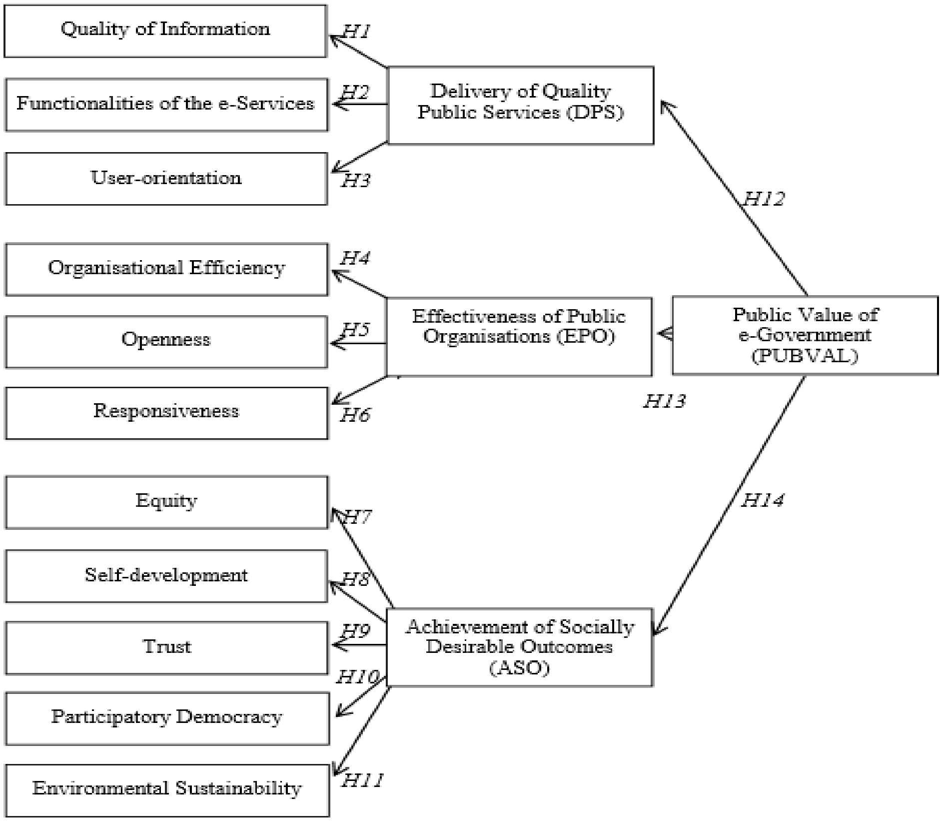
Governments have invested heavily on e-Government to re-kindle their economics (Rojko *et al.,* 2011; Meyer *et al.,* 2015; Ondego & Moturi, 2016). Some countries have witnessed e-Government budgets increasing more than proportionately in the face of financial crises (Ojiako, 2012). The anticipated benefits include improved public service, enhanced cost efficiencies and transparency (Gonzalez *et al.,* 2007; Nfuka & Rusu, 2011; Rose *et al.,* 2015). Alford and Hughes (2008) argue that there is a need to create and maximize public value within the available resources. This could mean taking cognizance of resource constraints, and making administrative processes more efficient. For instance, DeMarie (2004) argues that the use of collaborative technologies such as groupware improves team performance. This is through improved productivity, cost reduction, and enhanced output quality *(ibid)*. On the contrary, the comprehension of these values remains a contention in research (Alshehri *et al.,* 2012; Alghamdi *et al.,* 2011). Further, for sustainability, Carratta *et al.,* (2006) argue that value in the public space must be objectively evaluated. This has posed challenges at both a theoretical and a practical level *(ibid)*. The challenges include the intangible nature of some benefits, the period over which a benefit is accrued and the multifaceted characteristics of e-Government (Savoldelli *et al.,* 2013).

There have been reflections on the suitability of return on investment (RoI) as a model in measuring e-Government value in isolation from other investments, rather than just an objective oriented action (Jetzek *et al.,* 2014). In addition, there have been calls to integrate contextual realities as GDP, organizational learning or time lags, the management philosophy or IT-governance, overall quality of governance, levels of illiteracy alongside the financial indicators as inflation (Gatautis *et al.,* 2015). Table 3-2 present the common models that have been used as evident in the extant literature:

Table 3-2: e-Government Value Approaches

Research Output	Strengths of The Framework	Limitations of Framework
Carrara (2007)	Takes care of socio-economic, operational and customer values	Focuses on private sector value
Omar, Scheepers, & Stockdale (2011)	Takes care of e-Government service quality	Focus at the conceptual level; validity and reliability are a challenge.
Liu, Zsofia, Marta, & Alexander (2008)	Takes care of multiple public value evaluation dimensions – social, economic, strategic and operational; Focuses on G2B perspective	G2C and G2CS are not considered
European Union (2006)	Takes care of efficiency, democracy and effectiveness;	Focus on developed economies;
Golubeva (2007)	Takes care of public service quality, trust and outcomes in evaluation;	Focus is on e-Portals;
Kearns (2004)	Takes care of quality and trust in public service delivery;	Environmental sustainability is not considered;
Karunasena *et al.* (2011)	Expanded indicators in Kearns' (2004) model.	Limited validity due to the sole use of secondary data;

As is evident in Table 3-2 and also in support of Karunasena and Deng (2012), the existing e-Government value frameworks have skewed focus on developed countries with an inadequate consideration of the contexts and perspectives of developing countries. Thus, they propose a revised framework based on the latter context. Due to the extant similarities between Sri-Lanka and Kenya in terms of e-Government maturity and context (Biyagamage, 2014), the framework presented in Figure 3-3, which is consistent with the public values of e-Government as presented in section 3.1.2 was used as an initial point of information to structure the research study:



Adopted from Karunasena (2012)

Figure 3-2: e-Government Value Framework

Drawn from Karunasena (2012), Sri Lanka commenced e-Government programmes in 2005, a year later than Kenya, under the banner of e-Sri Lanka, which was a nationwide initiative. As a developing country, it has experienced a number of challenges that can be categorized under a broad political, organizational and technical theme (Weerakkody *et al.,* 2009; Biyagamage, 2014). These include ignorance, shortage of ICT infrastructure and relevant skills as well as the inability to offer public services on e-Government in dialects local to the Sri Lankan context (Karunasena *et al.,* 2011; Biyagamage, 2014). In comparison to the developed economies, these conditions pose a challenge in developing countries. Thus, skills shortage and human capital challenge the facilitative role of e-Government in developing countries (Amagoh, 2015). Still, ICT has been positioned as a key enabler in the developing Sri-Lankan context.

Table 3-3: Theoretical bases of Value Framework

	Critical Theme	References
Public Value Theory (PVT)	Ultimate goal of public sector is public value	Moore (1995); Witesman (2016)
Sources of Public Creation	Services Quality; Effective Public Sector; Socially Desirable Outcomes;	Moore (1995); Try & Radnor (2007)
Inventories of Public Value:	User Orientation; Quality; Self-development; Environmental Sustainability; Efficiency; Responsiveness; Equity; Participatory democracy; Trust; Openness;	Jørgensen & Bozeman (2007); (Kernaghan, 2003)
e-Government Dimensions	E-citizens: Connecting citizens, supporting accountability and democracy, improving services; E-services: Delivering quality public services; E-administration: Cutting cost, linking processes, Empowering staff, and improving transparency and accountability; E-society: Building the social and economic capacities and capital of local communities;	Ndou (2004); Jones et al., (2007)

Adopted from Karunasena (2012)

Thus, building on Chapter Two, just as in the case of Sri-Lanka, Kenya faces similar multi-faceted challenges. Although e-Government Strategy of 2004 has been in place for over a decade, there have been limited technical capacities and institutional structures in place, impeding the optimal exploitation of e-Government investments to derive the intended values (Ochieng & Gichoya, 2013; Malungu & Moturi, 2015; Bwire, 2015). To meet the policy goals, rational investment in e-Government infrastructure is needed to present envisaged values and contain the incidences of inefficiencies (Maake & Mzee, 2014).

Therefore, the framework presented in Figure 3-3 laid the foundation for designing and implementing the two components of the research: quantitative and qualitative. More specifically, this informed the design of the questionnaires that facilitated data collection and analysis.

3.2.4 Standards of Governance

Overall quality of governance influences the performance of ICTs in organizations (Gatautis *et al.,* 2015). Over the last three decades, there has been a wave of international efforts attempting to establish performance of countries in terms of quality of governance (Erkkilä & Piironen, 2014). The main thrust is that governance is a vital factor in national development (Fritz *et al.,* 2009).

Indeed, in developing nations, citizens are getting more concerned about the costs of poor public sector management. Over the years, the World Bank has been grappling to come up with the issue of the measure of governance (Fritz *et al,* 2009). Hence, new standards of governance have been coming up. Unlike other indicators of quality of governance (QoG), such as the Corruption Perception Index (CPI) of Transparency International's that centres on a specific sub-component of governance, the World Bank Governance Index (WGI) covers multiple QoG sub components.

Launched in 1996, the WGI is one of the first sources to offer governance-related dataset freely for scholarship work (Charron, 2010). It is a 'composite index', published every year, and contains six (6) sub-components of governance (Kaufmann et al., 2008). These are *(1) Control of Corruption* which labels 'corruption' as an *'abuse of public power for personal gain', (ibid) (2) Rule of Law* referring to an adherence to societal norms *(ibid)*, *(3) Government Effectiveness,* which indicates the standards of service delivery and policies formulated *(ibid), (4) Voice and Accountability,* which gauges the citizens exercise of the freedom of expression and the free media*(ibid), (5) Regulatory Quality,* which refers to the ability of the government to monitor policies in a way that permits development *(ibid),* and (*6) Political Stability and Absence of Violence* which measures any probability of politically instigated uncertainties *(ibid)*.

The WGI is a vital empirical QoG data in both academia and industry (Charron, 2010). In this research, given the readily accessible datasets, WGI was used as a measure of QoG. It triangulates from various primary data sets, and Charron (2010) argues that the data shows a remarkable internal reliability and consistency. The original data is internally sound and solidly robust *(ibid).*

3.3 Efficiency in Public Sector

The term *'efficiency'* is a common terminology in public economics. Matei and Savulescu (2009) argue that the term should be understood within the framework of obtaining a maximum effect for a fixed resource allocation. It is often expressed in terms of cost, and implies how to optimize on each dollar spent (Sharma & Kumar, 2014). Indeed, Gatautis *et al,* (2015) observe that governments have decentralized and transformed workforce structure and changed budgetary practices towards a cost-efficient model. In the thesis, efficiency constitutes the extent to which public sectors strive to achieve an output with optimal resources for the populace, hence per capita basis costing. Even private entities' focus is on profit maximization or technical efficiencies, which are a measure of the outputs or outcomes against the inputs (Hookana, 2011; MacKenzie, 2011).

However, there exists a major difference between the profit-driven and not-for-profit-driven sectors. Specifically, in the public sector, there is no competition for profit but the 4Es – *Equity, Efficiency, Economy and Effectiveness* (Picot *et al.,* 2015). In accordance with the dictums of public value model, these have to be pursued through governments' efforts in involving a range of stakeholders. This includes the legislature (G2G), private sector (G2B), citizens (G2C) and bureaucrats (G2E) within the economy. Therefore, when analyzing the efficiency, Clifton and Fuentes (2003) argue that the private enterprises have a limited objective in relative terms, which is mainly the maximization of profits, while the public sector strives to maximize the social welfare in addition to economic purposes. In this respect, Matei and Savulescu (2009) argue that components of the administrative costs are different, as this is contingent upon the analyzed contexts. The administrative burden being the expenditures generated in organizations, through meeting the informational obligations based on the legislative rules (European Union, 2005).

In the above considerations, Sharma and Kumar (2014) define public expenditure as the costs that public agencies incur to offer services to the public. In fact, Matei (2001), while looking at the impact of reducing the public sector administrative costs, presents an example based on a classical approach, using the Cobb-Douglas production function:

Equation 3-1: Output production Function

$Y = AK\alpha \ L\beta$, where Y is the output (or GDP in case of an economy); K is the fixed capital used; L is labour force; A - the coefficient of dimension, α – elasticity of production as contributed by the capital; β is the elasticity of production as contributed by labour. The average productivity can then be estimated based on the capital (R_K) or the labour force (R_L) as:

Equation 3-2: Capital based productivity Function

$R_K = AK\ (\alpha\ \text{-}1)\ L\beta$

Equation 3-3: Labour-based productivity Function

$R_L{=}AK\ \alpha\ \ L\ (\beta\ \text{-}1)$ where R_K and R_L are relative ratios on the basis of the contribution of capital and labour parameters to total factors productivity (TFP).

Given technological changes influence the administrative bureaucracies (for example labour) as well as management decisions (for example capital structure) (Kumar-Sadhu, 2014); these changes have the potential to alter the relationship among labour, capital and other factors of production *(ibid).* In fact, in the information industry, Pettinger (2012) observation is that there has been a phenomenal increase in investments on microchips. This is intended to enhance the processing power for a similar amount of inputs in order to upturn productivity. This is called capital deepening (Madsen, 2010; Solow, 1957). In addition, increases in technological capital through investments in the relevant infrastructure have been found to be reflected in a proportionate increase in total factors productivity (TFP) (Samimi & Arab, 2011). In this respect, the total productivity is seen to be contingent upon technological, capital and labour parameters (Solow, 1957). In the global arena, e-Government is one of such technological platforms in the public sector in the digital age (Almarabeh *et al.,* 2016; Franco *et al.,* 2016).

To put the above into context, Matei and Savulescu (2009) argue that productivity is determined by production *(effectiveness)*. The production responds to attain a given outcome *(efficiency),* which is the total-factor productivity, also called multi-factor productivity. Its level is defined by how efficiently the inputs of production are used to give rise to an output (Comin, 2006). To illustrate this, consider the Organization for Economic Co-operation and Development (OECD), while health alongside pension expenditure shore up pressures on the budget, the public is calling upon governments towards accountability (Curristine et al., 2007). Motivated by this, some OECD countries have decentralized and changed budgetary practices to introduce results-oriented approaches in management *(ibid)* to address productivity that is citizen centric. Though the extant research is not conclusive *(ibid),* findings following an examination of investments in e-Government in municipalities in the United States show that there is enhancement in the efficiency of business processes *(ibid).* Thus Walker (2014) observes e-Government as improving the sector efficiency and performance.

3.3.1 Operational Efficiency in Public Sector

In developing nations, the reforms need to be aligned to the principles of performance and efficiency. The benefit of efficient and equitable decision-making has a strong public administrative component (Andrews & Boyne, 2013). Mohair *et al.,* (2010) underscores that the primary objective is to ensure overall public welfare is accounted for. Indeed, public value-driven management approaches advocate for improvement of this general welfare. In a comparative analysis of private and public sectors, Kilter & Lee (2006) seem to agree with the observations and this is as presented in Table 3-4:

Table 3-4: Contrasting a Public and a Private Sector

Organization	Public	Private
Competition	Usually Monopolies	Operating in Competitive Markets
Decision Making	More rigid Process	More Flexible, usually by a Single Leader
Goal	Reflect Public Interest	Seek Profit Maximization
Resources	Distribute, re-distribute and regulate	Produce and Distribute
Funding	More or Less Poorly Funded	Financed depending on Productivity
Information Flow	Public Poorly Informed, Suspicion	Shareholders well informed

Source: (Kotler & Lee, 2006)

In an attempt to put Kilter and Lee's (2006) comparison into context, Mohair et al. (2010) argue that though the direct economic benefits may not be identified, social benefits can be identified but not quantifiable in monetary value. The economic efficiency of the public sector investment may be zero, as the effects may be difficult to assess in monetary terms (Mihaiu et al., 2010). In such a case, effectiveness becomes a necessary condition for achieving efficiency. This delicate balance is further put into context by Florişteanu (2004) in the triangle of performance.

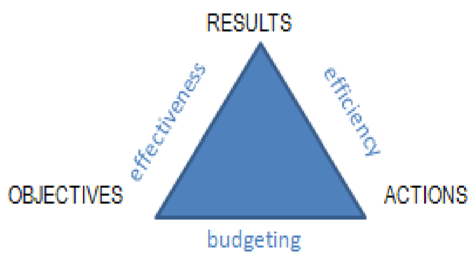


Figure 3-3: Effectiveness, Efficiency and Budget Triangle

Source: (Floristeanu, 2004)

Indeed, the Pubic Value Management (PVM) theory postulates such an administrative culture and dilemma. However, flexibility, accountability, as well as balancing effectiveness and efficiency in enhancing performance of a public sector need achieved to result into public values (O'Flynn & Alford, 2012; Savio & Nikolopoulos, 2010).

To be underscored is that to estimate efficiency in the public sector, a comparison of the costs of inputs and cost of outputs, is critical. However, to apply this relationship to model government expenditure, Alfonso *et al.* (2006) argue that expenditure in public service is efficient only when per capita output is large enough. Indeed, some economists justify the castigation of governments when public resources are inefficiently put to use (Afonso *et al.,* 2006). Hence the choice of per capita terms in measuring efficiency in this thesis.

3.3.2 Operational Efficiency of e-Government

Initiatives in e-Government, Karunasena *et al.*, (2011) argue, have improved the efficiency in public services delivery in developed economies. Bertot *et al.*, (2010) analyze how e-Government services have opened up access to the government. Websites such as http://www.nta.or.ke/ in Kenya and www.usaspending.gov in the US have been developed with the intentions of disclosing government services as well as expenditure. Such initiatives have a real impact on openness and cost efficiency, transforming the way governments interact with citizens (G2C) (Karunasena & Deng, 2012). Kim *et al.,* (2009) argue that such information portals have helped combat corruption in cities as Seoul Metropolitan in Korea. In addition, in 2004 India launched *Kaigarike Bhoomi*, a project aimed at automating land information records (Aiyappa, 2016). The portal on the platform of Geographic Information System (GIS) mapped about 139 industrial clusters in *Karnataka.* This has not only saved in costs and time but ensured transparency, accountability and accuracy in the management of land information (Khandare, 2016).

Therefore, with increased spending on ICTs, lower costs of production and general expenses are registered (Mitra & Karim-Chaya, 1996; Omariba & Okebiro, 2015). This is comparable to e-commerce in the private sector (Zhu & Kraemer, 2005). Though these relationships might not apply in government, overall cost-efficiency benefits are intended since governments also have limited resources out of public taxes to deliver public services. Hence, cost-efficiency will be more fitting in the examination of the contribution of e-Government following their investment in the public sector. In fact, public economists while studying on government efficiencies have treated public sector as producer of multiple goods for public service using a fixed amount of inputs (Fiorina & Noll, 1978; Anderson & Martin, 2010; Anomaly, 2015). However, it is also observed that a centralized management of organizational ICTs presents an even more cost-effective use of this infrastructure (Weill & Ross, 2004).

Therefore, efficiency mechanisms can be argued to be geared towards improved resource utilization, minimized wastage and maximized outcome (Jetzek et al., 2014). In using e-Government as an intervention, the public sectors have attempted to manage the administrative bureaucracy through enhancing cross boundary interactions *(ibid).* In fact, in a comparative study using Generalized Methods of Moments (GMM) estimation, Shamim (2007) documents cross-countries' evidence for a period of 1990 to 2002 in developing countries. The results suggest that well invested, e-Government exhibits cost containment potential (Çiftçioğlu & Betyak, 2014; Bashir *et al.,* 2014), since resources can move from non-value to value-laden tasks that generate more public value (Jetzek *et al.,* 2014).

3.4 Performance Impact in Public Sector

Performance management can be defined as a continuous process of improvement in organizations (Bussim, 2012). This is achieved through a strategic use of resources as guided by a defined set of objectives (Zvavahera, 2014; Hookana, 2011).

3.4.1 Performance in Public Sector

The increased attention to public sector performance is due to the rise of administrative reforms for improved service delivery (Power, 2000; Brillantes & Fernandez, 2011). In the 1980s, global economic decline triggered such reforms. New Public Management (NPM) as a management philosophy emerged and became the catchword (Hood, 1991). This was aimed at improving efficiency and performance. In the developing countries, too, the aims justified the need for the reforms (Lufunyo, 2013).

In a panel analysis of 108 national economies for a span of four decades between 1970 and 2010, using varied proxies for government size, Afonso and Jalles (2011) argue that national development is limited when the performance of the public sector accounts for zero per cent of the economy. This is studied in detail in the *'Armey Curve'*. However, the underpinnings are presented in Dupuit (1844). In this reasoning, Friedman (1997) suggests a performance threshold where a public sector role in economic growth is between 15 to 50 per cent of the national income. In Kenya, over 50 per cent of the nation's annual revenues go in public sector wage bill. This has also been threatening to cripple national development (KIPPRA, 2013).

On the flipside, existing literature presents contradictory results about the relationship that exists between the public sector size and performance. In some cases, this relationship impacts negatively due to government inefficiencies (Barro, 1991; Bajo-Rubio, 2000). Though the efficiency of government depends on how expenditure is optimized (Afonso & Jalles, 2011), Tanzi and Zee (1997) earlier found an inverse relationship if the public sector size outstrips a certain threshold. The same observation is made by Slemrod *et al.,* (1995)

Further, Guseh (1997) developed a model that attempts to explain the various impacts of government size across varied political systems in a developing country context. He finds that increase in the size of a government has an adverse effect on its performance. The effect is worse in non-democratic systems. Afonso and Jalles (2011) observe that the excess public sector expenditure is harmful to growth. The impact of the public sector size is stronger where institutional or governance quality is lower *(ibid),* but lessens for smaller sizes of government *(ibid).* Thus, size of government is a variable whose effect is noteworthy and is a main focus in this thesis.

3.4.2 Performance Impact of e-Government

Information is a basic ingredient in governance, and thus accounts for government performance (Heeks, 1999; Fung, 2014). It is observed that openness and information sharing between the government and the public is an essential component of a democratic government (White House: Office of Budget, 2000), and this impacts on the performance.

Unlike the private sector, the government sector creates social as well as economic values (Blaug, Horner, & Lekhi, 2011; Moore, 1995; Engida & Bardill, 2013). Thus, the performance of e-Government cannot be evaluated only through examination of the economic values (Moore, 1995; Engida & Bardill, 2013), but also through a set of societal values (Blaug, Horner, & Lekhi, 2011; Engida & Bardill, 2013). Given, the thin proof of the consistency in the performance frameworks (Omar et al., 2011); the contextual nature of the public values prompts a need to conduct a validity test on frameworks (Jørgensen & Bozeman, 2007). In fact in Kenya, despite the implementation of the three-phased reform, and the launch of e-Government initiatives beginning 2004, the public sector size which is argued as one of the measures of performance is becoming a challenge to manage, the wage bill continues to balloon (Institute of Economic Affairs, 2006; World Bank, 2013).

Thus, there are various perspectives for evaluating the performance of e-Government (Rorissa *et al.*, 2011). The recent attention is in the conceptions of public value (Bonina & Cordella, 2009; Savoldelli *et al.,* 2013; Prakash, 2015). Though Amagoh (2015) and Karunasena and Deng (2012) contend that despite some progress having been made for evaluating the performance of e-Government, there is a shortage of research on the evaluation from a perspective of developing countries where e-Government initiatives are still at a nascent stage *(ibid).*

3.4.3 Size of Government as a Performance Impact Measure

The significance of public sector expenditure has been a contention in academic debates (Olaleye *et al.,* 2014), including classicalists as Wagner, who argued that public expenditure is an endogenous factor in national income, which has no effect on the economic growth (Wagner, 1890). This position was supported by Abizadeh *et al.*, (2002), Ansari (1993) and Kim and Cayer

(1997). However, Keynes (1936) disputed this and postulated that government spending is an incentive for economic growth. Though the debate on this continues, Olaleye *et al.,* (2014) argue that since the position of Keynes solidified after the use of the public policy to end the great depression of 1930s, the focus has shifted to the impact of governments' expenditure on overall economy. Earlier, Barro (1990) had studied the impact of government sector on national growth with the simple endogenous growth model. He concluded that the economic growth rises with the ratio of public sector production expenditure to Gross National Product (GNP) (Barro, 1990). Barro (1991) argues that government expenditure has different effects. However, this is largely determined by its size (Dizaji, 2012).

Garand (1988), while attempting to understand government growth in the United States (US), defines *'government size'* in terms of *'state government spending as a proportion of total state economic output'*. This he does taking cognizance of explicit price deflators being employed for the public and private sectors. Therefore, it can be argued that total state personal income can be used as a surrogate and alternate measure for state economic output. Though not a perfect measure, the personal income pattern over time is sensitive to overall state economic output *(ibid)*. It is as a result of these complex linkages in management and economic ideologies that this study is motivated to give a special focus on the influence that investment intensity in e-Government has on cost expenditure, which is defined in terms of size of public sector and appears to impact on developing nation's productive capacities (Koki *et al.,* 2011)

3.5 Existing gaps

From the above expositions, it is evident that there are existing researches on the public value of e-Government. However, several gaps are seen in those research studies. Though the existing body of knowledge has a vast range of quantitative-empirical studies on the value of e-Government (Ha, 2016), the debate on the developing countries has been relatively thin (Garg & Choeu, 2015). The debate is not so focused on the African perspectives (Yeboah-Assiamah *et al.,* 2016). In addition, the extant research has had a heavier focus on private sector (Basamh *et al.,* 2014) despite heavy investment that the public sector has made on e-Government (Amagoh, 2015; Munyoka & Manzira, 2013). Further, while some scholars have argued for a direct linear link between e-Government investments and the consequent public values (Liao, 1996; Savoldelli *et al.,* 2013), others have advanced a theory that the relationship between these depends on a third-level variable. They propose GDP or management philosophies to form a bivariate relationship (Gatautis *et al.,* 2015). In all, these have led to inconsistent and contradictory results (Yao & Liu, 2016; Rose *et al.,* 2015).

Therefore, considering the complex facets of e-Government as a phenomenon (Jones *et al.,* 2007; Al Salmi & Hasnan, 2016), there is a need to understand and explain these relationships from a broader multi-disciplinary and theoretical perspectives. Even paradigms and theories are transiting to a more integral modus of thinking that is considered more effective (Wallis, 2010). Wright & Wallis (2015) conjecture is that such an integrative understanding is an emergent method, and this is reflective even in the new approaches to policy formulation (Stoker, 2006). Further, over the years there have been calls to employ research approaches drawn upon a variety of disciplines for a better conceptual and theoretical insight (Yang, 2013) to enhance richness in models (Wallis, 2010). This research fills in the described gap and provides a new multi-theoretical insight for value researchers in ICTs. In the study, the research problem was viewed from a number of theoretical vantage points (Banister *et al*., 2011) drawn across varied disciplines. This is envisaged to improve the efficacy of policies and subsequently have a significant implication on theory.

3.6 Conclusion

Chapter Three has presented a review of the literature to provide theoretical arguments to support the contextual focus. The chapter has delineated, synthesized and integrated various conceptual positions to constitute an argument in this thesis. Further, it has illuminated the existing research gaps; Figure 3-5 presents the identified areas of interest in literature development that the study has attempted to realign and understand their influence considering the various interplaying factors for the context of Kenya.

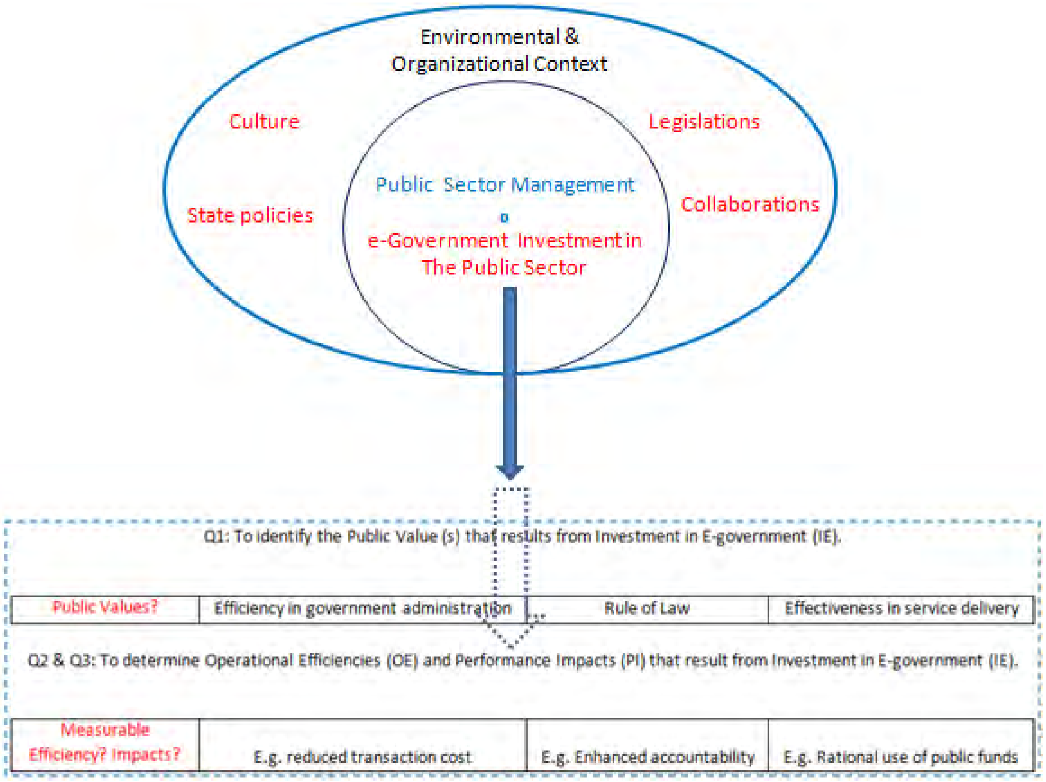


Figure 3-4: Interplaying Factors

4. CHAPTER FOUR: THEORETICAL FOUNDATION

No social fact can have any scientific meaning until it is connected with some other social facts

- Comte, 1830-1842

This chapter presents theoretical foundations that the research aims to base its arguments on explaining the nature and consequences of e-Government as an investment in the public sector. Fox and Bayat (2008) define a theory as *'a set of interrelated propositions, concepts and definitions that present a systematic point of view of specifying relationships between variables with a view to predicting and explaining a phenomenon'*. Therefore, in this chapter, the research drew upon the models from the disciplines of public management, public economics and political sciences. Their interrelationships are explained and in closing a conceptual model is presented.

4.1 Theoretical Models

4.1.1 Public Value Management Model (Stoker, 2006)

The fundamental precept underlying this point of view is that public sector managers need to expand public value created using available inputs, just as business managers expand private value in profit-making enterprises (Moore, 1995). In response, Kelly *et al.* (2002) and Stoker (2006) present a public value management (PVM) model, as an overarching post-competitive framework that offers collaborative networked conceptions to effect this. The model emphasizes the importance of enhancing organizational capacities to generate more public value (O'Flynn & Alford, 2012). Its strengths lie in the reconfigurations in the public sector to achieve efficiency and equity in a management network (Stoker, 2006).

Indeed, the sub-Saharan Africa has been in dire need of a paradigm shift from a spatially scattered rural setting with no access to information (Vyas-Doorgapersad, 2011). Santos and Heeks (2003) argue that the region needs a *'one-stop shop'* to enhance delivery of public services. This linkage is possible through e-Government, which can improve a 'bureaucratically stagnant and a technologically immobile' public sector (Vyas-Doorgapersad, 2011; Bwalya & Healy, 2010). Vyas-Doorgapersad (2011) suggests a shift to Moore's (1995) paradigm; an approach supported by the academics (Bovaird, 2004; Hefetz & Warner, 2004; Moore, 1995) and reinforced by Stoker (2006).

In fact, reconfiguration of administrative capacities towards efficiency leads to an enhanced value creation for the public (Alford & Hughes, 2008; Stoker, 2006), hence even transiting the delivery of public services, for instance the filing of tax returns or passport application from human contact to an internet platform presents benefits to parties concerned. This saves users' time and enhances productivity in the transactions (Limba & Gulevičiū tė , 2014). For example, Kenya's National Transport and Safety Authority's (NTSA) electronic tracking of contract-band automobiles and renewal of driver's licenses generate a number of benefits for both, the public and the government. Thus, e-Government can improve public administration by reducing excessive bureaucracies and red tape, in consistence with the precepts of PVM's collaborative conceptions (Stoker, 2006). The electronic capture of every transaction enhances accountability and reduces the administrative burden, enabling faster decision-making.

Further, PVM focuses on public value creation through public deliberation (Stoker, 2006), enhancing a legitimately networked governance where democracy and effective management are partners (Vyas-Doorgapersad, 2011; Overeem & Tholen, 2011). This ensures a stable link between the citizens and the bureaucrats, not just the narrow legitimacy in the older order models (Aldridge & Stoker, 2002). It does not confine itself to politics, but the central public management challenges (Smith, 2004; Mauri & Muccio, 2012; Stoker, 2006). The paradigm relies on collaboration with stakeholders to legitimize governance (Stoker, 2006; CoK, 2010). Therefore, public services and policies are increasingly being created in deliberation and negotiations involving a range of stakeholders, considering the increasing complexity and size of government administration. In this regard, e-Government presents an alternative platform for such participation of as many stake claimers as possible.

Table 4-1: Shared Dictums of e-Government and PVM Model

e-Government Enhances:	External
	Public participation
	Accountability
	Faster service delivery
	Citizen empowerment
	Internal
	Cost containment
	Simplified bureaucratic procedures
	Inter-agency collaboration

The framework is adequate to model the research problem since its core maxims which include a system of dialogue and accountability constitute a rich lens to uncover e-Government whose central tenets are quality, cost efficiency, collaborations and simplified bureaucracy.

4.1.2 Multi-Product Firm Model (Aigner *et al.,* 1977)

Multi-product models came under focus following the seminal works of Baumol *et al.*, (1982). The research postulated that a typical firm is able to produce multiple products and can switch the mix of output types in response to market forces. These seminal works emerged simultaneously with the canonical papers of Aigner, *et al.* (1977) together with those of Meeusen and van Den Broeck (1977). While using a stochastic frontier model, they postulated that an operation is cost-inefficient if it does not minimize its cost given its output.

Indeed, government offers a basket of public goods and services under one roof, unlike in the private sector; these goods are a challenge to quantify into a single measure such as profits. However, since governments work towards minimizing expenditures for a given level of output, there is a need to observe operational efficiency, which focuses on optimal use of resources (Yoon *et al.,* 1999; Yoo, 2002). Specifically, this aims at minimizing a set of inputs for a given output. Thus, on the basis of Farrell's (1957) productive efficiency that is applicable to a whole economy (Farrell, 1957; Fare *et al.,* 1994; Lovell, 1993; Coelli *et al.,* 1998), a government is considered a creator of a number of public goods and services (Moore, 1995), and therefore can be considered a multi-product firm. Farrell's postulations provide an intellectual base for specifying the model as diagrammatically presented in Figure 4-1:

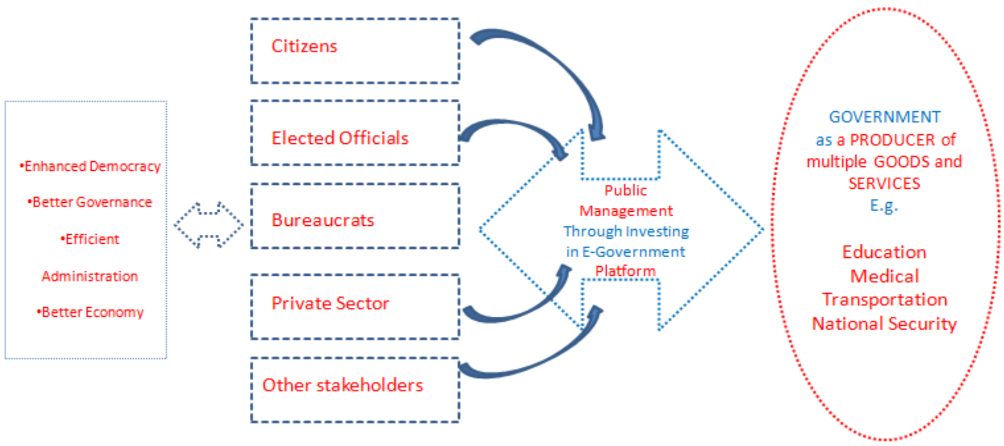


Figure 4-1: Dictums of Government as a Multi-Product Firm

Therefore, the public sector is likely to aim at minimizing input costs (Kim *et al.,* 1996), through restructuring its organization with public welfare as its central agenda (Yoo, 2002). Padmapriya

(2013) and Badaso (2014) observe this agenda as slowly shifting towards giving self-service offers through online web-based applications that e-Government can offer. The government as a multi-product firm would then minimize a cost function, subject to a technological constraint:

Equation 4-1: Multi-product minimum cost Function

$min \sum W_i X_i$ subject to $G = \{(X,W): W$ can be produced from $X\}$

This is an efficient, cost-minimized input function for producing the i^{th} outputs (W) at price (X), *subject* to a technological constraint G. G may be optimized to produce a given amount of output (W) at a given price (X).

It is evident that cost efficiency is a factor of the transformation technology employed. This is the initial characteristic of a technology that is put into consideration during an examination of cost containment potential of e-Government in the public sector (Archmann & Iglesias, 2010). This is due to public sector agenda to offer multiple services cost effectively. This conception adequately models the research problem as it deals with multiple outputs as well as multiple inputs (Zhang & Garvey, 2008). Indeed, governments have as many multiple sources of revenue *(inputs)* as public services *(outputs)* to offer.

4.1.3 Legislative 'Rent Seeking' Model (Fiorina & Noll, 1978)

The most cited of bureaucratic models is that of Niskanen (1975). This emphasizes the relationship between Parliament and the bureaucrats in a budget-making environment. This is where parliament or politicians place a demand for a given output and the bureaucrats in return demand for a given level of funds from the Parliament.

Though the model is founded upon the basic laws of demand and supply, Chang *et al.* (2014) argue that budgeting as a deliberation present two major advantages for the agency or the bureaucrats. The bureaucrats have adequate information about the politician's demand and related budget caveats: the bureaucrats can present all-or-nothing proposals *(ibid).* Given this scenario, Chang *et al.*,(2014) support an effective monitoring and control system for the two parties. Given the complexities in societies and technological advancement, the public needs professional monitoring mechanisms on major national projects, funded by taxpayers *(ibid).* Using the PVM model, this complex deliberation allows for multiple principals (Wilson III & Wong, 2003; Wilson, 1989), precipitating into a framework for organizational collaboration as proposed by Fiorina and Noll (1978).

Given legislature self-interestedness, Fiorina and Noll (1978) postulate that legislature's involvement for private gain leads to the expansion of the bureaucratic structures towards inefficiencies. This results in a disproportionately bloated and a larger bureaucracy. This enhances *'rent seeking'*, a form of economic corruption (Gaskins, 2013). In return, this leads to a higher quantity, but not certainly a superior service quality from the bureaucracy. In addition, this reduces public resources with a proportionate increase in private gain, which is wasteful and inefficient in economic terms (Coolidge & Rose-Ackerman, 2000). This results in an excessively *'big size'* government and counters the goal of efficiency that is the main driver of e-Government (Karunasena & Deng, 2012; Savoldelli *et al.,* 2013; Meyer *et al.,* 2015).

Further, Mistry and Jalal (2012) observe that e-Government can open up information flow. This is transparently possible among the legislature, bureaucrats and citizens (Rodríguez-Domínguez *et al.,* 2011). This has the capability to weaken the above bureaucratic tendencies (Haque, 2002). In return, public value generation is enhanced through the synergies created by openness, collaboration and sharing (Jetzek *et al.,* 2014).

To put the above expositions into context, assume a balanced public sector budget at an instant, *t,* the budget constraint (*B)* is:

Equation 4-2: Government Budget Control

$B = (1-\beta)\,T$ subject to $0<\beta<1$

Where the total government revenues *(T)* is meant to finance a summation of the cost of public services offered to citizenry $\{(1-\beta)\,T\}$ and total transfers, which may be in form of external loans and grants (βT). However, only a part of $\{(1-\beta)\,T\}$ is used in service delivery, as *rent seekers* capture the rest. Mistry and Jalal (2012) contend that e-Government can minimize the dissipations through opening up information flow among stakeholders.

The legislative *'rent-seeking'* model appears adequate in explaining the public value creation exercise that happens at the cost of the tax payers. The cost of public services seems inflated by a facilitative role of legislative bureaucracies. This can be rationalized through a vast dissemination of information, facilitated by e-Government (Bwalya & Healy, 2010; Kayrouz & Atala, 2014; Nurdin *et al.,* 2014). This conception forms a rich lens to model the research problem considering its central concepts of bureaucracy and efficiency. E-Government acts as a change model to weaken the exposed bureaucratic tendencies (Mistry & Jalal, 2012).

4.1.4 Bureaucracy in Asymmetric Information Model (Banks & Weingast, 1992)

Like the legislative *'rent-seeking'* model, this model is adapted from the seminal works of Niskanen (1975) and focuses on the budgetary relationships in public sector. Though Niskanen distils the priorities that inform the actions of bureaucrats as 'survival through budgeting', he declines to make formal the model. This presents research opportunities for extending the knowledge to the realms of complex econometric structures. These is done by, among others, Miller and Moe (1983), Romer and Rosenthal (1978), Breton and Wintrobe (1975), Bendor and Moe (1985) and Banks and Weingast (1992).

In the model, the bureaucrats are assumed to price public services at the maximum price that Parliament or legislature is willing to allocate. Under such circumstances, the production happens at a level where the marginal cost exceeds the marginal value. This is a level where the agency's budget exceeds the need, while Parliament does not know a fair price for the services for which public funds are committed to. This results in a demand-constrained result (Niskanen, 1975). The constraint is occasioned by lack of adequate information, also known as information asymmetry on the part of legislature.

Indeed, economic crime or corruption flourishes in such a space of information asymmetry (Gaskins, 2013), which can be reduced by an effort to shrink the asymmetry *(ibid).* Evidence exists that such approaches have been beneficial (Neupane *et al.,* 2012). For example, in Uganda, an information campaign presented parents with public-funding information for funds granted to local academic institutions (Reinikka & Svensson, 2005). The crucial information on the handling of the funds led to a significant reduction in fund misallocation that had been experienced. Thus, it can be argued that technological factors influence the sizes of budgets of organizations (Wood *et al.,* 2008). In the digital era, one of such influences is e-Government.

Further, Banks and Weingast (1992) argue that the agency exploits the informational advantage by interacting with the legislative arm of the government in a world of asymmetric information. When the legislature's cost of auditing the agency is high, the agency extracts more *(ibid).* The auditing cost depends on the monitoring mechanism, and the ability of an interest group to monitor the agency's choices and relay that information to politicians or legislature (Whitford, 2008). The level of auditing costs involved for the agency to *'tell the truth'* is dependent on the expenditures incurred to obtain the relevant information (Williamson, 1985). This can be monetary or non-monetary (Kachwamba, 2011). Therefore, Banks and Weingast (1992) argue that agencies fare well where bureaucrats' informational advantage is diminished to the minimum compared to the political value. In addition, organized interest groups should be able to monitor agency's actions by providing independent sources of information *(ibid),* leading to lower gains for the bureaucrats (Franchino, 2006).

This model fits the research problem as it places e-Government in context as capable of improving the overall system functioning by enhancing free flow of information (Lau, 2005). It can redesign the system to lower the information asymmetry (Liu, 2010) while maximizing total public value *(ibid).* Figure 4-2 summarizes the Legislative *'Rent Seeking'* and the Bureaucracy under Asymmetric Information models;

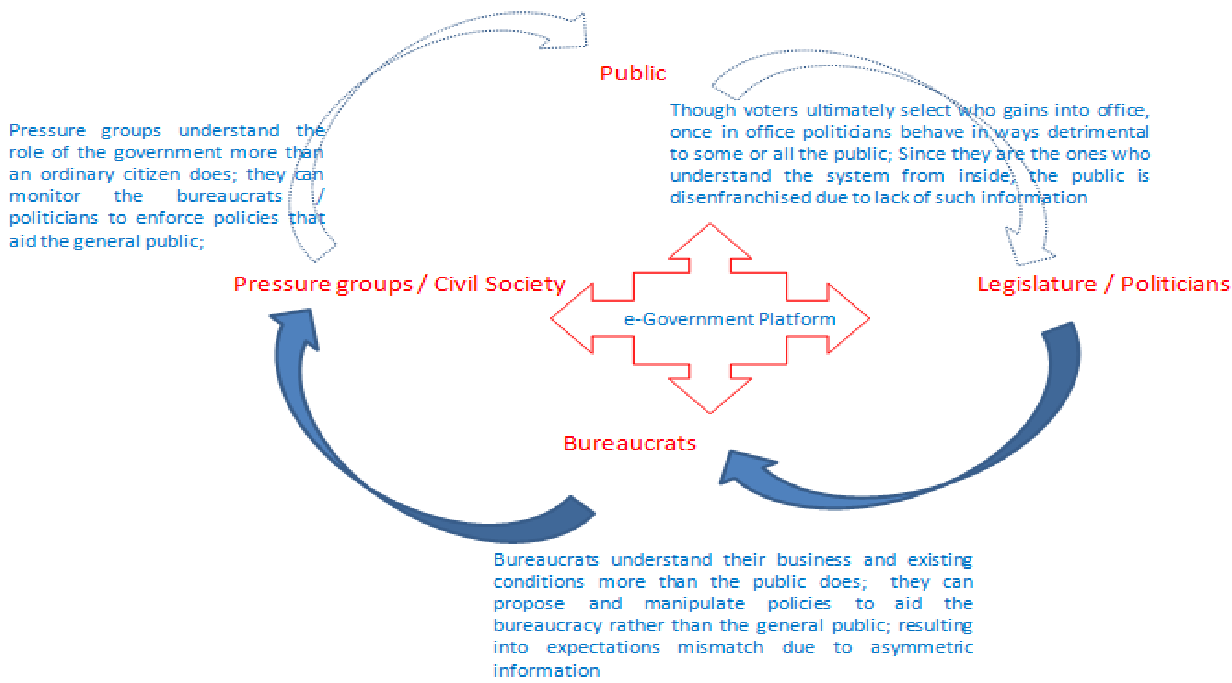


Figure 4-2: Theoretical Foundation

4.2 Conceptual Framework

Conceptual framework is a visual or a written model or structure that represents the main things to be investigated in a research (Miles *et al.,* 2013). This can be in either a graphical or a narrative manner. It presents the principal factors, conceptions or variables *(ibid).*

To the best of the researcher's knowledge, the theoretical models as discussed in section 4.1 have not been used to aid in explaining e-Government public value logic from a developing economy perspective. However, the concepts and tenets that emerge from the models appear relevant in addressing the research problem for contextualization in Kenya. Indeed, public value creation is increasingly positioning itself central to the goals of e-Government (Bonina & Cordella, 2009;

Savoldelli *et al.,* 2013). The latter seem to have the potential to aid the more isolated sections of the society overcome the retrogressive bureaucratic barriers to information that lead to excessive structures in government. This scenario burdens the taxpayers, depriving them of public value. Barro (1990) observes that the structure of government expenditure results in various performance impacts, one of which is determined by its size (Dizaji, 2012). This expenditure is also a function of GDP, which captures total income in an economy. Since investment is a function of income, then investment in e-Government is affected by national income levels. Therefore the concepts, the models and the literature reviewed informed the conceptual framework for this these. This is depicted in Figure 4-3:

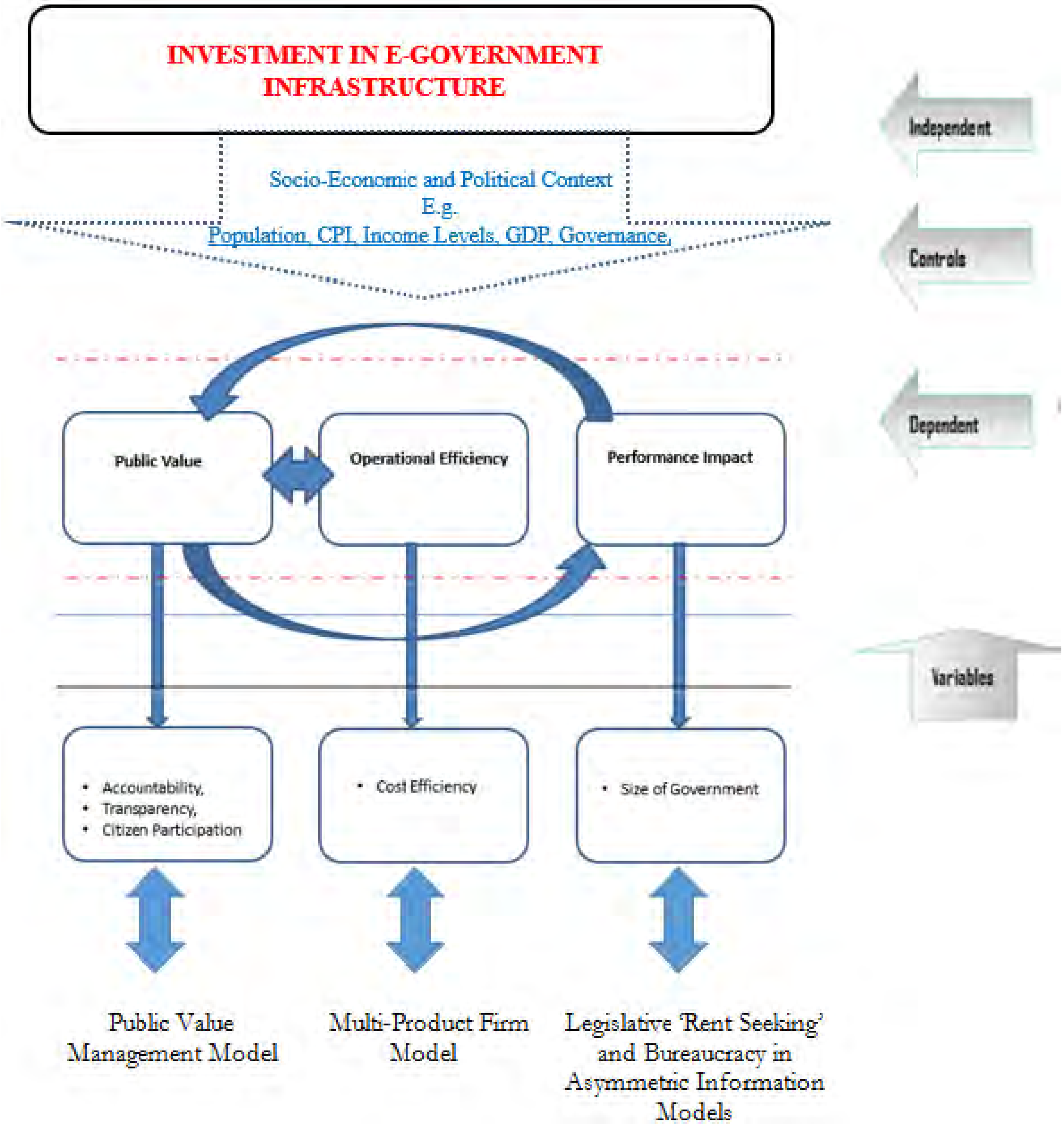


Figure 4-3: Conceptual Model

The conceptual framework in Figure.4-3 presents the variables as conceptualized and as informed by the multi-disciplinary theories. In this research, this provided a holistic representation, allowing the matching of broad predictors with broad outcomes (Edwards, 2001).

4.2.1 Description of Model's Variables

This study explored the hypothesized relationships between investments in e-Government on one side and public values, operational efficiency, performance impact on the other side as key variables. The governance and socio-economic variables were used as control variables as put forth in the conceptual model in Figure 4-3.

The independent variable is investment in e-Government. The mediating controls in the conceptual model include age, occupation, income, education level, GDP, consumer price index (CPI), governance index and population. The dependent variables are public value, operational efficiency and performance impact. While the respondent's age, occupation, income, education and public values are captured and measured from the survey exercise using a closed-ended questionnaire, the governance control variables are part of secondary data captured through a review of historical documents. In this research, these form the governance index, which is a 'composite index', published every year, and contains six sub-components of governance (Kaufmann *et al.,* 2008). These are *(1) Control of Corruption* where 'corruption' is defined as an *'abuse of public power for personal gain', (ibid) (2) Rule of Law* measures the extent to which the public adheres to the societal norms *(ibid)*, *(3) Government Effectiveness,* which indicates the standards of service delivery and the policies formulated *(ibid), (4) Voice and Accountability,* which gauges the citizens' exercise of the freedom of expression and the free media*(ibid), (5) Regulatory Quality,* which presents the government's ability to monitor policies in a way that permits development *(ibid),* and (*6) Political Stability and Absence of Violence* which is the perception of the likelihood of politically instigated uncertainties *(ibid)*. The six components form the World Bank Governance Index (WGI). *WGI* is a vital empirical data on quality of governance (QoG) in both academia and industry (Charron, 2010). Given it is readily accessible; *WGI* was used as a measure of QoG. It triangulates varied primary data sets to present a remarkable. It is solidly robust and internally sound *(ibid).*

In addition, the macroeconomic variable of Gross Domestic Product (GDP) is also used. This is a vastly used indicator in macroeconomics to measure of a country's living standard (Bernanke & Gertler, 1989). Though supplied by World Bank national accounts, GDP per capita depicts the measure of GDP as a proportion of the mid-year population (ILO, 2003). The data was captured from the World Bank World Development Indicators (WDI) and was measured in Kenya Shilling

(KSh). Although some scholars suggest the use of Gross National Product (GNP), the use of GDP is considered a more reliable estimate of the economic welfare of a country (Brezina, 2012). In fact, almost all countries use this estimate as a measure of country production (Bureau of Economic Analysis, 2010). Previous researches that focused on the relationships between macroeconomics and ICT variables have used GDP or GDP per capita (Farid, 2016; Chang-Gyu, 2015).

Further, investment in e-Government *(Ie)* measures the actual spend per ministry on e-Government in a given year. Data for the variable was captured from audited accounts as published in Kenya's Ministry of Finance's budget estimates. The variable was measured in per capita terms to account for the population changes that affect budget and policy choices in the public sector (Adam, 2016). In any case, public expenditure is considered inefficient when it produces the inadequate benefit for the populace (Afonso *et al.,* 2006). However, depending on data availability and the situation under consideration, some researches have captured this variable in terms of the intensity of e-Government investment which is a proportion of e-Government expenditure on total expenditure (Sharpe, 2015; Thomas, 2015). Since the study uses nominal values of expenditures, price effects are controlled for. This is done by factoring a measure of the overall changes in price levels in an economy, which is known as the Consumer Price Index (CPI). CPI measures the weighted average pricing of a basket of goods and services (Bundey, 2015). Hence, changes in CPI can be used to assess price changes associated with the cost of living. In this study, such effects on the expenditures are strongly hypothesized and therefore CPI is captured on the basis of the February 2009 prices as provided by the Kenya National Bureau of Statistics (KNBS) (GoK: KNBS, 2016). CPI has been used as an indicator of economic performance as well as a key measure of inflation (Habimana *et al.,* 2016).

Then there is a variable on operational efficiency which requires an estimation of the association between the input costs and output costs. This is operationalized as cost efficiency. Indeed, there is a need to have public expenditure produce the largest possible benefit for the population (Afonso *et al.,* 2006). This in essence means that cost efficiency is measured in the per capita terms of recurrent expenditure in each sector, by computing it as a ratio of total expenditure. For this, while population data is captured from the census records of Kenya National Bureau of Statistics (KNBS), the recurrent and total expenditure of specific sectors or ministries are found in data files of audited financial reports of Ministry of Finance.

Further, performance impact is presented as a dependent variable in the conceptual model. In a study of performance of 108 countries, Afonso and Jalles (2011) employ government size as a proxy for public sector performance. The argument is that national development is limited by government performance. Barro (1990) conjecture is that such performance is contingent upon the ratio of productive government expenditure to GDP. Further, Barro (1991) finds that such government expenditure is largely determined by its size (Dizaji, 2012). Therefore, in this research, the performance impact of e-Government investments is measured by its effect on the public sector size. This was captured as a ratio of total recurrent expenditure as a ratio of the summation of personal incomes, a surrogate measure for ministry or sector GDP (Garand, 1988). The income expenditure comprises of personal emoluments and allowances aggregated per ministry or sector. As well, this was captured from audited financial reports of the Ministry of Finance and measured in Kenya Shillings *(KSh)*.

4.2.2 Interplay of Model's Variables

Worthy to note is that the continued and enhanced generation of public values is a measure of the public sector performance (Moore, 1995; O'Flynn & Alford, 2012). Then again, Jørgensen and Bozeman (2007)'s and Kernaghan (2003)'s inventory of public values on the basis of over 230 studies document a set of public values that include quality, openness, efficiency, user orientation, democracy, responsiveness, equity, environmental sustainability and citizens' self-development. In the conceptual model, there is some interplay of variables. This is evident between public value and operational efficiency as well as public value and performance impact. This is indicated by the bidirectional arrows and implies an aspect of having the two variables having a complex effect on each other (Hewings, 2012). This reciprocal relationship implies that while the thesis measured performance impact and operational efficiency as stand-alone variables, both form part of the public value. Efficiency is a form of public value (O'Flynn & Alford, 2012) and the same applies to performance *(ibid)*. In essence, if operational efficiency and performance improve in the public sector, then public values are likely to expand (Adams *et al.,* 2014). It is also possible that improvement in public value could as well improve performance and operational efficiency in the public sector (Fourie & Poggenpoel, 2016; Van-Ryzin, 2016).

Finally, in revisiting the general research question *'What public value (s), if any, result following investment in e-Government in Kenya? Considering the investment levels in e-Government, what is the direction of the relationship and the extents thereof?'*, a set of relationships is expected. While public values are expected to arise with increase in investment in e-Government by the public sector, the increase in intensity of investment of e-Government is expected to shore up cost efficiency and optimal performance, which are specific public values of interest for research questions II and III in this research. However, this is contingent upon the set of control variable which could act singly or jointly to influence the relationships. Comprehensive details of the data measurements and sources for this study are set out in *Appendix F*.

4.3 Conclusion

This chapter has presented the theoretical foundations of the thesis. This is drawn upon an array of disciplines. An attempt has been made to underscore the qualities and interrelationships among the models, and further related them to the extant literature as conceptualized in Chapter Three. Then, a link has been formed between theoretical and empirical aspects of the phenomenon under investigation to form a conceptual model, whose variables have further been described and explained. The next chapter presents the research methodology adopted to address the research questions.

5. CHAPTER FIVE: RESEARCH METHODOLOGY

Every discourse, even a poetic or oracular sentence, carries with it a

system of rules for producing analogous things

– Jacques Derrida

This chapter describes the philosophical views, the research methodology and the methods that are deemed suitable to address the research problem. In the thesis, confirmatory and exploratory approaches were used. While the confirmatory element tested the hypothesized theoretical framework of public value, the exploratory element established the operational efficiency and performance impact of investments in e-Government (Onwuegbuzie & Leech, 2005). Due to the approaches, a mixed methods methodology was considered suitable (Teddlie & Tashakkori, 2009).

5.1 Philosophical Frameworks

In social sciences, research paradigm concerns one's philosophy of research (Wahyuni, 2012). This forms important assumptions guiding a researcher's view of the world *(ibid)*. These encompass the suppositions and propositions about the structure and the synchronization of the social world. The frameworks guide the behaviour of the researcher (Jonker & Pennin, 2010), aiding in understanding the social phenomena (Neuman, 2011). In this research, the researcher intended to examine and understand the public values, operational efficiency and performance effects consequent to investment in e-Government.

The three dimensions of a paradigm according to Guba and Lincoln (1994) are: (1) the form and nature of reality which addresses the ontological question; (2) The link between the researcher and the researched, which concerns the epistemological question; (3) How the researcher finds out the researched, which constitutes the methodological question. Worth noting is that the paradigms 'constitute human constructions that are neither right nor wrong' (Arvay, 2014). Though science may not deliver an entire truth, it certainly does not deal with dogma (Murphy, 2013). Thus observation, rationalism and principles are central to the delivery of the scientific truth. The proponents have just to argue for their utility (Guba & Lincoln, 2005). Therefore, in this research, objectivism as an ontological stance, positivism as an epistemological stance, mixed methods as a methodological stance are argued as adequate to inform the research problem. This takes into consideration the structured, the systematic and the rational modus of the research's confirmatory and exploratory strands. These strands are informed by the theorized causal laws of the behaviour of social phenomenon (Guba & Lincoln, 2005; Hill, 2014).

5.1.1 Objectivist Ontology

Ontology as a consideration is the initial point of all researches (Grix, 2010), it studies the being (Crotty, 1998) and its assumptions that characterize what constitutes a reality. The ontological component queries the form and the nature of reality (Collis & Hussey, 2013). Two thoughts attempt to address the query: objectivism and constructivism (Bryman & Bell, 2015). The former's crux is that reality is a phenomenon that is capable of existence in independence, while the latter holds that reality is a consequence of people's interactions (Creswell, 2013). Hence, researchers need to take a stance with respect to their perceptions of how things really are (Hill, 2014).

In this research, objectivism offers an ontological stance that presents the social phenomena as a set or sets of facts that are beyond the researchers' influence (Bryman & Bell, 2015). In this research, e-Government as well as investment of it is considered independent and separate from the researcher. Investment in e-Government has a concrete reality of its own. Its components and resulting operational efficiency can be seen as having an objective reality. The knowledge of e-Government and resulting public values is what is available to the researcher's senses. This is what is collected through the use of objective instruments such as a closed questionnaire. In this research, metaphysical phenomena have no validity as *'knowledge'* (Pizarro, 2011). The falsification of scientific theories exclusively depends on logical relationships between investment in e-Government as an explanatory variable and the other dependent variables under study. These relationships are contingent upon empirical data available through observation (Keat, 1981). The thrust is that it is not possible to gain an insight about e-Government investments and related laws or relationships through reflection; these insights have to be controlled through empiricism (Stegmüller, 1978).

In this stance, conceptual model in section 4.2 can only lead to valid knowledge if, say the relationship between *investment in e-Government* on one hand and *public value, operational efficiency and performance impact* on the other hand, is supported by an empirical observation. This conceptual model is not *sui generis*, rather a preliminary stage in the research process. It clarifies the research questions and acts as a reference point for interpreting empiricism. Consider the general research question: *'What public value(s), if any, result following investment in e-Government in Kenya? Considering the investment levels in e-Government, what is the direction of the relationship and the extents thereof?'* the expected response to this question calls for objectivity on the part of the researcher. It is intended to dispel researcher's personal biases on his understanding of the social phenomenon. In this regard, scientific procedures were used to enable replication of the study, even later. This is because, in the identification of *public values of investment in e-Government*, objectivism can aid define with exactness of the terms *'public value', 'operational efficiency' and 'performance impacts'* and relate them to the explanatory variable, that is, *'investment in e-Government'*.

5.1.2 Positivist Epistemology

The two fundamental epistemological stances common in research are positivism and interpretivism (Saunders *et al.,* 2015). Positivism determines the codes or patterns underlying the phenomenon of interest. This is more often associated with confirmatory research that attempts to endorse predefined relations concerning constructs (Hair *et al.,* 2010). The view is more aligned to quantitative approaches such as surveys. Indeed, this research focused on the presupposed cause and effect association between *e-Government investment* on one hand and a set of *public values, operational efficiency and performance impact* on the other hand. It also quantified the strength of the relationships. It thus conforms to the philosophical view of positivism.

Instead, interpretivists argue that neither statistical patterns nor numerical correlations can fully and exhaustively comprehend a situation. People's meanings and value need to be understood in context. This stance more often informs the exploratory endeavours that tend to discriminate the shades of relationships underlying constructs or factors (Hair *et al.,* 2010). It is goes hand in hand with the qualitative approaches, hence lends credence to unstructured research methods (Blaikie, 2010). Therefore, since epistemological position is concerned with how knowledge is generated or attained (Guba & Lincoln, 1994), it addresses the nature of the linkage between the one observing and the one being observed (Guba & Lincoln, 2005). However, revisiting the research question 'What public value(s) result from investments in e-Government in Kenya?' Considering the investment levels in e-Government, what is the direction of the relationship and the extents thereof?' The realities under study as investment levels and direction of relationships seem to fall within the prism of natural sciences (Bryman & Bell, 2015). These advance the application of scientific methods to research the envisaged presuppositions *(ibid).*

In consideration of the above, true knowledge arises through the deployment of a set of observations and experiments. This is only possible if reality is objective. This in essence means that the positivism as a stance applies if reality is viewed from objectivism as an ontological philosophical prism. Therefore, in this thesis, knowledge consists of facts (6 & Bellamy, 2013), personal and contextual biases are removed; data was accurately collected, analyzed and discussed. Metaphysics or theism was rejected (Hill, 2014), as the researcher remained detached, neutral and objective (Benton & Craib, 2001) in his relation with the *'studied'*. Any reduction in independence of *e-Government investments* or resulting *public value* was considered a threat to the validity of the expected results.

To note is that, positivism is allied to a deductive approach to research (Teddlie & Tashakkori, 2009). Considering the multiple theories that inform the thesis, predetermined relationship between the variables forming the conceptual model, the hypothesis testing was conducted to endorse the causal relationships based on theorized causal laws and the extant literature (Bryman & Bell, 2015). However, since interpretivism observes a social phenomenon through personalized and individual interpretation (Bryman & Bell, 2015), it was considered as countering the notion of 'phenomena quantification' (Symon & Cassell, 2012), which is evident in the way the research question was framed 'What public value(s) result from investments in e-Government in Kenya? Considering the *investment levels* in e-Government, what is the direction of the relationship and *the extents* thereof?'

In the above respect, this thesis provided the hypotheses that were testable for confirmation and falsification through deduction. This maintained the independence of the researcher and the researched, which is considered an essential characteristic of any scientific analysis within the sphere of positivism as an epistemological stand point.

5.1.2.1 The Model

Some types of theoretical models are implicit as preconceptions and some are explicit such as organized concepts (Miles & Huberman, 1994). Since there are a number of theoretical models more suited to address positivist-objectivist studies (Neuman, 2011), in this study that aimed at examining the causal relationships among e-Government *public values, operational efficiency and performance impact*, an explicit theoretical model was selected. This was informed by the existence of a set of well-defined conceptions in terms of variables of interest *(e-Government investments, public value, operational efficiency and performance impact)*, laws of interaction of the units of interest *(signifying the direction of correlation)* and a boundary within which the theoretical models hold *(public sector)* (Dubin, 1978). This may allow for model testing in several related but justifiable contexts.

5.1.2.2 Propositions

Following the description of the concepts in the theoretical model, predictions about the phenomenon were made using propositions that link values of the units, to form a proposition that may be studied deductively, systematically and logically (Shanks, 2002). In this research, propositions were developed for the context of Kenya's public sector. The major propositions are:

1. There are public values associated with Investment in e-Government in Kenya.
2. Operational efficiency is positively associated with Investment in e-Government in Kenya.
3. Performance impact is positively associated with Investment in e-Government in Kenya.

In addition some sub-propositions, which in a way re-examined the major propositions, were subjected to testing. This includes:

4a) *Quality of Governance (QoG)* has a significant *moderating influence* on the relationship between *public sector performance (PI)* and *investment in e-Government (Ie).*

4b) *Investment in e-Government (Ie)* is positively associated with the *Quality of governance (QoG).*

For this research, these propositions were converted to hypotheses to allow for empirical testing. The conceptual values in the propositions were operationalized before being subjected to empirist-based testing (Shanks, 2002). The values are given an empirical pointer. This is replaced in the propositions to them testable *(ibid).*

5.1.2.3 Hypothesis

Hypothesis is a product of the proposition. It is a statement that is capable of undergoing empirical test (Shanks, 2002). Since the terms in the propositions belong to the abstract theoretical model space, these were substituted to constitute corresponding hypotheses as presented in Table 5-1:

Table 5-1: Hypotheses

P/No	Hypothesis
H1	Public Value (s) (For example Transparency, Trust) is associated with Investment in e-Government in Kenya
H2	Higher cost efficiency is positively associated with the Higher Level of Investment in e-Government in Kenya
H3	Smaller size of public sector is positively associated with Higher Level of Investment in e-Government in Kenya
H4a	Governance Index has an intervening influence on the relationship between the Size of Government and Investment in e-Government in Kenya
H4b	Higher Level of Investment in e-Government is positively associated with Higher Governance Index in Kenya

It is evident from the above that the hypotheses were structured in a form that is capable of empirical test. Since, the terms as used in the hypothetical statements are *'things observable'* (Dubin, 1978), the structure of the hypothetical statements need to allow for the collection and examination of the empirical data of interest. For this research, Table 5-2 summarizes these relationships:

Table 5-2: Operationalization of Propositions and Hypotheses

Statement		Independent Variable	Dependent Variable
Proposition (abstract form)			
	P1	e-Gov investment	Public value
	P2	e-Gov investment	Operational efficiency
	P3	e-Gov investment	Performance impact
	P4a	Quality of governance	Relationship between public sector performance and investment in e-Government
	P4b	e-Gov investment	Quality of governance
Hypothesis (concrete form)			
	H1	e-Gov investment	Public value (s) For example Transparency, Trust
	H2	Intensity of e-Gov investment	Cost efficiency
	H3	Intensity of e-Gov investment	Size of public sector
	H4a	Governance Index	Relationship between sector performance and e-Government investment
	H4b	e-Gov investment	Governance index
Definition (Operationalized)			
	OD1	e-Gov Investment	Public value (s) For example Transparency, Trust
	OD2	Per capita e-Government expenditure	Per capita recurrent expenditure
	OD3	IT: Total Expenditure	Total recurrent expenditure: Total personal income
	OD4a	Percentile aggregate governance index	Relationship between sector performance and e-Government investment
	OD4b	Investment in e-Government	Percentile aggregate governance index

5.1.2.4 Hypothesis Testing

Once hypotheses were formulated, they were subject to an empirical test by relating their predictions against the observed data. In this research, the deductive theory that guided it involved searching for a disconfirming proof to falsify the testable statements (Lee, 1989). The statements of test can then be refined on the basis of the falsification arguments then subjected to a further test of empiricism (Shanks, 2002).

To note is that the results of the statistical tests of the research hypotheses may or may not lend support for the hypotheses, the proposition, the theoretical model and the paradigm. In this research, if the null form of the hypothesis was not rejected, then reasons not limited to the notion that the theoretical model or, even the paradigm, might not be a correct depiction of reality were then explored.

5.1.2.5 Objectivist and Positivist Views of the Research

From the illustrations above, the research is premised upon the existence of *a priori* or a pre-determined fixed causal relationship subject upon the phenomenon, characteristically examined in a structured manner (Orlikowski & Baroudi, 1991). Sometimes referred to as positivist-empiricist research (Ryan, 2006), such a study primarily tests theoretical models to enhance a predictive understanding (Orlikowski & Barley, 2001). Given objectivists and positivists believe in a stable reality, capable of being objectively examined (Levin, 1988), the positioning of this research rejects any or further speculations (Sritanayarat *et al.,* 2010).

In this specific study in the information systems (IS) domain, according to Lincoln and Guba (1985), there are additional precepts that informed the choices of objectivism and positivism as philosophical views. These include:

- The phenomenon of interest is single, tangible and fragmentable. In essence *cost efficiency, performance impact and intensity of investment in e-Government* in Kenya exist and can be characterized and measured using structured instrumentations, in their entirety.
- The researcher and the object of enquiry are independent. There is a distinct demarcation between the observation and the model statements. The causal forces shaping the generation of the *e-Government public values* are discoverable through a *systematic observation* for a reliable, organized and tested knowledge (Richards & Morse, 2013). In this thesis, the sole role of the researcher was to discover and measure the variables of interest that are given.

- The nomothetic statements, that constitute the law-like generalization independent of time or context, is possible since *scientific concepts are precise* and have a fixed and an invariant meaning. In this thesis, the structure of *public value or cost efficiency* was considered objective and an objectively devised instrumentation was used to measure their spans.
- The inquiry is value-free. Ontologically, the social realities exist separate from the people in them (Greener, 2008). Hence, model testing was conducted using *objective instrumentations to capture standardized responses* (Chen & Hirschheim, 2004).

Therefore, considering the general question of the research 'What public value(s) result following investment in e-Government in Kenya? Considering the investment levels in e-Government, what is the direction of the relationship and the extents thereof?' it is evident a belief exists that the social phenomenon of interest is measurable. This adequately links it to quantitative methods, hence a subject of statistical analysis (Collis & Hussey, 2013). This is a stance of objectivism and positivism. These views aided in the refocusing of the study by hypothesizing a measurable public value model and relationships between investment in e-Government and cost efficiency (or size of public sector) on the basis of extant literature and theoretical foundations.

These objectivist ontological and positivist epistemological positions called for the application of natural science methodology in attempting to understand the social reality's (Bryman & Bell, 2015) expositions of e-Government public value. Positivism enabled the e-Government value research reach a full understanding based on countable and quantifiable facts, since knowledge is an outcome of a direct examination, obtained through a rational and a deductive exercise (Ryan, 2006).Table 5-3 presents the ontological and epistemological positions as used to guide this research:

Table 5-3: Ontological and Epistemological Maxims of the Research

Ontological	**Epistemological**
❖ Reality is external to the researcher, represented by objects in space; ❖ Objects have meaning, independent of any consciousness of them; ❖ Reality can be captured by our senses and predicted;	❖ Methodology of natural sciences employed (Grix, 2004); ❖ Truth attained as knowledge rests on a set of firm, unquestionable, indisputable truths from which beliefs may be deduced *(ibid);* ❖ Knowledge generated deductively from theory and hypothesis; ❖ Knowledge is objective;

Adopted from Mack (2010)

Though other philosophical stances in IS research are not preferred in the research, it is necessary to give an overview of their maxims to further argue for the choice of objectivism and positivism in this thesis. However, to be noted is that, while epistemological choices may be philosophically distinct, in practice these are not clear demarcations (Myers, 1997). Scholars have argued that there is substantial incongruity as to whether the philosophical views are inevitably conflicting or can inform a single study *(ibid)*. The Table 5-4 presents the summary of fundamental beliefs of the various research paradigms as appearing to attain consistency among most authors:

Table 5-4: Research Paradigms and Fundamental Beliefs

	Research Paradigm			
Fundamental Belief	Positivism or Naïve Realism	Post positivism or Critical Realism	Constructivism or Interpretivism	Pragmatism
Ontological stance defines the nature of being	objective, external, independent of social actors	independence of the human beliefs, socially conditioned interpreter, objective;	Subjectivity or social construction of reality;	The choice is with a focus to best respond to a research problem;
Epistemological stance describes the theory of knowledge;	Focuses on causalities	explaining within context; data credibility through observation of the phenomenon;	Social phenomenon has got subjective meanings contingent upon them; details are situational;	Integration of various approaches to best understand data;
Axiology constitutes the value theory in the relationship between the research and researcher's views;	An objective view, researcher and the data independent, value free and etic;	Etic and laden with value; researcher is influenced through culture;	Subjectivity due to emic and value bond where the researcher and the researched cannot be separated.	Both subjective and objective stances; the interpretation of data is influenced by value;
Research Methodology forms the conceptions of the methods;	Quantitative	Qualitative or Quantitative	Qualitative	Mixed-method design

Source: Guba & Lincoln, 2005; Hallebone & Priest, 2009; Saunders, Lewis, & Thornhill, 2015

5.1.3 Methodology

In terms of a methodological position, the philosophical views discussed informed the generation of the propositions, which are operationalized as hypotheses and subjected to replicable sets of empirical tests. Thus, a methodology can be defined as a strategy that informs the decision to use a particular set of methods (Crotty, 1998). It is concerned with *why, what, from where, when* and *how* of data collection, collation and analyses. This is concerned with the conceptions contingent upon data collection approaches (Guba & Lincoln, 1994).

In essence, the methodology informed the choice of research design. The research design is the blueprint which defines the approaches to data collation, collection, measurement and analysis (Kirshenblatt-Gimblett, 2006). It encompasses the plan of investigation aimed at obtaining the empirical evidence and confirmations on the observable relations in the research problem (Kerlinger, 1986). In this thesis, a design based on the mixed methods design was adopted. This was directed at explaining relationships, as well as the identification of the causes that influence outcomes (Creswell, 2008). The selected methodology aimed at formulating laws, so as to present a basis for prediction and generalization. The deductive approach aided in the testing of the theories (6 & Bellamy, 2013).

5.1.3.1 Mixed Methods

This thesis employed the use of quantitative and qualitative data to adequately answer the research questions (Creswell, 2008). This was meant to temper the biases inherent in quantitative and qualitative methods (Sosulski & Lawrence, 2008). This is because the power of numbers and generalizable outcomes are balanced with the participants' live experiences (Onwuegbuzie & Leech, 2005). Al-Jaghoub *et al.* (2010) advance a strong case for such a methodology in examining real-world practices and phenomena as e-Governance. Further, since the research attempted measuring the extents of the public values, operational efficiencies and performance impacts following an investment in e-Government, positivism as a philosophical stance was chosen to inform the identification, quantification and the description of reality, by systematically teasing out the facts, the causes and the relationships (Gunawan, 2013).

5.1.3.2 Mixed Method as a Research Design

Mixed methods research is more of an approach to examining a research problem than a methodology (Burch & Heinrich, 2016). It suffices in an investigation of a multi-level perspective (Matsaganis, 2016). In the thesis, it enabled the deliberate and cautious use of quantitative and qualitative methods, or a cross-sectional and a longitudinal approach. The quantitative methods aimed at identifying regularities and patterns (Sayer, 2000) or demi-regularities (Lawson, 1995; 1997) but with a limitation on explanatory power. It encompasses descriptive and inferential statistics (Sayer, 1992).

Further, due to the inherent weaknesses in quantitative methods, qualitative methods were explored (Davison & Martinsons, 2011; Mingers, 2001) but still the researcher's maxim remained within the broader positivist paradigm. These methods enhanced the richness of the results (Davison & Martinsons, 2011; Greene & Caracelli, 1997), as it compensated for the flaws underlying either method (Venkatesh *et al.,* 2013). The approach is even more compelling in information systems impacts studies (Al-Jaghoub *et al.,* 2010). It allows for the findings to be triangulated. This verification process improves the results' validity by informing the research from a multiple of views (Yeasmin & Rahman, 2012). The findings of one approach illuminate the other (Wahyuni, 2012; Banister *et al.,* 2011).

Further, since this research focuses on all segments of the population, the mixed methods served to allow the understanding of the underrepresented and underestimated strata. The public value perceptions of the poor, those living with disabilities, ethnic or racial minorities were accounted for (Creswell., 2013). To deploy the design, there are three recommended approaches *(ibid):*

- Sequential strategy, where the results from a method is enhanced by another method. This can start with a qualitative strand for exploration then quantitative strand for a confirmation. It is possible to firstly apply the quantitative strand to test the theories then make a follow using a qualitative strand for a more in-depth detail through a test of a few cases.
- Concurrent strategy, where convergence is established between qualitative and quantitative data to allow for a broad understanding of the problem of research. The strategy may accommodate 'data nesting', where a form of data analysis is integrated into another form to aid answer diverse levels of analysis and enquiry *(ibid).*
- Transformative strategy, where a theoretical foundation provides a viewpoint of both qualitative and quantitative data. In this technique, frameworks and approaches of data collection are accounted for in the theoretical lenses of choice. The other two strategies may be used as data collection methods in this strategy.

This study adopted a sequential mixed methods design where the quantitative strand was followed by the qualitative strand (Creswell, 2013). This provided a more comprehensive outcome (Bryman & Bell, 2015; Creswell, 2013). The research began by the collection and analyses of the quantitative data obtained from the primary and secondary data sources *(survey and document review)* to address the first phase of the study. Thereafter the qualitative phase was developed on the basis of the preliminary findings of the quantitative phase, which in this research comprised the *user conference.* This was a final stage to aid in explaining and legitimizing the statistical results by exploring stakeholder's views in a greater depth (Creswell, 2008; Teddlie & Tashakkori, 2009). Morse (1991) conjecture is that the design is also recommended when surprising findings arise out of quantitative data analysis. Under such circumstances, the unexpected findings can be examined in greater depths using a relative qualitative data. For this research, this was done in the *user conference* as a qualitative phase.

5.1.3.3 Mixed Method as a Research Process

Scientists gain knowledge 'not only through empiricism but also through rationalism' (Graziano & Raulin, 2010). The thrust is relevant for a research aimed at the advancement of science (Söldner *et al.,* 2009). In this research, the process began out of reason and experience. This entailed the thought of the rationale informing substantially intensive investments that governments are making towards the development of e-Government infrastructure and the researcher's experience in e-Government projects in developing nations. Graziano and Raulin (2010) conjecture is that such a motivation can serve as an inspiration for the research. Guided by Graziano and Raulin (2010) – as shown in Figure 5-1 – this research adopted a sequential mixed methods process:

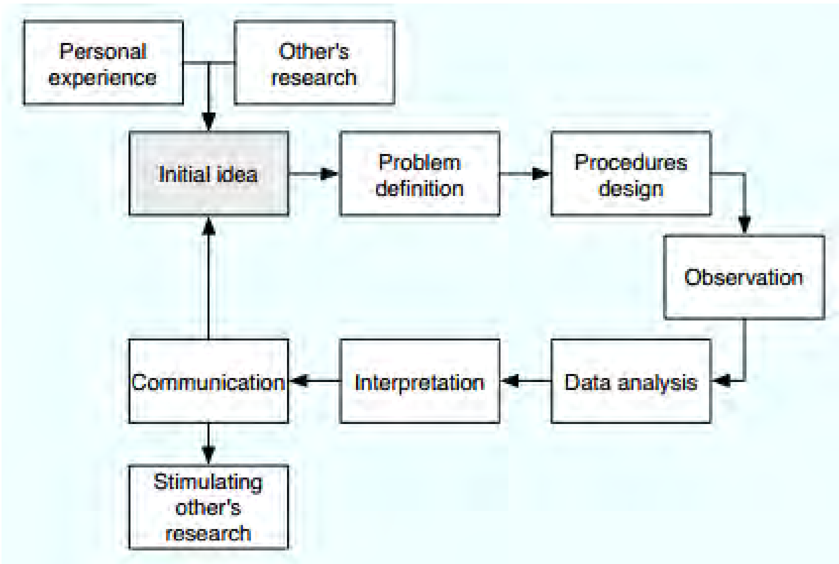


Figure 5-1: Mixed Methods Process Model

Source: (Graziano & Raulin, 2010)

Therefore, the first phase of the research process was more exploratory, as it began with the search of published data, and seeking out the experiences well informed on topic (Cooper & Schindler, 2013). The unstructured exploration enabled the development of the research question *(ibid),* which Zikmund and Zikmund (2000) define as *'problem discovery phase'* that progressively narrows down the research scope. Following the exploration; attempts were made to have the research problem, the questions and a conceptual model clearly defined. Hypotheses and research design followed. Subsequently, reasoned decisions on the sampling design and data collection methods were made. Finally, the data was analyzed and interpreted before inferences and conclusions are drawn to be disseminated in publications to a wider research community to stimulate further or newer research.

5.1.4 Methods

Methods comprise the specific procedures and practices applied in the collation, collection and analysis of data (Crotty, 1998). In this study, this was either quantitative or qualitative. Prior, there was a consideration to choose research methods aligned to the ontological view, the epistemological view and the methodology adopted. Since the research sought predictions and generalizations, the research methods lent towards quantitative data. Pring (2015) observes that these include the use of standardized tests and closed-ended questionnaires. Thereafter the analysis involved data descriptions and inference, which informed the generalization of results.

In that regard, the study used the secondary data resources which included the economic surveys, audited government expenditure reports, budgetary estimates, white papers and policy papers, while the primary sources included user conference and structured questionnaires. Precise details of the data measurements and sources for this study are in *Appendix F.*

The following subsection deals with the description of the methods and methodological strategies that were applied to address the research questions.

5.1.4.1 Research Objective I:

Informed by the public value management (PVM) model drawn upon public administration discipline, this objective identified the nature and dimensions of the public value (s) that result from investment in e-Government in Kenya. In this, a value framework was hypothesized as presented in Section 3.2.3. Subsequently, this was tested and validated through a path model using structural equations. Prior to this, data was collected using a closed-ended questionnaire, due to ease of coding and analysis as argued by Bailey (1994).

5.1.4.2 Research Objective II:

Informed by multi-product firm cost model drawn upon public economics discipline, this objective set out to determine operational efficiencies that result from investment in e-Government in Kenya. Precisely, this was to establish the extents of cost efficiency resulting from investment in e-Government in Kenya's public sector, and the causal links, if any, and relate them to the e-Government value logic.

In this endeavour, detailed quantitative analyses of the strength of relationships between investments in e-Government and the total cost of operations in the public sector were conducted against the background of contextual and macro-economic variables in Kenya.

It is worth noting that, in addressing research objectives II and III, documents review was used to collect the required data. Lincoln and Guba (1985) delimit a document to that which is '*written or recorded material'*. There are two main categories of documents. These may be a public record or a personal document *(ibid)*. The former are generated and stored to be used to attest to or provide an account of an event (Lincoln & Guba, 1985). In this research, this included government's audited historical accounts, annual financial and performance reports, budgetary estimates, policy manuals and census reports covering the period 2004 to 2014.

Indeed, these documents aided in understanding the values, financial priorities, concerns as well as a history of that which is subject to recall biases under ordinary and normal circumstances.

5.1.4.3 Research Objective III:

Informed by models of Legislative 'Rent Seeking' and Bureaucracy under Asymmetric Information drawn upon political sciences discipline, this objective sought to determine the performance impacts that result from investment in e-Government in Kenya. Precisely, this explored the relationship between the size of the public sector as a performance measure and the intensity of investment in e-Government in the public sector of Kenya.

Worth noting is that Barro (1991) and Oni *et al.* (2014) observe that government expenditure influences national development, and the influence is substantially and markedly determined by its size (Dizaji, 2012; Shumaila & Qayyum, 2014; Kaseb *et al.,* 2014; Dzhumashev, 2014). Therefore, as had been explicated earlier in Chapter Three and Chapter Four, this is aimed at estimating the strength of association between e-Government investments and the public sector size, amidst the intervening macro-economic and political variables identified in literature.

Further, other sub-objectives were also pursued: *(4a)* Informed by models of Legislative 'Rent Seeking' and Bureaucratic control under Asymmetric Information, this objective set out to re-examine research question III by assessing the intervening influence of quality of governance *(QoG)* on the relationship between the public sector performance *(PI)* and investment in e-Government *(Ie)* in Kenya. The index of governance was used as an intervening variable in the step-wise regression analysis, and *(4b)* Informed by the models of Legislative 'Rent Seeking' and Bureaucratic control under Asymmetric Information, this objective sought to determine the directional influence that investment on e-Government *(Ie)* has on the quality of governance *(QoG)* in Kenya.

Finally, the results from the three major study components and the two sub components informed by theories drawn upon multiple of disciplines were triangulated to generate a set of a more robust insight on the public value of e-Government investment in Kenya. This formed a set of preliminary findings that formed a basis for the qualitative phase of data collection process.

5.2 Data Collection

The quantitative and qualitative data for the main and the intervening variables were collected in three sets: the structured questionnaire in a survey, standard document form in a document review exercise and a user conference. The constructs that informed the three components of data collection was informed by the extant literature that culminated in the conceptual model in section 4.2.

5.2.1 Survey

Surveys are highly economical methods (Saunders *et al.,* 2015) for data collection among a sample. The intention is to statistically generalize the results of analysis to a larger population (Collis & Hussey, 2013). This method is associated with deductive approaches (Bryman & Bell, 2015). This, in essence, means it lends itself to a top-down logic of reasoning, where a theory is held and thereafter a prediction or hypothesis is made on the basis of the theoretical postulation (Bryman & Bell, 2015). This understanding positions surveys within positivism as they present an attempt to test theories to increase a predictive understanding of a phenomenon of interest (Collis & Hussey, 2013).

This phase of data collection was principally to respond to the research question I which focuses on the nature and the dimensions of public value resulting from investment in e-Government on the basis of a prior prediction of the relationship. A choice was made to conduct the exercise using closed-ended questionnaires. There are benefits for this choice. Firstly, Bailey's (1994) crux is that the responses are easier to code and analyze. Secondly, the respondents always have a good understanding of the questions. This is made better by choosing the answers provided. Considering this, fewer frustrated respondents fail to answer the questions at all *(ibid).* Thirdly, irrelevant responses are kept to a minimum *(ibid).*

Both a descriptive survey and an analytical survey were performed. The former identified the central measures of statistics in the data, while the latter established relationships among the variables of the research (Neville, 2007; Collis & Hussey, 2013).

5.2.1.1 Sampling Technique

The sampling design was chosen to enhance the accuracy of the estimates of the survey. Neville (2007) argues that surveys involve drawing an unbiased sample from the population of study. Given the focus of the research was public value, the interest of *'general public'* or the mass population was critical. Since the research generates the knowledge 'through rationalism' (Graziano & Raulin, 2010), as argued in Okongo and Sakwa (2012) as well as Lee (2007), the respondents were differentiated into three strata or sub-sets to represent the various sections of the mass population *or the public*. These were public servants, students and housewives. The reason is because public servants are the major executors and evaluators of public policy (Pourkiani *et al.,* 2014). The students are frequent users of digital infrastructures (Ayub *et al.,* 2014). Hence, students' awareness served as a major index for digital infrastructure related policies (Okongo & Sakwa, 2012; Lee, 2007). For the stratum of housewives, Wang (2014) and Burrell (2010), argue that the choice of housewives in social research aims at compensating for the limitation of the data predominantly of the vulnerable categories of persons in the society. In most digital inclusion studies, this includes the disabled, the very poor and the citizens residing in the rural settings (Hechavarria, 2014; Burrell, 2010). This stratification strategy improved the efficiency in data collection. Within each stratum, the respondents were picked randomly, making the survey estimates more reliable and representative of the wider public.

In addition, the questionnaires adopted a *Likert* scale. The *Likert-type* scale provides a summated scale. Each respondent recorded an agreement or a disagreement on each item in a question on an intensity scale. This scale is considered reliable and is recommended for obtaining people's perceptions (Hartley & Maclean, 2006; Likert, 1932). Further, the respondents had a chance to express additional opinions by responding to *'any issues not raised'* in the instrument of data collection.

Finally, the data collected was analyzed prior to being triangulated using the secondary resources resulting from document review data analysis and findings.

5.2.1.2 Sample Size

The sample size for this research was calculated through a formula for a large population as proposed by Yamane (1967):

Equation 5-1: Sample Size

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

where n is the size of the sample used, N is size of the population, and e is the precision level. Given the population of university students (≈443,800) (GoK: KNBS, 2016), housewives (≈929,705) *(ibid)* and civil servants (≈175,510) (GoK: PSC, 2014), the questionnaire targeted at least 1 151 respondents under the three strata:

Table 5-4: Population and Sample Sizes

	Male	Female	Population	Total Sample (5% Confident Interval)
University Enrolment	259,600	184,200	443,800	384
House wives			929,705	384
Civil Servants			175,510	383

For the purposes of increasing the rate of survey response, the administration of the questionnaires to the respondents was conducted directly by the twelve (12) researcher-trained research assistants. The research assistants then returned them to the researcher upon completion.

5.2.1.3 Pilot Experiment

Generally, prior to data collection proper, a pretesting was conducted for two psychometric properties – validity and reliability. Based on expert view, the validity and content were checked whether the questions in the instruments elicited meaningful responses. Thabane *et al.* (2010) observe that *'You never test the depth of a river with both feet'* and this is the thrust upon which the pre-test experiment was conducted. In addition, content validity was examined. This indicated the extent to which measures reflected the social phenomena being observed (Wahyuni, 2012).

Further, data reliability was checked. Cronbach's Alpha Test was used to establish whether the items of measure contained any flaws or defects to compromise the validity and legitimacy of the statistical information resulting from the administered questionnaire. In concept, the mathematical formula for a standardized Alpha test is presented in Equation 5-2:

Equation 5-2: Standardized Cronbach's Alpha

$$\alpha = \frac{N \times \bar{c}}{\bar{v} + (N - 1) \times \bar{c}}$$

(Cronbach, 1951)

N is the number of items; $\bar{c}$ is the average inter-item covariance among the items; $\bar{v}$ is the average variance. The reliability coefficient of Cronbach's is normally between 0 and 1. In most social sciences, $\alpha \geq 0.600$ is considered as acceptable (Tseng *et al.,* 2006). This was the adopted threshold in the thesis. Further, given that Cronbach's Alpha Test is sensitive to the scale length or number of measures in the scale (Cronbach, 1951), it is in order to report the mean inter-item correlation for the items to lend more credence to the reliability of the scales used. The recommended window for the inter-item correlation is between 0.2 and 0.5 (Briggs & Cheek, 1986) or 0.15-0.50 in case the measures are on higher order constructs (Clark & Watson, 1995).

In fact, Wahyuni (2012) argues that the reliability and the validity of a research inform its replicability and generalizability. While reliability describes a time-invariant stability of the research findings, Yin (2009) contends that construct validity depicts the replicability of the findings using the same construct when the data is subjected to multiple contexts. This should lead to the same conclusions. Though the internal validity measures whether the collected data provides the information about the theory in use, the external validity measures the generalizability of the findings *(ibid).*

5.2.2 Document Review

In this phase of data collection, mostly quantitative data was collected from historical documents. This in principle was to address the main research questions II and III.

5.2.2.1 Sampling Technique

In section 4.1.2, the national government is argued and dimensioned as a Multi-Product Firm. Therefore, the research focused on key and critical topmost sectors or ministries in terms of expenditure, as is evident from national government expenditures in the last 10 years since Kenya adopted an e-Government strategy Paper in 2004. The documents reviewed contained relevant data on *Education, Medical Services, Transportation & Infrastructure, Foreign Affairs, Energy, Finance,* *Agriculture and Internal Security* that are considered the most representative sectors of national government expenditure (Institute of Economic Affairs, 2014). The aim of the review was to collect the relevant data for the period spanning 2004 to 2014. Apart from being representative sectors of the economy, these are the public services that Kenya's government is or was responsible for supplying at the national level for the period under consideration (CoK, 2010). These services occupy as much as 80 per cent of national government budget and the same is reflected in the recurrent expenditure for the period under consideration (Institute of Economic Affairs, 2014).

The sets of data were collected from multiple sources of reports on economic surveys, audited financials, budget estimates statements, census on population, World Bank facts and archival appropriation accounts for Kenya, all converged in a triangulated fashion (Jetzek *et al.,* 2014). Precise details of the data measurements and sources are in *Appendix F.*

5.2.2.2 Document Form

During document reviews, the data of interest were filled-in in the prepared standard templates, or document forms *(Appendix R)* with over 1 200 entries of data. These were structured in cognizance of conceptual framework and variables of interest. As described in details in section 4.2.1, the variables of interest included *(1) total government expenditure, (2) e-Government expenditure, (3) total recurrent estimates, (4) total development estimates, (5) inflation rates, (6) governance index, (7) consumer price index (CPI), (8) population, (9) gross domestic product (GDP), (10) rebased GDP, (11) total personal income or emoluments (12) actual expenditure on development and (13) actual recurrent expenditure* across 8 ministries or sectors over a 10 year period from 2004 to 2014. Despite reaching out to desperate and isolated data sources, for each of the sectors there was need for consistency in the design of the document form to enhance uniformity in data collation and collection. This was achieved through the use of standardized Microsoft Excel *(MS Excel)* sheets *(Appendix R)* with over 1 200 data entry cells. In addition, the credibility of the data was critical. This enhanced the truthfulness of the data to allow for direct testing of the findings (Lincoln & Guba, 1985). Credibility was achieved through cross-checking varied data sources as observed by Banister *et al.* (2011).

5.2.3 E-Government User Conference

This is the qualitative phase of the study. The data was collected to corroborate, validate and verify the preliminary findings of the research. Cognizant of the preliminary findings from the analyses of the data collected through the survey and the document review, this was conducted using a set of heterogeneous group of stakeholders who have an interest in the practice and the theory of e-

Government. Similar to Mulder's (1991) curriculum conference drawn upon the discipline of education psychology and technology, the e-Government user conference aimed at a broader community, to *deliberate, validate and legitimize* the findings of the research. In any case, the use of quantitative methods alone has led to ethical tensions (Lyons & Bike, 2010; Denzin & Lincoln, 2011). The methods have been seen as tools of disproof, rather than of 'revelation and verification' (Banks C. , 1992). Therefore, user conference as a method was adapted to determine and validate the consequences of e-Governance as revealed using quantitative methods, and to make decisions about investing in e-Government infrastructure on the basis of an all comprehensive picture of the envisaged public values.

It is argued that complex hypotheses are better unpacked and examined by groups (Verburgh & Mulder, 2002). Therefore this focused on argumentation, constructive deliberations and interaction (Mulder, 1991). The broader view of this exercise was intended to result in a better quality of a solution (Mulder, 1991; Verburgh & Mulder, 2002). The approach was useful in the retention of the emerging convergence (Nunn, 2013).

5.2.3.1 Sample and Sampling Technique

In this qualitative enquiry in the user conference on e-Government, key informants' purposive sampling was used to identify the respondents who may or may have not participated in the baseline survey (Brinkerhoff *et al.,* 1983). To address data validity, respondents were to have an interest, knowledge or experience in the e-Government theory or practice. The participants were not to act in the interest of specific sector or strata but in the interest of the entire public, or the *mass population*.

In this study, the e-Government user conference pooled one (1) public sector chief information officer (CIO), three (3) non-management level civil servants, three (3) ordinary citizens and three (3) university students, one (1) research assistant and the researcher (1) as the convener cum conference facilitator.

In this data collection, the usefulness of deliberation is considered interwoven in the constellation and patterns of its context (Mulder, 1991). Thus to establish an agreement on a particular view, a deliberate decision was made to associate 'etic' depiction of issues with 'emic' perceptions *(ibid).* In emic perspective, the participants' native meanings of the social phenomenon under study were captured (Yin, 2015). This enabled the researcher to look at issues through the eyes of the participants (Willis, 2007). This allowed the true comprehension and appreciation of the unique nuances. On the contrary, Morris *et al.* (1999) argue that the etic perspectives allow the researcher to use the descriptions in terms of the conceptual structures, pre-existing models and the hypothetic statements to understand the participants' perceptions. This enabled comparative analysis across the multiple strata – *student, housewives and civil servants* – which may have contextual variations.

In conducting a user conference, Mulder (1991) postulates four scenarios in the deliberation *(1)* if the opinions are homogenous; conclusions are easily arrived at as deliberations are expected to be limited. However, if the opinions are heterogeneous, *(2)* the participants can chose to make a rush conclusion without a debate. This is known as *quasi deliberation (3)* the participants may choose to analyze each opinion thereafter a supposition is drawn. This is called a *restricted deliberation*, or *(4)* the participants of varied views may exchange opinions on the basis of arguments, weigh the opinions before drawing inferences. This is called *full deliberation*. In this research, full deliberation was adopted. Thereafter the conclusions were drawn and the decisions taken.

5.2.3.2 E-Gov User Conference Techniques

Since the user conference is conducted to share and deliberate upon structured information (Mulder, 1991), preliminary findings were shared out seven days before. This was done on 5 June 2016.

The document, as attached in *Appendix E*, was designed based on the initial results from the analysis of datasets from the surveys and document review. The presented document contained the consistencies and inconsistencies in the initial findings with the theoretical postulations. The document contained the research background, the research questions and the research methods employed in addressing the research problem. In addition, the conceptual model that guided the research and the aim of the user conference were explained. Informed by the conceptual model, the resulting preliminary findings of the research were shared.

Table 5-5 is a presentation of the research questions, respective theoretical framework and research methods that informed the research process:

Table 5-5: Research Questions, Theoretical and Analytical Models

	Research Question	Theoretical Model	Discipline	Methods	Data Type	Analysis
1	Public Values	Public Value Management	Public Management	Survey	Quant + Qual	Path Analysis
2	Cost Efficiency	Multi-Product Firm	Public Economics	Document Reviews	Quantitative	Inferential Analysis
3	Performance	Legislative 'Rent Seeking'	Political Science	Document Reviews	Quantitative	Inferential Analysis
		Bureaucracy under Asymmetric Information	Political Science	Document Reviews	Quantitative	Inferential Analysis
	General Question	Full Deliberation	Education Psychology and Technology	User conference	Qualitative	Descriptive Analysis

5.3 Data Analysis Techniques and Procedures

Owing to the sequential mixed methods design adopted, the quantitative *(document reviewed data)* and qualitative data *(as part of the survey questionnaire)* were analyzed separately, then a final analysis attempted to merge the findings to form a set of the preliminary findings to form the first phase of the research. The second phase *legitimized* the preliminary findings in the *user conference*, which was praxeological. This means the conference was an open system that presented an atmosphere for rational, cogent and integrated argumentations to resolve a practical problem (Mulder, 1991).

5.3.1 Survey Data Techniques

The primary data was captured and analyzed using Predictive Analytics Software (PASW) 20, earlier called SPSS. PASW allows for methodical modelling, reporting and graphics. In the thesis, both the descriptive and the inferential data analysis were applied. The former described the demographic characteristics cognizant of the strata of respondents – *civil servants, students and housewives* – while the latter generalized the results for the population of interest.

In addition, a test of the normality was conducted. This was to ascertain whether the distribution of survey questionnaire items differs significantly from a normal distribution (George & Mallery, 2011). The Quantile-Quantile (Q-Q) plots and Histogram curves were used to address the cause. In correlation analysis, while *no correlation* was represented using coefficients ranging from 0.00 to 0.01, *weak correlation* was from 0.02 to 0.029, *moderate correlation* was ranging from 0.30 to 0.69, *strong correlation* was in the range of 0.70 to 0.89 as a range from 0.90 to 0.98 represented a very strong correlation (Rummel, 1970).

Also, the coefficient of determination (R^2) was established. This determined the Goodness of Fit of the models. It presented the proportion of variance of one variable that was predictable from another variable. The closer the R^2 is to 1, the better the fit of the model to the data (Giordano *et al.,* 2013). Finally, a Chi-square (χ^2) Test was used to establish the differences between the observed co-variances and the co-variances of the model *(ibid)*. This enabled the comparison of observed data with the expected data aligned to the hypothesized framework (Sharpe, 2015).

5.3.1.1 Non-Normality

There are a number of procedures for handling non-normal data, in case there are. for example bootstrapping (Kline, 2010). This procedure does a sub-sampling in the original sample (Bin *et al.,* 2016). However, it requires a sample larger than 40 (Ong, 2014). In this thesis, the sample size was appropriate for the procedure as the sample was larger than 1150. In addition, bootstrap Maximum Likelihood (ML) estimation as a procedure can be used (Hair *et al.,* 2010). This procedure is more robust against the violations of normality (Scott *et al.,* 2013). In this study, the data collected was found normal, hence no treatment on non-normality was sought.

5.3.1.2 Structural Equation Modeling

The survey responses were further subjected to advanced regression through Structural Equation Modelling (SEM). This was done for each sub-sample: *house wives, civil servants and students*. SEM assumes a confirmatory approach mindful of the fact that the structural theory is borne upon the phenomenon of interest (Byrne, 2010). It does more than what traditional regression models do (Carvalho & Chima, 2014). It does so owing to the multiple numbers of the independent and the dependent variables in a given set of regression. In addition, it tests the hypotheses on relationships among the observed and the latent variables *(ibid).*

In this thesis, SEM centred on three areas: Firstly, it was used to validate the hypothesized model through the assessment of the relationship between the latent constructs and the 20 observed variables underlying the constructs. Secondly, it attempted to fit the structural model through the estimation of the significance of the relationships. Often, this is achieved through a path analysis (Kaplan, 2009). Thirdly, it assessed the model validity. In this, SEM examined the degree to which the hypothesized model fitted the sampled data (Byrne, 2010). This depended on acceptable levels of indices of Goodness of Fit (GoF) (Hair *et al.,* 2010). In sum, SEM assesses how best the theory fits the data sampled *(ibid).*

Table 5-6: Model Fit Indices Benchmarks

GoF Index	Value
χ^2 and, probability value *(P-value)*	Relatively minimal χ^2, P-value > 0.05 (Byrne, 2010; Hair *et al.,* 2010;Hoe, 2008).
Normed Chi Square χ^2/ df	Less than 2.0 (Hair et al., 2010; Hoe, 2008)
Tucker-Lewis Index	Close to 0.95 (Byrne, 2010; Kaplan, 2009)
RMSEA	Less than 0.05 (Schumacker & Lomax, 2015; Brown., 2015)

To conduct this exercise, the *Analysis of Moment Structures* (AMOS) as the analytical tool was selected. Not only because it provided an array of statistical and graphical techniques needed, under the same roof, AMOS houses all the stages of data analysis (Coromina, 2014).

Using AMOS, the Chi-Square measured the overall fit of the model through assessing the divergence or the difference between the sample data and the expectation as informed by the hypothesis (Sharpe, 2015). While using AMOS as a statistical tool, Chi-square value is called

CMIN. If a model attains a good fit, SEM provides an insignificant Chi square at a benchmark of 0.05 (Byrne, 2010; Hair *et al.,* 2010). In fact, Chi-Square statistic is notably called a metric of bad fit (Kline, 2010) or lacking in fitness (Mulaik *et al.,* 1989). Though popular, a Chi-squared test has a number of stark drawbacks (Hooper *et al.,* 2008). It assumes a multivariate normality. In this aspect, even a properly specified model may be unfairly rejected (McIntosh, 2007). Also, given its sensitiveness to sample size, more often it rejects models for large samples (Bentler & Bonett, 1980). It is also worth noting that in the cases of small samples, it lacks statistical power. It therefore may fail to separate between a good and a poorly fitted model (Kenny & McCoach, 2003), hence researchers have sought for alternative or more advanced forms of the Chi-square test. This includes a relative Chi-square, often referred to as a normed Chi-square. The normed Chi-square is arrived at by dividing the Chi-square value by the degrees of freedom (df). It is less sensitive to the sample size (Moss, 2016). Hair *et al.* (2010) argue that for a model to be accepted as meeting the fitness criterion, the value of the normed Chi square should be less than 2. In addition, Tucker-Lewis Index (TLI) is also reasonably independent of the sample size. Models with TLI values that are close to 0.95 are considered fit (Byrne, 2010; Kaplan, 2009; Tucker & Lewis, 1973).

Further, there is the Root Mean Square Error of Approximation (RMSEA), which favours parsimony (Hooper *et al.,* 2008). In this context, a parsimonious model is that which is able to estimate the reality under investigation with the least set of assumptions and parameters but able to offer the greatest explanatory power. For an acceptable model, RMSEA should be less than 0.05 (Schumacker & Lomax, 2015; Brown, 2015).

5.3.2 Document Review Data Techniques

The secondary data was captured in Microsoft Excel (MS Excel) from the historical records and documents in a standard Document Form *(Appendix R)* of over 1200 entries and analyzed in STATA. Though STATA is largely for time-series econometric analyses, it houses an integrated package of cross-sectional panel data and forecasting analyses.

In this research, the descriptive as well as the inferential statistical modelling were used to examine and analyze the secondary data. The descriptive statistics described the basic characteristics contingent upon the data collected while inferential modelling was aimed at reaching conclusions that extend beyond the immediate data on the basis of conceptual framework in Section 4.2. Prior to data analysis, some diagnostics were conducted on the secondary data.

5.3.2.1 Stationarity Analysis

This is a mathematical technique that attempts to establish whether a statistical character of a variable does vary with time (Baltagi, 2013). The characters may include variances, confidence intervals, means, coefficient of variations or biases. Data that is non-stationary is more often unreliable and cannot be modelled *(ibid)*. Cognizant of this, an initial phase in any study involving a time series or a panel data is to conduct the analysis by establishing the order of integration of the variables of interest (Handa & Ghebre Kahsay, 2011). This is achievable through a test for non-stationarity and co-integration. These enable the addition of cross sectional dimensions on the time series. Though this increases the data base, it enhances the power of testing and estimation by modelling the dependence structure (Mahadeva & Robinson, 2004). So if the variables – *dependent or independent* – in the regression model are not stationary, then the regression estimates may be untrustworthy. In addition, the standard assumptions for asymptotic analysis are considered invalid. For instance, if the *'t-ratios'* cannot follow a *t-distribution*, this means a valid hypothesis testing cannot be undertaken (Baltagi, 2013).

Therefore, if the data is not stationary or is trending, two often used de-trending techniques are differencing and time trend regression (Hussin & Saidin, 2012). To render stationarity to the data, a unit root test was conducted. This determined if a non-stationary data should first be differenced or regressed against a function of time.

In terms of methodologies of unit root test, considering a size-adjusted power or the rate of rejection of a null hypothesis without a distortion in size, *Fisher-Type Test* performs better than *Im-Pesaran-Shin (IPS)* (Baltagi, 2013). However, in the presence of a linear time trend, the power of *Fisher-Type* and *IPS* tests sizably declines (Baltagi, 2013). *Levin-Lin-Chu (LLC)* performs better if time dimension is large relative to cross sectional dimension. Cognizant of these observations, Baltagi (2013) advocates for a need to analyze the outcome of both the *LLC* and the *IPS* test. In any case, *LLC* and *IPS* are the most popular unit root tests (Asghar *et al.,* 2011). Thus, *LLC* and *IPS* were adopted for this research.

5.3.2.1.1 Levin, Lin, Chu (2002)

In this test, two opposing hypotheses were examined, namely: (a) null hypothesis (H_0): each panel contains a unit root and, (b) alternative hypothesis (H_1): each panel is stationary.

LLC assumes that all panels have common (technically referred to as autoregressive) parameters, hence LLC does not provide for the possibility of only some sector or ministries' variables containing a unit root. It has to be all or none. The test explicitly presents the presumed behaviour of the set of panels and the time periods, and encompasses the fitting of an augmented Dickey-Fuller regression for each panel, providing for the lags chosen. Since LLC requires that the ratio of the number of panels *(N)* to time periods *(T)* tends to zero asymptotically $N/T \to 0$, it is not suitable for a large panel with a relatively small time period *(T)*. Following transformation by LLC conditions, the t-star statistic is normally distributed under the null hypothesis.

5.3.2.1.2 Im, Pesaran, & Shin (2003)

Im, Pesaran and Shin (2003)'s *IPS* test, unlike the *LLC*, is not so limiting and restrictive. In this test, the hypotheses are:

Null Hypothesis - H_0: each individual panel follows a unit root process and,

Alternative Hypothesis - H_1: some (not all) individual panels have a unit root.

Based on augmented Dickey-Fuller regression for each panel, IPS requires that the ration of N to T tends to zero *($N/T \to 0$)* for $N \to \infty$ where N is number of panels while T is time periods. Monte Carlo simulations for small samples presents IPS as better perfoming than LLC (Baltagi, 2013).

5.3.2.2 Panel Data Techniques

This thesis adopted a panel data form to investigate the relationship between investment in e-Government on one hand and, cost efficiency and size of public sector on the other hand. The analytical method presents a set of multiple regressions. The estimations of coefficients in the technique is done through pooled ordinary least squares (OLS), random effects (RE) or fixed effects (FE). The panel comprises of observations of a group or cross-sections *(ministries)* across time (Yaffe, 2003). In this thesis, this involved variables relating to Kenyan ministries over the ten-year period from 2004 to 2014.

The panel regression model in its general form was estimated as follows:

Equation 5-3: General panel regression model

$$Y_{it} = \beta_0 + \beta_1 X_{it} + \ldots\ldots\ldots + \beta_k X_{kit} + u_{it}$$

where Y_{it} is dependent variable, X_{it} represents the independent variable *(investment in e-Government in this case)*, $i = 1 \ldots\ldots N$ sectors or ministries, $t = 1 \ldots, T$ time periods, β_0 denotes the constant term, β_1 is the coefficient of independent variable while u_{it} stands for the error term.

The error term can be broken into two sets. This can be ministry- or sector-specific v_i and others of unknown peculiarities (Andreß *et al.,* 2013), otherwise known as random or an idiosyncratic error ε_{it}..

Equation 5-4: Error term function

$$u_{it} = v_i + \varepsilon_{it}$$

The specification of the empirical panel model is informed by the behaviour of the error term. This gives rise to three standard panel models derived from the general model 5-3. In this thesis, an assumption is also made to address the differences in regression coefficient across sectors (or ministries). Therefore, a panel data regression model was estimated by pooled ordinary least squares (OLS) , random effects (RE) or fixed effects (FE):

- In a pooled OLS, a constant intercept and slope are supposed. The model is estimated if there are no significant sector specific and time effects. Though the assumption about uncorrelated observations being constant is held, this model is inappropriate for a small time period (Gujarati & Porter, 2008). It takes the general form in Equation 5-5:

  Equation 5-5: Pooled OLS Model

  $$Y_{it} = \beta_0 + \beta_1 X_{it} + u_{it}$$

  Y_{it} is dependent variable, X_{it} represents the independent variable, $i = 1 \ldots n$ sectors or ministries, $t = 1\ldots, T$ time periods, β_0 denotes the constant term, β_1 is the coefficient of independent variables while u_{it} represents the error term.

  Basically, this is biased if the unobserved differences across the ministries under study, otherwise known as heterogeneity *(X_{it} and u_{it}),* are correlated.

- In the random effects model, it is presumed that the differences that are unobserved are not correlated with any of the independent variables - v_i are treated as random constant terms (Greene, 2012) where the intercept is also an outcome of a random variable. The model allows variables that do not vary with time. The equation is of the form 5-6:

  Equation 5-6: Random effects model

  $$Y_{it} = \beta_0 + \beta_1 X_{it} + v_i + \varepsilon_{it}$$

  Y_{it} is dependent variable, X_{it} represents the independent variable, $i = 1 \ldots\ldots N$ sectors or ministries, $t = 1\ldots\ldots, T$ time periods, β_0 represents the constant term, β_1 is the coefficient of independent variables while v_i is between-sector error and ε_{it} is within-sector error.

  Thus, v_i are assumed to be random variables and that the covariance, $cov\ (x_{it}, v_i) = 0$. However, if the covariance, $cov\ (x_{it}, v_i) \neq 0$, then the random effects estimator is biased. In this respect, this thesis used the Hausman test (as *discussed in section 5.3.2.2.1*) to determine the bias in the estimator of the random effects.

- The Fixed Effects model assumes constant slopes but different intercepts for cross sectional (group) units, and in this thesis, it is the individual sectors or ministries. The Fixed Effects model takes the following general form:

  Equation 5-7: Fixed effects model

  $$Y_{it} = \beta_1 X_{it} + v_i + \varepsilon_{it}$$

  Y_{it} is dependent variable, X_{it} represents the independent variable, $i = 1 \ldots\ldots N$ sectors or ministries, $t = 1\ldots\ldots,T$ time periods, β_1 is the coefficient of independent variables while ε_{it} is within-sector error. v_i is the unobservable sector-specific effects which differ between sectors but do not change with time, i.e. time-invariant.

5.3.2.2.1 Testing of Classical Model

From the above, there was a possibility of a model for a Fixed Effects (FE), Random Effects (RE) or Pooled OLS. Hausman specification test was used to determine the appropriate model choice between FE and RE (Hausman, 1978). Thereafter, Breusch & Pagan (1980)'s Langrange Multiplier (BP-LM) was used to determine whether FE or RE model is more appropriate than Pooled model or ordinary least squares (OLS). These tests helped in determining the consistencies and efficiencies in the estimators.

5.3.2.2.2 Panel Analysis as a Technique

From the above expositions, the benefits of using panel data analysis as an analytical technique are firstly, to enhance the accuracy of the estimations. Considering N x T where N is the number of ministries while t is time period *(2004 to 2014)* over which the data collected spans, the larger the size of the sample the lesser the error in the estimation. In addition, multi-collinearity which is a common challenge in the time series analysis is controlled in the panel framework (Baltagi, 2013; Balestra, 2011), due to a greater degrees of freedom as well as expanded variability (Hsiao, 2003). Therefore, the panel analytical framework allows for a better, a more reliable and efficient exploration of the issues leading to the cost efficiencies and sizes of the public sectors as a result of investment in e-Government in Kenya across the eight ministries over a period of 10 years.

5.3.3 E-Gov Conference Analytical Technique

Post-panel data and survey data analyses, e-Government user conference was held. The aim was to address the research problem through an analysis in participatory process. A supplementary agenda was to increase participants' sense of being in control so that they become reflective on the situations (Patton, 2010). To limit the levels of subjectivity, the use of 'thick, rich and deep descriptions' (Ryle, 1949; Yin, 2015) was adopted. The truth was assumed to be with the participants. This was meant to be collected through a rigorous and a highly focused deliberation (Kamberelis & Dimitriadis, 2013). The deliberations were on the basis of the focus as defined, hypothesis as formulated and preliminary findings as synthesized in a presentation in *Appendix E*. Following these, the results were negotiated and conclusions drawn.

Prior to the user conference, data triangulation was explored using the results from analysis of survey and document review data. This improved the results validity by informing the research a multiple vantage points (Creswell, 2003). In this intermediate phase, results from primary survey data were used to strengthen the results from secondary data analysis. These were further pooled, and presented to be *legitimized* in the conference exercise. This was deemed to present an increased validity through incorporating several viewpoints and methods (Yeasmin & Rahman, 2012). Through this, the overall results received more credence (Banister *et al.*, 2011).

5.4 Ethical Research Considerations

Ethical acceptability is vital during operationalization of research (Saunders *et al.,* 2015). This research addressed ethical issues as required (Babbie, 2010; Babbie, 1990). The study set out that *(1)* taking part in the research was not mandatory but by choice. Hence all the participants were duly informed of the choice. The respondents were informed of the choice to pull out of the study when they found it of necessity, *(2)* Participants' responses were treated with confidentiality and the information collected used solely for the academic research. In addition, their responses were coded to disguise identity. Similarly, objectivity guided the data handling and analysis process. This ensured that the data was appropriately interpreted, cognizant of the ontological and epistemological stances adopted.

Although the University of Cape Town required the researcher to seek permission from Ethics in Research committee prior to data collection *(Appendix A),* permission was also sought from relevant authorities to undertake the research in the public sector *(Appendix C).* Also, an introductory letter on the letterhead of the University of Cape Town vouching for the legitimacy of the research as argued by Bailey (1994) *(Appendix D)* was sought.

In addition, a research approval letter from Kenya's National Commission for Science, Technology and Innovation (NACOSTI) *(Appendix B)* was provided to the respondents. The letters presented the objectives of the study, assured the respondents of ethics levels held and the confidentiality of the data collected from them. Finally, of consideration also was the reciprocity of the research. This is to incentivize the respondents in return for information acquired from them (Creswell, 2011). This was provided as an option to reciprocate participants' effort by sharing the aggregate findings of the study if the participants showed interest *(ibid)*.

Figure 5-2 is a summary of the sequential multi-method process of the research as was conducted:

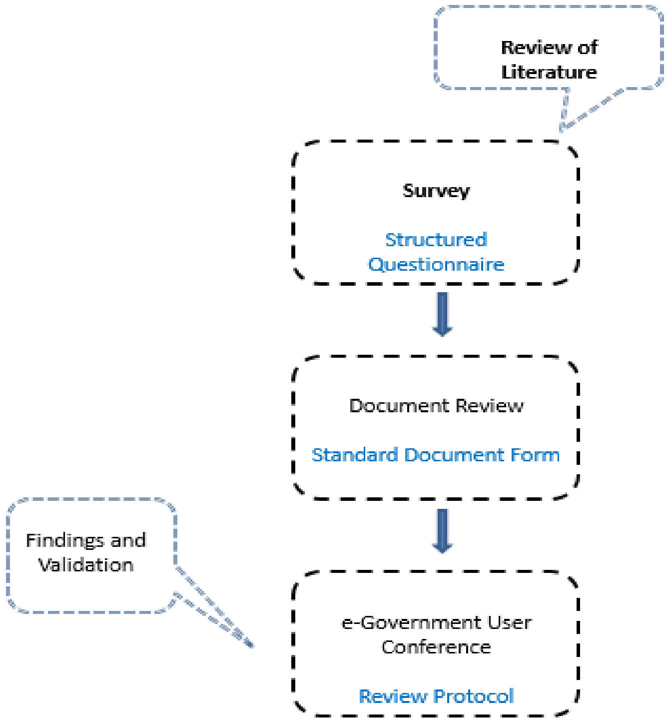


Figure 5-2: Sequential multi-method design

5.5 Conclusion

The chapter has presented the study's methodology, philosophical underpinnings, methods and methodological assumptions that were applied to adequately address the research problem. To address the objects of the study, positivism had been identified as a dominant epistemological view among other competing philosophical stances. Table 5-6 summarizes the research methodology:

Table 5-7 Research Methodology

Component	Choice
Domain	e-Government Value Theoretical Perpectives
Ontological stance	Objectivism
Epistemological stance	Positivism
Approach to research	Deductive
Design	Sequential mixed methods
Data type	Quantitative and Qualitative
Instruments	Closed ended questionnaire, document review, conference protocol
Unit of Analysis	Individual and Sector/Ministry Level

6 CHAPTER SIX: DATA ANALYSIS

If you torture the data long enough, it will confess.
– Ronald Coase, Economist

This chapter presents the results of data analyses as underpinned by the theories, research methodology and the methods applied. The chapter intends to accomplish the objective of answering the general question of the research, *'What public value(s), if any, result following investment in e-Government in Kenya? Considering the investment levels in e-Government, what is the direction of the relationship and the extents thereof?'* In order to answer the question, this study used both primary and secondary data.

To start with, the chapter highlights the data preparation procedures and the descriptive statistics. The chapter is organized in the order of research objectives. Firstly, the public value resulting from investments in e-Government is explored then the resulting cost efficiency and performance impact are estimated. Further cost efficiency and performance impact are again estimated accounting for the intervening variables as explained in the conceptual model.

6.1 Data Preparation

In this phase, data was checked for accuracy, missing values as well as transforming them so that their informational meaning is best represented (Gandomi & Haider, 2015)

6.1.1 Survey Data

The data was collected through the administration of the structured questionnaire to civil servants, university students and housewives by the research assistants engaged. Prior to data analysis, some diagnostic tests were conducted on data that was collected.

6.1.1.1 Reliability and Validity

6.1.1.1.1 Cronbach's Alpha

In this research, a reliability test was conducted on the 20 items used to measure the public value of e-Gov Investment in Kenya. The reliability test measured how constructs were used or may be used in replicating the research in a similar manner. In this study, internal consistency was used to establish that the constructs could, to a large extent, be used to construct a more similar outcome. The reliability results are as presented in Table 6-1:

Table 6-1: Cronbach's Alpha

Cronbach's Alpha	Cronbach's Alpha based on Standardized Items	No. of Items
0.864	0.865	20

The overall score of Cronbach Alpha (α) for the variables used to predict the public value was found to be reliable. α ≥ 0.600 is normally considered as acceptable (Tseng *et al.,* 2006). In addition, Hair,*et al.* (2010) conjecture that any construct with a score value exceeding 0.7 presents an adequate and an acceptable reliability level. Hence, the overall score based on 20 items *(α =0.865)* is a reflection of the desired outcome. The need to define better scores for the Cronbach Alpha was not necessary as the scores on each construct showed a good indication of reliability. It was above the recommended threshold.

6.1.1.1.2 Inter-Item Statistics

The Cronbach Alpha computed above is considered sensitive to the scale length or number of measures in the scale (Cronbach, 1951). Under such circumstances, the researcher finds it appropriate to report the mean inter-item correlation for the items to lend more credence to the reliability of the scales used. The recommended inter-item correlation threshold is between 0.2 and 0.5 (Briggs & Cheek, 1986) or 0.15 to 0.50 in case the measures are on higher order constructs (Clark & Watson, 1995). In this research, the corrected inter-item correlation was found within both thresholds *(Appendix I).* The scale was thus considered valid and reliable. This estimated the extent to which the scale items assessed the same content (Cohen & Swerdlik, 2005). The results suggested that while the scale items may or may not be homogeneous, they contain unique variances sufficient enough not to be isomorphic with each other. Further, Table 6-2 shows the scale items relationships of the variables of concern:

Table 6-2: Correlation Matrix

Variable	Pearson Correlation	Sig. (2-tailed)	N
quality1	1.000		1156
quality2	.533**	0.000	1137
delivery1	.425**	0.000	1151
delivery2	.271**	0.000	1135
governance1	.198**	0.000	1140
governance2	.196**	0.000	1116
efficiency1	.110**	0.000	1146
efficiency2	.147**	0.000	1127
openness1	.286**	0.000	1143
openness2	.121**	0.000	1138
responsiveness1	.281**	0.000	1140
responsiveness2	.186**	0.000	1140
equity1	.256**	0.000	1144
equity2	.158**	0.000	1144
trust1	.118**	0.000	1106
trust2	.144**	0.000	1106
democracy1	.172**	0.000	1110
democracy2	.076**	0.011	1105
esustainability1	.226**	0.000	1121
esustainability2	.145**	0.000	1119
esustainability2	.145**	0.000	1119

** implies significant at 1%

From the results above, all the variables were found positively and substantially related at 1%.

6.1.1.1.3 Item-Total Statistics

The item total statistics is normally used to examine for variables that undermine the reliability of the required constructs. But then, after scrutinizing the item-total statistics table, there were very minimal changes to the Cronbach Alpha score if subsequent scales were deleted. The changes seen did not deviate much from the overall score, α =0.865. The scores achieved exceeded the cut-off of 0.7. Therefore, the scales and the constructs were considered reliable. The details of these results are in *Appendix I.*

6.1.1.2 Normality Test

Following the administration of the survey questionnaire, normality test was conducted to ascertain whether the data had a normal distribution characteristic (George & Mallery, 2011). In the survey data, this was achieved using two approaches: 1) Quantile-Quantile (Q-Q) Plots, and 2) Histogram curves to estimate the distribution parameters. The scale of the items was in the range of 1 to 5, providing a mean of 2.5. For a normal distribution, the location of a Q-Q plot should be between 2.0 and 3.0 or exactly 2.5. It is observed that all measures were normally distributed on Q-Q plots *(Appendix J)* as well as on the histogram curves *(Appendix K).*

6.1.2 Document Review Data

Data preparation exercise was conducted prior to secondary data analysis. This included the examination of the data collected using the form in *Appendix* R, followed by Stationarity Analysis.

6.1.2.1 Missing Data Analysis

This was conducted because a significant effect on data analysis may arise due to missing or incomplete data. This may adversely impact on the results. Though addressing the issue of missing data is not the principal focus of the research, it is mandatory to address this lest the results appear prejudiced, wanting in prediction power and undependable (Schafer & Graham, 2002). A rule of thumb is that an upper threshold should be 10% of missing data in any analysis column. However, a less restrictive rule puts the threshold at 20% (Hair *et al.,* 2010). The research focused on eight key ministries over a period of 10 years. Table 6.3 shows the missing data analysis for the independent, the intervening, and the dependent variables for secondary data.

Table 6-3: Missing data percentages (N=80).

Variable	Missing Data Percentage
Total Personal Income	0%
Gross Domestic Product (GDP)	10%
Re-based GDP	0%
Population	0%
Total Expenditure	11%
Development Expenditure	15%
Recurrent Expenditure	15%
Governance Index	0%
Consumer Price Index	0%
Inflation	0%
e-Government	10%

From the foregoing, all variables did not exceed both the thresholds. Therefore, there was no justifiable need to explore a method of handling missing data.

6.1.2.2 Stationarity Analysis

To enhance the power of testing and estimation, the dependence structure of the data was modelled (Mahadeva & Robinson, 2004), through the process of unit root testing. This was to establish their conditions of stationarity. The non-stationary series was differenced. In panel data estimations, trending data yields non-sensible or 'spurious' results (Baltagi, 2013).

In panel data, following Baltagi (2013)'s argument in Chapter Five and Hoang & McNown (2006), there is a need to analyze the stationarity conditions. For the sake of robustness in methodologies of choice, both methodologies are explored. In any case, *Levin, Lin, Chu (LLC)* and *Im, Pesaran, Shin (IPS)* are the most popular unit root tests (Asghar *et al.,* 2011).

6.1.2.2.1 Levin, Lin, Chu (2002)

In this test, the hypotheses were H_0: each panel contains a unit root *(null)* and H_1: each panel is stationary *(alternative)*. LLC assumes that all panels have common parameters, hence LLC does not provide for the possibility of only some sector or ministries' variables containing a unit root.

6.1.2.2.2 Im, Pesaran, & Shin (2003)

In this test, the hypotheses are - H_0: each panel follows a unit root process *(null)* and H_1: some (not all) individuals have a unit root *(alternative)*. IPS test is a robust test in econometrics for the analysis of long-run panel data relationships (Asghar *et al.,* 2011).

In Table 6-4 are the results following the stationarity analysis:

Table 6-4: Unit Root Test

Variable	**Levin, Lin, Chu**	**Im, Pesaran, Shin**	**Conclusion**
Total Expenditure	-4.1820 ****	-1.5686*	I(0) with individual intercept
Total Budget	-16.3738****	-2.3788***	I(0) with individual intercept and trend
Log of per capita Recurrent Expenditure	-3.1835***	-1.5079***	I(0) with individual intercept and trend
Total Recurrent Budget	-16.2135***	-3.2079***	I(0) with individual intercept and trend
Log of per capita e-Government Expenditure	-12.1013***	-5.9218***	I(0) with individual intercept
Total Development Expenditure	-8.7976***	-3.3975***	I(0) with individual intercept
Total Development Budget	-4.7598***	-2.5125***	I(0) with individual intercept
Consumer Price Index (1966=100)	-12.5199***	-2.3694***	I(0) with individual intercept and trend
Log of per capita GDP	-15.5341***	-7.4764***	I(0) with individual intercept
Performance (Size)	-2.25**	-1.39*	I(0) with individual intercept
Governance Index – Political Stability	-8.1060***	-5.0063***	I(0) with individual intercept
Governance Index – Regulatory Quality	-7.5321***	-2.2638***	I(0) with individual intercept
Governance Index – Rule of Law	-6.0050***	-0.0399	I(0) with individual intercept and trend
Governance Index – Effectiveness	-25.1327***	-6.1063***	I(0) with individual intercept and trend
Governance Index – Corruption	-6.0215***	-2.1684**	I(0) with individual intercept
Governance Index – Accountability	-4.2330***	-1.9552**	I(0) with individual intercept

*Note: *,*** , and *** indicate significance at 10%,5% and 1% levels, respectively.*

The results of unit root tests indicate that all variables are stationary *(I(0) data series are trend stationary)*. There is therefore no need for testing for co-integrating relationships among the variables. In addition, it is evident that the inclusion of sector/individual intercept, which in this research is the *'government ministry'*, helps make the series stationary. From the discussions in Chapter Five, this indicates in part that a fixed effects model may be the appropriate analytical model. However, to achieve robustness, appropriateness of all the three models, i.e. the pooled model, the random effects model and the fixed effects model, were empirically tested under panel data estimation.

6.1.2.3 Choice of Appropriate Model

In testing for the appropriateness of the three models, the choice of model depends on the extent of the intercept homogeneity, coefficients of the slope and the extent to which any individual cross-sectional *(or ministry)* effects are correlated with the independent variable *(investment in e-Government)*. In this case, there are three different models to be explored.

First is a consideration for a pooled model that combines all the time series components and cross-sectional elements and run a least-squares estimation. It assumes a single intercept and a single slope coefficient. A standard pooled model is depicted by model 6-1:

Equation 6-1: Standard pooled model

$$Y_{it} = \beta_0 + \sum_{j=1}^{k} \beta_j X_{jit} + \varepsilon_{it}$$

Y_{it} is the dependent variable for cross-section i at time t; X_{jit} is a vector of j observed independent variables for cross-section i at time t; β_0 is a common intercept for all cross sections and β_j is a vector of slope coefficients that are not different across cross-sections. This model assumes a homogenous behaviour of all the ministries under consideration *(cross sections)*. The term ε_{it} captures the random disturbances in the model. Second is a consideration of improvement of the pooled model. This is called a fixed effects model. This model exists in five different variants: *(i)* individual fixed effects model that assumes same slope for cross-sections *(ministries)* but varying intercepts across *cross-sections,* but not across time *(2004 to 2014)*; *(ii)* time-fixed effects model that assumes same slope coefficients across individual cross-sections and time, and intercepts vary across time but not across individual cross-sections; *(iii)* two-way fixed effects model that assumes same slope coefficients across individual cross-sections and time but intercepts differ across cross-sections and time; *(iv)* fixed effects model with varying slopes and intercepts over cross-sections but not time; *(v)* fixed effects model with varying slopes and intercepts overtime and across cross-sections.

However, a typical fixed effects model is depicted by the model in Equation 6-2:

Equation 6-2: Fixed effects model

$$Y_{it} = \beta_0 + \sum_{j=1}^{k} \beta_j X_{jit} + a_i + \partial t + \varepsilon_{it}$$

Y_{it} is the dependent variable for cross section *i* at time *t*; X_{jit} is a vector of *j* observed independent variables for cross section *i* at time *t*; β_0 is a common intercept for all cross sections and β_j is a vector of slope coefficients that are not different across - cross sections. While ε_{it} captures the random disturbances in the model, a_i is a measure of the unobserved cross-sectional heterogeneity, and ∂t captures time effects on the data.

There are two main variants of fixed effects model: within-group model and between-group model. A within-group model uses deviations from averages *(through time)*. Model 6-3, which is a modification of model 6-2, shows a within-group fixed effects model:

Equation 6-3: Within group fixed effects model

$$Y_{it} - \overline{Y_i} = \sum_{j=1}^{k} \beta_j X_{jit} - \sum_{j=1}^{k} \beta_j \overline{X}_{ji} + \partial(t - \bar{t}) + \varepsilon_{it} - \overline{\varepsilon_i}$$

Y_{it} is the dependent variable for cross-section *i* at time *t*; X_{jit} is a vector of *j* observed independent variables for cross section *i* at time *t*; β_0 is a common intercept for all cross sections and β_j is a vector of slope coefficients that are not different across - cross sections. While ε_{it} captures the random disturbances in the model, ∂t captures time effects on the data. In this model, it is evident that the intercept and the time invariant components are eliminated. $\overline{Y_i}$, $\overline{X}_{ji}$ and $\bar{t}$ are respective cross-sectional averages computed across time. On the other hand, the between-groups fixed effects model uses variable changes over time, as shown in model 6-4:

Equation 6-4: Between group Fixed Effects Model

$$Y_{it} - Y_{it-1} = \sum_{j=1}^{k} \beta_j (X_{jit} - X_{jit-1}) + \partial(t - (t-1) + \varepsilon_{it} - \varepsilon_{it-1}$$

$\boldsymbol{Y_{it}}$ is the dependent variable for cross-section *i* at time *t*; X_{jit} is a vector of *j* observed independent variables for cross section *i* at time *t*; β_j is a vector of slope coefficients that are not different across - cross sections. While ε_{it} captures the random disturbances in the model, ∂t captures time effects on the data. Thus, model 6-4 can be summarized as model 6-5:

Equation 6-5: Modified between group fixed effects model

$$\Delta Y_{it} = \sum_{j=1}^{k} \beta_j \Delta X_{jit} + \partial + \varepsilon_{it} - \varepsilon_{it-1}$$

It is evident that while the between group fixed effects model eliminates the intercept and time-invariant variables; it also introduces autocorrelation in the system, autocorrelation being the correlation between two values of the same variable but at different times, say t_i and t_{i+1}. In this regard, the estimation of the model requires a control for autocorrelation. The within-group and between-group models estimation results facilitate a decision to either introduce cross sectional or time dummies in the fixed effects model of interest. As a rule of thumb, if R-squared *(R^2)* generated from the between-groups fixed effects model is higher than that generated from the within-groups r-squared *(r^2),* then time is an important factor. This was done to attempt an estimation of the effect of time lag in realising the effects of e-Government investments. To note is that such investments may sometimes translate into efficiency gains only after a time lag (Gatautis *et al.,* 2015). This meant time dummies should be introduced. The reverse would imply that cross sectional effects / individual effects are more important and, as such, dummy variables capturing cross sections should be introduced (Baltagi, 2013).

Third is a random effects model. This considers that the unobservable heterogeneity *(a_i)* is embedded in the random disturbance or an error term, as depicted in model 6-6:

Equation 6-6: Random effects model

$$Y_{it} = \beta_0 + \sum_{j=1}^{k} \beta_j X_{jit} + \partial t + \upsilon_{it}$$

Y_{it} is the dependent variable for cross section *i* at time *t*; X_{jit} is a vector of *j* observed independent variables for cross section *i* at time *t*; β_j is a vector of slope coefficients that are not different across cross-sections.

While ∂t captures time effects on the data, $\upsilon_{it} = a_i + \varepsilon_{it}$, with the assumptions that *mean of* υ_{it} = *Mean of* $(a_i + \varepsilon_{it})$, *Variance of* υ_{it} = *variance of* a_i + *variance of* ε_{it}, i.e. $\delta_{\upsilon_{it}}^{\ 2} = \delta_{a_i}^{\ 2} + \delta_{\varepsilon_{it}}^{\ 2}$. If the ratio $\delta_{a_i}^{\ 2} / (\delta_{a_i}^{\ 2} + \delta_{\varepsilon_{it}}^{\ 2})$ is large or when $\delta_{a_i}^{\ 2} > \delta_{\varepsilon_{it}}^{\ 2}$, then there is heterogeneity (*observable effect*), otherwise there is no heterogeneity.

However, it is noteworthy that the parameters and computations above were run through statistical commands in STATA as the analytical software. STATA is largely for time-series econometric analyses; but it houses a robust and an integrated package of cross-sectional panel data and forecasting analyses that is considered suitable for this kind of panel.

6.1.2.4 Specification of the Empirical Model

To facilitate the choice between a pooled model and random effects models, or between a fixed effect and a random effects model, two main tests were considered: *Breusch Pagan Langrange Multiplier (BP-LM)* and the *Hausman*. Hausman specification test was used to determine the appropriate model choice between fixed effects (FE) and random effects (RE) (Hausman, 1978). Thereafter, Breusch and Pagan (1980)'s *BP-LM* was used to determine whether FE or RE model is more appropriate than pooled model.

In particular a *fixed effects model* assumes the individual or time specific effects to be fixed. This requires the use of dummy variables to account for individual cross-section or time effect. However, with too many dummy variables a risk is possible to have the regression of reduced degrees of freedom. In addition, multi-collinearity may be aggravated by adding the dummy variables in the analyses. However, this was avoided by assuming that the unobservable effect is random (Baltagi, 2013). In the above respect, fixed and random effects models were empirically tested to establish which was consistent for the analysis.

The results are presented in *Appendix N* and *Appendix O*. Therefore, the next sections present the descriptive and inferential analysis of survey *(primary)* data followed by document review *(secondary)* data, following the diagnostics in section 6.1:

6.2 Descriptive Statistics

6.2.1 Survey Data Overview

The data was collected through a survey using structured questionnaire. This was to address the research Question I. In total, 1176 respondents were interviewed in the three strata, comprising students, housewives and civil servants across ministries of the Government of Kenya. Though the sample size was 1151, the questionnaires administered were 1200. According to Baruch (1999), this translated to an acceptable response rate. This was achieved since majority of the research assistants employed the *'drop-&-pick'* tactic (Ibeh *et al.,* 2004). Indeed, higher response rates present a higher statistical power (Baruch & Holtom, 2008) and offer a greater credibility for the findings among stakeholders (Rogelberg & Stanton, 2007).

Using PASW 20 *(or SPSS),* demographics was analyzed along age, stratum, education level, income level and gender. Among the respondents interviewed, majority were students accounting for 441 (38 per cent), housewives were 91 (33 per cent) and civil servants were 340 (29 per cent). Of the 340 civil servants, 65 per cent were non manager level officers while the remaining 35 per cent comprised manager level officers. In terms of gender, 58 per cent of the respondents were female while 42 per cent were male. This is consistent with the gender distribution of the country as presented by CIA: World Fact Book (2016); hence the sample formed an adequate representation of the general population. In terms of the age structure, the majority were in age brackets of 21-30 (46 per cent), followed by 31-40 (25 per cent). Respondents aged 40 and below were slightly more than 90 per cent compared to those aged 51 and above that accounted for less than 5 per cent of the entire sample. This implies that the respondents were generally young. For this research, this was unexpected but interesting. Indeed, the African population is predominantly the young (Kabiru *et al.,* 2013), which may explain the witnessed technology exuberance (Kizza, 2013) in Kenya.

Further, in terms of education, the majority of respondents were fairly educated with approximately 52 per cent holding at least a diploma as an academic qualification while 46 per cent had either primary (5 per cent) or secondary level of education (41 per cent). According to CIA : World Fact Book (2016), while 81.1 per cent of males can read and write, 74.9 per cent of females can do the same for the ages of 15 and above. The findings also appear to be consistent with the extant literature *(ibid).* In addition, in terms of income, the majority (54 per cent) of the respondents interviewed had a monthly turnover of at most Ksh 10,000 (≈ USD 100) while those earning above Ksh 30,000 (≈ USD 300) per month represented about 15.9 per cent. Specifically, 84 per cent of students and 65 per cent of housewives had a monthly income of at most Ksh 10,000 (≈USD 100). In addition, approximately 28 per cent of the civil servants earn between Ksh 20,001-30,000 (≈USD 200-300) per month. Civil servants earning above Ksh 30,000 were approximately 51 per cent with only 4 per cent earning a monthly income of Ksh 80,000 and above (≈USD 800 and above). While none of the housewives earned above Ksh 70,000 (≈USD 700 and above) a month, 65% recorded earning at most Ksh 10,000, 29 per cent earned Ksh 10001-20000 (≈USD 100-200); 5 per cent earned between Ksh 20,001 and 30,000 (≈USD 200-300). Only 1 per cent earned above Ksh 30,000 (≈USD 300) a month. It is thus evident that majority of respondents have at least a monthly income, however minimal. However, considering the number and sizes of households in Kenya, this is consistent with the contention that a fair share of individual inhabitants in sub-Saharan Africa still survive on less than USD 1.25 a day. This is a core characteristic of Africa, that features the lowest GDP per capita in the world (Winther & Henriksson, 2013; Akobeng, 2016). Indeed, considering the cost of accessing the digital services in Africa, this income level informed the choice of stratification of the sample. In fact, the stratum of housewives, Wang (2014) and Burrell (2010), conjecture is that it aims at recovering the analysis limitation that such a research might have on the vulnerable in the society. In most digital inclusion studies, this includes the disabled, the very poor and the citizens residing in the rural settings (Hechavarria, 2014; Burrell, 2010).

Of 441 student respondents, 60 per cent were male while 40 per cent were female, of the 340 civil servants, 51 per cent male and 49 per cent female. Though this is considered as almost balanced, women are still less. In this light, Kirai (2013) argues that the figures in civil service could be explained by the women's career progression in the government ministries, which she theorizes as having been hampered by gender stereotype, social cultural beliefs and organizational bureaucracies. Emerging also from the data is that majority of students interviewed were between the ages 21-30 (52 per cent), with four students out of the 439 interviewed aged above 40 years.

In the civil service, 42 per cent was aged between 31-40 years and 6 per cent was under 20 years of age, majority of whom in the non-managerial roles. This informed the research on the perception of the public value among the civil servants who are not top decision makers in the public sector. In addition, 0.5 per cent of civil servants were above 60 years. Though, the retirement age in Kenya's public service is 60, the government engages retired officers in special assignments on contract bases. In the case of housewives, approximately 45 per cent were in the range of 21-30 years in age, 7.2 per cent were in the range 41-50 years, 1.5 per cent were between 51-60 years, 31 per cent were between 31-40 years. The housewives were used in cognizance of Wang (2014) and

Burrell (2010)'s argument. This was to account for vulnerable class in the society *(ibid).* This is consistent with Chiyadzwa (2014)'s findings that though the elderly and the rural folks may be interested in the use of digital technologies, they are incompetent in terms of requisite skills. This reinforced the need to represent them into the research to understand the expectations and the perceptions of public value resulting at the cost of the public taxpayer.

In terms of level of education for the students, around 52 per cent of the students had secondary education, 27 per cent had a diploma. For the case of civil servants, 35 per cent had a diploma, 34 per cent had at least a Bachelor's degree while 17 per cent had either a Master's degree or a PhD. The majority of the civil servants with secondary or primary level of education were either clerical or drivers, hence in non-management roles. Still, their perception and expectation of e-Government was at the centre of the research whose general focus was the entire public. On the other hand, while 55 per cent of the housewives had secondary education, 24 per cent had a diploma while 9 per cent had a Bachelor's degree. This signifies a fairly educated sample. In Kenya education up to secondary level is considered basic, though Ogolla (2015) observes that women who are purely housewives have limited or basic education at best.

From the foregoing, it is evident that the sample of respondents was representative of the larger population of interest, in terms of the characteristics. Given the study focused on public value, this is in line with Moore's contention (1995) on the theory of public value management. He argues that 'public value' is the equivalent to 'private sector' shareholder value. Therefore, in designing policies in the public sector, attempts must be made not to respond to the interests of a single citizen, but an entire public *(ibid).* Under such circumstances, the perceptions of 'public' were represented by the strata – *civil servants, student and housewives* – interviewed.

The detailed cross-tabulations representing the descriptive analysis as discussed are given in *Appendix G.*

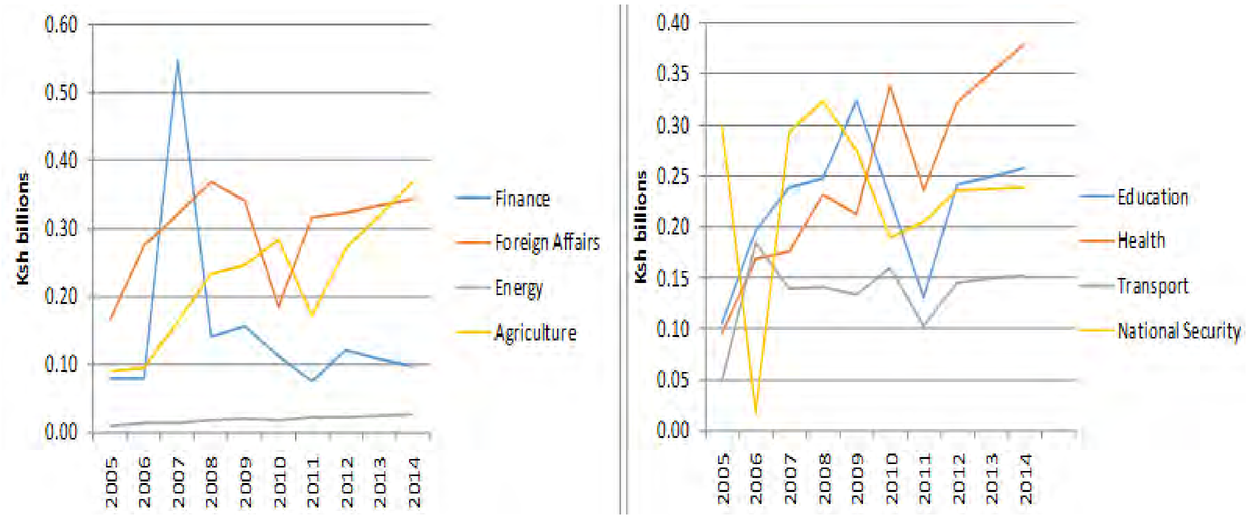
6.2.2 Document Review Data Overview

The review of the historical documents was meant to source secondary data. This was collected predominantly to address the research Questions II and III. The descriptive analysis was biased towards graphical presentation. This was useful considering the trends of the variables of interest over time (Minter & Michaud, 2003).

6.2.2.1 E-Government Expenditure

Table 6-5 is a representation of the trends in investments in e-Government in the eight (8) key ministries of focus, i.e. *Education, Health, Transport, National Security, Finance, Foreign Affairs, Energy* and *Agriculture.*

Table 6-5: Trends in e-Government Investment



There is a general trend of growth in all the eight ministries, except for a sharp decline in 2007 that *Finance* witnessed in investment in e-Government. This is attributed to the re-configuration of governance of ICTs in Kenya's public sector. The development and management of backbone ICT infrastructure as National Optic Fiber Backbone (NOFBI) was moved to the newly created Kenya ICT Authority, a semi-autonomous government agency. This role previously resided in the mainstream civil service, specifically under the Ministry of *Finance*. Further, the general trend in rise in e-Government expenditure is explained by the adoption of Kenya's ICT Policy in 2006. The policy paper envisioned 'a prosperous ICT-driven Kenyan society' with a mission to 'improving the livelihoods of Kenyans by ensuring accessible, efficient, reliable and affordable information services.' Following this, government enhanced budget allocation to address the mission in almost all ministries. Unfortunately, after the disputed elections of 2007, progress in the ICT arena almost slowed to a crawl (Bowman, 2010). This is evident in the decline which is noticeable in all ministries, but more severely in *Finance, Foreign Affairs,* and *Transport & Infrastructure.*

In August 2010 Kenya ratified a new constitution. The new dispensation challenged the information hegemony (Sihanya, 2012). The political implication was to enhance transparency, riding on the potential of ICTs to spur cross-sector collaborations and improve efficiency to drive the quality in public services (CoK, 2010). This prompted the government to review its investments in the general area of ICTs, and so post-2010, marking the start of the operationalization the new constitution, the investment in e-Government appears enhanced in all ministries with the exception of *Finance*. This is because of the continued re-organization of governance of public sector ICT in Kenya. Prior to this, the budget of public sector ICT resided in the Ministry of *Finance*.

In 2013, Kenyans voted a government christened *'digital government'* under Uhuru Kenyatta. Kenyatta underscored the fact that ICT in general is a crucial tool in reducing the cost of service delivery (Presidential Strategic Communication Unit, 2013). He observes that the cost of offering public service is high, and argues that this has led to a reduction in funds for critical national projects (Namunane, 2014; Anyanzwa, 2014). Mwangi's (2014) observation is that the exorbitant public sector expenditure is in wastage and corruption. Thus, the newly elected government's goodwill seems to explain the increased expenditure in e-Governance initiatives in almost all sectors of the economy, as informed by the ICT Master Plan 2013-2017 (Government of Kenya: MoICT, 2014). The projects that have been focused on include training of trainers portal, public literacy program via e- learning, school broadband connectivity program *(Education),* an integrated national health management system that aims at integrating all the health sub-systems *(Health),* transport information management system *(TIMS),* national spatial data infrastructure (NSDI) *(Transport and Infrastructure),* national persons registry system, integrated security, intelligence and surveillance system *(Security),* companies registration system, national payment gateway *(Finance),* online visa application system *(Foreign Affairs)* and national agriculture commodity exchange platform *(Agriculture).*

It is further evident that the e-Government expenditure in *Energy* is surprisingly low. This is explained by the fact that in Kenya, the Ministry of *Energy* focuses largely on policy. The management and implementation of infrastructural projects is delegated to the numerous semi-autonomous agencies under its ambit. The agencies include *Energy Regulatory Commission (ERC), Rural Electrification Authority (REA), Kenya Pipeline Company (KPC), Geothermal Development Company (GDC), Kenya Petroleum Refineries Limited (KPRL), Kenya Power (KP) Kenya Electricity Generating Company (KenGen), Kenya Electricity Transmission Company (Ketraco), National Oil Corporation of Kenya (NOCK), Kenya Nuclear Electricity Board (KNEB) and Renewable Energy Portal (REP).* To be noted that, for practical purposes, the focus of the research was mainstream public service and not semi-autonomous agencies and independent commissions under the ministries.

Overall, the mean annual investment in e-Government across the ministries over the 10-year period of 2004-2014 was Ksh 0.19 billion (≈USD 1,900,000), which is about 0.004% of 2014 GDP. In particular, over the period under study, the highest mean spending in e-Government was recorded by *Foreign Affairs* (Ksh 0.30 billion or ≈USD 3,000,000 annually) while the lowest was the *Energy* (Ksh 0.02 billion annually or ≈USD 200,000). This is surprising, but is the reality given the structure of governance of ICT projects in Kenya. In Kenya, Foreign Affairs is the mother ministry for the State Department of International Trade, and it is in this sector that large ICT infrastructural projects as Electronic Single Window System reside. This is a regional flagship project that has been going on for a while. It is anchored in Kenya's Vision 2030 and expected to benefit Kenyans, as well as regional economy, in savings made through enhanced efficiencies, optimized use of port space and reduced corruption (Kubai, 2015; Amoako-Tuffour *et al.,* 2016). While the *Energy* sector is to invest heavily in ICT projects in the digital era (Ahmed *et al.,* 2016; DeWit, 2015), as had been explained, these investments reside in the semi-autonomous government agencies which were not of focus in this study.

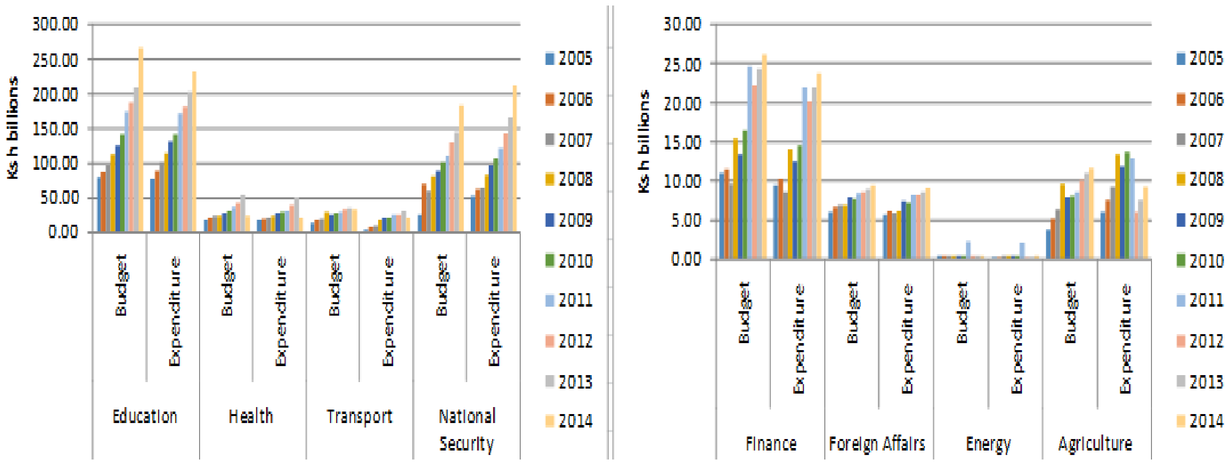
In addition, it is evident that in all ministries, investment in e-Government is on a general upward trend, despite the sizes of investments. This implies that the choice to leverage on investment in e-Government may be centrally determined in Kenya but the size of allocation to each sector is sector-specific. This is explained by the policy structures of public sector ICTs in Kenya. While policy guidelines are centralized at the Ministry of ICT in consultation with the Presidency, the development and management of e-Government budget specific to delivery of each sector's mandate is decentralized and reside in the sectors or ministries. This may infer sector-specific drivers of spending levels, thus justifying the need to carry out sector-level analysis at the inferential phase of the analysis.

Appendix Q contains a table presenting the central measures of the variables used in this research.

Further, the sectoral expenditure patterns show the highest allocations of government budgets in *Education and National Security*. This could be motivated by the fact that there would always be a strong feedback effects if the population is well educated. Education actually matters for national development (Ginsburg *et al.,* 2016). This serves other sectors in the provision of required human capital to serve the growing populace. On the other hand, *National Security* is a necessity to provide a suitable condition for the growth of the economy. In 2014, the actual expenditure surpassed the provision since the government invested intensively to combat terrorism and safeguard national borders. This impacted negatively on the governance index of the same year, considering a sub-component of the governance index used in this thesis is *political stability*, which measures the perception of the likelihood of violence, including terrorism. Similarly, *Finance, Foreign Affairs and Agriculture* received huge budgetary allocations. These allocations are justified on grounds of their contributions to Gross National Product (GNP). Indeed, Kenya's economic mainstay is Agriculture, which is the single largest sector contributor to the Gross Domestic Product (GDP) (Alila & Atieno, 2006; Kinuthia, 2009; Kimenyi & Kibe, 2014; World Bank, 2015). Considering that GNP summates GDP and the net income inflow from national's assets abroad, it follows that leveraging the diaspora population through *Foreign Affairs* is central to informing government performance and overall economic development (Chand, 2016).

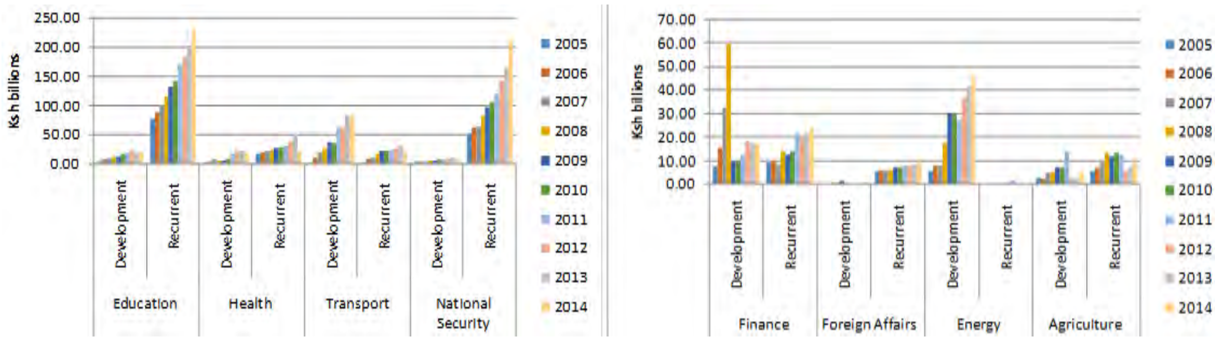
Table 6-6 is a representation of sector expenditures against the budgets across eight key ministries under the research investigation.

Table 6-6: Sector Budget Vs. Actual



Further, an analysis of the budget allocation and spending trends in e-Governance presents the capital component of ICTs investments as development expenditure. However, servicing of the equipment is considered a recurrent cost. Table 6-7 presents a comparison between total development and recurrent spending per ministry for the years under the examination:

Table 6-7: Sector development vs. recurrent Expenditure

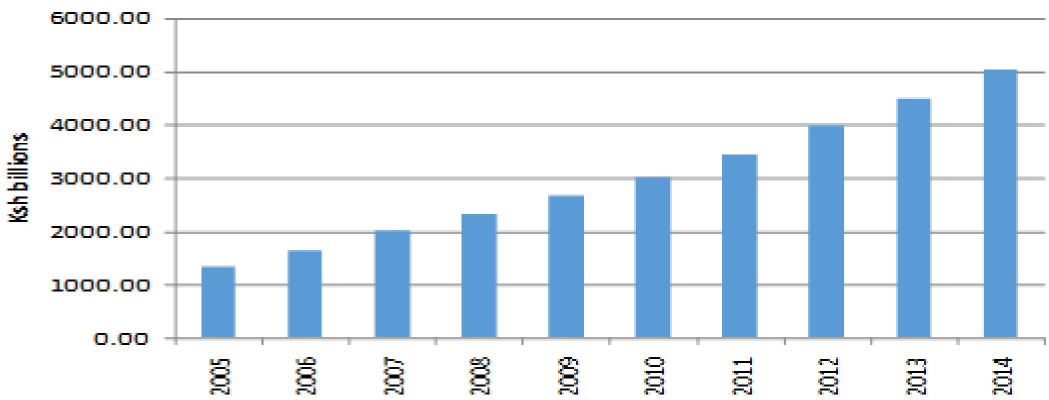


In the year 2008, the *Finance* development budget was around Ksh 60 billion. The better part of this budget was used in the e-Government Common Core Network (GCCN). Though in transition, e-Government Secretariat that was the implementing agency was domiciled in the *Finance*. Post 2008, the budgeting for e-Government programmes was decentralized to user ministries. This informs the sharp decline.

6.2.2.2 Analysis of Macro-Economic Variables

In this research, nominal Gross Domestic Product (GDP) was provided for in the model to control for the effects of business cycles (Bernanke & Gertler, 1989), which occurs due to the variabilities that economies experience over time. GDP captures total income in an economy, and since investment is a function of income, investment in e-Government is a function of national income. GDP performance has direct implications on the government revenue collections (Ghamdi, 1991) and this affects the funds available for investment, including investment in e-Governance. It is therefore expected that increased levels of GDP should result in increased levels of investment in e-Government, other factors being constant. Table 6-8 presents the GDP changes over the period of interest from 2005 to 2014:

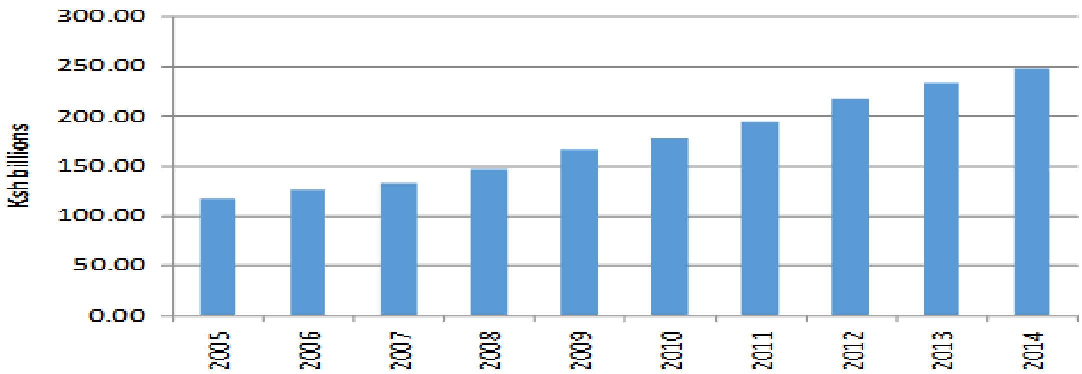
Table 6-8: GDP Trend 2005-14



There is a growth trend in Kenya's GDP over the sample period, hence an expectation of increased investment by government. This is evident in the rising investment in e-Government over the same period as depicted by Table 6-5.

On the other hand, since the study uses nominal values of expenditures, price effects are controlled for. This is done by factoring a measure of the overall pricing levels in the economy, which is the consumer price index (CPI). Table 6-9 presents the CPI changes over the same period:

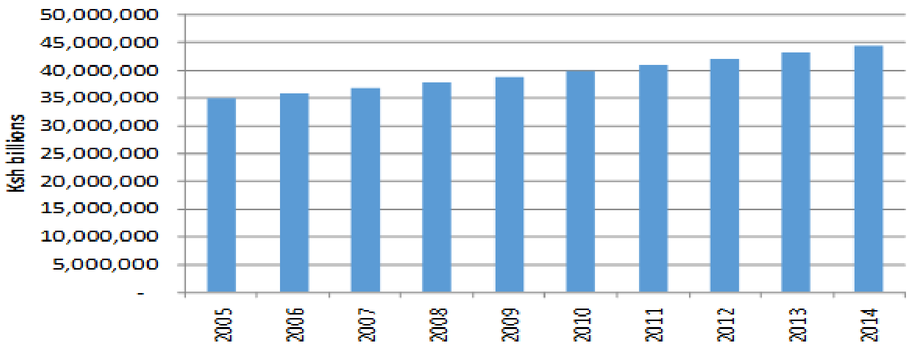
Table 6-9: CPI Trend 2005-14



It is evident that the general price level has been increasing, just as reflected in the GDP. Since CPI measures the weighted average pricing of a basket of services (Bundey, 2015), changes in CPI can be used to examine and gauge the price variations related to the cost of living. In this research, such effects on the expenditures are hypothesized.

Further, over time the total population in the country continues to grow steadily. While the trend reflects continued increase in the demand for government services, the government should in turn enhance its capacity to serve the growing population (Adam, 2016). In this analysis, a control is conducted for population expansion. This is done by conducting the analyses in per capita terms. In the following Table is a depiction of the growth of the population over the years under investigation:

Table 6-10: Population Trend 2005-14



6.2.2.3 Variables' Correlation Matrix

This analysis intended to establish whether and how strongly pairs of variables are related. Focusing on correlation coefficients that are significant at the 5 per cent level, total budget is significantly correlated with all other variables used in the study except expenditure on e-Government, and the sub-indices of governance on political stability, rule of law and accountability. However, among the significant correlation coefficients it is only the pairs between total budget and sub-indices on corruption and regulatory quality that are negative. This is consistent with expectations that, as corruption escalates and regulatory quality worsens, total budget allocations increase. Indeed, Fiorina and Noll (1978) theorize this occurrence as 'rent seeking' that leads to the growth of inefficiencies in administration. In fact, 'rent seeking' is a form of economic corruption (Gaskins, 2013), leading to a higher quantity, but not certainly a superior quality of the public service output.

In addition, GDP correlates positively with all non-governance related variables, except expenditures in e-Government. This implies that the investment in e-Government does not directly influence the country economy within the same period. GDP correlation with the effectiveness of government and adherence to the law is significantly positive, but negatively correlated to political stability, corruption, regulatory quality and accountability. Indeed, Lambsdorff (2010) asserts that increase in corruption lowers GDP, and of concern is that corruption is a factor of bureaucratic quality, and this is associated with the existing rule of law *(ibid)*. Thus, one possible solution could be to improve transparency of interactions in the public sector. This could reduce the discretionary power of public officials, and in return lower their preferential gains (Kochanova, 2015). Therefore, in the Bureaucracy under Information Asymmetry model, Banks and Weingast (1992) argue that agencies fare well where public officials' informational advantage is kept at minimum. There is a need to have monitoring technologies to shrink the information asymmetry to lessen the bureaucrats' gain (Franchino, 2006).

Similarly, with improved regulatory quality, where government formulates and implements sound policies that promote private sector development there is reduced spending by government. Considering Stoker's (2006) public value management concepts, such a level of regulatory quality is only achievable through public deliberation. This is enhanced within a networked governance approach where democracy and effective management are partners (Overeem & Tholen, 2011). In the long run, this ensures a constructive relationship between the public, the private sector and the government. The critical notion is that legitimate regulations fare well if the government partners with the stakeholders (Stoker, 2006). E-Government presents such a participation platform for all stake claimers (Vyas-Doorgapersad, 2011).

Further, population increase is positively and significantly related to government effectiveness and adherence to the rule of law. While the trend reflects continued increase in the demand for government services, the government in turn enhances its policies in various sectors to serve the growing population (Adam, 2016). Conversely, population correlates negatively with corruption, political stability, regulatory quality and accountability. As population increases there is greater strain on the working population occasioned by increased dependency (Niskanen, 1996). During times of resilient economy less motivation for rent-seekers exists. This is because returns on economic production are adequate. However, when economy recedes production becomes a challenge and rent-seeking spirals back (Marotta & Russell, 2013). This pushes the working population to 'rent seek' to support the increased population. This increases competition on available resources, but in return escalates tensions during political contests. This supports the earlier assertion that politics in Kenya is highly competitive (Bosire, 2010) and is one of the most expensive in the continent (Njanja, 2016). This may cause political instability. The increased competition worsens regulatory quality as negative politics become part of the drivers of national policy. Unfortunately, after the challenged and contested results of the 2007 elections, growth in the ICT sector slowed almost to a crawl (Bowman, 2010). *Appendix H* contains pair-wise cross-correlation coefficients of the variables used in this research.

6.3 Public Value

Following descriptive analysis in section 6.2.4, inferential modelling was conducted to generalize the resulting information on data to the population of interest. To be noted is that the research question I was formulated in confirmatory manner and was addressed using survey data.

For research question I, the study adopted ten indicator dimensions. These include: 'accuracy and up-to-date information,' 'online communication and online access to government document,' 'user-friendly web and non-technology-savvy web,' 'data sharing and lean staffing,' 'online filing of complaints and online display of government data,' 'online enquiries and online case tracking/follow-up,' 'access by the marginalized and supporting people with special needs,' 'security of government information and credibility of information exchanged,' 'providing information on upcoming public policies and online participation in policy making,' 'limiting duplication of resources and enabling recycling of consumables'.

6.3.1 E-Government Public Value Ranking

To be able to confirm the measured dimensions of public value in terms of importance to all cases of the respondents, the ordered results are presented in Table 6-11:

Table 6-11: Public Value Ranking

Item	N	Min	Max	Mean	Std. Deviation
online communication	1164	1	5	3.72	1.062
accurate information	1156	1	5	3.69	1.112
online enquiries	1154	1	5	3.61	1.134
limits duplication of resources	1138	1	5	3.58	1.284
enables recycling of consumables	1133	1	5	3.51	1.244
lean staffing	1137	1	5	3.50	1.138
data sharing	1161	1	5	3.48	1.206
up-to-date information	1146	1	5	3.47	1.175
user friendly web	1155	1	5	3.39	1.066
online access to government documents	1145	1	5	3.36	1.373
supports people with special needs	1156	1	5	3.32	1.265
online filing of complaints	1157	1	5	3.31	1.254
enables access by the marginalized	1157	1	5	3.22	1.307
online case tracking / follow-up	1151	1	5	3.09	1.245
security in government information	1122	1	5	3.06	1.262
credibility of information exchanged	1121	1	5	3.03	1.184
online display of government data	1149	1	5	3.02	1.302
none technology savvy web	1126	1	5	3.01	0.978
information on upcoming public policies	1126	1	5	3.00	1.306
online participation in policy making	1120	1	5	2.84	1.329
Total Averages	**1143**	**1**	**5**	**3.3105**	**1.2113**

In terms of rank, the respondents indicated *online communication, accurate information, online enquiries, limitation on duplication of resources, recycling of consumables and lean staffing* are of highest importance values that result following investment in e-Government. These results reveal that the citizens do value improved interaction with the government, enhanced cost efficiencies through lean management in terms of resource utilization and staffing (Gonzalez *et al.,* 2007; Nfuka & Rusu, 2011; Rose *et al*., 2015). Indeed, Stoker's (2006) in his postulation of the situation of public value argues for a need to change public sector to open systems. In such systems, processes are more transparent, more accessible and value for money is central. According to the public, e-Government can achieve this through minimizing wastages and lean service provision.

On the other hand, information on upcoming public policies and online participation in policy making are some of the public values that citizens perceive as relatively less critical outcomes of investments in e-Government. In fact, even access to government data, by the marginalized and those living with special needs, is fairly valued. Indeed, it was not until 2010 that Kenya ratified a new constitutional dispensation that challenged the information hegemony (Sihanya, 2012). The political implication was a need to spur collaborations in policy making (CoK, 2010). However, despite the provisions, it seems a larger constituency of citizens is ignorant or has no requisite capacity to engage the government in policy making to ensure that the crux of this is upheld (Murutu, 2014). In developing countries, skills shortage and technological capacities present a challenge to benefit from such a facilitative potential of e-Government (Amagoh, 2015).

6.3.2 Policy Participation

The participation and awareness of the public on ICT policy and e-Government strategy were tested. While 64 per cent of the respondents were aware of the existence of the national ICT policy, 62 per cent were aware of the existence of e-Government strategy. Despite this, only 19 per cent had been involved in public sector ICT policy debates in Kenya. This is illustrated below:

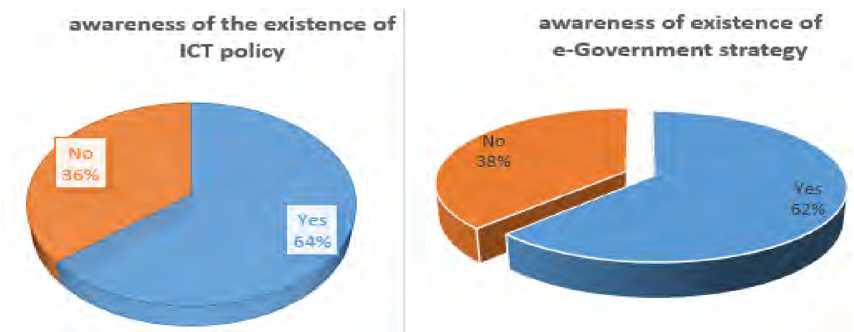


Figure 6-1: Policy and Strategy Awareness

Proportionately, 65 per cent of those aged between 31 and 40 were aware of the existence of the ICT policy. This percentage increases with age. This is similar to the awareness of the existence of the e-Government strategy. However, the involvement of those aged between 51 and 60 in ICT policy debates is at 45%. This involvement is relatively low among the categories in the younger age. This is expected as public servants are the major evaluators and executors of public policy (Pourkiani *et al.,* 2014). The students are just frequent users of digital infrastructures (Ayub *et al.,* 2014). In addition, a greater proportion of male than female is aware of the existence of the ICT policy, e-Government strategy and participate more in ICT policy debates in the public sector of Kenya. This further justifies the need for engendering ICTs and involving the Youth in related policy issues as espoused in national ICT policy (2006). The details of the proportions are presented in *Appendix L.*

Further, the study found that the interactions that the respondents have had with e-Government platforms or perceive as adding value to their well-being is mostly in the use of the government portals to carry out public sector jobs applications, e-procurement through Integrated Financial Management Information System (IFMIS), file tax returns, renewal of passport and driving licenses. This is what Stoker's (2006) public value model emphasizes as empowerment and partnerships in the creation of public values. In other words, there is need to align the authority, operational and administrative capabilities to create public value (O'Flynn & Alford, 2012). In the developing countries, there is a dire need to shift to such a paradigm of access to information (Vyas-Doorgapersad, 2011). Santos & Heeks (2003) propose a 'one-stop shop' to enhance delivery of the public services. E-Government can improve the public sector from such bureaucratic stagnation (Vyas-Doorgapersad, 2011; Bwalya & Healy, 2010).

On the other hand, the research finds that some of the outstanding issues in the implementation of e-Government in Kenya include lack of awareness, cyber insecurity, unfriendliness of the online portals, and little consideration of access by persons living with special needs as well as access in marginalized areas. Though e-Learning, e-Ticketing, i-Tax, IFMIS and Land Management Information Systems (LMIS) are some of the public sector ICT projects that featured as noble project conceptualizations of public sector ICTs, Biometric Voter Registration (BVR), e-Parking, and unfriendly websites are some of the projects that feature as bad examples as perceived by the public.

6.3.3 Structural Model Analysis

To confirm the hypothesized model of public value of investment in e-Government, structural equation modelling (SEM) was used in this research. SEM's framework for statistical analysis offers multivariate procedures as factor analysis and regression analysis (Hox & Bechger, 2007). The results can often be visualized by a graphical path diagram. In this regard, SEM is founded in path analysis, an invention of a geneticist, Sewall Wright (Wright, 1921).

In this thesis, SEM offered a suitable approach to put the hypothesized model to test (Hair *et al.,* 2010). The model was expressed using a set of latent and observed variables, with the relationships amongst them hypothesized. Thus, a fitness test against the sampled data was conducted to answer research question I based on the level of significance of 0.01. For this work, this model is built on the basis of the hypothesized structure in Figure 6-2:

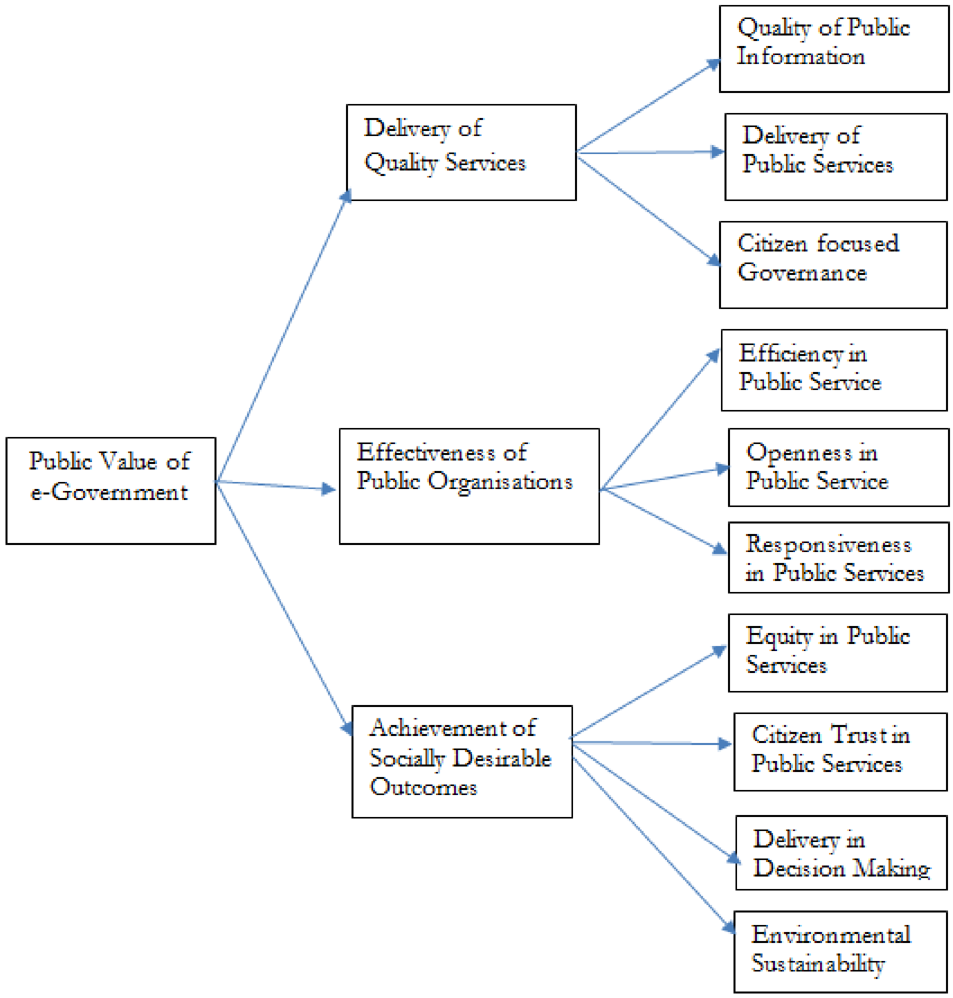


Figure 6-2: Hypothesized Framework

Following the decomposition of hypothesis H1 in section 5.1.2.3 into a set of 13 sub hypotheses as H1a to H1m, these relationships too were subjected to test:

Table 6-12: Public Value Hypotheses

Hypothesis	Description
H1 a	Delivery of Quality Services is reflected by Quality of Public Information
H1 b	Delivery of Quality Services is reflected by Delivery of Public Services
H1 c	Delivery of Quality Services is reflected by Citizen Focused Governance
H1 d	Effectiveness of Public Organizations is reflected by Efficiency in Public Service
H1 e	Effectiveness of Public Organizations is reflected by Openness in Public Service
H1 f	Effectiveness of Public Organizations is reflected by Responsiveness in Public Service
H1 g	Achievement of Socially Desirable Outcomes is reflected by Equity in Public Service
H1 h	Socially Desirable Outcomes is reflected by Citizen Trust in Public Service
H1 i	Socially Desirable Outcomes is reflected by Democracy in Decision Making
H1 j	Socially Desirable Outcomes is reflected by Environmental Sustainability
H1 k	Public Value of e-Government is reflected by Delivery of Quality Services
H1 l	Public Value of e-Government is reflected by Effectiveness of Public Organizations
H1 m	Public Value of e-Government is reflected by Socially Desirable Outcomes

In this analysis, SEM was used to test the hypothesized relationships relating the observed variables and the latent variables. The measured variable is shown in a rectangle, and is associated with measurement errors *(e_i)* in small ovals. In the model, the residual associated with a latent variable is (D_i) while the regression paths are shown using a single headed arrow to represent the hypothesized structural relationship. Through this, Raykov and Marcoulides (2000) observe that SEM explicitly separates 'true variance' from disturbances due to other factors, including errors committed during measurement. In this respect, 'the residual parameterizations afforded by SEM masks the limitations of a rather incomplete model' (Tomarken & Waller, 2005). In fact, an attempt to overlook the measurement errors compromises the validity and reliability of the observed data for the latent variables (Hair *et al.,* 2010). Using AMOS as the analytical software, the analysis was conducted in the three strata of Student, Civil Servants and Housewives prior to being conducted as a single case for the entire data set. Table 6-13 presents the Goodness of Fit statistics of the resulting measurement models:

Table 6-13: Goodness of Fit Indices

Fitness Index	Condition for good Model	All	Students	Civil Servants	Housewives
		(N=1172)	(N1=441)	(N2= 340)	(N3=391)
Chi Square	*Ho: Model fits the data if P-Values >0.05*	112.657	109.288	121.916	121.911
Df		106	103	100	99
P-Values		0. 311	0. 317	0.067	0.059
CMIN/DF	*CR or CMIN/DF <2*	1.063	1.061	1.219	1.231
Tucker-Lewis Index	*> 0.95*	0.999	0.996	0.985	0.982
RMSEA	*< 0.06*	0.007	.012	0.025	0.024
RMSEA (Lower)		0.000	0.000	0.000	0.000
RMSEA (Upper)		0.017	0.028	0.040	0.038

On the basis of the results in Table 6-13, in terms of validity the models fitted the sampled data for each of the cases – *students (P=0.317), civil servants (P=0.067)* and *housewives (P=0.059),* at *0.01* level of significance. Considering a model attains a good fit when a structural equation model presents an insignificant Chi square at a threshold of 0.05 (Byrne, 2010; Hair *et al.,* 2010; Hoe, 2008), the model fitted the data even when all cases were considered in the same dataset *(P=0.311).* This is due to the fact that χ^2 value with *P> 0.05* was obtained and this is adequate for a model fit (Hair *et al.,* 2010). In that respect, for all the models fitted, the study fails to reject the null hypothesis (*Ho: The model fits the data*).

Further, the estimates of the structural model were generated using AMOS. This was intended to confirm support for the paths in the multiple regression paths. Table 6-14 presents the model fit estimates for the regression paths in the model for the three cases – *student, civil servants* and *housewives:*

Table 6-14: Estimates in Path Analysis

	All Cases					Students					Civil Servants					House wives				
	Unstd. Est.	Std. Est.	S.E.	P	R^2	Unstd. Est.	Std. Est.	S.E.	P	R^2	Unstd. Est.	Std. Est.	S.E.	P	R2	Unstd. Est.	Std. Est.	S.E.	P	R2
EffectivenessPO < PublicValue	1.00	1.02			1.04	1.00	1.18			1.40	1.00	0.84			0.71	1.00	1.13			1.28
QualityPS < PublicValue	0.74	0.79	0.07	***	0.63	0.87	0.75	0.15	***	0.56	0.66	0.76	0.10	***	0.58	0.70	0.99	0.13	***	0.98
SocialDO< PublicValue	1.05	1.11	0.09	***	1.22	1.05	1.08	0.18	***	1.17	1.26	0.99	0.16	***	0.99	0.97	1.28	0.18	***	1.65
F1Quality < QualityPS	1.00	0.75			0.56	1.00	0.81			0.65	1.00	0.76			0.58	1.00	0.57			0.33
F2Delivery< QualityPS	1.01	0.96	0.07	***	0.93	0.88	0.95	0.09	***	0.91	1.13	1.00	0.14	***	0.99	0.78	0.79	0.14	***	0.62
F3Gov < QualityPS	0.85	0.73	0.06	***	0.54	0.66	0.65	0.08	***	0.42	0.93	0.80	0.13	***	0.64	1.05	0.68	0.15	***	0.47
F4Efficiency < EffectivenessPO	1.00	0.69			0.48	1.00	0.61			0.37	1.00	0.84			0.71	1.00	0.58			0.34
F5Openness < EffectivenessPO	1.19	0.79	0.08	***	0.62	1.18	0.67	0.15	***	0.44	1.25	0.99	0.12	***	0.98	1.24	0.66	0.18	***	0.44
F6Respon < EffectivenessPO	0.96	0.85	0.08	***	0.72	1.22	0.86	0.17	***	0.74	0.86	0.92	0.10	***	0.85	0.84	0.68	0.14	***	0.47
F7Equity < SocialDO	1.00	0.53			0.28	1.00	0.47			0.22	1.00	0.69			0.47	1.00	0.42			0.17
F8Trust < SocialDO	0.77	0.52	0.07	***	0.27	0.80	0.49	0.13	***	0.24	0.75	0.66	0.10	***	0.43	0.65	0.39	0.12	***	0.15
F9Democracy < SocialDO	0.76	0.44	0.07	***	0.20	0.64	0.35	0.12	***	0.12	0.64	0.60	0.10	***	0.36	0.86	0.36	0.16	***	0.13
F10ESustain < SocialDO	0.70	0.37	0.07	***	0.14	0.62	0.32	0.11	***	0.10	0.69	0.51	0.10	***	0.27	1.02	0.37	0.15	***	0.13
Quality1 < F1Quality	1.00	0.74			0.55	1.00	0.80			0.64	1.00	0.71			0.51	1.00	0.70			0.49
Quality2 < F1Quality	1.09	0.82	0.06	***	0.68	1.01	0.81	0.08	***	0.65	1.11	0.84	0.11	***	0.70	1.13	0.81	0.12	***	0.66
Delivery1 < F2Delivery	1.00	0.66			0.44	1.00	0.69			0.48	1.00	0.68			0.46	1.00	0.44			0.20
Delivery2 < F2Delivery	1.54	0.65	0.10	***	0.43	1.31	0.58	0.15	***	0.33	1.54	0.69	0.15	***	0.48	3.05	0.85	0.53	***	0.72
Governance1 < F3Gov	1.00	0.78			0.61	1.00	0.77			0.58	1.00	0.76			0.57	1.00	0.80			0.63
Governance2 < F3Gov	0.53	0.48	0.05	***	0.23	0.45	0.40	0.08	***	0.16	0.72	0.60	0.09	***	0.35	0.53	0.51	0.08	***	0.26
Efficiency1 < F4Efficiency	1.00	0.78			0.61	1.00	0.74			0.55	1.00	0.82			0.67	1.00	0.77			0.60
Efficiency2 < F4Efficiency	0.62	0.53	0.06	***	0.28	0.72	0.56	0.11	***	0.31	0.73	0.63	0.08	***	0.40	0.50	0.46	0.11	***	0.21
Openness1 < F5Openness	1.00	0.79			0.62	1.00	0.83			0.69	1.00	0.77			0.60	1.00	0.81			0.66
Openness2 < F5Openness	0.75	0.56	0.05	***	0.31	0.76	0.53	0.10	***	0.28	0.67	0.55	0.08	***	0.30	0.67	0.55	0.10	***	0.30

Responsiveness1 < F6Respon	1.00	0.69			0.47	1.00	0.68			0.46	1.00	0.70			0.50	1.00	0.67			0.45
Responsiveness2 < F6Respon	1.02	0.63	0.07	***	0.39	0.99	0.58	0.11	***	0.34	1.00	0.69	0.10	***	0.48	1.03	0.60	0.16	***	0.36
Equity1 < F7Equity	1.00	0.89			0.79	1.00	0.91			0.83	1.00	0.96			0.92	1.00	0.89			0.80
Equity2 < F7Equity	0.69	0.65	0.04	***	0.43	0.77	0.76	0.06	***	0.57	0.62	0.61	0.07	***	0.38	0.55	0.51	0.09	***	0.26
Trust1 < F8Trust	1.00	0.74			0.55	1.00	0.78			0.61	1.00	0.79			0.63	1.00	0.64			0.41
Trust2 < F8Trust	0.94	0.82	0.05	***	0.67	0.91	0.81	0.07	***	0.66	0.91	0.84	0.07	***	0.70	1.03	0.81	0.12	***	0.66
Democracy1 < F9Democracy	1.00	0.83			0.69	1.00	0.87			0.76	1.00	0.74			0.55	1.00	0.84			0.70
Democracy2 < F9Democracy	1.07	0.85	0.05	***	0.72	0.95	0.79	0.08	***	0.62	1.30	0.91	0.10	***	0.84	1.08	0.87	0.08	***	0.76
Esustainability1 < F10ESustain	1.00	0.83			0.70	1.00	0.81			0.66	1.00	0.86			0.74	1.00	0.89			0.79
Esustainability2 < F10ESustain	0.96	0.86	0.05	***	0.74	0.98	0.90	0.09	***	0.82	0.93	0.78	0.10	***	0.61	0.86	0.85	0.06	***	0.72

Note: Unstd. Est = Unstandardized Estimates; Std. Est = Standardized Estimates;

The validity of the model is based on the level of significance of 0.01.

It is imperative to note the analysis intended to as much as possible represent all segments of the population and so the three cases that were used were *public servants, students and housewives*. While public servants were considered major executors of *ICT policy and e-Government Strategy* (Pourkiani *et al*., 2014), students represented the frequent users of digital infrastructures (Ayub *et al*., 2014). As the students' awareness served as a major index for digital infrastructure related policies (Lee, 2007), the use of housewives aimed at recovering the analysis limitation that the research might have on data mainly from the vulnerable class in the society (Hechavarria, 2014; Burrell, 2010; Wang, 2014). In this respect, path estimates were done for each of the classes as well as for the entire data set as a single data case. The path diagrams for each case and then the entire case are in Figure 6-3 to 6-6.

6.3.3.1 Path Model for Students Case

Due to limitations of AMOS, that is used as an analytical software, to diagrammatically present the model details on the complex correlations between the measurement errors *(e_i)* associated with the measured variable and the residuals associated with a latent variable is *(D_i)*, this is presented in a table format in Table 6-15 on the next page.

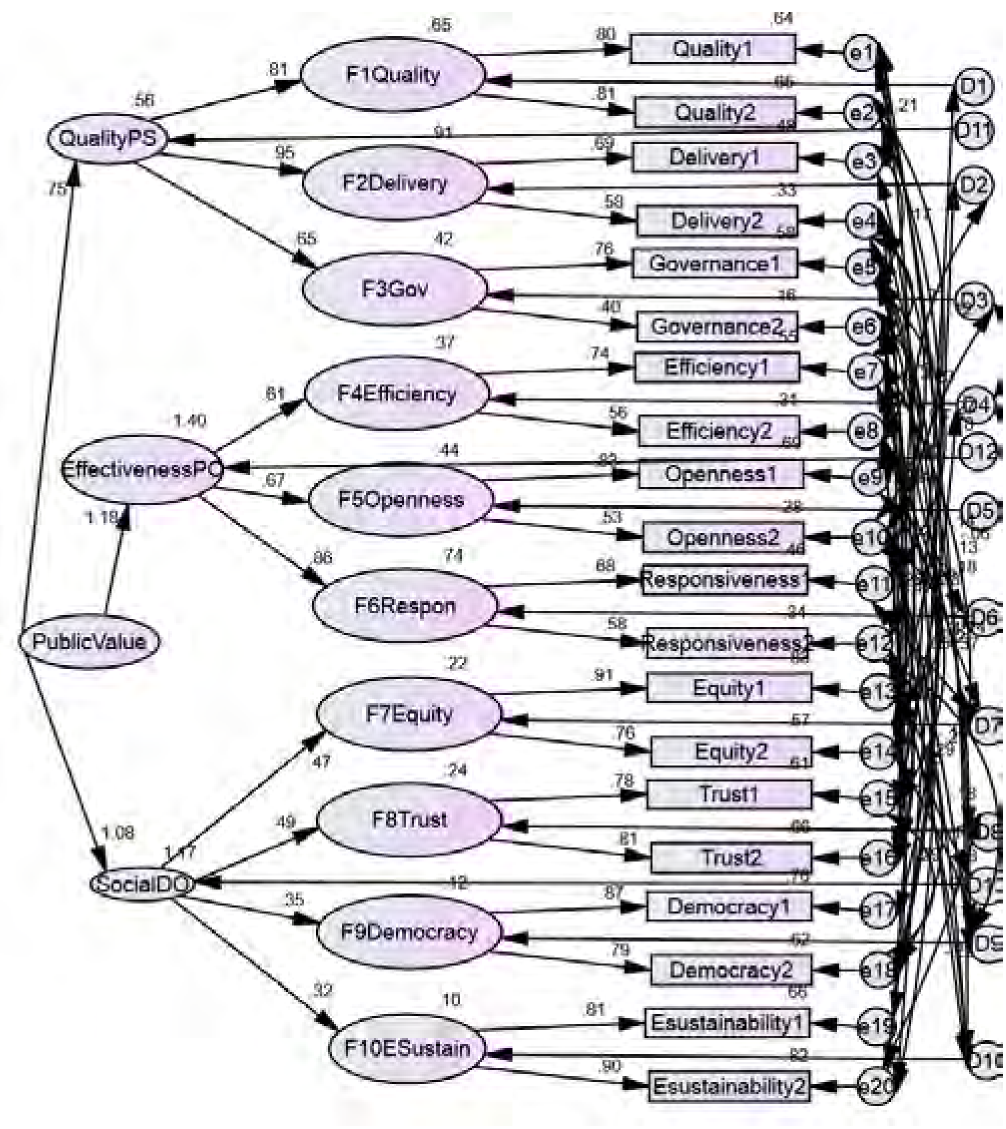


Figure 6-3: Students' Path Model

Figure 6-3 presents the structural path model representing the case of students. Amongst the students, the model accounts for 65 per cent variances in quality of public information, 91 per cent variances in the delivery of public services, 42 per cent variances in citizen-focused governance, 37 per cent variances in efficiency in public service, 44 per cent variances in openness in public service, 74 per cent variances in responsiveness in public service, 22 per cent variances in equity in public service, 24 per cent variances in citizen trust in public service, 10 per cent variances in democracy in decision-making and 10 per cent variances in environmental sustainability, all as a result of investment in e-Government in Kenya. Table 6-15 presents the detailed correlation matrices between the measurement errors *(e_i)*, associated with the measured variable and residuals *(D_i)* associated with the latent variables.

Table 6-15: Correlation of Errors in 'Student' Path Model

			Estimate				Estimate
D8	<-->	D9	0.561	e15	<-->	D4	-0.293
D7	<-->	D10	0.301	e8	<-->	D10	0.288
D3	<-->	D4	0.431	e10	<-->	e16	0.198
D4	<-->	D5	0.368	e10	<-->	D9	0.212
D4	<-->	D10	-0.108	e12	<-->	D9	0.172
D9	<-->	D10	-0.048	e12	<-->	e16	0.051
D2	<-->	D6	-1.042	e20	<-->	D2	-0.321
e10	<-->	e12	0.254	e2	<-->	e10	0.121
e4	<-->	e10	0.233	e20	<-->	D8	-0.22
e8	<-->	D7	0.281	e6	<-->	e8	0.145
e2	<-->	e13	-0.265	e6	<-->	e12	0.094
e1	<-->	e3	0.205	e6	<-->	e16	0.175
e3	<-->	e11	0.3	e8	<-->	e9	0.134
e8	<-->	D8	-0.144	e5	<-->	e8	0.028
e4	<-->	e7	-0.206	e4	<-->	e17	0.011
e7	<-->	e20	-0.097	e7	<-->	D7	-0.057
e1	<-->	e18	-0.141	e1	<-->	D10	0.13
e10	<-->	D10	-0.176	e4	<-->	e14	0.036
e10	<-->	e13	-0.134	e3	<-->	e5	0.173
e15	<-->	e18	-0.008	e6	<-->	e10	0.078
e9	<-->	e15	-0.367	e5	<-->	e11	0.177
e20	<-->	D1	-0.332	e1	<-->	e16	0.23
e11	<-->	D7	0.047	e13	<-->	e19	-0.294
e13	<-->	e18	-0.097	e5	<-->	e15	-0.212
e5	<-->	e18	-0.148	e14	<-->	D9	0.142
e7	<-->	e14	-0.099	e4	<-->	D9	0.18
e12	<-->	D10	-0.083				

Further, the model was found to fit the sampled data for the students' case with *$P>0.05$ (0.317)*, *Tucker-Lewis index*, also called the non-normed fit index or *$NNFI >0.95$ (0.996)* and Critical Ratio, *$CR <2$ (1.061)* as computed Goodness of Fit (GoF) indices.

6.3.3.2 Path Model for Civil Servants Case

Due to limitations of AMOS, that is used as an analytical software, to diagrammatically present the model details on the complex correlations between the measurement errors *(e_i)* associated with the measured variable and the residuals associated with a latent variable is *(D_i)*, this is presented in a Table format in Table 6-16 on the next page.

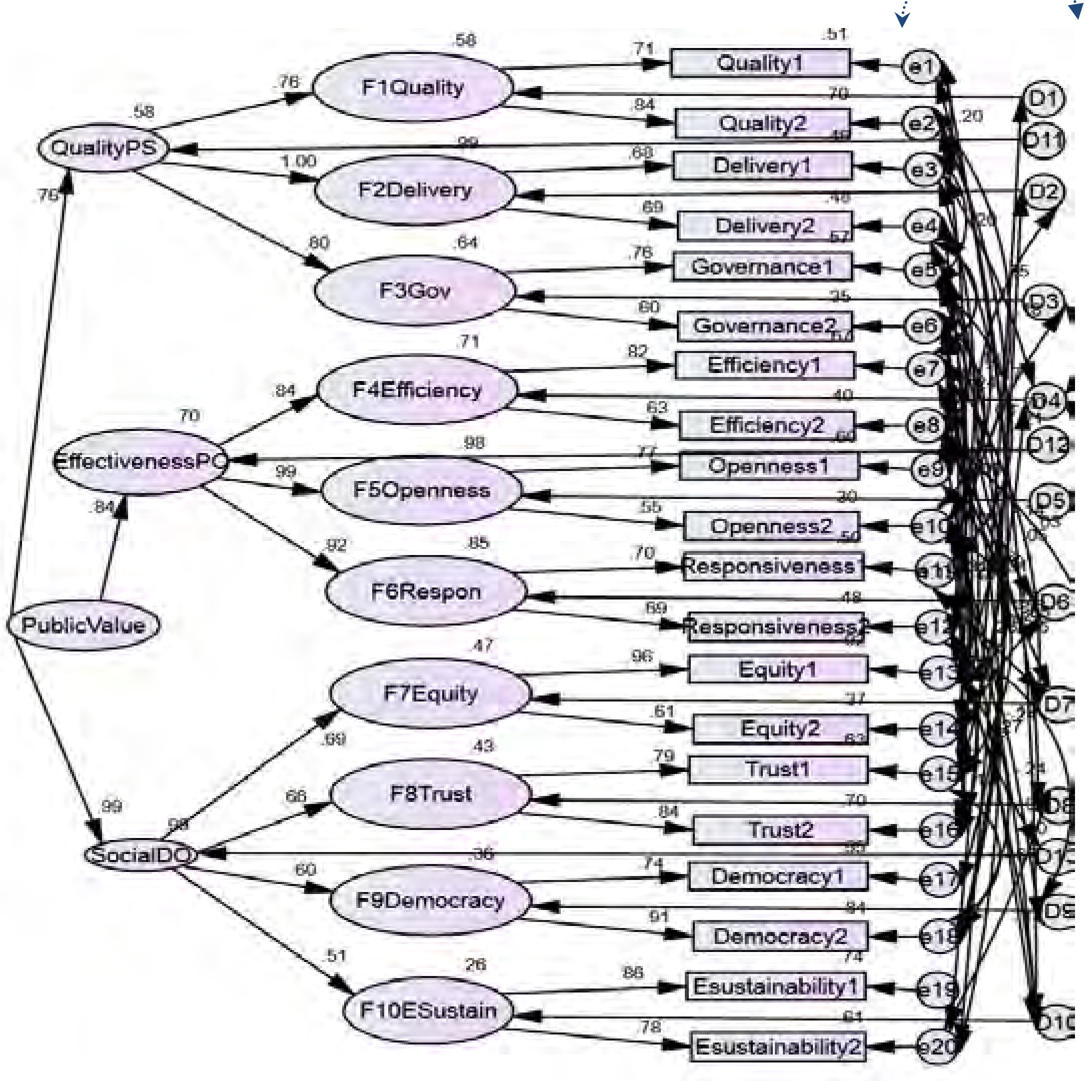


Figure 6-4: Civil Servants' Path Model

Figure 6-4 presents the structural path model representing the case of civil servants. Amongst the civil servants, the model accounts for 58 per cent of variances in quality of public information, 99 per cent variances in the delivery of public services, 64 per cent variances in citizen-focused governance, 71 per cent variances in efficiency in public service, 88 per cent variances in openness in public service, 85 per cent variances in responsiveness in public service, 47 per cent variances in equity in public service, 43 per cent variances in citizen trust in public service, 36 per cent variances in democracy in decision-making and 26 per cent variances in environmental sustainability, all as a result of investment in e-Government in Kenya. Table 6-16 is the detailed correlation matrices between the measurement errors *(e_i)*, associated with the measured variable and residuals *(D_i)* associated with the latent variables.

Table 6-16: Correlation of Errors in 'Civil Servants' Path Model

			Estimate				Estimate
D8	<-->	D9	0.514	e12	<-->	D10	-0.097
D7	<-->	D10	0.09	e15	<-->	D4	-0.103
D3	<-->	D4	0.467	e8	<-->	D10	0.271
D4	<-->	D5	-0.41	e10	<-->	e16	0.198
D4	<-->	D10	0.065	e10	<-->	D9	0.241
D9	<-->	D10	-0.282	e12	<-->	D9	0.154
D5	<-->	D9	0.111	e12	<-->	e16	0.22
D2	<-->	D6	0.012	e20	<-->	D2	-1.554
D3	<-->	D13	1.153	e2	<-->	e10	0.182
e10	<-->	e12	0.228	e20	<-->	D8	-0.144
e4	<-->	e10	0.174	e6	<-->	e8	0.248
e8	<-->	D7	0.311	e6	<-->	e12	0.103
e2	<-->	e13	-0.698	e6	<-->	e16	0.069
e1	<-->	e3	0.203	e8	<-->	e9	0.141
e3	<-->	e11	0.168	e5	<-->	e8	0.125
e8	<-->	D8	0.03	e4	<-->	e17	0.014
e4	<-->	e7	-0.011	e7	<-->	D7	-0.027
e7	<-->	e20	-0.195	e1	<-->	D10	0.054
e1	<-->	e18	-0.14	e4	<-->	e14	-0.094
e10	<-->	D10	-0.237	e3	<-->	e5	0.201
e10	<-->	e13	-0.56	e6	<-->	e10	0.031
e15	<-->	e18	-0.675	e5	<-->	e11	0.206
e9	<-->	e15	-0.062	e3	<-->	D4	0.353
e8	<-->	D9	-0.115	e5	<-->	e15	0.254
e20	<-->	D1	-0.31	e14	<-->	D6	0.549
e11	<-->	D7	0.264	e2	<-->	e12	0.241
e13	<-->	e18	-0.949	e14	<-->	e16	0.175
e5	<-->	e18	-0.362	e6	<-->	e9	0.173
e7	<-->	e14	-0.057				

Further, the model was found to fit the data with *P>0.05 (0.067), Tucker-Lewis index*, also called the non-normed fit index or *NNFI >0.95 (0.985)* and Critical Ratio, *CR <2 (1.219)* as computed Goodness of Fit indices.

6.3.3.3 Path Model for Housewives Case

Due to limitations of AMOS, that is used as an analytical software, to diagrammatically present the model details on the complex correlations between the measurement errors *(e_i)* associated with the measured variable and the residuals associated with a latent variable is *(D_i)*, this is presented in a Table format in Table 6-17 on the next page.

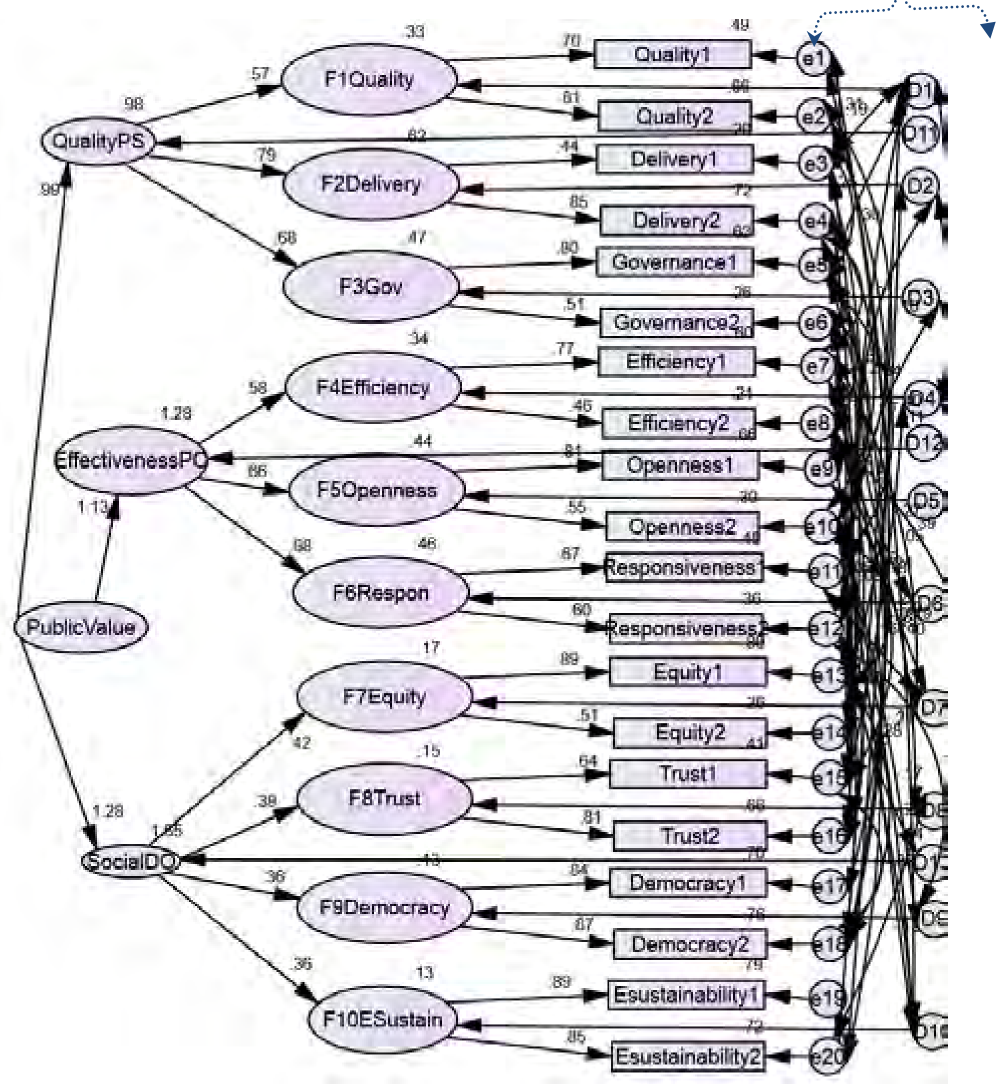


Figure 6-5: Housewives' Path Model

Figure 6-5 presents the structural path model representing the case of housewives. Amongst the housewives, the model accounts for 33 per cent variances in quality of public information, 62 per cent variances in the delivery of public services, 47 per cent variances in citizen-focused governance, 34 per cent variances in efficiency in public service, 44 per cent variances in openness in public service, 46 per cent variances in responsiveness in public service, 17 per cent variances in equity in public service, 15 per cent variances in citizen trust in public service, 13 per cent variances in democracy in decision- making and 13 per cent variances in environmental sustainability, all as a result of investment in e-Government in Kenya. In Table 6-17 is the detailed correlation matrices between the measurement errors (e_i), associated with the measured variable and residuals (D_i) associated with the latent variables.

Table 6-17: Correlation of Errors in 'Housewives' Path Model

			Estimate				Estimate
D8	<-->	D9	0.485	e12	<-->	D10	-0.236
D7	<-->	D10	0.317	e15	<-->	D4	-0.209
D3	<-->	D4	-0.16	e8	<-->	D10	0.277
D4	<-->	D5	0.121	e10	<-->	e16	0.231
D9	<-->	D10	-0.261	e10	<-->	D9	0.234
D5	<-->	D9	0.063	e12	<-->	D9	0.18
D2	<-->	D6	-0.497	e12	<-->	e16	0.159
D1	<-->	D4	-0.236	e20	<-->	D2	-0.179
D2	<-->	D9	-0.285	e2	<-->	e10	0.103
e10	<-->	e12	0.261	e20	<-->	D8	-0.132
e4	<-->	e10	0.036	e6	<-->	e8	0.106
e8	<-->	D7	0.062	e6	<-->	e12	0.105
e2	<-->	e13	-0.403	e6	<-->	e16	0.064
e1	<-->	e3	0.191	e8	<-->	e9	0.278
e3	<-->	e11	0.236	e5	<-->	e8	0.386
e8	<-->	D8	-0.188	e4	<-->	e17	0.239
e4	<-->	e7	-0.91	e7	<-->	D7	-0.393
e7	<-->	e20	-0.132	e1	<-->	D10	0.055
e1	<-->	e18	-0.27	e4	<-->	e14	-0.182
e10	<-->	D10	-0.168	e3	<-->	e5	0.296
e10	<-->	e13	-0.2	e6	<-->	e10	0.104
e15	<-->	e18	-0.327	e5	<-->	e11	-0.113
e9	<-->	e15	-0.402	e3	<-->	D1	0.307
e8	<-->	D9	-0.041	e3	<-->	e15	0.188
e20	<-->	D1	-0.175	e11	<-->	e18	-0.214
e11	<-->	D7	0.159	e15	<-->	D1	0.185
e13	<-->	e18	-0.229	e5	<-->	D1	0.253
e5	<-->	e18	-0.09	e11	<-->	e15	0.155
e7	<-->	e14	-0.152				

Further, the model was found to fit the data with *P>0.05 (0.059)*, *Tucker-Lewis index*, also called the non-normed fit index or *NNFI >0.95 (0.982)* and Critical Ratio, *CR <2 (1.231)* as computed Goodness of Fit indices.

6.3.3.4 Path Model for Entire Sample

Due to limitations of AMOS, that is used as an analytical software, to diagrammatically present the model details on the complex correlations between the measurement errors *(e)* associated with the measured variable and the residuals associated with a latent variable is *(D)*, this is presented in a Table format in Table 6-18 on the next page.

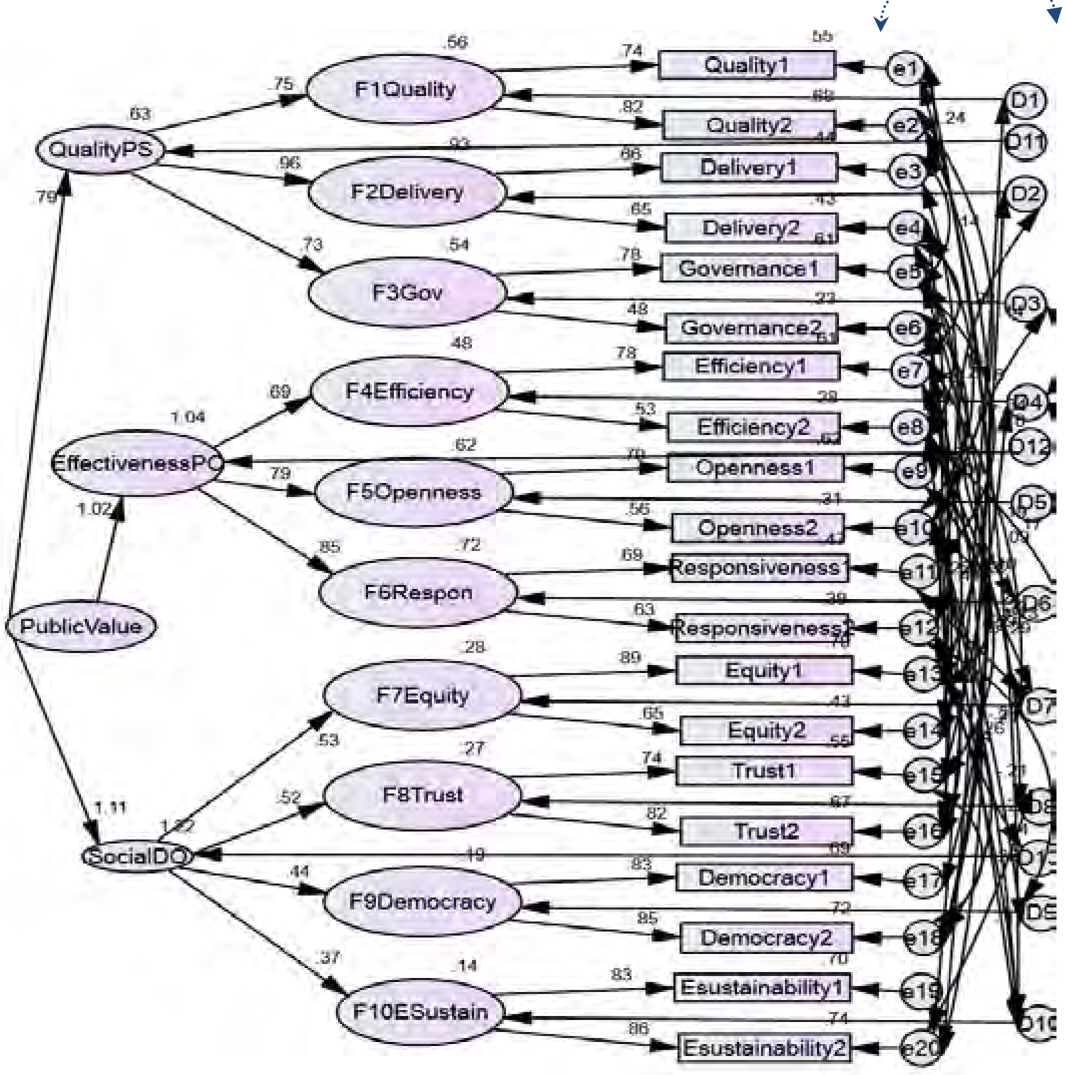


Figure 6-6: All Cases Path Model

The Figure 6-6 presents the structural path model representing all the cases together. Amongst the entire sample, the model accounts for 56 per cent variances in quality of public information, 93 per cent variances in the delivery of public services, 54 per cent variances in citizen focused governance, 48 per cent variances in efficiency in public service, 62 per cent variances in openness in public service, 72 per cent variances in responsiveness in public service, 28 per cent variances in equity in public service, 27 per cent variances in citizen trust in public service, 10 per cent variances in democracy in decision making and 14 per cent variances in environmental sustainability, all as a result of investment in e-Government in Kenya. Table 6-18 presents the detailed correlation matrices between the measurement errors *(e_i)*, associated with the measured variable and residuals *(D_i)* associated with the latent variables.

Table 6-18: Correlation of Errors in 'Entire Sample' Path Model

			Estimate				Estimate
D8	<-->	D9	0.581	e12	<-->	D10	-0.077
D7	<-->	D10	0.294	e15	<-->	D4	-0.323
D3	<-->	D4	0.459	e8	<-->	D10	0.292
D4	<-->	D5	0.394	e10	<-->	e16	0.172
D4	<-->	D10	-0.128	e10	<-->	D9	0.181
D9	<-->	D10	-0.105	e12	<-->	D9	0.144
D5	<-->	D9	0.011	e12	<-->	e16	0.048
D2	<-->	D6	-1.259	e20	<-->	D2	-0.377
e10	<-->	e12	0.259	e2	<-->	e10	0.132
e4	<-->	e10	0.214	e20	<-->	D8	-0.222
e8	<-->	D7	0.268	e6	<-->	e8	0.132
e2	<-->	e13	-0.301	e6	<-->	e12	0.102
e1	<-->	e3	0.213	e6	<-->	e16	0.178
e3	<-->	e11	0.33	e8	<-->	e9	0.1
e8	<-->	D8	-0.223	e5	<-->	e8	0.003
e4	<-->	e7	-0.222	e4	<-->	e17	0.139
e7	<-->	e20	-0.091	e7	<-->	D7	-0.056
e1	<-->	e18	-0.163	e1	<-->	D10	0.134
e10	<-->	D10	-0.17	e4	<-->	e14	0.048
e10	<-->	e13	-0.162	e3	<-->	e5	0.187
e15	<-->	e18	-0.007	e6	<-->	e10	0.084
e9	<-->	e15	-0.328	e5	<-->	e11	0.176
e8	<-->	D9	-0.198	e1	<-->	e16	0.213
e20	<-->	D1	-0.341	e13	<-->	e19	-0.294
e11	<-->	D7	0.045	e5	<-->	e15	-0.186
e13	<-->	e18	-0.093	e4	<-->	e16	-0.157
e5	<-->	e18	-0.166	e13	<-->	D9	-0.201
e7	<-->	e14	-0.095	e4	<-->	D7	-0.136

In general, following investment in e-Government in Kenya, for the entire sample the value of achieving socially desirable outcome *(1.11)* appears as the most important reflector of the resulting public value of e-Government followed by effectiveness in the public organization *(1.02)* then delivery of quality of service *(0.79)*. Amongst students, the effectiveness of public organization (*1.18)* is most important reflector of the resulting public value of e-Government followed by socially desirable outcomes *(1.08)* then quality of public service *(0.75)* while amongst civil servants socially desirable outcome *(0.99)* most important reflector of the resulting public value of e-Government followed by effectiveness in public organizations *(0.84)*; then least important is the quality of public service *(0.76)*. Finally, amongst housewives, socially desirable outcome, the most important reflector of the resulting public value of e-Government (1.28) of public value, followed by effectiveness in public organizations *(1.02)*, then quality of public service *(0.79)* as the least contributing element.

These results lend credence to Lau (2005)'s contention that by minimizing bureaucrats' informational advantage which can be used to the disadvantage of the public, the efforts aid in achieving a socially optimal point. In turn, this helps maximize the total public value for the entire citizenry. This is consistent with Banks and Weingast's (1992) conjecture that supports the minimization of the bureaucrats' informational advantage by providing independent sources of information to the public. This optimizes the cost of offering public service at a level where marginal cost equals marginal value, presenting a dimension that matches a socially ideal point that the public can pay.

Further the overall sample model was found to fit the data with *P>0.05 (0.311), Tucker-Lewis index*, also called the non-normed fit index or *NNFI >0.95 (0.999)* and Critical Ratio, *CR <2 (1.063)* as computed Goodness of Fit indices. Therefore, it is concluded that as formulated in section 5.1.2.3, H1 is supported.

6.4 Cost Efficiency

The second objective of the research set out to determine the cost efficiency that results following investment in e-Government in Kenya. As explained in Chapter Five, cost efficiency was measured in terms of per capita recurrent expenditure.

The analysis sought to establish the impact of investment in e-Government on cost efficiency in each sector under study for a period spanning over 10 years from 2004 to 2014. The variables were considered in their per capita state to account for population changes that affect public sector budget decisions (Adam, 2016). *GDP* is included as an intervening variable to account for the cyclical behaviour of the economy that affects government expenditure patterns (Ghamdi, 1991). Thus, model 6-7, which is a modification of model 6-1 is estimated as:

Equation 6-1: Standard Pooled Model

$$Y_{it} = \beta_0 + \sum_{j=1}^{k} \beta_j X_{jit} + \varepsilon_{it}$$

Y_{it} is the dependent variable for cross=section *i* at time *t*; X_{jit} is a vector of *j* observed independent variables for cross-section *i* at time *t*; β_0 is a common intercept for all cross sections and β_j is a vector of slope coefficients that are not different across - cross sections. The term ε_{it} captures the random disturbances in the model.

Equation 6-7: Efficiency Model

$$Efficiency_{it} = \beta_0 + \beta_1 ICT\_EXP_{it} + \beta_2 GDP_t + \beta_3 CPI_t + \varepsilon_{it}$$

$Efficiency_{it}$ captures cost efficiency in sector *i* at period *t*. Indeed, the measurement of efficiency considers an estimation of costs of inputs against those of the output. However, while applying the relationship in modelling the spending patterns in the public sector, the expenditure is considered efficient when a given investment produces a large per capita benefit (Afonso, Schuknecht & Tanzi, 2006). A rise in public investment is meant to result in increased benefits for the citizens *(ibid)*. In this respect, cost efficiency is measured by the per capita recurrent expenditure in each sector which is computed as a ratio of total expenditure. The term ICT_EXP_{it} measures total investments in e-Government by sector *i* in period *t*. It also enters the estimation in per capita terms. The remaining terms GDP_t and CPI_t represent control variables *per capita GDP* and *Consumer Price Index (CPI)* respectively. These are invariant across sectors. These variables are used in logarithm terms and as such the coefficient parameters β_0, β_1, β_2, and β_3 are interpreted as elasticities. The practice of logarithm is informed by the fact that the value of these may be large and wide-ranging. This can be from hundreds to billions of Kenya Shillings (Ksh). These tend to upsurge the variance, and so an approach to stabilize these is the employment of logarithmic data transformation (Olsson, 2005). This presents a more convenient approach to handling of such large data sets (Zar, 1999). In this study, the logarithm transformation normalizes the series so that large numbers such as *GDP* and *government expenditures* are effectively compared to small numbers such as *CPI*.

Therefore, to specify the empirical model to apply among *pooled, fixed effects and random effects,* the *BP-LM* and the *Hausman* tests were used. The *BP-LM* test compares which, between a *pooled model* and a *random effects model* with the null hypothesis *(H_0)* in favour of a pooled model. Estimation results indicate a *random effects* model is more appropriate than a *pooled model* since the reported Chi-square statistic *(χ^2)* is *189.80* with a probability of *0.0000* implying that the null hypothesis of a pooled model is rejected. To make the choice between a pooled and a random effects model, Table 6-19 presents the estimation results for the test using STATA.

Table 6-19: Breusch-Pagan Lagrange Multiplier (BP-LM) Test

Degree of Freedom	**1**
Chi-square (1)	189.80
P-value	0.0000

This rules out a pooled model and hence ascertainment of a consistent model between the choice of *random effects- and a fixed effects* model is progressed, through a *Hausman* test. Hausman (1978) tests the difference between a *random effects and a fixed effects* model. It involves a test for the null hypothesis that the *random effects model* is more consistent than a *fixed effects model*, against an alternative hypothesis that a *fixed effects model* is more consistent than a *random effects model*. Table 6-20 is a presentation of the results of the test using STATA:

Table 6-20: Hausman Test

Number of Observations	**80**
Number of groups	10
Observation per group	8
Chi Square (1)	0.58
P-value	0.4457

These results indicate a Chi-square (χ^2) measure of *0.58* with a probability of *0.4457*. This implies that the null hypothesis cannot be rejected. In this respect, a *random effects model* is more consistent than a *fixed effects model*. Therefore, the model based on *random effects* is estimated. The suitability of *a random effects model* is that it allows use of variables that do not change significantly over time. Table 6-21 presents regression results of *random effects model* based on model 6-7:

Table 6-21: Estimations of Random Effects Model

Dependent variable: *Log* (Per capita recurrent Expenditure)

Independent variables in *Log*	***Coefficient***		***Coefficient***	
per Capita e-Government Expenditure	-0.0515	(0.1053)	-0.1113	(0.1012)
GDP	1.7785*	(0.9349)	1.9958**	(0.8854)
CPI	-1.5699	(1.2446)	-1.8341	(1.1782)
Education			2.6902***	(0.1549)
Health			1.0560***	(0.1554)
Transport and Infrastructure			0.4675***	(0.1616)
National Security			2.3764***	(0.1549)
Finance			0.4066**	(0.1629)
Foreign Affairs			-0.2193	(0.1588)
Energy			-3.5874***	(0.2901)
Agriculture	Omitted to avoid dummy variable trap			
Constant	9.2556	(14.6196)	11.1304	(13.8279)
Diagnostics				
Sigma_u (cross sectional heterogeneity)	1.2480		0.0000	
Sigma_e (overall model disturbances)	0.3462		0.3462	
Rho (indication of heterogeneity)	0.9285		0.0000	
R-squared : within group	0.3077		0.3112	
between group	0.6074		1.0000	
overall	0.0009		0.9672	
Number of observations	80		80	
Number of groups or ministries	8		8	
Wald Chi Square (3)	26.96 (p-value:0.0000)		2032 (p-value:0.0000)	

Note: *, ** and *** indicates significance at 10%, 5% and 1% level of significance, respectively. *Figures next to coefficient estimates and in parentheses are standard errors for the respective coefficients.*

This model assumes no correlation between the independent variables and the cross-sectional individual effects in the model. In the second column of coefficient estimates, it is evident that despite having the expected sign, *per capita e-Government Investment*, insignificantly affects *cost efficiency*, as measured by *per capita Recurrent Expenditure*. Though the direction of relationship confirms Banks and Weingast's (1992) postulated direction of the relationship in a space of asymmetric information in the public sector, the level of significance is low. This is still consistent with Cipesa's (2015) assertion that most government departments outside the Ministry of ICT still do not fully appreciate the power or potential of e-Government. The capacity of civil servants to leverage e-Government in service delivery and citizen participation is low *(ibid)*. The old inefficient public sector ICT infrastructure appears to be the main hindrance to efficiency in the Kenyan public sector (Swalehe *et al.,* 2015). In an earlier research study, Ondari-Okemwa and Smith (2009) also found that generally the civil service in sub-Saharan Africa is still marred by a great deal of bureaucracy and is rigid in its operations. The civil service has the traditional career civil servants who seldom appreciate the efficiency benefits of ICT in the public sector *(ibid)*.

However, the influence of *GDP* on *cost efficiency* is positive and significant, implying that 1% growth in GDP increases recurrent expenditure by 1.78%. Considering that *GDP* performance has a direct implication on the government revenue collections (Ghamdi, 1991), this is expected since increased economic activity (*indicated by GDP)* increases revenue mobilised by government. In turn, this increases *Recurrent Expenditure*. Also, there is an inverse relationship between *Consumer Prices Index* and *Recurrent Expenditure* as expected. This is because increase in prices discourages spending. Given that the better part of e-Government expenditure is in maintenance, which is considered recurrent expenditure, this reinforces Mtingwi and Van Belle's (2013) argument that indeed high costs are involved in the development and maintenance of such infrastructure in developing countries.

Further, the variance measure that captures *cross-sectional heterogeneity (sigma_u)* is *1.2480*, which is higher than the *variance measure of the overall disturbance (sigma_e)* of 0.3462. This indicates the presence of cross-sectional individual heterogeneity in *Recurrent Expenditure* more than the *time effects*. In this regard, the cross sectional effects is introduced by including cross sectional dummies in the regression. One cross-sectional dummy variable *(Agriculture)* is omitted to avoid the dummy variable trap. In the third column is a presentation of regression results including the cross-sectional dummies. Despite accounting for cross-sectional individual effects, *per capita e-Government Investment* still does not significantly influence *cost efficiency*. However, there are significant cross sectional effects that influence the *efficiency*. In particular, there are ministry-specific characteristics that keep recurrent expenses in *Education, Health, Transport, National Security and Finance* higher than the *Agriculture* (the reference sector) by *2.69%, 1.06%, 0.47%, 2.38% and 0.41%* respectively. On the other hand, there are specific sector characteristics, not immediately evident, in the *Foreign Affairs and Energy* that keep *Recurrent Expenditure* lower than those incurred in *Agriculture* by *0.22%* and *3.59%,* respectively.

Based on the *Wald Chi-square* (χ^2) tests on the overall significance of the model, it is concluded that the models as specified are significant. This is evident from the very low p-values *(0.0000),* implying a rejection of null hypothesis of insignificant model specification.

6.5 Size of Public Sector

The third objective of the research set out to establish the performance impact that result from Investment in e-Government. This was to ascertain the extent of the impact of investment in e-Government on government performance as measured by its size. This was captured as a ratio of total recurrent expenditure on income expenditures, a surrogate measure for sector GDP (Garand, 1988), while investment in e-Government was measured in terms of the intensity of e-Government Investment which is the proportion of e-Government expenditure in Total Expenditure. The model is estimated in Equation 6-8:

REMEMBER:

Equation 6-1: Standard Pooled Model

$$Y_{it} = \beta_0 + \sum_{j=1}^{k} \beta_j X_{jit} + \varepsilon_{it}$$

Y_{it} is the dependent variable for cross-section *i* at time *t*; X_{jit} is a vector of *j* observed independent variables for cross-section *i* at time *t*; β_0 is a common intercept for all cross sections and β_j is a vector of slope coefficients that are not different across cross-sections. The term ε_{it} captures the random disturbances in the model.

Equation 6-8: Government Size Model

$$SIZE_{it} = \beta_0 + \beta_1 ICT\_INTENSITY_{it} + \beta_2 GDP_t + \beta_3 CPI_t + \varepsilon_{it}$$

While *SIZE* measures government performance, *ICT_INTENSITY* captures e-Government Investment as a proportion of Total Expenditure.

Therefore, to specify an appropriate empirical model, a *BP-LM* test is done to compare which, between a *pooled model* and a *random effects model* with the null hypothesis in favour of a pooled model in Equation 6-1. *BP-LM test* was conducted in STATA and the results are presented in Table 6-22:

Table 6-22: Breusch-Pagan Lagrange Multiplier (BP-LM) Test

Degree of Freedom	**1**
Chi-square (1)	0.00
P-value	1.0000

It is evident from Table 6-22 that the null hypothesis in favour of a pooled model cannot be rejected. This is supported by the test probability that is very high (1.0000). This implies that a pooled model is more appropriate for examining this objective. Therefore, model 6-8 is estimated as a pooled model using panel least squares estimation (LSE) technique in Table 6-23:

Table 6-23: Estimations of Pooled Model

Dependent Variable: Log (Size)

Independent Variables in Log:	**Coefficient**
e-Government Investment Intensity	-0.2950*** (0.0683)
GDP	0.7611 (1.7975)
CPI	-1.1619 (2.3765)
Constant	19.2025 (29.3263)
Diagnostics	
Adjusted R-squared	0.3252
Number of Observations	35
F (3,31) (P-value)	6.46 (P-value : 0.0016)

Note: *, ** and *** indicates significance at 10%, 5% and 1% level of significance, respectively. *Figures next to coefficient estimates and in parentheses are standard errors for the respective coefficients.*

It is evident that the intensity of investment in e-Government, measured by the ratio of Investment expenditure in e-Government to Total Expenditure, significantly impacts on sector size. SIZE is measured as a total recurrent expenditure on income expenditures, a surrogate measure for sector GDP. This supports the postulation of Fiorina and Noll (1978) on 'rent seeking' in public service. Given legislature's self-interestedness, Fiorina Noll (1978) advances that their involvement in executive functions leads to an inefficient growth, resulting in an excessively bloated, larger size and bureaucratic administrative structure. This 'rent seeking', Gaskins (2013) classifies as a form of economic corruption. It leads to a higher quantity, but not certainly a superior quality of agency output. This is considered wasteful and inefficient (Coolidge & Rose-Ackerman, 2000). However, e-Government can open up information flow among legislature, bureaucrats and citizens transparently (Rodríguez-Domínguez *et al.,* 2011), weakening the bureaucratic tendencies (Haque, 2002) and enhancing public value by shrinking the size of the bureaucracy. This leads to value generation for citizens through a networked synergy as postulated by Stoker (2006). This is enabled through openness and data sharing (Jetzek *et al.,* 2014). In this light, e-Government acts as a change model to optimise size of the public sector (Mistry & Jalal, 2012).

In this research, the relationship is found significant at 1 per cent (1%) level of significance. In particular, a unit per cent increase in the intensity of Investment in e-Government leads to 0.295% reduction in the size of the government bureaucracy. This implies an improvement in the performance of the ministry with respect to how much the government pays on recurrent personal emoluments. Indeed, this is attributed to the automated systems, rather than paid humans, to have a moderated authority over processes. In this respect, humans have a reduced need and ability to intervene (Smith *et al.,* 2010).

Further, the model indicates that 32.52% (Adjusted $R^2 = 0.3252$) of variations in ministry size are accounted for by variations in Investment in e-Government, GDP and consumer prices. However, the predominant variable is the Intensity of Investment in e-Government. It is the only significant determinant in the model. Indeed, these results also have implications on theory. Previous findings have it that technological factors have the capacity to influence the sizes of organizations (Wood *et al.,* 2008). E-Government is one such technological factor of the public sector in the digital era. For instance, Banks and Weingast (1992) argue that the agency exploits the informational disadvantage, due to the absence of e-Government or similar technological platforms, by interacting with other arms of the government in a world of asymmetric information. This presents an opportunity for the public officials to extract more given the legislature is information-deficient, leading to unsustainable sizes of public sectors. This strains the economy. In Kenya, this phenomenon has led to reduced funds, crippling national development projects (Namunane, 2014; Anyanzwa, 2014).

These results are consistent with theory and the model fits the research problem as it places an investment in e-Government in context as capable of improving the overall system functioning of public service. This is aided through enhancing the free flow of information (Lau, 2005). E-government redesigns public organizations towards a lower information asymmetry (Liu, 2010), ensuring optimal government size *(ibid)*.

The model is significant as specified. This is evident from the F-test results that report a probability of 0.0016, which is below 5% and 1% critical levels.

6.6 Intervening Control of Governance Index

This sub-objective re-examined objective III (the performance impacts that result from Investment in e-Government) while controlling for the intervening measures of governance. Governance in this research is an index. It is made up of sub-indices. These are political stability, government effectiveness, control of corruption, rule of law, accountability and regulatory quality. In this regard, model 6-8 was re-specified while introducing an intervening index of governance, using the sub-indices one at a time and, then all of them together to estimate model 6-9:

Equation 6-9: Governance controlled Government Size Model

$$SIZE_{it} = \beta_0 + \beta_1 ICT\_INTENSITY_{it} + \beta_2 GDP_t + \beta_3 CPI_t + \sum_{j=4}^{9} \beta_j GOV\_INDEX_t + \varepsilon_{it}$$

GOV-INDEX is cross-sectional invariant vector of governance sub-indices. Therefore, to specify an appropriate model among pooled, fixed effects and random effects, *BP-LM* test is applied to compare between a pooled model and a random effects model with the null hypothesis in favour of a pooled model. The STATA generated results are presented in Table 6-24:

Table 6-24: Breusch-Pagan Lagrange Multiplier (BP-LM) Test

Model	**Chi Square (1)**	**P-value**
Stability	0.00	1.0000
Government Effectiveness	0.00	1.0000
Regulatory quality	0.00	1.0000
Control of Corruption	0.00	1.0000
Rule of Law	0.00	1.0000
Accountability	0.00	1.0000

In the BP LM test results, all Chi-squares (χ^2) test results yielded a probability of 1.000, indicating preference for a pooled model as opposed to a random effects model. Therefore, this was progressed to estimate the pooled models accounting for the governance sub-indices one at a time and then all the indices together. Pooled model results generated in STATA are presented in Table 6-25:

Table 6-25: Pooled Model

Dependent Variable: Log (Size)

	Incorporated sub-index						
	Political Stability	Government Effectiveness	Regulatory Quality	Corruption	Rule of Law	Accountability	All Sub-Indices
Independent Variables in Log							
e-Government Investment Intensity	-0.2947***	-0.3007***	-0.3015***	-0.2955***	-0.2952***	-0.2948***	-0.3248***
	(0.0694)	(0.0689)	(0.0688)	(0.0693)	(0.0694)	(0.0694)	(0.0751)
GDP	0.6722	0.7847	1.8252	0.7022	0.7152	0.8286	2.6339
	(1.8728)	(1.8053)	(2.1343)	(1.8345)	(1.8766)	(1.9199)	(2.5925)
CPI	-1.0633	-1.4949	-2.8156	-1.1507	-1.0892	-1.2343	-4.2942
	(2.4578)	(2.4177)	(2.9726)	(2.4123)	(2.5095)	(2.4966)	(3.5423)
Political stability	-0.0086						0.0675
	(0.0405)						(0.1175)
Government effectiveness		0.0413					0.0394
		(0.0480)					(0.0624)
Regulatory quality			-0.0360				-0.0775
			(0.0387)				(0.0695)
Corruption				-0.0083			-0.0482
				(0.0271)			(0.0574)
Rule of Law					-0.0024		-0.0619

					(0.0228)		(0.0594)
Accountability						0.0046	0.0258
						(0.0406)	(0.1009)
Constant	17.9531	19.6855	39.5192	18.7136	18.4353	20.0346	55.4130
	(30.3585)	(29.4558)	(36.6248)	(29.8077)	(30.6575)	(30.6794)	(45.4944)
Diagnostics							
Adjusted R-squared	0.3038	0.3195	0.3223	0.3049	0.303	0.30.31	0.2482
Number of observations	35	35	35	35	35	35	35
F(4,30), (P-value)	4.71	4.99	5.04	4.73	4.70	4.70	2.25
	(0.0045)	(0.0033)	(0.0031)	(0.0044)	(0.0046)	(0.0046)	(0.0532)

Note: *, ** and *** indicates significance at 10%, 5% and 1% level of significance, respectively. Figures next to coefficient estimates and in parentheses are standard errors for the respective coefficients.

The results show that when the intervening influence of governance indices is accounted for in the relationship between intensity of investment in e-Government and government performance, no sub-index significantly influences size of the public sector for the period under examination. However, the direction of the influence that the sub-indices have on the relationship is maintained. The tests depict that improved government effectiveness and improved accountability increases government size. This may imply that for more effective governance, quality has to be enhanced, and quality as a measure of excellence is costly (Sailaja *et al.,* 2015). Indeed, effective governance requires increased expenses related to providing relevant services and thus increases the government size.

However, on the other hand, improved political stability, regulatory quality, reduced corruption and enhanced adherence to the rule of law tend to lower the size of government. This is because during periods of political turmoil the government spends more on such sectors such as security to achieve stability. In periods when the quality of policies formulated is good, this helps reduce unnecessary spending of government to achieve the same outcome. In addition, when there is low corruption, the government minimises unwarranted expenses and thus total expenditure declines. These have an inference on theory as postulated by Fiorina and Noll (1978). Though rent-seeking may certainly not be entirely eliminated by the use of policies, it nevertheless reduces public wealth in favour of private gain (Gaskins, 2013). One approach of reducing such is through participatory policy-making and minimising information asymmetry. Under such circumstances, effective e-Government policies come to bear. Moreover, when the population adheres to the rule of law, then vices as corruption are minimised and as such spending is effectively optimised.

However, when all the indices are altogether included in the analysis at the same time, there seems to be a significant change in the magnitude of influence of the intensity of investment of e-Government on the size of the public sector. This is despite the fact that all the indices remain insignificant in the model. Specifically, the coefficient of intensity of e-Government investment increases from the range of 0.2947- 0.3015 to 0.3248. This implies that when everything else is assumed constant, a 1% increase in the intensity of e-Government investment improves government performance by 0.3248%.

Indeed, the model diagnostic results as shown by F test statistics presents a well-fitted model. This is indicated by the low probability (*p*-values). An average R^2 of about 0.30 when the only significant variable is the Intensity of Investment in e-Government implies that the variations in the intensity of investment in e-Government account for up to 30 per cent of the variations in size of the public sector of Kenya.

6.7 E-Government as Determinant of overall Governance

The sub-objective set out to determine the influence of Investment on e-Government on the Quality of Governance, while controlling for key macroeconomic variables as GDP and consumer prices. Therefore model 6-10 was estimated:

Equation 6-10: Model of Governance

$$GOV\_INDEX_t = \beta_0 + \beta_1 ICT\_EXP_{it} + \beta_2 GDP_t + \beta_3 CPI_t + \varepsilon_{it}$$

Where GOV-INDEX is cross-sectional invariant vector of governance sub-indices. The term ICT_EXP_{it} measures total investments in e-Government by sector *i* in period *t*. It enters the estimation in per capita terms. The terms GDP_t and CPI_t represent control variables *per capita GDP* and *Consumer Price Index (CPI)* respectively. These are invariant across sectors. These variables are used in logarithm terms and as such the coefficient parameters β_0, β_1, β_2, and β_3 are interpreted as elasticities. Finally, the term ε_{it} accounts for random errors within-sector.

Firstly, *BP LM* test results indicate that a pooled model is appropriate for all the models of governance indices, except for political stability that takes the form of a random effects model. The STATA results of the *BP LM* tests and *Hausman* Test (for political stability model) are presented in Appendix O. Therefore, the estimated models generated in STATA are also presented in Table 6-26:

Table 6-26: Model of Governance Indices

Dependent Variable Incorporated	Political Stability	Government Effectiveness	Regulatory Quality	Corruption	Rule of Law	Accountability
MODEL TYPE	Random Effects	Pooled	Pooled	Pooled	Pooled	Pooled
Independent Variable in Log			**COEFFICIENTS**			
per capita e-Government Investments	0.0158 (0.2368)	0.0508 (0.2109)	-0.1658 (0.2306)	-0.0412 (0.3383)	0.0325 (0.4022)	0.0357 (0.2266)
GDP	-12.1200*** (4.5566)	-3.9829 (4.0585)	28.9269*** (4.4374)	-8.5669 (6.5110)	-16.4493** (7.7411)	-14.1691*** (4.3600)
CPI	13.1511 6.1454	12.1734** (5.4736)	-44.6614*** (5.9846)	2.5741 (8.7813)	25.8866** (10.4403)	14.5292** (5.8802)
Constant	-170.6863** (74.2703)	-65.1392 (66.1514)	549.4260*** (72.3269)	-79.4499 (106.1265)	-270.1495** (126.1767)	-169.2554** (71.0657)
sigma_u	0.0000					
sigma_e	2.018					
Rho	0.0000					
R^2 within between overall	0.0000 0.0000 0.2092					
Adjusted R squared		0.4979	0.5351	0.3954	0.0985	0.3183
Number of observations	80	80	80	80	80	80
Number of groups	8					

wald Chi² (3)	20.11 (0.0002)					
F(3,76) (P-value)		27.11 (0.0000)	31.31 (0.0000)	18.22 (0.0000)	3.88 (0.0123)	13.30 (0.0000)

*Note: *, ** and *** indicates significance at 10%, 5% and 1% level of significance, respectively. Figures next to coefficient estimates and in parentheses are standard errors for the respective coefficients.*

The results show no significant influence of e-Government Investment on overall index of Quality of Governance in Kenya. However, it is worth noting that while the increase in Intensity of Investment of e-Government appears to improve the political stability, government effectiveness and the adherence to the rule of law, it seems to diminish regulatory quality and control of corruption. Though insignificant, the direction is against expectations. Indeed, Otieno *et al.,* (2013) in a study of East African context contend that e-Government can enhance accountability and enhance citizen participation in the public sector. However, manipulation of installed information infrastructure by a public official is possible and can counter the controls put in place to curb corruption (Gaskins, 2013). In this regard, public officials can manipulate the system flow of information for an illegal gain. Further, the unexpected results could be accounted for by the fact that investment in e-Government can influence components of governance in varied ways considering that the implication in this research is an overall composite indicator of governance. Perhaps in-depth analyses of the effect of e-Government investments on the component data used to generate the sub-indices would be helpful to better understand this influence.

In overall, the models are correctly specified and are significant, as presented by the low probabilities on the F test statistics and the Wald chi-square test as presented in Table 6-26.

6.8 E-Government User Conference Analysis

This aim of the e-Government use conference was to 'legitimise' the preliminary findings of the study (Mulder, 1991). As explained in Chapter 5, the 'user conference' had strategic stakeholders to discuss the results from the perspectives of 'Do they recognise the preliminary results, on the public value resulting from investment in e-Government, as being reflective of the context of Kenya?'

Prior to this, a brief of the research was presented *(Appendix E).* This covered the research problem as defined, the hypothesis as formulated, the conceptual framework and the preliminary findings of data of the survey and document review. The exercise covered the main issues to be clarified:

- Whether investment in e-Government presents public values as found
- Whether cost efficiency is or is not one of the public values as a result of investment in e-Government
- Whether, if well invested, e-Government aids manage the size of public sector bill

The participants deliberated on the public value of investing in e-Government with the preliminary findings in mind. The approach enabled group reflections that generated richer and more informed positions on e-Government value logic. This was meant to reach a consensus through interactions and deliberations in case of conflicting positions. The results of this are presented in a descriptive mode.

The participants in the user conference were Chief Officer – ICT at the Ministry of Planning, 3 civil servants from three various ministries – *Mining, Environment and Lands*, three ordinary Kenyans, three university students, one research assistant and the researcher (1) who acted as the conference facilitator and the presenter of initial findings to be *'legitimised'*. The following sections give a summary of the negotiated findings:

6.8.1 Public Value of e-Government

The participants acknowledged that citizens need to have information to hold government accountable on the use of public funds. In addition, there was a need to have a mechanism for public input into the decision making processes driven by the government. This is a mandatory facilitation that the government needs to put in place to operationalize varied clauses of the new constitution (CoK, 2010)'s crux on public participation.

In terms of convergence, *transparency, public participation, and inter-agency collaboration* appear to be the most critical values that participants expressed as vital impacts that need to be considered. Though this is not in line with the public value ranking, it appeared more consistent with the path analysis that assigned a noticeable weight to the related factors, which were labelled *socially desirable outcomes* of e-Government. Indeed, making available and increasing the flow of quality information to public in a timely, relevant and credible manner constitutes the kind of public services that the public demands of Kenya's government. This is what constitutes 'improved performance' (Walther *et al.,* 2016). In his public value management theory, Stoker (2006) argues that such an arrangement has a strength that lies in the *efficiency, accountability* and *equity* inherent in the network. This is what Banks and Weingast (1992) theorize as minimizing the bureaucrats' informational advantage. This helps in achieving a socially optimal point, which in turn helps maximize the total public value realizable (Lau, 2005).

6.8.2 Cost Efficiency

The participants acknowledged that the hype in investment in most government projects, not limited to e-Government, is merely driven by what is happening in developed economies. There seemed to be a 'thick' agreement that e-Government value was not properly conceptualised in Kenya. Most public sector ICT projects are not conceived on the basis of economic soundness, but *rent-seeking* motives due to the funds involved, most of which are donor-financed.

The participants' convergence is that failure to understand the context in Africa has led to over estimating the benefits of using ICT technologies. A participant observed that 'the value added by the IFMIS (Integrated Financial Management Information Systems) and the associated risks were never raised until it failed through loss of funds – is that cost efficiency?' However, when the conference progressed to a full deliberation, varied positions were synthesised on the basis of weightages of the arguments. Thereafter, there seemed to be a consensus that investment in e-Government, if properly conceptualized, presents an opportunity for the taxpayers to get value for their money (VFM) through decreased bureaucratically stagnant structures of the government and enhanced information sharing. Participants agreed that some efficiency gains are a challenge to forecast in monetary terms. This supports the extant literature that besides savings realised in transaction cost through e-Government; some gains are in the associated network externalities. Such externalities work towards improving better relationships and the interaction with the public officials (Zeleti & Uusitalo, 2012). This arrangement is founded in the Stoker's (2006) public value management model, where management deliberation allows for multiple principals as partners in governance. This precipitates into an efficient framework of governance as proposed by Fiorina and Noll (1978).

6.8.3 Size of Public Sector

In the initial stage, few participants acknowledged a need to have a lean civil service structure to lower the administrative costs. This was informed due to the differing opinions of the participants on the role of governments; most arguing that the Government of Kenya (GoK) should be an *'employer of last resort'*. Some participants felt that governments should not peg employment on a government-need basis but on a citizen need *'that is why the research is on citizen value, not government value'*. In this respect, pursuing a lean structure through automation, the likelihood exists of downsizing the public service. This is in the background of the concern that over 50 per cent of Kenya's revenue is consumed by the public wage bill, higher than the internationally accepted ratio of Wage Bill to Revenue of 30-40%. In addition, Atkinson's (2015) conjecture is that until governments make a strong commitment to using e-Government to enhance production of public service, it remains a challenge to run a government in the digital economy.

However, the positions achieved some convergence that there is need to embrace a lean management as a philosophy, only if the quality of service in the public sector is enhanced. This can be driven by the thrust to eliminate wastefulness. This is possible through the use of e-Government to substitute for person-to-person interactions *(ibid)*. This is consistent with the findings of Gaskins (2013) that corruption booms when person to person interaction is encouraged in public service. This can be reduced by an effort to bridge the information asymmetry (Banks & Weingast, 1992).

Further, the participants underscored the need to cut the size of public service without compromising on the quality of service. In Stoker's (2006) public value management philosophy, service output and satisfaction are still found central in public service delivery, and therefore none should be compromised. DeMarie (2004) argues that the collaborative role of e-Government can expand both productivity and output quality of services rendered.

6.9 Conclusion

This chapter executed the various data analysis processes to examine the validity of the conceptual framework on the value logic of investment in e-Government. This was addressed on the basis of multi-disciplinary theoretical positions and the hypotheses corresponding to the structural relationships in the conceptualised frameworks. The e-Government public value model hypothesised was tested and validated. Using structural equation models (SEM), this was found to fit the data with $P>0.05$ (0.311), *Tucker-Lewis* index, also called the non-normed fit index or NNFI >0.95 (0.999) and a Critical Ratio, $CR<2$ (1.063) as Goodness of Fit (GoF) indices. In statistical terms, while per capita e-Government investment was found to immaterially affect the cost efficiency, unit per cent increase in the intensity of investment of e-Government was found to lead to a 0.295% reduction in the size of the public sector. This implies that an improvement in the performance of the ministry is likely to be seen with intensive investment in e-Government. In summary, the chapter has presented data analyses and findings of the public values, efficiency, performance models as well as correlational results underpinned by the theories and the research methodology chosen. The results present meaningful theoretical, methodological and practical implications which are discussed in the next chapter.

7 CHAPTER SEVEN: DISCUSSIONS AND CONCLUSIONS

If you can't explain it simply, you don't understand it well enough.
- Albert Einstein, Physicist

The previous chapter has presented data analysis and the results. This chapter introduces the discussions and conclusion by revisiting the problem of the research. Based on the findings of the research, the chapter presents the research contributions as well as possible limitations in the interpretation of the results. In addition, the avenues for future lines of research are presented.

7.1 Reflections on the Research

Although a range of extant literature on the impact of e-Government exists (Ha, 2016), much of this has focused largely on developed economies in comparison to the developing and emerging economies. Further, the focus has been less extensive in public sector as compared to the private sector (Basamh *et al.,* 2014), but the nature of the relationship between investment in e-Government on one hand, and operational efficiency and performance impact on the other still continues to be a subject of research, practice and policy debate. Given the contradictory results, there have been conflicting implications for theory, policy and practice, and so this research study set out to mainly identify the dimensions of public value, estimate the operational efficiency in terms of cost and measure the performance impacts in terms of the effect of the size of government, that results from investment in e-Government in Kenya from a number of vantage points. This was achieved through the use of mixed methods approach as well as a combination of primary and secondary data, informed by theoretical models drawn upon various disciplines. The theoretical models include public value management, multi-product firm and legislative 'rent seeking' models. The study attempted to examine how various classes of the general population perceive and identify with the resulting public values, cost efficiency and sizes of the public sector as consequences of investment in e-Government in Kenya. Analyses were conducted using 1176 respondents who were interviewed, classified in the three strata, comprising *students, housewives* and *civil servants* (Research Question I), across a panel of eight key and critical ministries of the Government of Kenya (Research Questions II & III). These ministries were Education, Health, Transport and Infrastructure, National Security, Foreign Affairs, Agriculture, Finance and Energy. These ministries make up the core sectors of the economy of Kenya.

In the research, the analysis identified instruments, policy papers, action plans and strategies used for translating policy into the practice of e-Governance in Kenya against the background of extant literature. In specific, informed by the model of public value management, the research demonstrated the existence of public values as a result of investment in e-Government, hypothesized an e-Government value framework and tested on the collected data to obtain a validated and well-fitted value model of investment in e-Government. Indeed, this supports extant literature that through investment in e-Government by the public sector in developing economies, governments not only try to meet economic or managerial values but also intend to embrace the political tones (Engida & Bardill, 2013). Through these the public enjoy certain desired services and efficiencies that would otherwise not been possible without e-Government. Public participation in policy formulation stands out as one of such nexuses that can be achieved through information access or interaction upon e-Government as an infrastructure. Indeed, this speaks to the new governance era of citizens' participation in governance. An idea that is adequately supported by Vyas-Doorgapersad (2011). Specifically, the research seem to support the notion that investments in e-Government as a reform programme has impacted heavily on access to information, delivery as well as consumption of services within the restrictive rules and policies of the government. By facilitating information access, the results show that citizens are empowered and hence can take part in governance. Indeed, e-Government has the potential to empower the users (Bwalya & Healy, 2010).

Further, e-Government is noted to have profoundly impacted the modes of service delivery towards efficiencies. The citizens, more especially in the developing economies, are sensitive to cost at both individual and societal levels. This is evident in the results where sampled population seems to agree that e-Government represents the aspirations of the society. E-government optimizes costs, ensures equity and fairness, sensitive to the concern for a 'green' economy as well as in meeting the desires of the vulnerable in the society (Aleksic, 2014; Masud & Malik, 2012). Hence, the broader outcomes of the investment in e-Government are seen to extend beyond simple economic goals to cover broader individual and shared expectations in a society. In fact, trust and legitimacy are some of the public values cherished at a societal level (Overeem & Tholen, 2011; Walther *et al.,* 2016). The two are socially desirable goals in any rational society and hence form part of the values that result following information integration and access upon e-Government.

In addition, the impact of e-Government Investment on operational efficiency was examined. This was done as informed and explained by the model of a multi-product firm. The metric of efficiency used is cost. This is due to the assumption that a government being a producer of a multiple of services can be likened to a firm producing a multiple number of products and services at a cost. The results confirm the direction of relationship as expected, although in statistical terms the intensity of e-Government investment does not materially impact on cost efficiency in the public sector. This is so even when unique characteristics of ministries as size or time lag are accounted for. This lends credence to some of the existing literature. Indeed, some studies in the past have presented such paradoxes (Pilat, 2004). There has been an argument that not all benefits of e-Government are measurable in terms of costs. Some benefits are largely sociological (Gimlin *et al.,* 2000; Stoel & Muhanna, 2008) or political. In fact, Gulati *et al.,* (2011) observe that some of the benefits of e-Government can be intangible such as making interactions less bureaucratic. To note also is that such e-Government investments may sometimes translate into efficiency gains only after a time lag (Gatautis *et al.,* 2015). This differs depending on context *(ibid).* Although statistically insignificant or immaterial, the results for the study establish that a unit (1 per cent) increase in per capita e-Government investment reduces the per capita expenditure by 5.15%. The model is significant as specified, and thus presents notable implications in the theory, policy and practice of e-Governance in developing countries.

Given the concern on the size of government in relation to the size of the economy, the impact of e-Government investment on resulting sizes of ministries was examined. Informed by the models of legislative 'rent seeking' and bureaucracy in asymmetric information, a significant relationship was found. An enhancement of the intensity of e-Government investment presents a proportional reduction in government size. In particular, a unit (1 per cent) increase in the intensity of investment in e-Government leads to 0.295% reduction in the size of the public sector. This is supported in literature. A past research found that technological factors influence the sizes of organizations (Wood *et al.,* 2008). In the digital era, one of such influences is e-Government infrastructure. Further, Banks and Weingast (1992) argue that the agency exploits the informational advantage by interacting with the legislative arm of the government in a world of asymmetric information. When the legislature's cost of auditing the agency is high, the agency extracts more *(ibid).* The level of auditing costs involved for the agency to *'tell the truth'* is dependent on the expenditures incurred to obtain the relevant information (Williamson, 1985). This can be monetary or non-monetary (Kachwamba, 2011). Therefore, Banks and Weingast (1992) argue that agencies assume optimal sizes where bureaucrats' informational advantage is diminished to the minimum. E-government can redesign the bureaucracy to lower the information asymmetry (Liu, 2010) while maximizing total public value *(ibid).* This presents a theoretical, practical and policy implications of investments of e-Government in the public sectors.

However, when the same impact is re-examined while controlling for the intervening influence of quality of governance (QoG), as per conceptual model, no significant change is empirically evident. Since QoG is an index with sub-components, the effects of the sub-indices are individually examined. The results show that improved political stability, regulatory quality, reduced corruption and enhanced adherence to the rule of law tend to lower the size of government, though immaterial in statistical terms. Still, when all the indices are included at the same time, a significant increase in the elasticity of government size is noticeable. The government performance is enhanced. Indeed, the increase in Intensity of Investment of e-Government appears to improve the political stability, government effectiveness and the adherence to the rule of law. However, it seems to diminish regulatory quality and control of corruption. Though insignificant, the direction is against expectations. Indeed, Otieno *et al.,* (2013) in a study of East African context contend that e-Government can enhance accountability and enhance citizen participation in the public sector. However, if information infrastructure is manipulated by public officials, the controls that counter corrupt activities are interfered with (Gaskins, 2013). In addition, the unexpected results could be accounted for by the fact that investment in e-Government can influence components of governance in varied ways considering that the implication in this research is an overall composite indicator of governance. Perhaps in-depth analyses of the effect of e-Government investments on the component data used to generate the sub-indices would be helpful to better understand this influence.

Further, the results from the quantitative analysis were subjected to the vital stakeholders in a user conference participation to be qualitatively legitimized. This was informed by Mulder's (1991) curriculum conference drawn upon education psychology and technology. Indeed, transparency, public participation and inter-agency collaboration appeared as the most critical values that participants expressed as vital impacts of investments in e-Government. Making available and increasing the flow of quality information to the public and across organizations in a timely, relevant and credible manner constitute the set of public services that the public expects of e-Government investment. This is supported by DeMarie (2004), Stoker (2006) and Neupane *et al.,* (2012). However, in agreement with Gulati *et al.,* (2011), the stakeholders did acknowledge that some efficiency gains are a challenge to quantify in monetary terms, a consensus was reached that if e-Government investment is correctly conceptualized it has the capacity to enhance cost efficiency in governance. This would lead to savings ultimately at both individual and societal levels. In terms of optimal size of government, the stakeholders appreciated the need to embrace a lean management as a philosophy in public sector governance. The consensus was arrived at with a rider, that e-Governance investment should be properly conceptualized not to compromise on the ideals, as well as the quality and standards of public sector products and services. In deed, Kachwamba (2011) found that e-Government presents both monetary and non-monetary gains. Thus, the summary of the results of the research study against the major objectives can be presented:

Table 7-1: Research Objectives and Results

Objective	**Hypothesis (H)**	**Findings**	**Conclusion**
To identify the dimensions of public value following investment in e-Government	E-Government Investment presents significant dimensions of public value.	E-Government Investment has a statistically significant influence on the resulting dimensions and nature of the public value.	H1 is supported
To determine operational efficiency of e-Government Investment	E-Government Investment has a significant influence on cost efficiency.	E-Government Investment has a statistically insignificant influence on the cost efficiency.	H2 is not supported
To determine performance impact of e-Government Investment	E-Government Investment has a significant influence on the government or public sector size.	E-Government Investment has a statistically significant influence on the size of public sector.	H3 is supported

7.2 Originality

The study is informed by theories drawn upon various disciplines – public economics, political sciences and public administration – considered foreign in information systems (IS). To the best of the researcher's found literature, no research endeavor has attempted to estimate the impact of investments in e-Government in a developing country from a multi-disciplinary theoretical perspective. Further, no study has attempted the nexus in a developing country as Kenya. This is intellectually innovative and relevant given the socio-economic context of the setting as well as the multifaceted nature of e-Government. In addition, no empirical information systems endeavor within positivism as a paradigm has employed a deductive multi-methods design to address *cost efficiency* and unsustainable *sizes of governments* characteristic of developing economies in a scientific and rigorous manner. This is in addition to segmenting the population into sub-segments of *student, civil servant* and *housewives* as justified to take care of inherent variations in the public perceptions of the public value of e-Government within a population. Indeed, the study was able to understand the importance of varied public values for different sections of the society. This offered a substantive empirical evidence that although e-Government investments result in public value, the varied sections of the society have varied perceptions of the value of e-Government investment. This is evident in the validated e-Government public value models developed, which form a major component of the contribution of this research.

7.3 Contributions of the Research

The study attempted to bridge some theoretical, methodological and practical gaps that had been identified in the review of literature.

7.3.1 Theoretical

This research contributes to theoretical perspectives of the value of e-Government by linking the concept of public value with investment in public sector ICTs, otherwise known as e-Government. This linkage framework is useful in the testing and gauging of the value logic of investment in e-Government. This is in addition to the place of resulting public values, cost efficiency and performance impact of e-Government. To the extent of the author's knowledge, no study has tested and estimated such an association using a robust structural equation model (SEM) for e-Government value model, informed by a multi-discipline theoretical position from a developing country perspective. Wright and Wallis (2015) argue that such an integrative propositional analysis is an emergent method. It uses the theory structure as data, rather than depending solely on empirical data and opinion. The theoretical models expand the scope of studies on value researches on ICTs as few existing positivist-objectivist researches in IS domain have explored these from developing economies' perspectives.

In addition, the research introduced the role of politics in valuing e-Government through the use of Banks and Weingast's (1992) Bureaucracy in Asymmetric Information Model and Fiorina and Noll's (1978) Legislative 'Rent-seeking' Model. This is not a common approach in the IS research domain. Indeed, few empirical studies have attempted this nexus in a scientifically rigorous manner. This thesis positioned e-Government at the crossroads of the domains of computer science, public economics, political science and public administration, "something that in 'research ecology' can only be good" (Heeks & Bailur, 2007). This aided in understanding the value of investing in e-Government from a number of vantage points. In fact, Williams and Shearer (2011) are concerned by some academic works that are marked by domain-specific theories. In this study, the role of politics over the information economy cannot be overlooked, and so this research fills in the theoretical gap and presents a new theoretical insight for future value researchers in ICTs.

7.3.2 Methodological

E-Government is a multifaceted phenomenon, comprising a number of facets, including institutional, organizational, technical and environmental. In addition to the use of primary and secondary data sources, the deployment of multiple methods enabled the acquisition of a new understanding of the interfaces involved in the process of information integration upon e-Government in the public sector. This enabled the capturing of the storyline at a different level of analysis. Prior to the user conference, a set of propositions was made on the basis of quantitative analysis. It is on this basis that the participants explored in an in-depth manner the interaction of social processes and technical artifacts. The representation of the results in numerical terms, as a result of structural equations modeling, removed any associated ambiguity, further facilitating the deliberation about the nature of public value through the 'eyes of the participants' (Willis, 2007). This unpacked the appropriateness of the mathematical relationship and formed the basis of 'legitimizing' the findings in non-mathematical language. In this regard, the conference presented an opportunity to 'legitimize' the models, if they really represented the behaviour of e-Government or a need existed for a reformulation of the model. The approach reinforced the extant literature that not all the impacts of investments in e-Government can be measured using scientific instrumentations or in mathematical terms.

The research further stratified the study sample into civil servants, housewives and students, to take care of the variations that might be inherent in the various segments of the population. It was evident from the overall 'legitimized' results that although the strata interrelationships are critical, focusing on one in isolation may result in a limited comprehension of the overall situation. However, the adoption of the 'user conference approach' drawn upon the discipline of 'Education Technology and Psychology' was unique. It was critical that the results be verified and negotiated by the user or relevant stakeholders to lend more credence before publication. The mixed methods methodology provided more insights on how a research is designed, questions are formulated, and qualitative and quantitative data are collected and analyzed prior to being triangulated for robustness purposes. This approach presented a rich complexity that is core to the public perception of e-Governance.

Therefore, this study has filled the gap in methodological pluralism within the IS domain that Venkatesh *et al.* (2013) identified, and further adds to the existing body of work in IS towards the development of an objectivist-empiricist research built upon a deductive mixed methods as a methodological approach.

7.3.3 Practical

This research provides a frame of reference that may be useful to e-Government stakeholders to understand the critical variables that constitute public values following investment in e-Government. One strategic finding that may have an important implication in practice is that more per capita spending on e-Government is associated with increased public value and cost-effective sizes of public sector. This comes with empirical evidence of detailed factors that need focus to achieve the envisaged values. These results can aid in addressing the concern in context, where Kenya's unsustainable size of the public service is threatening to cripple the national development. The developed models show the magnitude of influence of various independent and intervening factors on such government initiatives, which may need a special focus during the formulation and implementation of integrated e-Government policies.

In addition, the integrative model of theories identifies nature of relationships and central drivers and incentives informing the use or non-use of e-Government among various actors in the ecosystem. Though the rent seekers clearly benefit themselves or the lobby groups they represent, their actions do not add value in the larger public sector space. This is even worse when the public in this is informationally marginalized. Thus, using these results, the policy makers in developing countries may discover the extents to which the intentions of the investments of e-Government have or can be achieved among desperate segments of the population. Also, this result is useful for Kenya to demonstrate accountability for the investments made by donor agencies. This may inform their decision to continue the support for e-Government and related programs under the subsequent phases of US$ 114.4Million World Bank Transparency and Communications Infrastructure Program (TCIP).

Further, the findings provide significant implication to the legislature and the executive as policy influencing arms of a government bureaucracy. Owing to budget deficits, which is a commonplace, in the developing countries (Mwigeka, 2016; Slimani, 2016); ICT budgets become a quick target for reduction or deferment (Simamoto, 2012). These decisions may counter the transformative efforts to improve service delivery in public service and compromise the efficiency in the public sector. In fact, governments need to re-consider their needs to leverage e-Government as tools that drive efficiency, even more during the times of fiscal crises.

7.3.4 Multi-disciplinary

Philosophies and paradigms are transiting from postmodernism to more integral manners of thinking, which is considered more effective (Wallis, 2010). This evolution in thinking is equally reflected in new approaches to strategy and policy development (Stoker, 2006). Decades ago, these approaches were simplistic and were found ineffective (Glock-Grueneich & Ross, 2008). Therefore, to accomplish this research, multiple theories were drawn to inform various levels and angles of the enquiry in this study. Theoretical thinking, models and methods were drawn upon public economics, public administration, political science and education technology. This filled in the gaps that scholars have identified in the recent past. The gaps have prompted calls to employ approaches drawn upon various disciplines to create more and better conceptual and theoretical insights (Chiasson *et al.*, 2007; Yang, 2013). In this thesis, selected theories drawn across multiple disciplines were reviewed and integrated to position this study within the domain of information systems (IS). Wallis's (2010) conjecture is that a more carefully integrated understanding enhances richness in models and understanding of a phenomenon. Indeed, the theories provided a lens through which the research problem was viewed from a number of vantage points; this may improve the efficacy of policies and subsequently have a significant implication towards improving the condition of humanity in developing countries using e-Government infrastructure.

7.4 Limitations of the Research

In any given scholarship effort such as this, there may be underlying limitations (Creswell, 2011). These form a critical component in evaluating the viability of the research results (Leedy & Ormrod, 2010). Therefore, explicitly stating the limitations this study may have suffered from is vital for a consideration in the replication the research (Creswell, 2011).

Firstly, the primary data collected from civil servants, students and housewives was cross-sectional. However, as is evident in the time series nature of secondary data, the effects of the investment in e-Government undergo a constant change over time. This means that the findings as a result of survey data may change over time, and so a need exists for a review. However, the two data sets were analyzed individually prior to merging the findings. Also, the choice of panel data analytical framework attempted to alleviate this. The use of the panel analytical framework discriminates between a residual heterogeneity related to changes along and across time (Hsiao, 2003), and hence reduces biases in the results. In addition, an e-Government user conference that was conducted aided in the negotiations to legitimize whatever results that arose for a more robust conclusion.

Secondly, during literature review, some variables as time lags were considered significant and so attempts were made to control for their effects during analysis. However, it is possible that some heterogeneity may pass unaccounted for (Greene, 2005) and hence may have impacted on the results during panel data estimations. However, attempts were made to make up for these by drawing robust conclusions based on high levels of statistical significance.

Thirdly, though the research is placed within the public sector in Kenya but with a general focus on developing countries, the choice of particular ministries to examine might have not been representative of other public services structures in other developing countries. Therefore, in this research, attempts were made to capture the general understanding of such a public sector as appears to reach consensus among scholars, policy makers and practitioners with interest in developing countries' perspectives. This was drawn from the varied disciplines of public administration, public economics and political sciences.

Fourthly, the meanings and interpretations of public values vary across societies (MacCarthaigh, 2008). These values evolve over time. Though this could threaten the validity and reliability of the resulting public value models of e-Government, attempts have been made to adhere to a set of broadly coherent and accepted definitions for stability of the results obtained (Toonen, 2003). Fifthly, the model estimations did not account for the changes that may have occurred in the quality of services offered in the public sector as a result of investing in e-Government.

Finally, the general research focus is on sub-Saharan Africa, but for practical purposes a choice is made for Kenya as an empirical setting. Though this may pose some limitations in the overall results, it is done purely to avoid the complexities resulting from socio-cultural, practical and interpretive challenges (Dunleavy *et al.*, 2006; Turpin & Alexander, 2014).

7.5 Further Research

To the best of the found knowledge in extant literature, the thesis is one of the pioneer value researches of investment in e-Government within the broader context of developing countries, examined from a multi-disciplinary theoretical position, therefore a number of opportunities exist for future lines of research.

Firstly, though the thesis argues that increasing intensity of investment in e-Government leads to a proportionate reduction in the size of government, it is silent on the effect size on the rendered quality of services. Indeed, this concern was evident during the user conference. There is need to explore this strand to establish the impact on service quality following such investments to comprehensively understand the entire ecosystem of e-governance, including its drawbacks.

Secondly, this research found out an insignificant impact on the time lag as a result of investment in e-Government. The time lag was introduced to account for the organizational learning and other time-sensitive adjustments. Probably the 10-year-period under investigation was relatively short. Although this is the period that e-Government implementation has been conducted in a structured manner, future studies may explore this concern with an effect of a longer time period as well as a consideration of other organizational characteristics such learning curve characteristic of the particular public sector organization under study.

Thirdly, future researches may explore effects of centrality of e-Governance management and quality of leadership that a country or a sector of the ministry has to investigate their influence on the models. In this respect, the study may attempt to replicate these results in other contexts with a different leadership philosophy. In addition, this can also be attempted at lower levels of governance such as provincial governments or county governments in response to the new public governance dispensation in Kenya. Indeed, post-2014, large parts of e-Government budgets have been devolved to the county governments to improve service delivery at the grassroots, and thus may need evaluation.

Further, it may be an area of interest in future to consider the effects of other policy papers which this study may not have deeply delved into given the draft phases they were in during the study. These may include understanding the intentions and effects of Open Government Partnership (OGP) Action Plan 2016-2018 for Kenya as well as Kenya's National ICT Policy of 2016.

I almost wish I hadn't gone down that rabbit-hole—and yet—and yet— it's rather curious, you know this sort of life!

– Lewis Carroll, Alice's Adventures in Wonderland (1865)

Now a debate has been born. The thesis is democratic socialism. The antithesis is free-market capitalism. The democrats have posed the challenge. It is now up to the republicans to pick it up, and fight along these lines

– Dick Morris

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9 APPENDICES

Appendix A: Ethics Approval

Faculty of Commerce

Private Bag X3, Rondebosch, 7701
2.26 Leslie Commerce Building, Upper Campus
Tel: +27 (0) 21 650 4375/ 5748 Fax: +27 (0) 21 650 4369
E-mail: com-faculty@uct.ac.za
Internet: www.uct.ac.za

13 July 2016

Kennedy Okong'o

Department of Information Systems

Re: Application for Ethics Approval

Project title: PUBLIC VALUE OF E-GOVERNMENT INVESTMENTS IN THE DEVELOPING COUNTRIES: Empirical Exploration of the Public Sector in Kenya

Reference Number: 0712201506

Dear Kennedy Okong'o

This letter serves to confirm that the Ethics committee has approved the research as described in your submitted protocol.

Please note that you are required to inform the Committee immediately should any changes in the research procedure occur that might affect the experience of the participants. This includes major changes to the questionnaire.

We wish you well for your studies

Signed

A/Prof. Ulrike Rivett
Commerce Faculty Ethics in Research Committee

Appendix B: Letter of Authority

NATIONAL COMMISSION FOR SCIENCE, TECHNOLOGY AND INNOVATION

[illegible]

Ref. No. **NACOSTI/P/16/48060/10507**

Date:

21st April, 2016

Kennedy Odiwuor Okongo
University of Cape Town
SOUTH AFRICA.

RE: RESEARCH AUTHORIZATION

Following your application for authority to carry out research on ***"Public value of E-Government investments in the developing countries: Empirical exploration of the public sector in Kenya,"*** I am pleased to inform you that you have been authorized to undertake research in **Nairobi County** for the period ending **19th April, 2017.**

You are advised to report to **the Principal Secretary, Ministry of Information, Communications and Technology, the County Commissioner and the County Director of Education, Nairobi County** before embarking on the research project.

On completion of the research, you are expected to submit **two hard copies and one soft copy in pdf** of the research report/thesis to our office.

Signed

BONIFACE WANYAMA
FOR: DIRECTOR-GENERAL/CEO

Copy to:

The Principal Secretary
Ministry of Information, Communications and Technology.

The County Commissioner
Nairobi County.

Appendix C: Research Permit

CONDITIONS

1. You must report to the County Commissioner and the County Education Officer of the area before embarking on your research. Failure to do that may lead to the cancellation of your permit
2. Government Officers will not be interviewed without prior appointment.
3. No questionnaire will be used unless it has been approved.
4. Excavation, filming and collection of biological specimens are subject to further permission from the relevant Government Ministries.
5. You are required to submit at least two(2) hard copies and one(1) soft copy of your final report.
6. The Government of Kenya reserves the right to modify the conditions of this permit including its cancellation without notice

REPUBLIC OF KENYA

NACOSTI

National Commission for Science, Technology and Innovation

RESEARCH CLEARANCE PERMIT

Serial No. A 8786

CONDITIONS: see back page

THIS IS TO CERTIFY THAT:
MR. KENNEDY ODIWUOR OKONGO
of UNIVERSITY OF CAPE TOWN, 0-40404 Rongo,has been permitted to conduct research in *Nairobi County*

on the topic: *PUBLIC VALUE OF E-GOVERNMENT INVESTMENTS IN THE DEVELOPING COUNTRIES: EMPIRICAL EXPLORATION OF THE PUBLIC SECTOR IN KENYA*

for the period ending:
19th April,2017

Permit No : NACOSTI/P/16/48060/10507
Date Of Issue : 21st April,2016
Fee Recieved :Ksh 2000

Signed

Applicant's Signature

Signed

Director General
National Commission for Science, Technology & Innovation

Appendix D: Letter to Participants

Department of Information Systems
Leslie Commerce Building
Engineering Mall, Upper Campus
OR
Private Bag X3 - Rondebosch - 7701
Tel: +27 (0) 21 650 2261 Fax: +27 (0) 21650 2280
Internet: http://www.commerce.uct.ac.za/informationsystems/

Dear **Sir, Madam,**

I would like to invite you to participate in an academic research titled *Public Value of e-Government Investments in the Developing Countries: Empirical Exploration of the Public Sector in Kenya.* This research has been approved by South Africa's University of Cape Town, Faculty of Commerce Ethics' Research Committee and National Commission for Science, Technology and Innovation (NACOSTI), in Kenya.

The aim of the research is to present a distinctive multi-theoretical position of e-Government Investments through an exploration of the resulting public values. It uses Kenya as an empirical setting and so the questionnaires are distributed to selected participants in the month of March' 2016 over a period of one month.

Your participation is voluntary. All information collected will be confidential and will be used exclusively for the purpose of this academic study. No individual names will be recorded or published. You will not be requested to supply any identifiable information. This will ensure anonymity in your responses. You can choose to withdraw from the study at any time for whatever reason, in accordance with the ethical research requirements.

The anonymous survey will take about 20 minutes. If you are willing to participate in this study, kindly sign the appended consent form. Should you have any questions regarding this research, please feel free to contact me on +254 720 352 348 or +27 630 363 969 or email: OKNKEN001@myuct.ac.za. Thank you for your time and participation.

Yours sincerely,

Signed

KENNEDY OKONG'O

University of Cape Town Private Bag, Rondebosch, 7701 South Africa

"Our Mission is to be an outstanding teaching and research university, educating for life and addressing the challenges facing our society."

Appendix D*: Consent Form

I, ____, consent to participate in the research titled *Public Value of e-Government Investments in the Developing Countries: Empirical Exploration of the Public Sector in Kenya*. I am aware that participation is voluntary and that I may choose to withdraw from this study at any time, should I choose to do so.

Signature……………………………………………………Date……………………………………..

Appendix D**: Questionnaire

The questionnaire comprises the following parts:

Part I: Demographics

Part II: Public Value of e-Government

Part III: ICT Policy, e-Government Strategies and Projects

PART I – DEMOGRAPHICS

1 Gender: Male ☐ Female ☐

2. Age: 20 & Under ☐ 21-30 ☐ 31-40 ☐ 41-50 ☐ 51-60 ☐ Over 60 ☐

3. Highest level of education: Primary ☐ Secondary ☐ Diploma ☐ Bachelor ☐ Master ☐ PhD ☐ Others………………………………………………………………

4. Occupation: Student ☐ Civil Servant ☐ Housewife ☐

5. If civil servant, Managerial Level ☐ Operations Level ☐

6. Monthly Income Level (KSh)

0-10,000 ☐ 10,001-20,000 ☐ 20,001-30,000 ☐ 30,001- 40,000 ☐ 40,001-50,000 ☐

50,001-60,000 ☐ 60,001-70,000 ☐ 70,001-80,000 ☐ Over 80,000 ☐

For Part 2-5 TICK (√) as appropriate using the scale *Strongly Disagree (1), Disagree (2), Not sure (3), Agree (4), Strongly Agree (5)*

PART II – PUBLIC VALUES OF e-GOVERNMENT

No	Public Values of e-Government	1	2	3	4	5
7	ICTs in government enhance *Quality of Public Information:*					
	7a) Accurate information					
	7b) Up-to-date information					
8	ICTs in government enhance *Delivery of Public Services:*					
	8a) Online communication					
	8b) Online access to government documents					
9	ICTs in government enhance *Citizen Focused Governance:*					
	9a) User friendly web					
	9b) None technology savvy web					
10	ICTs in government improve *Efficiency in Public Service:*					
	10a) Data sharing					
	10b) Lean staffing					
11	ICTs in government enhance *Openness in Public Sector:*					
	11a) Online filing of complaints					
	11b) Online display of government data					
12	ICTs in government improve *Responsiveness in Public Service:*					
	12a) Online enquiries					
	12b) Online case tracking or follow-up					
13	ICTs in government promotes *Equity in Public Service:*					
	13a) Enables access by the marginalized					
	13b) Supports people with special needs					
14	ICTs in government promotes *Citizen Trust in Public Sector:*					
	14a) Security in government information					

	14b) Credibility of information exchanged
15	ICTs in government enhances *Democracy in Decision Making:*
	15a) Information on upcoming public policies
	15b) Online participation in policy making
16	ICTs in government promotes *Environmental Sustainability:*
	16a) Limits duplication of resources for example papers
	16b) Enables recycling of consumables for example cartridges

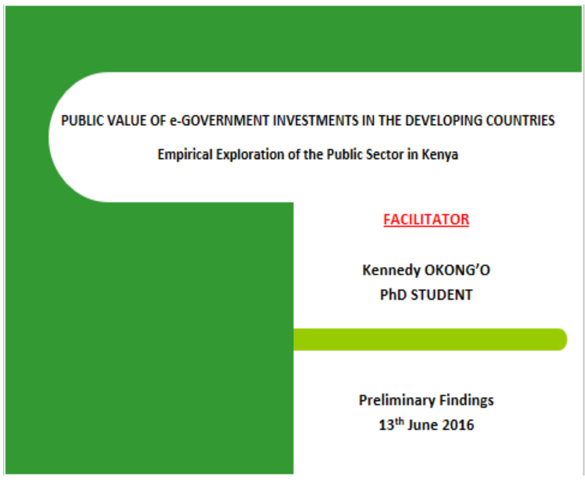
PART III – ICT POLICY, e-GOVERNMENT STRATEGIES and PROJECTS

		YES	NO
17	You are aware of the existence of *a national ICT Policy* for Kenya		
18	You are aware of the existence of *an e-Government Strategy* for Kenya		
19	You have been involved in public sector *ICT policy debates* in Kenya		

20. Briefly describe the nature of your involvement, if any……………………………………..
21. In your opinion, what is still outstanding, if any, in e-Government implementation in Kenya…………………………………………………………………………………….
22. Are you aware of any public sector ICT project that is particularly a:
    22a) good example …………………………………………………………………
    22b) bad example…………………………………………………………of the way in which ICTs are used in Government.
23. Are there <u>any issues not raised in this questionnaire</u> that you would like to comment on, in regards to e-Government in Kenya?…………………………………………

Thank you for participating in this survey

Appendix E: e-Government User Conference Protocol



BACKGROUND

In the last two decades, new ICTs have emerged. In both developed and developing countries, a substantial growth in such investments is evident (Mutula, 2013; Bollou & Ngwenyama, 2008). A range of researches has attempted to establish if such investments are resulting into the envisaged returns, and a relatively adequate focus has been on the private sector (Kanwal et al., 2014; Brynjolfsson & Saunders, 2010).

Though a range of quantitative - empirist researches on the impact of e-Government or public sector ICTs exists (Ha, 2016), much of the debates has left out the African perspectives despite the existent of inefficient African administrative systems that have placed most sub Saharan African governments into focus (Burke, 2012; Yeboah-Assiamah et al., 2016). In addition, the research focus is relatively thin in the public sector as in private sector (Basamh, Qudaih, & Suhaimi, 2014).

RESEARCH QUESTION

General Question: 'What public value (s), if any, result following investment in e-Government in Kenya? Considering the investment levels in e-Government, what is the direction of the relationship and the extents thereof?'

Specific research questions:

1. What public value(s) result from investments in e-Government in Kenya?
2. What is the operational efficiency resulting from investments in e-Government in Kenya?
3. What performance impacts result from investment in e-Government in Kenya?

RESEARCH METHODS

- **SURVEY:** respondents were stratified into 3 strata to represent the various sections of *the public*. These were public servants (Pourkiani et al., 2014), students (Ayub et al., 2014) and housewives (Wang, 2014; Burrell, 2010)

- **DOCUMENT REVIEW:** was to address the main research questions II & III. The documents reviewed relevant data on Ministries of *Education, Medical Services, Transportation & Infrastructure, Foreign Affairs, Energy, Finance, Agriculture and Internal Security* for the period running 2004 to 2014. The sets of data were collected from multiple sources of reports, all converged in a triangulated fashion (Jetzek et al., 2014).

  The variables of interest are *(1) total government expenditure, (2) e-Government expenditure, (3) total recurrent estimates, (4) total development estimates, (5) inflation rates, (6) governance index, (7) consumer price index (CPI), (8) population, (9) GDP) (10) rebased GDP (11) total personal income or emoluments (12) actual expenditure on development and (13) actual recurrent expenditure.*
- **USER CONFERENCE: ?**

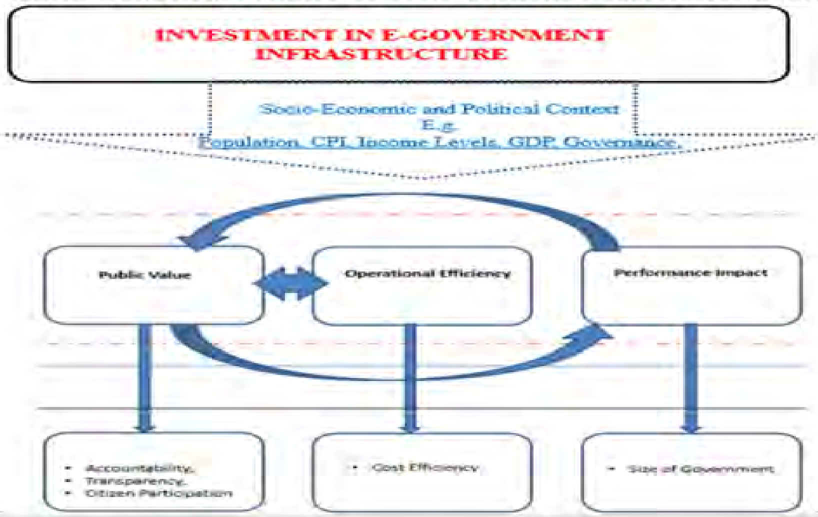
USER CONFERENCE

- This is qualitative. The data collected in the exercise is to validate & verify the preliminary findings *(to be presented in this session)* by stakeholders *(you)* who have an interest in e-Government. The aim is to *deliberate, validate and legitimize* the findings. Complex hypotheses are better examined by groups (Verburgh & Mulder, 2002). Therefore this will focus on argumentation and interaction (Mulder, 1991). A broader view of this exercise should result in better quality findings (Mulder, 1991; Verburgh & Mulder, 2002), by retention of the emerging convergence (Nunn, 2013).

- Note that the participants are not to act in the interest of specific sector or strata but in the interest of the entire public, or the *mass population.*

CONCEPTUAL MODEL

The model is informed by theories from a multiple of disciplines. It hypothesized relationships between investments in e-Government on one side & PV, OE, PI on the other side as central variables. Political & socio-economic factors form the controls.



PRELIMINARY FINDINGS

Objective	Hypothesis (H)	Findings	Conclusion
To identify dimensions of public value following investment in e-Government	e-Government Investment present significant dimensions of public value	e-Government Investment has a statistical significant influence on the resulting dimensions of public value	H1 is supported
To determine operational efficiency of e-Government Investment	e-Government Investment has a significant influence on the cost efficiency	e-Government Investment has a statistically insignificant influence on the cost efficiency	H2 is not supported
To determine performance impact of e-Government Investment	e-Government Investment has a significant influence on the size of the public sector	e-Government Investment has a statistically significant influence on the size of public sector	H3 is supported


FULL DELIBERATION


THE END

Appendix F: Measurement and Sources of Variables

Variable	Measurement	Meaning	Source
Sector specific	Total Budget	Approved by Legislature or Parliament to cover development and recurrent expenditure per ministry	Kenya's Ministry of National Treasury ' Budget Estimates
	Development Budget	Approved by Legislature or Parliament to cover development expenditure per ministry	
	Recurrent Budget	Approved by Legislature or Parliament to cover recurrent expenditure per ministry	
	Total Expenditure	Actual spend on development and recurrent expenditure per ministry	
	Development Expenditure	Actual spend on development expenditure per ministry	
	Recurrent Expenditure	Actual spend on recurrent expenditure per ministry	
	e-Government Expenditure	Actual spend per ministry on e-Government	
	Government Size	Total Expenditure as a proportion of sector / ministry GDP or personal income	
Macro-Economic	Gross Domestic Product (GDP)	Total value of goods and services produced in a country within a year, reflects economic activity.	Kenya National Bureau of Statistics (KNBS)
	Consumer Price Index (CPI)	Overall consumer price index based on February 2009 prices =100	
	Total Population	The whole number of persons in the country	
	Governance Index	The aggregate indicator that combines the views of a large number of enterprise, citizen and expert respondents. Is in terms of percentile rank, and indicates the percentage of countries worldwide that rank lower than the indicated country, so that higher values indicate better governance scores. They correspond to 90% confidence intervals. Consists of six (6) dimensions: *political stability, government*	World Bank (World Bank Development Indicators)

		effectiveness, corruption, rule of law, accountability and regulatory quality.
	Political stability	The perception of the likelihood of political instability and /or politically-motivated violence, including terrorism.
	Government effectiveness	The perception of the quality of public services, policy formulation, credibility of government's commitment and the degree of its independence from political pressures
	Control of corruption	This is the perception of the extent to which public power is exercised for private gain, as well as 'capture' of the state by elites and private interests.
	Rule of law	This is the perception of the extent to which agents have confidence in and abide by the rules of society.
	Accountability and Regulatory quality	This is the perception of the ability of the government to formulate and implement sound policies that permit and promote private sector development.

Appendix G: Sample Cross Tabulations

1) *Gender and Occupation*

		Occupation			Total
		Student	Civil servant	Housewife	
Gender	Male	266	173	0	439
	Female	175	167	391	733
Total		441	340	391	1172

Age and Occupation

		Occupation			Total
		Student	Civil servant	Housewife	
Age	Under 20	180	19	36	235
	21-30	227	109	182	518
	31-40	28	141	114	283
	41-50	4	54	24	82
	51-60	0	10	7	17
	61-70	0	1	1	2
	71-80	0	1	0	1
Total		439	335	364	1138

2) Educational Qualification and Occupation

		Occupation			Total
		Student	Civil servant	Housewife	
Highest Level	Primary	12	8	42	62
	Secondary	226	38	209	473
	Diploma	118	118	90	326
	Bachelor	76	112	28	216
	Masters	0	55	7	62
	PhD	0	2	0	2
	Others	0	0	2	2
Total		432	333	378	1143

3) Monthly Income and Occupation

		Occupation			Total
		Student	Civil Servant	Housewife	
Income level	0-10000	362	15	252	629
	10001-20000	61	53	111	225
	20001-30000	5	95	18	118
	30001-40000	2	58	2	62
	40001-50000	1	41	1	43
	50001-60000	2	19	1	22
	60001-70000	0	22	1	23
	70001-80000	0	19	0	19
	>80000	1	14	0	15
Total		434	336	386	1156

Appendix H: Correlation Matrix

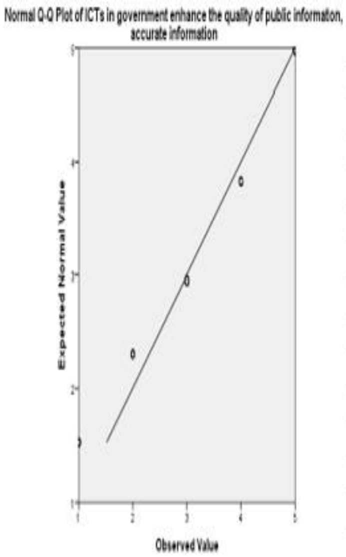
	Budget					Expenditure				Governance Index						
	Total	Dev't	Rec't	GDP	Pop	Total	Dev't	Rec't	e-Gov	CPI	Stab'ty	Eff'ness	Corrupt'n	Reg'n	Law	Account'ty
Budget	1.000															
Dev't	0.3451*	1.000														
Recurrent	0.9260*	-0.0347	1.000													
GDP	0.3909*	0.3619*	0.2707*	1.000												
Pop	0.3906*	0.3626*	0.2700*	0.9972*	1.000											
Expenditure	0.9773*	0.2140	0.9546*	0.3619*	0.3628*	1.000										
Dev't	0.3456*	0.9597*	-0.0180	0.3709*	0.3742*	0.2526*	1.000									
Rec't	0.8991*	-0.0831	0.9907*	0.2560*	0.2558*	0.9519*	-0.0560	1.000								
e-Gov	0.1112	-0.2173	0.2058	0.2141	0.2145	0.1317	-0.2659*	0.2201*	1.000							
CPI	0.3899*	0.3616*	0.2698*	0.9972*	0.9962*	0.3608*	0.3677*	0.2559*	0.1990	1.000						
Stability	-0.1190	-0.1100	-0.0824	-0.2874*	-0.3319*	-0.1226	-0.1435	-0.0811	0.1006	-0.3055	1.000					
Effec'ness	0.2776*	0.2508*	0.1947	0.7168*	0.7161*	0.2738*	0.2966*	0.1886	0.1348	0.7164*	-0.0839	1.000				
Corruption	-0.2298*	-0.1965	-0.1656	-0.6148*	-0.6293*	-0.2188	-0.2085	-0.1597	0.1768	-0.6161*	0.7396*	-0.1773	1.000			
Regulation	-0.2314*	-0.2079	-0.1628	-0.6120*	-0.5628*	-0.2064	-0.1841	-0.1547	0.0935	-0.6143*	0.0530	-0.4683*	0.4042*	1.000		
Law	0.1505	0.1204	0.1118	0.4024*	0.3399*	0.1234	0.0954	0.0971	0.0784	0.3651*	0.3671*	0.1278	-0.1854	-0.6644*	1.000	
Account'ty	-0.1676	-0.1687	-0.1107	-0.4104*	-0.4669*	-0.1635	-0.1886	-0.1090	0.1145	-0.4305*	0.8526*	-0.2355*	0.6319*	-0.0716	0.4851*	1.000

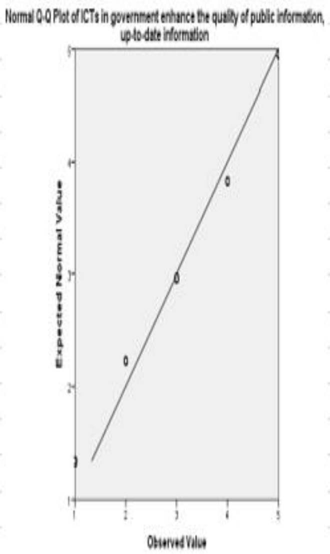
*Note: * indicates correlation coefficients significant at 5% level of significance.*

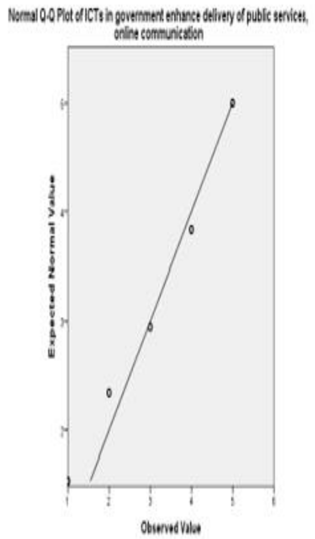
Appendix I: Item Total Statistics

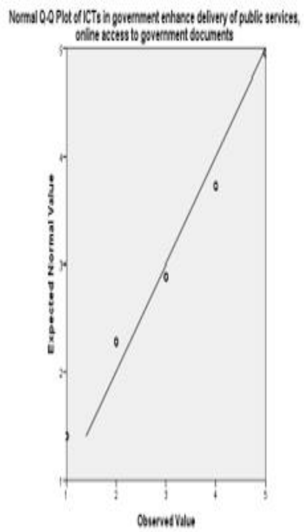
	Scale Mean if Item Deleted	Scale Variance if Item Deleted	Corrected Item-Total Correlation	Squared Multiple Correlation	Cronbach's Alpha if Item Deleted
accurate information	62.63	152.621	.419	.396	.860
up-to-date information	62.83	149.846	.484	.440	.857
online communication	62.59	151.040	.500	.362	.857
online access to government documents	62.99	146.494	.504	.377	.856
user friendly web	62.94	150.964	.502	.345	.857
none technology savvy web	63.30	155.119	.368	.213	.861
access by the marginalized	63.13	147.474	.498	.457	.857
supports people with special needs	63.05	151.631	.376	.316	.862
security in government information	63.25	149.427	.453	.382	.858
credibility of information exchanged	63.30	149.710	.484	.447	.857
information on upcoming public policies	63.31	147.591	.501	.482	.857
online participation in policy making	63.47	148.981	.443	.491	.859
data sharing	62.80	150.729	.450	.309	.859
lean staffing	62.82	152.523	.404	.312	.860
online filing of complains	63.01	146.201	.568	.398	.854
online display of government data	63.28	149.674	.434	.366	.859
online enquiries	62.71	149.592	.509	.336	.857
online case tracking/ follow-up	63.20	148.897	.485	.318	.857
limits duplication of resources for example papers	62.73	150.815	.408	.459	.860
enables recycling of consumables	62.83	152.918	.351	.459	.862

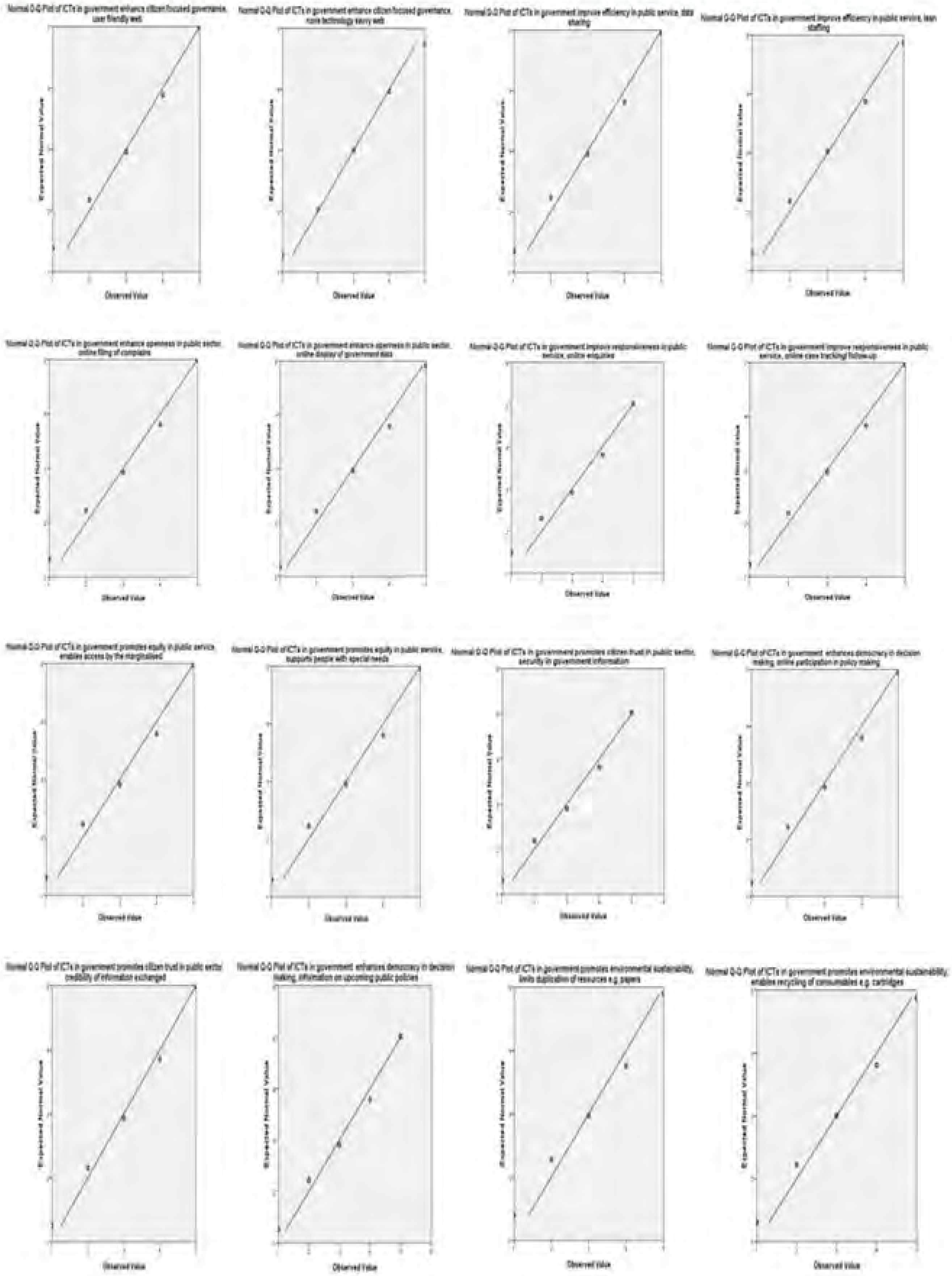
Appendix J: Q-Q Plots



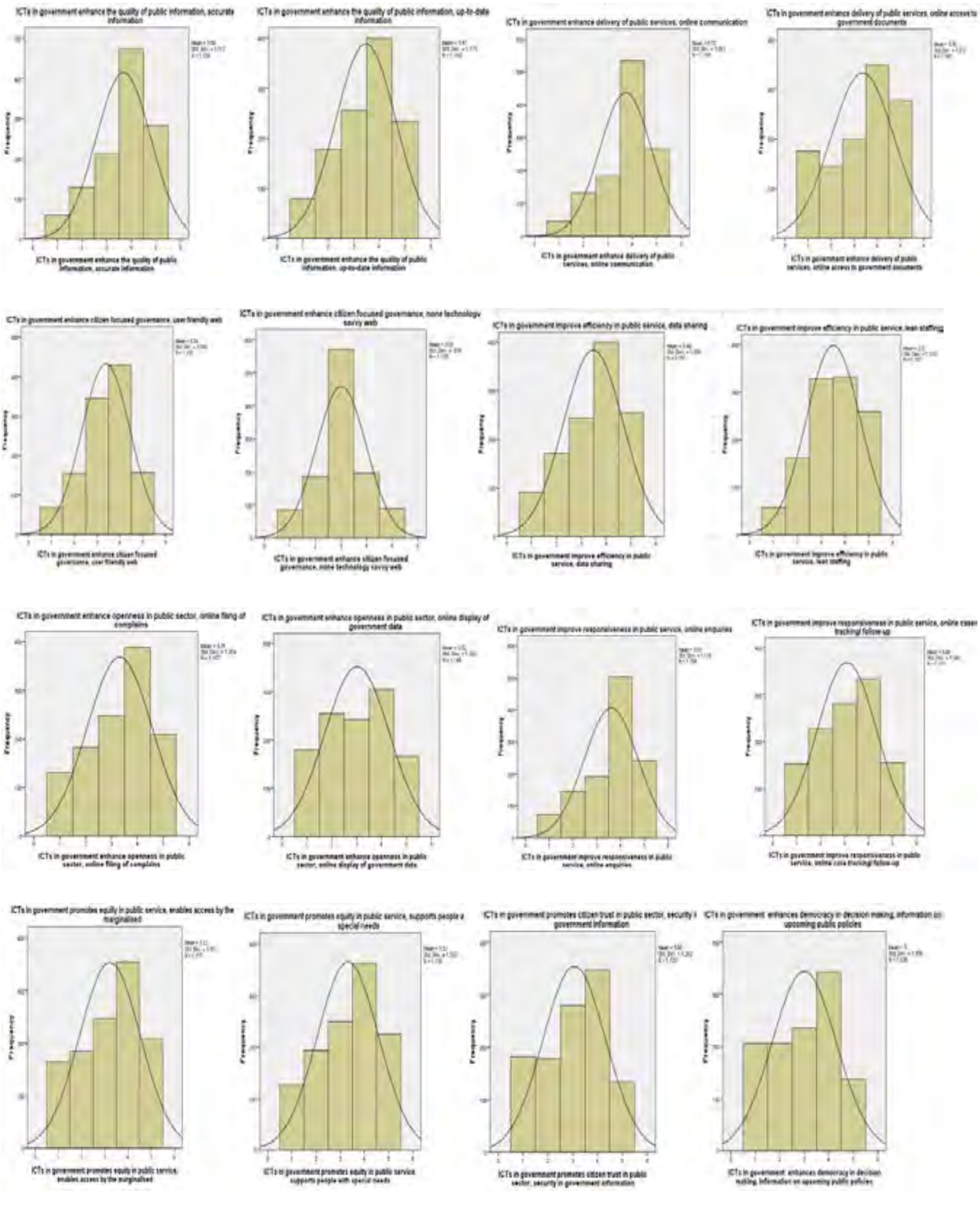


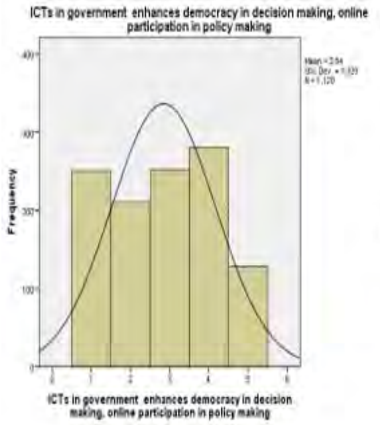


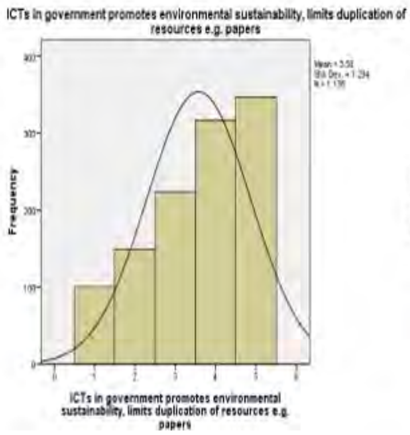


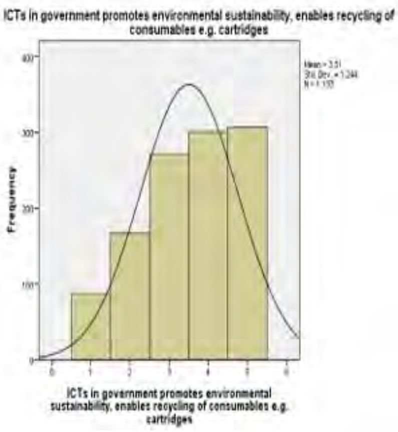


Appendix K: Histogram Curves









Appendix L: ICT Policy & Strategy

Age and Awareness of existence of ICT Policy for Kenya

				Total
		Yes	No	
Age	Under 20	135	95	230
	21-30	310	181	491
	31-40	164	86	250
	41-50	66	16	82
	51-60	16	1	17
	61-70	2	0	2
	71-80	0	1	1
Total		693	380	1073

Age and Awareness of e-Government Strategy for Kenya

				Total
		Yes	No	
Age	Under 20	129	99	228
	21-30	308	178	486
	31-40	148	99	247
	41-50	65	16	81
	51-60	14	3	17
	61-70	2	0	2
	71-80	0	1	1
Total		666	396	1062

Age and Involvement in Public ICT Policy debates for Kenya

				Total
		Yes	No	
Age	Under 20	67	158	225
	21-30	80	395	475
	31-40	29	218	247
	41-50	17	64	81
	51-60	5	11	16
	61-70	2	0	2
	71-80	0	1	1
Total		200	847	1047

Gender and Awareness of national ICT Policy for Kenya

				Total
		Yes	No	
Gender	Male	275	138	413
	Female	430	259	689
Total		705	397	1102

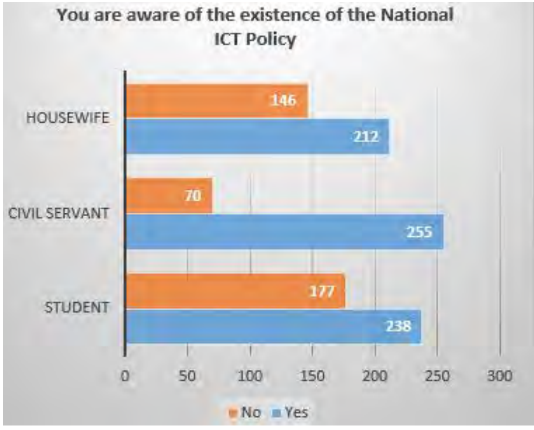
Gender and Awareness of e-Government Strategy for Kenya

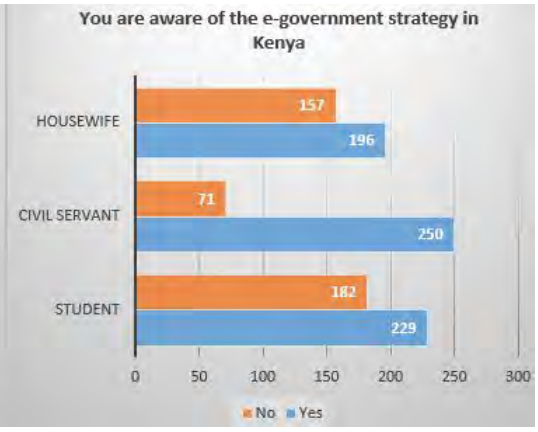
		Yes	No	Total
Gender	Male	271	140	411
	Female	408	270	678
Total		679	410	1089

Gender and Involvement in Public ICT Policy debates for Kenya

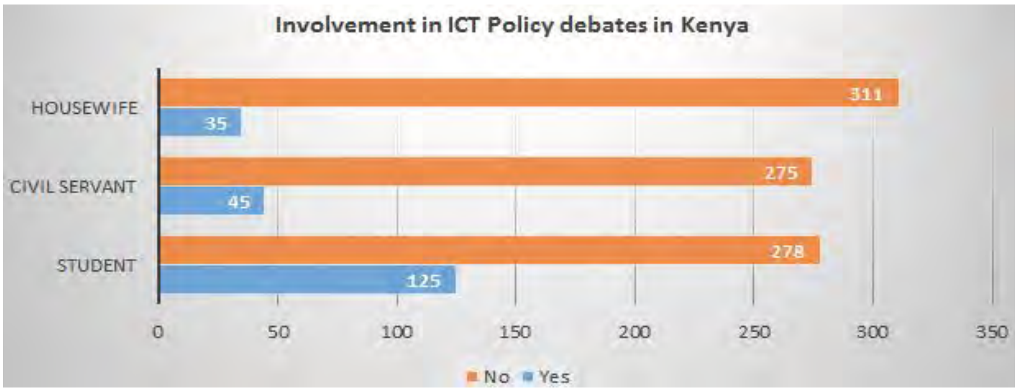
		Yes	No	Total
Gender	Male	103	304	407
	Female	104	562	666
Total		207	866	1073

Awareness of the existence of ICT Policy and e-Government Strategy





Cluster and Involvement in ICT Policy debates for Kenya



Appendix M: Random Effects Estimations

With Cross Sectional Dummies		**Without Cross Sectional Dummies**	
Number of Observations	80	Number of Observations	80
Number of Groups	8	Number of Groups	8
Observation per group	10	Observation per group	10
Degrees of Freedom	10	Degrees of Freedom	3
Wald Chi Square (10)	2022.11	Wald Chi Square (3)	26.96
P-Value	0.0000	P-Value	0.0000

Appendix N: Breusch-Pagan Lagrange Multiplier (BP-LM) Test – Objective IV

Model	Chi Square (1)	P-value
Political Stability	0.00	1.0000
Government Effectiveness	0.00	1.0000
Regulatory Quality	0.00	1.0000
Control of Corruption	0.00	1.0000
Rule of Law	0.00	1.0000
Voice and Accountability	0.00	1.0000

Appendix O: Haussmann and Breusch & Pagan Lagrangian Multiplier – Objective V

Model	TEST	Chi Square (1)	P-value
Political Stability	Breusch and Pagan Lagrangian Multiplier	279.96	1.0000
Government Effectiveness	Haussmann Test	0.00	1.0000
Regulatory Quality	Haussmann Test	0.00	1.0000
Control of Corruption	Haussmann Test	0.00	1.0000
Rule of Law	Haussmann Test	0.00	1.0000
Voice and Accountability	Haussmann Test	0.00	1.0000

Appendix Q: Central Measures of Tendencies

Variable		Mean	Std Dev	Min	Max	Observation
Total Budget	overall *	61.41	59.87	6.05	298.16	N = 80
	between * *		24.64	26.43	98.96	n = 10
	within * * *		55.05	-27.46	260.62	T = 8
Development Budget	overall	19.22	22.61	0.10	115.45	N = 80
	between		8.85	6.91	31.91	n = 10
	within		20.97	-12.59	102.76	T = 8
Recurrent Budget	overall	42.19	56.22	0.26	266.93	N = 80
	between		16.00	19.52	69.17	n = 10
	within		54.11	-26.66	239.95	T = 8
GDP	overall	2997.90	1180.25	1345.03	5044.24	N = 80
	between		1236.29	1345.03	5044.24	n = 10
	within		0.00	2997.90	29997.90	T = 8
Population	overall	29400000	3016095	34900000	44300000	N = 80
	between		3159311	34900000	44300000	n = 10
	within		0	39400000	39400000	T = 8
Total Expenditure	overall	57.42	58.80	3.52	253.63	N = 80
	between		22.46	24.71	91.13	n = 10
	within		54.76	-24.02	219.93	T = 8
Development Expenditure	overall	15.59	18.05	0.03	84.50	N = 80
	between		7.35	3.32	24.67	n = 10
	within		16.63	-8.84	75.42	T = 8
Recurrent Expenditure	overall	41.84	56.99	0.22	232.90	N = 80
	between		15.32	21.39	66.46	n = 10
	within		55.08	-24.33	208.28	T = 8
Consumer Price Index	overall	175.78	43.88	117.18	247.40	N = 80
	between		45.96	117.18	247.40	n = 10
	within		0.00	175.78	175.78	T = 8
Inflation	overall	0.09	0.02	0.05	0.13	N = 80
	between		0.03	0.05	0.13	n = 10
	within		0.00	0.09	0.09	T = 8
e-Government Expenditure	overall	0.19	0.11	0.01	0.55	N = 80
	between		0.04	0.11	0.24	n = 10
	within		0.11	-0.03	0.50	T = 8
Governance Index – Political Stability	overall	12.48	2.12	9.50	16.30	N = 80
	between		2.22	9.50	16.30	n = 10
	within		0.00	12.48	12.48	T = 8

Governance Index – Government Effectiveness	overall	34.51	2.42	29.80	37.80	N = 80
	between		2.53	29.80	37.80	n = 10
	within		0.00	34.51	34.51	T = 8
Governance Index - Corruption	overall	16.50	3.53	12.00	22.40	N = 80
	between		3.70	12.00	22.40	n = 10
	within		0.00	16.50	16.50	T = 8
Governance Index – Regulatory Quality	overall	46.55	2.75	41.60	50.20	N = 80
	between		2.88	41.60	50.20	n = 10
	within		0.00	46.55	46.55	T = 8
Governance Index – Rule of Law	overall	19.53	3.44	15.90	27.50	N = 80
	between		3.60	15.90	27.50	n = 10
	within		0.00	19.53	19.53	T = 8
Governance Index – Voice of Accountability	overall	40.20	2.23	35.50	43.80	N = 80
	between		2.33	35.50	43.80	n = 10
	within		0.00	40.20	40.20	T = 8

*Note: * computes statistics using all observations-across time and sectors, between** uses observations across time periods and within*** represents statistics across cross sections*

Appendix R: Document Form

			VARIABLES														
				BUDGET							EXPENDITURE						
State Ministry or Sector	Sector Code	Financial Year	Personal Income	Total	Dev't	e-Gov	Recurrent	Old GDP	Re-based GDP	Pop	Total	Dev't	e-Gov	Recurrent	Governance Index	Consumer Price Index	Inflation
			Ksh Billion														
EDUCATION																	
	1	2004/5															
	1	2005/6															
	1	2006/7															
	1	2007/8															
	1	2008/9															
	1	2009/10															
	1	2010/11															
	1	2011/12															
	1	2012/13															
	1	2013/14															
HEALTH	2																
TRANSPORT	3																
SECURITY	4																
FINANCE	5																
FOREIGN AFFAIRS	6																
ENERGY	7																
AGRICULTURE	8																