CHALLENGES TOWARDS E-GOVERNMENT ADOPTION IN KENYAN PUBLIC ADMINISTRATION: A SURVEY OF PROVINCIAL ADMINISTRATION, UASIN-GISHU COUNTY

BY

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DECLARATION

DECLARATION BY THE CANDIDATE:

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DEDICATION

To my:

Father *Joshua Kiptoo*,

Mother *Eunice Kipchumba,*

Husband *Stephen Talai,*

My son *Ezra Kibet* and

Daughter *Nellie Jerotich*

ABSTRACT

Governments around the world are trying to transform themselves in order to ensure that Public Administrations provide effective service delivery to the public. The invention of Information and Communication Technology (ICT) led to the adoption of reforms based on its use in forms of governance which is called E-government. Despite its foreseen impacts on efficiency of governance, there are a lot of challenges that hinder governments in adopting the new technology. This thesis assessed the level of ICT infrastructure coverage; forms used in Provincial Administration, Information and Communication Technology usage, knowledge on e-government and reviewed factors that challenge its adoption. The research sought to answer what the level of ICT infrastructure coverage is, what were the forms of communication technology used, how often they were used and what were the challenges faced in ICT adoption process. The guiding theory of the research was the open systems theory. The study targeted the Provincial Administration officers and the adult members of public (MoP) comprising of 100 and 58 respectively in Uasin-Gishu County. Qualitative research approach was used to describe the outcome of the study. Data was obtained by use of both questionnaires and interview schedules. The data was presented in form of tables, pie charts and through description. The main findings of the study are: the forms of ICT infrastructure in application were voice services with massive mobile infrastructure and limited fixed/landline and internet, mobile phone usage was common place while internet use was low. E-government was not popular among provincial administration officers and the challenges facing the adoption of e-government affected both the MoP and the Provincial Administration officers and were of a technical, economic and social nature. It was concluded that Information and Communication Technology adoption in PA in the county was skewed because mobile use was prevalent; internet infrastructure was minimal with PA offices neither connected by any cable nor wireless internet infrastructure, despite the presence of cable, wireless and Wi-Fi local area networks. The recommendations of this study were: massive sensitization of e-government policy should be carried out; ICT infrastructure should be equally built especially in government offices; electricity connection should be facilitated to have all government offices powered, and that ICT training programme for PA officers should be put in place for the officers to be able to handle ICT. With the new Administration in Kenya that support ICT adoption, PA should be at the forefront in support of e-government.

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LIST OF ABBREVIATIONS

ACE	Access Channel for Employees
AISI	African Information Society Initiative
B2G	Business to Government
BPOs	Business Process Outsourcings
CCK	Communication Commission of Kenya
DC	District Commissioner
DO	District Officer
E-Government	Electronic Government
G2B	Government to Business
G2C	Government to Citizen
G2E	Government to Employees
G2G	Government to Government
G2N	Government to Non-profit actors
GCCN	Government Common Core Network
ICT	Information and Communication Technology
ISPs	Internet Service Providers
ITU	International Telecommunication Union
LAN	Local and Wide Area Network
MoP	Members of Public
NGOs	Non-governmental Organizations
NTFONP	National Terrestrial Fibre Optic Network Project
PA	Provincial Administration
TFON	Terrestrial Fibre Optic Network

OPERATIONAL DEFINITION OF TERMS

Adoption: It's the ability to accept and use something. In this study, it is the installation of Information and Communication Technology in provincial administration offices and its use in daily formal activities

Challenges: are all factors that act as barriers or inhibit adoption and use of Information and Communication Technology

E-government: The use of mobile phones and fixed/landline for calls, internet for e-mail through wireless and cable networks. Also included was the use of broadband.

ICT gadgets/tools: The hardware part of ICTs and involve mobile phones, fixed land lines and computers.

ICT infrastructure: Includes networks used to access internet and voice services. This infrastructure involves the cable networks, wireless and broadband for internet and mobile phones and landlines for voice services.

ICT: Information and communication technology is used synonymously with e-government.

Provincial Administration: It is the executive arm of government that falls under the ministry of state and internal security and it is distributed all over the county, its officers representing the president in their respective jurisdictions

Public Administration: It is the organization in place that serves the public and funded by the government

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CHAPTER ONE

INTRODUCTION

This chapter discusses the background to the study, the statement of the problem, justification of the study, the objectives, research questions, scope and limitations of the study.

1.1   Background to the Study

The efforts to adopting of e-government are rising through public organizations and public administrations across the world. More and more governments are using Information and Communication Technology (ICT), especially internet or web-based network, to provide services between government agencies and citizens or businesses, employees and other non-governmental agencies (Fang, 2003).

E-government, according to Gronlund and Horan (2005), emerged in the late 1990s. The term was born out of the internet boom, but history of computing in government organizations can be traced back to the beginning of computer history. KEMP (2010) argued that, the rise of e-government is linked to the Great Britain where it was firstly introduced in 1999 though first attempts dated 1994. This was the first attempt of e-government and involved setting up of central government websites that was forwarding internet users to specific departmental agency sites aiming at providing public services efficiently and effectively.

There are millions of websites set up, containing public and private information, governments not left behind because they are using websites and ICTs to deliver services

and communicate information to citizen (Fidelis & Ayoo, 2008). The systematic arena of e-government has therefore advanced from global and regional to in-country, national, state, provincial, county and local levels of government. This advancement, though, is coupled with lots of challenges like those of economic backgrounds, social and technical nature (Okpaku, 2007).

In Africa, e-government originated from the Africa Information Society Initiative (1996, as cited in Hafkin, 2009) that called for the development and implementation of national policies and plans to promote Information and Communication Technology' adoption throughout key economic sectors and in the national administration. The African Information Society advocated for the use of ICTs to improve effectiveness of government service delivery (Hafkin, 2009).

As the rest of the world kept embracing the benefits of e-government, Africa also showed significant milestones in developing similar electronic government platforms (Gronlund and Horan, 2005). E-government was therefore introduced in African countries under the banner of New Public Management (NPM) and was meant to improve governance in developing countries. It was transferred to Africa as a panacea to bad governance by carriers; among them are the western trained civil servants, consultants and information technology vendors (Ochara, 2008).

In Kenya, e-government's first national Information and Communication Technology policy was approved in the year 2004. The policy aimed at issues that involved development of ICT infrastructure which included interoperation of information systems, enhancement of public services, cost saving in service delivery, purchasing,

communication, e-commerce, etc. It also involved development of skills through capacity building, research and development, Information and Communication Technology education and training (Kandiri, 2010). The policy thus, aimed at making the government more result oriented, efficient and citizen centered through increased and better access to government services (Waema & Mitulla, 2006).

Kenya, according to Gronlund (2005) has since then been attempting to implement this public sector reform aimed at improving communication within government agencies, between government and business and between government and citizens. The 2007 ICT policy also drafted freedom of information as a vision to make the country a knowledge-based society by ensuring maximum access by all Kenyans to information held by public authorities to contribute to the clarity of the e-government.

The transition period from the KANU government to NARC government in December 2002 marked the full realization of e-government aspect as the nation was set to tap the great potential of ICT in service delivery to its subjects. It led to establishment of a directorate of e-government in 2004 to draw the plan of action for future ICT implementation (Ibrahim and Khalid, 2004).

Since its inception in Africa to its declaration in Kenya there is a clear indication that, indeed, challenges exist because it took a span of 10 years to have it formally launched in Kenya.

The Cabinet Office came up with a framework that saw an establishment of the e-government programme in June 2004 (Office of the President, 2004). Currently, almost

all government ministries have websites that provide information or thematic functions of government. The information provided is usually static and some provide downloadable forms online, job advertisements, especially government jobs and/or public service jobs. The introduction of e-government meant an efficient dynamic tool that is interactive. The static nature shows that challenges are prevalent in the adoption of the concept into full operation.

Kenya's Vision 2030 is the country's long term development blue print that aims at transforming Kenya into a newly industrializing, globally competitive and prosperous middle income country with a high quality of life for all citizens by 2030. The vision 2030 is based on three pillars namely: economic, social and political pillars. These are all anchored on foundations which include infrastructure, Information and Communication Technology, science, technology and innovation, land reforms, human resource development, security, peace building and conflict management. It is therefore clear that the three pillars are going to be achieved with the great incorporation of ICT (GoK, 2007).

The economic pillar aims at maintaining a sustained growth of 10% per annum over the next 22 years whereas the social pillar aims at achieving a just, cohesive society enjoying equitable social development in a clean secure environment while the political pillar seeks to arrive to an issue based, people oriented and accountable democratic political system (ibid). According to African Consortium (2013), Kenya has through Vision 2030 objectives recognized Information and Communication Technology as a foundation for knowledge economy and the recognition involves a development of affordable ICT

network infrastructure and application which are central to building of an information economy. The blue print involves development of Information and Communication Technology parks and digital villages that will gradually lead to the low cost provision of ICT goods and services.

Provincial administration is the physical arm of the government. It cascades from the national to the grassroots level. It traces its origin to the colonial era, when the colonial authorities came up with it in their effort to effectively govern the East African protectorate. They introduced the institution which represented a formal mechanism of government decision making and political influence (GoK, 2007).

It's an executive arm of government falling in the office of the president in the ministry of state and internal security. PA is divided into eight provinces headed by provincial commissioners, provinces into districts headed by district commissioners, district into divisions headed by district officers, then locations by chiefs and sub-locations manned by assistant chiefs. The role of PA is to promote statehood and nationhood, mobilize local resources for development, disseminate and interpret government policies, peace building and management, coordinate and supervise government activities among others (ibid).

The Kenyan Provincial Administration (PA), under the current Kenya constitution (2010), will play more complex and indispensable administrative roles than ever before. Its roles will be to: coordinate inter-ministerial duties; manage the relationship between the national and county governments and monitor the implementation of national policies and utilization of funds (Obuya, 2011). To carry out these roles effectively, the absolute adoption of Information and Communication Technology will make the institution a

common place for government services like provision of security information, quick to respond to crisis, fast inter-ministerial coordination, transparent and connected county and national government connections and monitored project implementations, reports of national policies and the utilization of funds.

Despite the current loopholes evident in the e-government adoption in the country, the government has and is doing a lot to eliminate hindering factors to Information and Communication Technology adoption. The government's national ICT master plan aims at connecting every citizen, resident, home and institution through country-wide robust accessible and affordable Information and Communication Technology infrastructure by 2017 (Longwe,2012). Public services will therefore be available to all citizens through ICT so that all Kenyans will be able to use them to improve their knowledge, business and livelihood.

It is not just in the master plans but also in some specific projects to combat e-government adoption obstacles. The government is financing the extension of electricity supply in rural areas as part of the basic infrastructure to stimulate economic growth. The current policy also provides for the extension of electricity to market centers, public secondary schools, youth polytechnics, health centers among other community projects. This will solve power problems in the process of adopting ICT (Sessional paper No.10, 2012).

During the 2011/12 financial year, the minister of finance announced that some equipment in the ICT sector had been zero-rated to allow growth in the sector. This equipment included set-top boxes needed for digital migration and tax on imported

software to encourage computer literacy. The government announced its intention to see all schools, hospitals and police stations connected to the fibre backbone while towns were targeted for Wi-Fi connections (Githae, 2013). According to Kaimenyi (2013), the government is currently trying to review its curriculum so as to make Information and Communication Technology universally available. These reforms in educational curriculum were part of the ruling party's manifesto and included the provision of laptops for all Standard1 pupils to support the universal adoption of ICTs. Etta and Elder (2005) argue that the cabling of all government buildings is on-going so as to provide infrastructure and connectivity between and within government buildings.

Despite the many potential benefits of using modern Information and Communication Technology, governments still struggle with the problems of rigid and ineffective internal and inter-institutional process. A severe lack of understanding the citizens' real needs, attitudes and abilities to use ICT-based services also exists and this consequently leads to low take up of online offers (Codagnone &Wimmer, 2007).

The reasons for inefficient use of ICTs include great heterogeneity, fragmentation and inability of information systems to interoperate. Furthermore, business processes are not properly designed for effective implementation. Cooperation among government agencies and with the society (citizens) and the market (business) is in most cases realized only in limited ways (ibid).

This research, sought to establish the reasons why this new administrative system (e-government) has not been so much embraced in the region despite the launch and advocacy already backed by the central government. This was because it is still evident

that paperwork is used for purposes of communication in PA and people are walking long distances seeking services from the offices. It seeks to answer how much has ICT infrastructure covered PA offices, what forms are used in PA, how often they are used, and what are the challenges facing its adoption in PA.

1.2   Statement of the Problem

Over the years, ICT has remained Kenya's top development agenda as evident in the country's national plans and other government initiatives such as the e-government strategy (2004-2009) which provided a roadmap for Information and Communication Technology implementation (Siambi, 2008). E-government adoption is a reform that has the potential to mould Kenya's public sector pitfalls, such as slow delivery of service, corruption, and slow response rates to conflict and other security issues. Since its official launch in the year 2006, to date, most government offices have not fully adopted the new strategy. The immense positive impact of the use of ICTs in governance is evident and its slow rate of adoption shows that there are some underlying factors that impede government agencies from going absolutely electronic. Prior studies has shown that e-government has faced a lot of challenges such as low penetration of ICT infrastructure whose connectivity countrywide is inadequate especially in rural areas, technology challenges in terms of low computer literacy level, availability of few computers and resistance to change due to the uncertainty of the outcome of new technology which led to fear of both members of staff and the citizenry hence a preference to the continuity of the old system of manual operations (Siambi, 2008).

Currently, there is a proliferation of cybercafés, flow of affordable mobile phones, presence of a wide selection of ICT networks across the country and the presence of ICT learning institutions (Mitula and Waema, 2005). PA as compared to other public administrations like ministry of higher education seems left behind in the use of these new ventures in service delivery. This study sought to answer why, despite the current high technological level in the country, the implementation plans and projects in place, allocations of millions in finances to the projects and programs; e-government is still not optimally utilized in PA.

1.3   Justification of the Study

E-government adoption as an ICT reform in the public sector is expected to bring in an extra dimension to good governance. To achieve good governance, that is, effective, efficient, accountable and transparent, all factors that hinder its adoption should be known so as to be eliminated. Assessing the current e-government situation and knowing the barriers that stand between the adoptions of the concept in PA will act as a roadmap towards its full implementation in the future.

The outcome of the study will therefore be a significant resource for Kenyan policy makers, government officials and students interested in tapping the benefits and opportunities of e-government. Policy makers will be aware of factors realized from the study and can be in a position to make future sound strategies that will make the concept a success by being in a position to understand the reality of the policy in specific settings like Uasin-Gishu county. The level of ICT coverage, ICT usage, knowledge of PA officers on e-government and challenges established in the study will help them

understand how far the policy in terms of its adoption and use has gone hence, help in drawing future strategies on the same.

This research will also provide a reference framework for scholars interested in conducting similar studies and will add to the academic field of political science, specifically, Public Administration. Not much research has been documented on ICT adoption in Uasin-Gishu County's public sector. Prior studies have not attempted to narrow to county level and more so, PA and the outcome of the study will fill the gap left by prior research through concentration on Provincial Administration in Uasin-Gishu County.

The studied institution too can benefit from the outcome of this study. The PA will be in a position to know their effort in ICT adoption and use and the challenges that come with it. This will therefore ease their mode of implementation of the reform since the hindering factors are already established.

The following are the objectives, research questions, scope and limitations of the study given in detail.

1.4 Objectives of the Study

The general objective of the study was to investigate the challenges that influence adoption of E-government in the Provincial administration. The specific objectives were:

i. To analyze Information and Communication Technology coverage by Information and Communication Technology infrastructure.

ii. To determine the forms of Information and Communication Technology used in Provincial Administration.

iii. To assess the Information and Communication Technology usage in the area under study.

iv. To investigate the knowledge of Provincial Administration officers on e-government policy

v. To examine the challenges facing the adoption of Information and Communication Technology.

1.5 Research Questions

i. What are the Information and Communication Technology infrastructures available in the area of jurisdiction?

ii. What are the kinds of Information and Communication Technology used in Provincial Administration's day to day operations?

iii. How often is Information and Communication Technology used in Kenyan Provincial Administration?

iv. Do the Provincial Administration officers know of e-government policy?

v. What are the challenges facing the adoption of Information and Communication Technology?

1.6   Scope of the Study

This research was limited to the use of Information and Communication Technology as a tool of governance in Provincial Administration. It involved the assessment of all factors that act as barriers to full adoption and the use of ICT effectively which are popularly known as e-government and include the use of internet by either broadband, wireless and cable and voice services which are in form of fixed/landline telephones and mobile phones. This study was confined to the use of the internet and telephone services and not the use of TVs and radio services within Uasin-Gishu County.

1.7   Limitations of the Study

The limiting factors encountered during this study were in the tools of data collection and the respondents. Some of the respondents were not willing to participate, especially those purposively sampled. On the instruments, the use of questionnaires was the major limiting factor because once the questionnaires were dispatched, the researcher lost control of them. To overcome these challenges, follow-ups were used to counter the loss of questionnaires while on the respondents; interviews were employed to persuade respondents to participate in this study.

1.8   Summary of the chapter

This chapter discussed in detail the background to the study, the statement of the problem, the justification of the study, objectives, research questions, scope of the study and limitations of encountered in the study. The next chapter discusses the literature reviewed.

CHAPTER TWO

LITERATURE REVIEW

2.1 Introduction

This chapter discusses the various definitions of e-government, importance that come along with the adoption of Information and Communication Technology (ICT) in governance, its infrastructure, forms of ICTs, frequency of its usage, e-government policies, the challenges that face the process of adoption of Information and Communication Technology, the e-government readiness and the theoretical and conceptual framework adopted in the study.

E- Government has varying definitions according to different authors as shown below:

i. *The World Bank:* E-Government refers to the use by government agencies of information technologies (such as Wide Area Networks, internet, mobile computing) that have the ability to transform relationships with citizens, businesses and other arms of government (World Bank, 2011).

ii. *The United Nations:* E-government is a government that applies Information and Communication Technologys to transform its internal and external relationships (UN, 2003).

iii. *Gartner research:* E-government is the continuous optimization of government service delivery, constituency participation and governance by transforming internal and external relationship through technology, the internet and new media (Gartner, 2009).

iv. *The United Nations:* E-government may be defined as the implementation of ICTs in government facilitating organizational change and transformation in internal and external relationships with a view to become more efficient, effective, accountable, reliable and transparent (UN, 2008).

v. *Office of the President:* defines e-government as the use of information technologies such as the Wide Area Networks, internet and mobile computing by government agencies to transform government operations in order to improve the effectiveness, efficiency, and service delivery and to promote democracy. It's the use of Information Technology to support government operations, provide investments that are needed in people, tools, policies, processes, engage citizens and provide government services (Cabinet Office, 2004).

vi. *Misuraca (2007):* defines e-government as the use of ICTs especially of the internet to adopt a new conception, attitude of governing and managing where participation and efficiency are required of all partners linked in a network.

ITU (2009) defines the term by explaining that, beyond the internet, other technologies and applications can be used for e-government services, such as telephones (fixed or mobile), messaging systems (SMS or MMS), fax, biometric identification, smart cards, radio frequency, RFID chips as well as television or radio- based government services used to provide disaster warnings, electronic newsletters, education management systems and traffic control systems.

2.1.1 Importance of Adopting E-Government

The introduction of e-government applications have been beneficial to governments in several ways, most significantly, in the area of public procurement, electric applications have expanded government access to potential suppliers and increased the number of offers received in a timely manner. E-government applications provide a valuable development tool by increasing the effectiveness of aid and procurement (ITU, 2009).

Governments all over the world are recognizing e-government as a strategic option to fine-tune their internal and external operations. Its strategies include: information dissemination on searchable database; customer satisfaction; online transactions; implementing the use of e-checks and be available to measure government systems. This, in turn, makes it offer accessibility to government information and services for citizens, businesses and government agencies and thus improving the quality of e-services and providing greater opportunities for participation in democratic institutes and processes (Grottschalk & Solli-Saether, 2009).

Interacting with the government online saves time, effort, frustration and cost. E-government interactions are cheap, quick and easy, especially on online communication, banking and accounting payments. The system is likely to serve as a major drive behind the adoption of e-commerce in a country (Botha & Geldehuys, 2008).

ICTs are bringing about major changes in the way in which regional and local authorities operate, interact and communicate internally with other administrators, enterprises and citizens, as the closest level of government and as the main providers of public services.

Its integration into government can enhance the delivery of public service to all citizens (Misuraca, 2007).

E-government has the potential to improve participation, transparency, accountability, responsiveness, effectiveness and efficiency which form major constructs of government (Waema & Mitullah, 2006). It can also support certain applications such as e-taxation ande-procurement as well as harmonizing the implementation of multiple activities such as commerce, social service, education, health and agriculture (Wanja, 2009).

The cabinet Office (2004) argued that e-government is a fundamental element in the modernization of government: it provides a common framework and direction and enhances collaboration among public sectors and institutions between government policies; e-government is cheaper than print: it reaches many people and at the same time, allows faster distribution; it reduces cost, inefficiencies and inconveniences; more information can be made accessible and it's easier and more effective to get feedback. E-government is leaner and at the same time empowers citizens through access and use of information through the internet as well as having an easier access and more effective way to get feedback (Waema & Mitullah, 2006).

According to ITU (2009), the time and funds required to provide government services can be a burden to citizens, businesses and to administrations, particularly for those in developing countries and rural areas. By introducing e-government services, governments can dramatically reduce transaction costs and improve internal planning mechanisms. This leads to the streamlining of administrative processes which, on the other hand,

improves efficiency, reduces costs and generates savings, lowering the cost of government services.

It supports democratization (e-democracy) by enabling citizens to participate in political consultations in real time and in a cost effective manner. The applications provide a means for politicians to be better informed about public opinions. In addition, the use of ICTs for social networking is giving citizens a powerful instrument to influence political processes, and increased citizen involvement is another factor considered as a means to reach national environmental targets, as it eases the process towards a paper free office (ITU, 2009).

According to Pardo (2000), e-government leads to citizens' access to government information, Facilitates general compliance allows citizen's access to personal benefits, enhances faster procurement including biding, purchasing and payment, encourages citizen's participation and allows easier government to government information transfer.

 Kenneth (2006) states that e-government will lead to improved efficiency, increased transparency, accountability of government functions, convenient, faster access to government services, and improved democracy leading to lower costs for administrative services. The citizens will get connected to government more easily via electronic means of communication. The efficiency will, in turn, be achieved in public service delivery through faster dissemination of government information to a larger audience. The cases of corruption are reduced as accountability and transparency is increased. This is because the physical contacts of citizens and government service providers are limited, and their activities are easily monitored (ibid).

E-government also makes sure that there is equal opportunity to access information which is provided regardless of one's physical location and physical disability. The government bureaucracy experienced in the government offices is broken because the hindrances caused by those in "power" are removed and the services are offered regardless of one's background (Kenneth, 2006).

The office the president, in its e-governance strategic framework, gave some foreseen benefits that e-government strategy was designed to achieve (Cabinet office, 2004). These predetermined set of objectives are:

   i.   To achieve better and efficient delivery of government information and services to the citizen.

  ii.   To promote productivity among public servants.

 iii.   To encourage participation of citizens in government.

 iv.   To empower all Kenyans in line with development priorities outlined in the economic recovery strategy for wealth and employment strategy creation (CCK, 2004).

All these therefore were meant to improve collaboration between government agencies through reduction in the duplication of efforts, to enhance efficiency and effectiveness, improve Kenya's competitiveness by providing timely information and delivery of government services. E-government is also meant to reduce transaction costs for governments, citizens and private sector as well as providing a forum for citizen participation in government activities.

2.1.2   E-Government Delivery Models

To explain further the importance of e-government, the models of e-government are given. These potential e-government models as given by Fang (2003) and Hafkin (2009) are: Government to citizens (G2C), Citizen to Government (C2G), Government to business (G2B), Business to Government (B2G), Government to Government (G2G), Government to Employees (G2E), Employees to government (E2G).

2.1.2.1 G2B Model

According to Botha and Geldehuys (2008), this mode of transaction emphasizes on reducing the burden on businesses by eliminating redundant collection of data and better leveraging of e-business technologies for communication. This model actively drives e-transaction initiatives. These initiatives are like, e-procurement and the development of an electronic market place for government purchases, and carry out government procurement tenders through electronic means for exchange of information and commodities.

G2B transactions include various services exchanged between government and the business community, dissemination of policies, memos, rules and regulations. Business services offered include obtaining current business information, downloading application forms, renewing licenses, registering businesses, obtaining permits, and payment of taxes. The services offered through G2B transactions assist in business development, specifically the development of SMEs. Simplifying application procedures that would facilitate the approval process for SME requests would encourage business development (Grottschalk & Solli-Saether, 2009).

On a higher level, G2B services involve e-procurement, an online government-supplier exchange for the purchase of goods and services by government. Typically, e-procurement websites allow qualified and registered users to look for buyers or sellers of goods and services. Depending on the approach, buyers or sellers may specify prices or invite bids. E-Procurement makes the bidding process transparent and enables smaller businesses to bid for big government procurement projects. The system also helps government generate bigger savings, as costs from middlemen are shaved off and purchasing agents' overhead is reduced (Jeong, 2007).

In Kenya, "Stop Stock outs" is an example of the model. It is a campaign lobbying for African Governments to meet their obligations to provide essential medicines by increasing the national budgetary allocation for the purpose of these medicines and ensures transparency and efficiency in the procurement, supply and distribution of medicines. It is a model that uses SMS technology in its monitoring activities such as 'pill checks', where researchers visit public health institutions to check on the availability of essential medicines. The frontline SMS is stated to have improved the "Stop Stock outs" in its communication thus, reducing the time spent and enabling an online mapping of results for easy comprehension and sharing (Consumer Information Network, 2010).

According to World Bank (2012) mobile technology through mobile money services can now be considered as a sub-sector of the wider industry of branchless banking that uses a variety of methods and technology to extend financial access. Kendall (2011), in his research surveying the landscape in Kenya, found out that M-pesa has emerged as a

platform for a wide variety of new applications and services. These services include medical savings plan, payment of bills and application fees.

2.1.2.2 G2C Model

ICT, according to Siambi (2008), can facilitate both transparency and participation in public service delivery, which can lead to increased efficiency and responsiveness, as well as improvement in government's ability to correctly prioritize government services to correspond with citizen desires.

The focus in this model is on building easy to find, easy to use, one stop points of service that make it easy for citizens to access high quality government service. It involves communication pathway relationship between the citizen and the government and vice versa (Botha & Geldehuys, 2008).

The model is composed of:

a. Talking to citizens which entail providing citizens with public sector details on its activities.

b. Listening to citizens who entail increasing the input of citizens into public sector decisions and actions.

c. Improving Public Services that have to do with improving service delivery to public through quality, convenience and cost.

In Kenya, there exists a model that has been successful in its undertakings. The Ushahidi ICT project began after the 2007/2008 post-election violence because there was a need to

accurately and efficiently monitor election fraud and rioting in order to mobilize support to prevent and/or mitigate such situations. It created a crowd sourcing information and internet mapping site that allowed users to submit eyewitness accounts of election fraud and riots through web, email, text or Twitter, in order to help mobilize support for preventing or mitigating crisis situations (Commonwealth Secretariat, 2013).Information sent was verified, mapped for the public to view online and communicated to the public authorities, which could respond to the report (ibid). The impact of the project was felt and between 30th December2007 and April 2008: the platform had 45,000 unique visits, 173 page views and 220 incident reports (Hanna, 2012).

2.1.2.3 G2G Model

The model provides the government departments or agencies corporation and communication online bases on mega database of government to have an impact on efficiency and effectiveness. It includes internal exchange of information and commodities. The objective is to make it easier for locals and provincial government to meet reporting requirements and to participate as full partners with the central government in its citizen services, while enabling better performance measurement especially in providing grants (Botha & Geldehuys, 2008).

E-government in this case provides a two way communication and interaction between these models. They are, therefore, the primary e-delivery models. Thus e-government should result in the efficient and swift delivery of goods and services to citizens, businesses, government employees and agencies. To citizens and businesses, e-government would mean the simplification of procedures and streamlining of the

approval process. To government employees and agencies, it would mean the facilitation of cross-agency coordination and collaboration to ensure appropriate and timely decision-making (Hafkin, 2009).

2.1.3 Successful E-government Models in Place

Previous research has shown that there are e-government models that are successful. According to Wikimedia (2012), they are the following:

2.1.3.1 Global Cooperation on Transnational Crime: G2G Transactions

The inherently transnational nature of the Internet has not only seen the transformation of legitimate business activities, but also provided new opportunities for illicit business. In recent years, there has been a significant increase in the sophistication of organized crime and illegal trafficking activities, encouraged by the anonymity provided by the Internet (Wikimedia, 2012).

To combat this growing trend, 124 heads of government went to Palermo, Italy, in December 2000 to sign the United Nations Convention against Transnational Organized Crime. In putting the convention into effect, the UN designed the "Global Program on Transnational Organized Crime" (UN, 2003) to improve information sharing and further enhance international cooperation. The main objectives of the program are:

    i.   Assess organized crime groups worldwide according to how dangerous they are and the kind of threat they pose to society.

ii. Provide Member States and the international community with reliable information and analysis on the major emerging transnational organized crime groups.

iii. Support and expand the technical cooperation activities of the Center for International Crime Prevention in the field of organized anti-crime strategies.

iv. Assist requesting countries in the formulation of policies and guidelines aimed at preventing and combating transnational organized crime.

The goal is to establish a network of data providers and national focal points in the field (i.e., law enforcement agencies, governments, NGO institutions, research centers and other relevant international organizations) to create a global database and reporting center for all Member States.

2.1.3.2 Payroll Information Self-Service: G2E Transactions

As of October 2002, Mississippi state government employees in the United States of America could view their payroll and tax information records online through a secure, Web-based, self-service application called Access Channel for Employees (ACE). ACE is directly linked to the state's legacy payroll system, enabling employees with a log-in ID and password to view their payroll accounts. Government employees who receive their paychecks through direct deposits can view their last 10 pay stubs as well. Employees are notified by e-mail when their pay stubs arrive and they can then review the information before the actual payday. This application has given the state of

Mississippi US$ 0.50 in savings for every W-2 form that is printed and mailed. Aside from the savings in cost, if employees spot mistakes on their W-2s, re-issuing these electronically takes only two days instead of two weeks. Of the more than 40,000 state employees of Mississippi, 17% have adopted and used this new application (Wikimedia, 2012).

2.1.3.3 G2B Transactions

The Golden Customs project in china was proposed by Vice Premier Li Lanqing in 1993 to create an integrated data communications system connecting foreign trade companies, banks, and the customs and tax authorities. The system aims to speed up customs clearance and strengthen the authorities' ability to collect tax and duty payments. The Golden Customs project allows companies to submit import and export declarations to customs authorities, calculate duty payments, and check import and export statistics. This electronic data tracking system allows customs departments to verify a range of data through networks to facilitate customs management and prevent illegal activities, one of the initial conceptual attractions of the project. This system enabled China customs to solve criminal and smuggling cases valued at approximately RMB80 billion (US$96 million) and increase tariff payments by RMB71 billion (US$86 million) (UN, 2003).

2.1.3.4 E-citizen Portal: G2C Transactions

Through Singapore's e-citizen portal (*http://www.ecitizen.gov.sg*), Singaporeans are able to access about 1,600 e-services pertaining to business, health, education, recreation, employment, and family. Of this, 1,300 e-services are completely transacted by citizens with government online. The e-citizen portal is divided into categories based on the real-

life needs of every individual, with every single ministry and statutory board providing e-services through the same portal. Singaporeans thus have one-stop access to government services; they are spared having to navigate through the bureaucratic jungle. A few of the popular e-services offered are: submitting application forms for purchase of apartments, searching for school information, employment search, career development, and voter registration. As of June 2002, about 77% of public services deemed feasible for e-delivery were enabled for online delivery (Wikimedia, 2012).

2.1.3.5 The Budget Tacking Tool (C2G)

This is one of the successful e-government models in Kenya. The Budget Tracking Tool is a collaborative platform that allows citizens to view projects and expenditures of Constituency Development Fund (CDF). CDF money has been controversial in Kenya because it is under the control of Members of Parliament. There have been many instances of misuse and theft. This model allows grassroots communities to see whether Members of Parliament are following through with their promises (Heacock, 2010).

The system gets 5,700SMS and web queries per month about development projects and the citizens have used the information obtained to expose corruption at local as well as national levels of government. An example was the uncovering of a major corruption scandal at the ministry of water which eventually led to the firing of a number of public officials involved. It is a website used in the country to monitor government spending and to help combat corruption (Commonwealth Secretariat, 2013).

Having reviewed literature on importance of e-government and models in place, this study will seek to establish the models in practice in Uasin-Gishu's PA jurisdiction. Reviewed next is the ICT infrastructure, forms of ICT used and ICT usage.

2.2 Information and Communication technology Infrastructure

There are several kinds of infrastructure existing globally. These are composed of fixed and wireless cellular networks, fixed and wireless broadband, fiber optic technologies and submarine fiber optic cables (ITU, 2010).

Globally, wireless broadband standards are used. These are the third generation family mobile standards (3G), Worldwide Interoperity for Microwave Access (WiMAX) and a Long Term access Evolution (LTE). In developed countries, the dominant form of internet-access infrastructure has been copper-based: either upgraded telephone lines or upgraded cable T.V. networks. The wireless networks in these countries are seen as a complement to the traditional fixed copper based connections and not a supplement to it (Williams, 2011). The telecommunication infrastructure in the developed world consists of a complex mesh of interconnected network designed to carry different types of communication traffic. These networks are traditionally divided into 'fixed' and 'mobile' networks reflecting the historical divide between the copper-based fixed line telephone networks of advanced countries and the mobile wireless networks that began to emerge in 1980s (ibid).

Information and Communication Technologies in Africa according to Williams (2011), has been a remarkable success. The availability of services has gone up and the cost has gone down. In just 10 years dating from the end of 1990s mobile network coverage rose

from 16% to 90% of the urban population by 2009 while the rural coverage stood at just under 50% of the population. Africa's network architecture is different from those of the developed world like the US and the United Kingdom. The integration of its network is less advanced because they have been built as stand-alone, end to end networks. The fixed line copper-based connections have had very low penetration level and in many cases, the levels have fallen over time.

The mobile infrastructure in the continent has provided a ready substitute for fixed line copper-based connections for the basic voice services while offering added mobility, lower costs and more payment flexibility. It is evident that, there is rapid growth of mobile infrastructure in Africa and this has expanded the access to telecommunications. Networks that were initially concentrated in towns and cities increasingly began pushing into rural areas. By 2009, 90% of Africa's urban population and 48% of its rural population lived within reach of mobile network (OECD, 2005).

In offering the broadband infrastructure, Africa has followed a different infrastructure growth path than the developed countries. It lacks suitable copper wire line infrastructure which limits the access to broadband internet while increasing the role of wireless network infrastructure in providing such access although, in Africa, Worldwide Interoperity for microwave Access (Wi MAX) was the firstly deployed broadband access network infrastructure. There is also a recent trend of mobile operators starting to upgrade their networks to be able to provide 3G and some are using LTE on a trial basis (Williams, 2011).

Fibre optic networks in Africa are developing quickly. As of the end of December 2009, the operational terrestrial fiber optic transmission networks in sub-Saharan Africa, was 234,000 km long with a further 41,000km under construction. Key players in the development of fibre optic networks in the continent have been state owned telecommunication operators although this is gradually changing as new private operators enter the fiber optic network business. Private operators are currently building about half the length of fiber optic cables currently under construction (ibid).

The submarine fibre optic network infrastructure in Africa has also recently proliferated. As of 2010, 12 submarine cables were operational in sub-Saharan Africa and five were being deployed (Williams, 2011). In South Africa, there are also several promising initiatives that are underway such as the gateway project (DPSA, 2012) aimed at providing a central portal to government services, but none are yet operational. There also seems to be a lack of coordination between government departments with regard to the overall e-government policy. The policy relies heavily on the government departments to come up with their own strategies and projects. The departments do not seem to be initiating e-government projects at the rate that is expected , at worst, they are not initiating e-government projects at all (Trusler, 2009).

In Kenya, developing affordable information and communication network infrastructure and applications is central to building the information economy. The Governments' objective is to ensure that the country has a competitive ICT industry which delivers reliable and affordable services and products for the economic and social benefit of citizens. The development of Information and Communication Technology Parks and

Digital Villages according to the strategic plan on ICT will gradually lead to low-cost provision of ICT goods and services. These are expected to facilitate the growth and establishment of BPOs (Republic of Kenya, 2010).

The National Information and Communication Technology Infrastructure, according to the National Information and Technology Sector Master Plan 2008-2012 (Republic of Kenya, 2010), looks forward to the following plans:

2.2.1 National Terrestrial Fibre Optic Network Project

The National Terrestrial Fibre Optic Network Project is intended to complement projects. The Government according to this plan will during the planned period implement NTFONP to ensure maximum utilization of capacity and connectivity in all districts in the country. The project was executed by a company known as National Optic Fibre Backhaul Infrastructure (NOFBI) established through the Companies Act Cap 486.

Implementation of the NTFONP was divided into three main components that included the Central, Western, Coast and North Eastern regions of the country. Three firms were awarded tenders to construct the TFON and implementation was already underway. The project was anticipated to have very positive developmental impact through facilitation of widespread connectivity to ensure universal access to ICT throughout the country, enhancement of Kenya's economic competitiveness, development of an information and knowledge economy and improving Kenya's learning opportunities. It is therefore possible that the Fibre Optic Network, part of the national ICT infrastructure, is available in some PA offices since its implementation period is winding up.

2.2.2 *Government Common Core Network (GCCN)*

The GCCN is a plan of network meant to serve as a shared and secure interoperable Government-wide ICT architecture. The system which will be implemented during the plan period will not only integrate work processes and information flows, but also improve inter-ministerial sharing of databases and exchange of information to eliminate duplication and redundancies, improve public access to government services and ensure responsiveness in reporting, monitoring and evaluation.

2.2.3 *Local and Wide Area Networks*

LAN is a type of network connection classified in terms of geographical scope. It is a telecommunication network that requires its own dedicated channels and that encompasses a limited distance, usually one building or several buildings in close proximity. The network gateway connects the LAN to public networks, such as the telephone network or other to other corporate networks, so that the LAN can exchange information to external network to it (Ferreira, 2009).

Local Area Networks in Kenya, according to Republic of Kenya (2010), will during the plan period continue to be installed in all Government ministry headquarters. In addition LANs will be installed in the provinces as well as the districts. Currently, the project has been implemented in five provincial headquarters. These LANS will eventually be linked to GCCN to form the basis of a national information infrastructure that will allow for seamless communication in Government. The target is to complete the project during the plan period.

2.2.4   Web Portal

This is a Government plan aimed at maintaining a regularly reviewed and updated Web Portal (www.kenya.go.ke) which is a database driven, interactive website that enhances online access to Government services and applications. All ministries, parastatals and other public bodies which have web sites which are largely informational, with some having downloadable forms will be accessible through hyperlinks in the Government Portal. This indeed forms part of the national ICT infrastructure.

This literature indicates several plans in place in support of ICT infrastructure development in provincial administration. This study will fill the gap by establishing whether these infrastructure projects have been implemented in the PA by seeking to analyze ICT coverage by ICT infrastructure.

2.3   Forms of Information and CommunicationTechnologiess

According to Martin (2003), ICT involves the process of digitalization through which information flows, coordination mechanisms: whether relayed through text, sound, voice, image or other media. The first requirement of digital conduct is the physical infrastructure usually known as "the net" and the generic service application being the second requirement to make technology feasible to use the physical infrastructure so as to create value (ibid).

The physical infrastructure include: build out of computer networks, digital T.V., Telephone lines, Fibre optic networks, wireless networks and all sorts of hardware and telecommunications and generic services. The generic service application include the

entire array of software, webhosting, browsers, multimedia application along with anything else that fall in the category of "bits and bytes".

The forms of ICT used globally are majorly internet-based which are either fixed or mobile and the voice service based which are telecommunications like fixed/ landline or mobile. The developed countries have fixed broadband services as well as the wireless forms that supplement the traditionally existing fixed telecommunications forms like the copper-based telephones. Their forms of Information and Communication Technology are very much interconnected and service providers have to depend on each other. The dominant form of internet access in the OECD countries has been copper based, either upgraded telephone lines or upgraded cable TV networks (Williams et al., 2011). The African forms are different whereby, mobile networks are very much likely to be wireless throughout. This is because of the inadequacy of copper based connections infrastructure which have had a very low penetration level in the continent, leading to an increased use of mobile forms of ICTs (ibid).

In Kenya, the liberalization of the market that started in 1999 is one of the key factors in development and expansion of Information and Communication Technology forms (CCK, 2008). The process started with the splintering of the national public operator, the Kenya Post and Telecommunications Corporation, into three different units: The Postal Corporation of Kenya, Telkom Kenya Ltd. (later privatized) and the Communications Commission of Kenya (CCK), which took on the role of regulator. In 2004, the monopoly of Telkom Kenya Ltd. came to an end with the entrance of new private mobile operators, although it remained the sole fixed network operator in the country. In 2007, almost half of the shares of its mobile filial, Safaricom, were sold to Vodafone (the

largest mobile operator in the world) becoming the largest private operator in the country. The other two mobile operators, Celtel Kenya and Econet Wireless Kenya, started in 2000 and 2004 respectively (Apoyo Consultria, 2011).

In the case of the Internet, market liberalization was not as much of a factor as the development of appropriate infrastructure. While internet access in the country can be dated back to the early 1990s, it was by 1998 when the Kenya Posts and Telecommunications Corporation decided to launch an Internet access backbone, increasing the rate at which Internet Service Providers (ISPs) entered the Kenyan market. When the market was liberalized in 1999, however, all the informal ISPs were granted a license, and Telkom Kenya, the newly privatized fixed-phone operator, applied for one as well. Today, there are more than 50 ISPs in Kenya (ibid).

According to Athane (2012), the forms of networks of ICT in Kenya are:

i. Internal Networks which are usually referred to as Local Area Networks (LAN) that involves linking a number of hardware in terms of input and output devices plus computer processing within an office or building. The aim of LAN is to be able to share hardware facilities such as printers or scanners, software applications and data. It is an invaluable type of network in the office environment whenever colleagues need to access common data or programmes.

ii. External Networks is often referred to as Wide Area Networks (WAN). It involves its use when one needs to communicate with someone outside the

Internal Network, and therefore, will need an external Network. WAN is a vast

network of networks comprising of the internet that is the ultimate

At this level therefore, mobile phones with different service providers, fixed telephones, broad bands, cables, licensed ISPs, cybercafés and telephone bureaus are the major forms of ICTs used in the country (Republic of Kenya, 2010).

The research sought to establish the forms used specifically in PA in Uasin-Gishu county. The preceding sub-sections of literature review discuss the ICT usage, e-government policy and challenges towards the adoption of e-government.

2.4 ICT usage

The world is home to 7 billion people, one third of which have the internet. It has been noticed that 45% of the world's internet users are below the age of 25. Over the last five years, developed countries have increased their share of world's total number of internet users from 44% in 2006 to 62% in 2011. Today, the internet users in China represent almost 25% of the world's total internet users and 37% of the developing countries internet users. Younger people tend to be more online than older people, in both developed and developing countries. 30% of those under the age of 25 use internet in the developing countries compared to 23% of those who are 25 years and above (ITU, 2011).

In terms of cellular phone usage, there are almost 6 billion cellular phones subscriptions with5.9 billion mobile cellular subscriptions. Global penetration reaches 87% and 79% in the developing world. In the last four years, there is an increase in mobile broadband

subscription which has grown at a rate of 45% annually and therefore, there are twice as many mobile broadband as fixed broadband subscriptions (ibid).

There are about 1.8 billion households worldwide and one third has access to internet. In the developing countries, only 25% of homes have internet access. On mobile broadband subscriptions, it reaches about 1.2 billion and a total of 159 economies worldwide have launched 3G services commercially and this thus has led to an increased active mobile broadband subscriptions. People in the developed countries in this case use the mobile broadband networks in addition to fixed broadband connection. In Africa, mobile broadband is often the only access method available to people in developing countries (ITU, 2011).

In Kenya, according to Apoyo Consultria (2011), access to voice services (Mobile phones) is relatively high. More than 50% of the populations have used mobile phones. Kenya, according to CCK (2008), has also been very favorable for the expansion and penetration of ICTs. As of 2011, Kenya had 380,748 fixed telephone lines (fixed lines plus fixed wireless). The case of mobile services, with more than 25 million of subscribers, that is, a penetration rate of almost 65% and the Internet and especially broadband. The number of internet/data subscriptions reached 4.7 million at the end of the second quarter of 2011 (around 10 million of users). The mobile data/internet subscriptions through GPRS/EDGE and 3G dominate internet subscriptions and account for 99% of the total subscriptions which is a result of the positive outcome on mobile penetration.

In this sense, there are differences in counties in terms of the levels of the use of mobile services/ phones. Counties like Nyeri, Kiambu and Nairobi have their usage levels close to 70% while such as Turkana and Wajir have levels below 10%. Uasin-Gishu County has 56.5% use of mobile telephone and 8.0% of internets use (Apoyo Consultria, 2011).

2.5   E-government Policies

E-government is one of the most appealing public sector management initiatives in Kenya. It's a reform aiming at redefining how the public sector operates, developing and introducing as well as providing new ways of delivering enhanced services. It involves moving interactions to digital platforms in all departments within the public sector entities to those entities like the business, citizens, NGOs, and other public sector entities, interacting with the public sector officials, executives, and managers (Muganda, 2013).

In the country, e-government vision was first articulated in 2004 with its major objective on how to adopt e-government. That vision has gained an increasing voice in the country's development framework of achieving economic prosperity. This has led to a setup of institutes to help in the attainment of e-government vision. Among such institutes, is the e-government secretariat which was set up in 2004 under the office of the president to be an oversight body to galvanize all ICT projects (Muganda, 2013).

The ministry of Information and Communication set up e-government secretariat in 2004 and its role was to mainly handle the wider universal access goals to enable the citizens actively participate in a global economy which is increasingly knowledge-based (Muganda, 2013). According to steve.ntwiga.net, the Kenyan official government policy framework is a formidable document covering a lot of ground which among them,

include, structure, training requirements, standards and activities to be carried out towards the achievement of the policy objective stated in the framework. The policy states that the government will implement initiatives that will lead to full achievement of the policy: it became operational in June 2004 based on an improving communication within government and citizens.

Kenya, through vision 2030 also has recognized ICT as a foundation for a knowledge economy, developing affordable information and communication network infrastructure and application whose central role is towards building the information economy. The government has an objective of ensuring that the country has a competitive telecommunication industry that is capable of delivering reliable and affordable services for both the economic and social benefits of the citizens (African Consortium, 2013).

Kenya's Information and Communication Technology policy frameworks also involves the development of ICT parks and digital villages which in the end will lead to having a low-cost provision its goods and services as well as facilitating the growth and establishment of BPOs. It includes laying of undersea fibre optic cable from Mombasa to Fujaira in UAE linking Kenya to the global fibre optic submarine system that was completed in 2009. It's a project that has already provided the country with an affordable and a high capacity bandwidth (ibid). There are some policies in place to support ICT adoption and among them, according to African Consortium (2013), are:

a. Kenya Education Network (KENET) is a National Research and Education network that promotes the use of ICT in teaching, learning and research in higher institutions in the country. It also facilitates electronic communication among

students, and faculties in member institutions. Currently, 64 KENET member institutions have been provided with affordable and efficient bandwidth.

b. Pasha Centers (Digital Villages) is a policy rolled out in 2004 aimed at diffusing ICT know-how to the rural and marginalized areas to address regional disparities. They provide a host of services to the public via computers connected to the internet, digital cameras, printers, fax machines and other communication infrastructure. These services include; e-mail, internet access, agency banking, e-government, e-banking, money transfer, etc.

c. Wezesha Initiative is a policy whose objective is to provide a financial initiative towards the purchase of laptops for registered university students. It is funded by the World Bank and implemented by the ICT board under Kenya Transparency and Communication Infrastructure.

The African Initiative (2002, as cited in African Consortium, 2013) noted that, the government is currently working on the National Cyber security Framework, a master plan that will provide the government national level plan to defend and secure its digital infrastructure and security standards for the country's private networks. The government had also set up Technology Park at Konza, as part of the Vision 2030 flagship programme. Imported hardware are not subject to any fiscal concessions because they are imported and taxes on ICT hardware are largely zero-rated to boost its adoption in the country.

Currently, the government is holding negotiations with various ICT software providers with a view to securing bargains that will make Information and Communication Technology affordable and universally accessible. It is promoting local software, by ensuring that at least 50% of government software procurement is sourced from local developers, provides local fiscal concessions on software and encourages software multinationals like Microsoft and Oracle to offer special incentives such as free development tools, training and certification (African Consortium, 2013).

2.6   Challenges to the Adoption of e-Government

Fang (2003) observes that governments worldwide are faced with the challenges of transformation. There is need to re-invent government systems in order to deliver efficient and cost effective services, information including knowledge through ICTs.

A dependable information system is essential for efficient management and operation of the public and private sectors. There is a shortage of locally generated information needed for efficient performance of these sectors. To meet this objective, ICT use in every sector has to be accelerated in terms of information generation, utilization and applications. This can only be realized if there are procedures put in place to facilitate adoption of relevant Information and Communication Technology in every sector of the economy. This, therefore, calls for need of formulation of e-government policies both in organizational level and national level so as to counter impeding factors of ICT (Kandiri, 2012).

Compared to the developed countries like USA and Japan e-government implementation in developing countries like china, India, Singapore and African countries among many

others are generally more problematic. As it offers opportunities for governments in developed nations, the ability of developing countries to reap benefits of e-government is limited and is largely hampered by the existence of myriad political, social, and economic hindrances (Matavire et al., 2008). In Africa, the key challenges broadly consists of: development of ICT infrastructure, current world position in the economy, human resources development and employment creation, insufficient legal regulatory framework, corruption especially when the country's political landscape is characterized by a corrupt political elite, access problems which include mental access, skills access, material access and usage access, literacy level whereby, low literacy levels hinder the types of media available for e-government implementation (ibid).

Braa (2004) noted that, technological determination in most ICT implementations in Africa is a challenge. According to Matavire and Dewale (2008), Information and Communication Technology in the developing world are often naively adopted without sufficient consideration of social, cultural and historical contexts in which implementations occur.

Martin (2003) also gave several challenges to e-government adoption and one among them is the digital divide whose presence has a potential to widen the gap between regions and counties normally called the "international digital divide" and between groups of citizens within a society better known as "the domestic digital divide". This is a dividing line between sectors of the population that are already in a position to benefit from ICT and those that are as yet unable to make use of these new technological system. The digital divide comes in two forms which are the digital divide in the

infrastructure access which is the quantitative measure of access to technology and the digital divide in the quality of services gained from utilizing the physical infrastructure, that is, digital divide in context provision context content use (ibid).

E-government, an ambitious strategy in governance in Kenya has a lot of challenges on its adoption too. Key among them is poor ICT infrastructure, inadequate skills required to operate the Information and Communication Technology gadgets and lack of a stable power supply across most regions. Other challenges are the minimum threshold level of technological infrastructure, human capital, and internet access for all, lack of enabling environment and lack of political (Hafkin, 2009). According to Martin (2003), the process of digitalization is not an overnight phenomenon and therefore, delays and institutional rigidity can hold back the process of e-government adoption and its potential benefits.

The presence of regulatory frameworks to the access and use of ICTs is also a challenge. This kind of framework involves the regulation of technological services– both physical infrastructure and services. Also, the human capital is still far from reaching the level of skilled human resources necessary to respond to the needs arising from the emerging information society (Martin, 2003).

According to Ari-Veiko and Malkia (2007), the challenges of implementing e-government in Kenya are: lack of critical ICT skills and, where they exist, they are not sharpened enough to cope with the anticipated task of realizing the e-government strategy; presence of a workforce that was brought up in an era when computers were a

mystery to many; lack of commitment by the top leadership; high cost of software and hardware, and poor basic telecommunications infrastructure.

The population, to some extent, plays a significant role by being a challenge in itself to adoption of e-government. At some places, the people are too poor to think of embracing ICTs which comes as a leisurely activity. Owning a phone, a computer and a broadband is a luxury while some professional, learned as they may, may not have the will to adapt to some basic knowledge required to operate ICTs. They most of the time, act as reactors to change rather than embracers of change.

Another challenge to the adoption of e-government, specifically in Kenyan public administration is that the government has classified information put in place by the generating ministries as either secret, top secret and confidential. This will make citizens not to access such kind of information creating a legalistic obstruction to the flow of information. Citizens as well as other stakeholders in need of it won't be able to access (Kamar, 2006).

 There is also reluctance to share information and this has resulted in policies that deny access to information hence the creation of "empty" government ministry websites or are having information of little value. There is low information technology literacy in the country which then slows down the process of e-governance. Uneven distribution of internet facilities in the county coupled with high cost of connectivity is a challenge too (Kamar, 2006). There exists unimpressive human and institutional capacity which has brought about inadequacy in terms of accessing as well as affording ICT machinery like telephones, computers, the internet and broadcasting (ibid).

Rabaiah (2010) argues that, the development of E-government is not a straight-forward process, adding that many challenges have to be overcome during the different phases of development. E-government strategy has long time validity extending over many years. This makes its adoption to be a national plan depicting what the country will be doing in the next few years, a challenge both economically and technically.

Rabaiah (2010) gave seven categories of factors impeding e-government development:

i.   Leadership failures resulting from poor understanding of E-government or biased prioritization of initiatives towards achieving short term tangible public services e.g. in health, education, for constituency competition.

ii. Financial inhibitors which include cost of hardware, software, training, and consultation.

iii. Digital divides and choices in terms of wealth, age, gender, disability, language, culture, geographical location, and size of business.

iv. Poor coordination across agencies.

v.   Workplace and organizational inflexibility which is synonymous with resistance to change.

vi. Lack of trust which fuels the controversy between data collection of individuals which is necessary for offering services and protecting their privacy at the same time.

vii. Poor technical design of E-government systems like inappropriate user interfaces and usability issues.

There are also legal, economic, organizational as well as technical constraints in adoption of E-government. This study therefore sought to find whether these challenges are a replica in Provincial Administration in Uasin-Gishu county's PA offices.

2.7   E-government Readiness

Governments have made rapid progress worldwide embracing ICT for e-government in the past years. In 2001, the UN E-government survey listed 143 member states as using the internet in some capacity. By 2003, 91%, or 173 out of 191 of member states had a website presence and 18 countries were not online. At present, government websites are mushrooming around the globe in a haphazard manner. State and sectoral websites reflect wide variations among and between countries in the provision of on-line information and the basic public services (UN, 2003).

It is confirmed that North America (0.867) and Europe (0.558) lead among the world regions in terms of E-government readiness and usage rankings. Africa (0.241) was 9th in terms of regional ranking after the South and Central America (0.442), South and Eastern Asia (0.437), Western Asia (0.410), the Caribbean (0.401), Oceania (0.351) and South and Central Asia at 0.292. Africa, being a 3rd world/developing world, its countries is at the initial 3 stage of e-government development with little or no transaction or networked services (UN, 2003).

Today's world, as Misuraca (2003) argues, is not only referred to as being 'networked' due to the advancement of ICT's but also because of the growing phenomena of the increasing Non-State Actors into policy making, either in a consultative way or through

the development of new participatory approaches by use of Information and Communication Technology.

In Africa, e-government originated from the AISI in 1996, which was called for the development and implementation of national policies and plans to promote ICTs adoption through key economic sectors and national administration (Hafkin, 2009).

Katonga and Ayoo (2008, as cited in Bwalya, 2009) explain that there has been an increase in the number of African governments setting up websites although most of them are not taking full advantage of web facilities to provide information and services to citizens. In this case, most websites are rudimentary with basic or very little information and to even add on, most of them are not even interactive. According to the UNPAN E-government Readiness Survey in 2008, few have made the leap. Africa lags behind especially in terms of citizen engagement. South Africa takes the lead while East Africa comes third in terms of e-government readiness (Ibid).

Although there has been an increase in the number of African governments setting up websites, most of them are not taking full advantage of website facilities to provide information and services to citizens, in this case, most websites situation are not interactive, including Kenya (Mitullah & Waema, 2006).

In the National E-government readiness, Kenya ranked 11th (0.29) with South Africa (0.515) in the lead. Somalia is last with 0.049 readiness ranking (UN, 2003). Katonga and Ayoo (2008) present the Kenyan situation of e-governance. They explained that many people in Kenya still have to walk to government offices from far. There is also

evidence of missing and lost files, untidy offices, tempers, flare, frustrations and lost time. This situation has led to an environment where corruption thrives. Kenya is now rapidly gaining a reputation as one of Africa's forerunners in the development of Information Technology, which is one of the fastest growing sectors. In the past decade, Kenya has had one of the largest and fastest growing Internet sectors in Africa. Since the internet came to Kenya in 1994, the country has experienced phenomenal growth in its use. There are now numerous internet hosts, close to 100 licensed Internet Service Providers and over quarter million internet users in the country (Maina, 2006).

Kenya has always been in the forefront of Information Technology developments in Africa. The country also recently rolled out its first National Internet Backbone connecting six cities with the use of digital switches, Fibre Optic Cable and satellite services. Telkom (K) Ltd is also in the process of laying fiber optic cables to facilitate faster connections. Information Technology is now in use in various sectors of the economy such as banking, accounting, medical services, transportation, mining, research, defense, agriculture, education and communications. There is a strategy in place to link all Government departments, agencies and service providers with a view to providing efficient, effective and citizen focused public services on a 24/7 basis (ibid).

E-governance seems to be ripe especially on personal businesses and commercial sectors. PA has tried but still, there is a loop hole where you find that, some offices lack even the basic equipment to support the initiative. Computers and other web-based materials like broadband may be present but the staff may lack the technological knowhow hence,

contributing to the problem. Sometimes, it just might be a behavioral problem whereby people are not ready and not willing to embrace change.

The government of Kenya established the e-government programme in June 2004. The first National ICT policy was approved in 2006 and aimed at making government more result oriented, efficient and citizen centered. It was meant to redefine the relationship between government and citizens, empower citizens through increased and better access to government services. Currently, almost all government ministries have websites which largely provide static information on thematic functions of government. Some provide downloadable forms as well as on-line job advertisement especially government jobs (Waema & Mitullah, 2006).

Information and Communication Technology can be said to be in its infancy stage. This scenario as explained by Waema and Mitulla (2006) is a reality in some parts of Kenyan PA fields whereby, although the government has embraced it, it's not really as operationally efficient as it is in some parts of the world like USA, Singapore, china among other well established systems. It is evident in some Kenyan websites that available information is really too basic.

From the literature reviewed above, it shows that the adoption of ICT has great importance in service delivery as outlined in the national Information and Communication Technology policy of Kenya. The e-government models in place has also showed significant importance such as the G2G in the united states that has enhanced global cooperation to combat crime and the Kenyan C2G budget tracking tool that allows

citizens to view projects and expenditures hence curbing theft and misuse. The study therefore shows how far ICT has been implemented in Uasin-Gishu county's PA offices.

The literature available on e-government infrastructure coverage indicates that mobile network infrastructure in the country is more advanced and spread across all regions while internet is limited to urban centers only while rural areas are left behind. The study will thus unfold if the case is same in the county by establishing the level of its infrastructure coverage, usage and the challenges that come with ICT adoption in Uasin-Gishu county's PA offices.

2.8   Theoretical Framework

Theories, in the views of Porter and Riddle (2007), are important for guiding research and providing justification for ideas and findings. The theoretical framework adopted in the study was open systems theory of organizations that states that, an open system is a system which continuously interacts with its environment. The interaction takes the form of information, energy or material transfers into or out of the system boundary (Getzels, 1977).

It is a theory that was propounded by Von Bertalanffy Ludwing in the 1930s as a simple explanation of how complex the world is. This was because former theories had failed to include the fact that organizations are influenced by their environment. It was developed after the Second World War in reaction to other theories of organizations such as Human Relations perspectives of Elton Mayo and the Administrative Theories of Henri Fayol which treated the organizations largely as self-contained entity. The environment consists

of other organizations that exert various forces of an economic, political and social nature (Bastedo, 2004 as cited in Blake, 2012).

According to Getzels (1977), open systems are those which do interact with their environment, on which they rely on for essential inputs and for discharge of its outputs. Social systems, which involve organizations, are always open systems just as are the biological and information systems. They usually have three characteristics: they receive inputs or energy from the environment, convert these inputs into outputs and discharge their outputs into the environment. These inputs include people, materials, information and finances, etc.

According to Bertalanffy (1962), *inputs* include the raw materials which are energy, and resources processed to produce outputs of the organization while *out puts* are the products or services which come from the systems process and may include for example provision of services like awareness programs on diseases, civic education and reacting to conflicting situations.

Feedback refers to information about some aspects of data or energy processing that can be used to evaluate and monitor the system and to guide it to a more effective performance. It also provides a means by which the system establishes equilibrium with the environment's demands (Analoui & Anwiti, 2007).

According to Anderson (1979), systems are those identifiable and interrelated institutions and activities in society that make authoritative decisions or allocation of values that are binding on society. Easton (1957, as cited in Anderson, 1979) defined inputs as those

things from the environment into the political system and consists of demands and support. The environment consists of all those conditions and events external to the boundaries of the political system. Demands are the claims made by individuals or the groups in the political system for actions to satisfy their interests. Support is rendered when groups and individuals abide by, for example election results, pay taxes, obey laws, and otherwise accept the decisions and actions of the authoritative political system made in response to demands (ibid).

This theory applied to this research because, as the theory propounds, the Kenyan PA is a social system comprising of, as Getzels (1977) explains, interdependent elements which receive from and contribute to the whole. It involves people acting in specific roles, are goal oriented and its structure is differentiated with each component carrying specific functions. Provincial Administration, with regard to the study interacts with its environment which is composed of other PA departments e.g., human resource, customer care and procurement and other PA jurisdictions e.g. sub-location, location, division and the district, the citizens within its area of authority, the business enterprises, NGOs and other political units in the country. This kind of interaction as a matter of fact was and is still very slow that the introduction of e-government concept seems to make this kind of interaction efficient, effective and readily available to all.
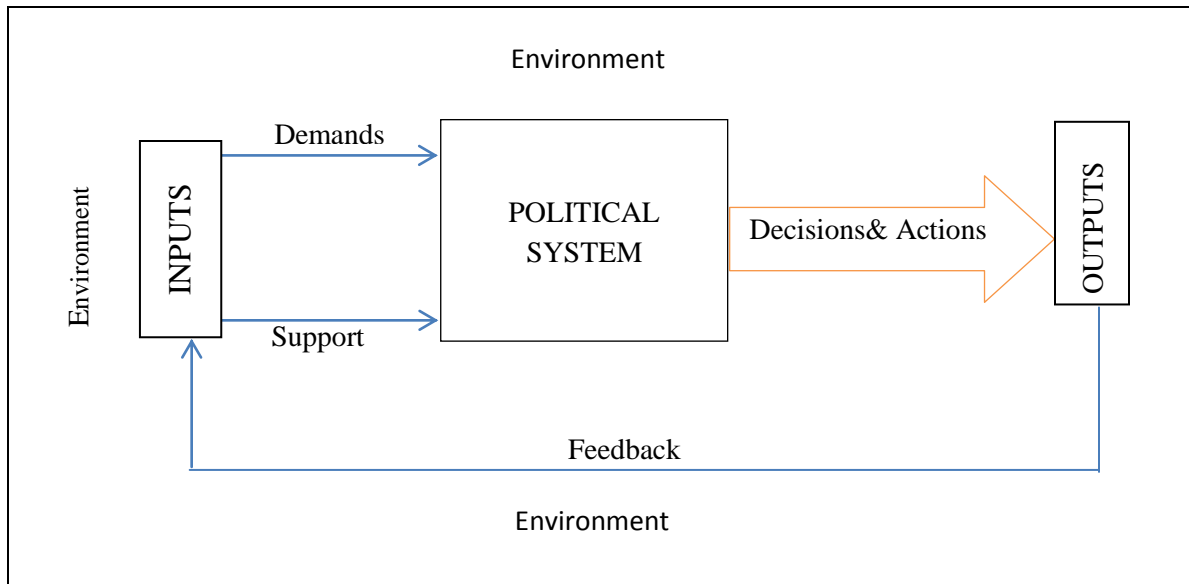
Figure 2.1: The Model of an Open System

(*Source:* Hanna (1997) and Easton (1957))

2.9   Conceptual Framework

The systems theory has been used to conceptualize e-government and Provincial Administration. The PA is itself the system that processes the demands from the environment. Adoption of e-government is another social demand that can contribute to social, economic and political dimensions in society by acting as an efficient link in G2G, G2C, C2G, G2B, B2G, G2N, N2G, and G2E models. This concept therefore brings in a complete overhaul of how social systems or organizations work or carry out their day to day activities in a more pleasant, transparent and faster means by incorporating ICT in their day to day functions.
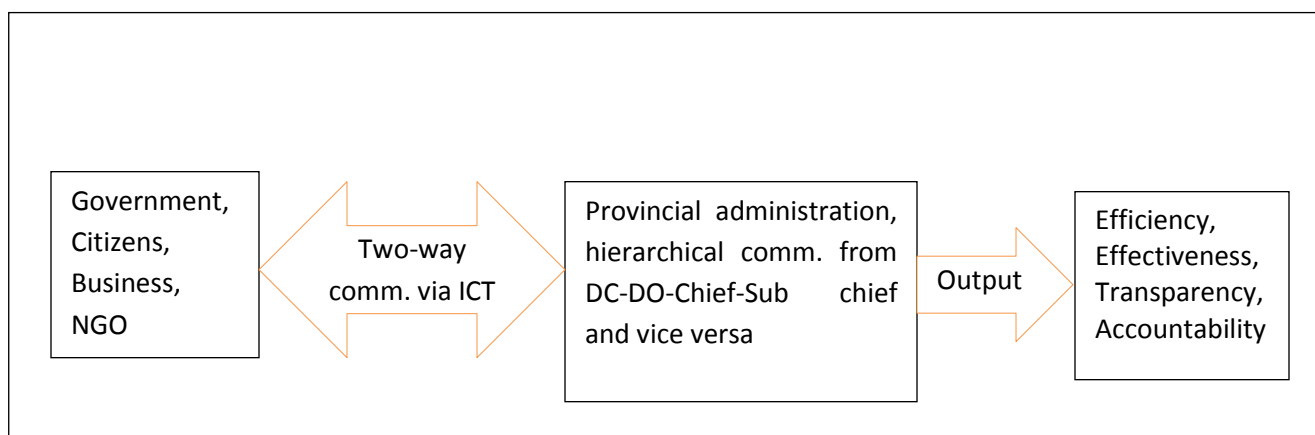
Figure 2.2: Conceptual Frame Work of Provincial Administration E-Government

The challenges facing the adoption of E-government in this conceptual framework, comes in the two way communication between the PA and the government as well as the citizens. These challenges are also mingled with the factors impeding the adoption of E-government. The two-way communication via ICT acts as a link between all delivery models and when the link is not efficient and effective, then it shows that there exists factors hindering the two-way electronic communication and therefore demands won't reach the desired destination from the environment and outputs will neither be realized as well as support and feedback.

The feedback also, that comes from the models either to support or demand, were inform of ICTs and without proper use of it, feedback will be very slow, to an extend that the presence of both support and demands will not reach both sides in time. The feedback will therefore come from the PA and the e-government delivery models, hence, emanating from both sides. In this regard, the existence of these challenges impedes the

much desired effect of e-government which is the output consisting of effectiveness, efficiency, transparency and accountability among others.

2.10 Summary of the chapter

This chapter presents the literature reviewed on the study. It gave a detailed discussion of the importance of adopting e-government, e-government delivery models, types of information and communication technology infrastructure, their forms and how they are used. E-government policies are presented, factors challenging the adoption of ICTs, e-government readiness, the theoretical and conceptual framework used in the study. The next chapter is the methodology adopted in the study

CHAPTER THREE

RESEARCH METHODOLOGY

3.1   Introduction

This chapter covers the research methodology utilized in the study. This includes the research design, the target population, sample size and sampling techniques, data collection instruments and methods of data analysis and presentation.

3.2   Research Design

The study used a descriptive research design. A descriptive study design involves three methods: observational study design, case study design and survey study design. Survey research design was specifically utilized in the study. It is a qualitative research design that attempts to collect data from members of a population in order to determine the current status of that population with respect to one another or more variables (Miller and Neil, 2009).

Survey study design involves collection of data reported by individuals and it is used to get ideas of how a group or a population feel about a number of things such as political debates, new businesses, classes, among others. It can be a way for people to measure how often or how little people engage in different behaviors (Miller et al, 2009). This study design can be administered in various forms which include: in-person interviews either through telephone, internet or paper questionnaires that require participants to write answers. The way a survey is administered is not the most important aspect in getting valid results, instead, the representativeness of the sample of the target population is what matters (Tara, 2013).

It is a study design that involves picking of smaller samples that represent the overall target population. It is a self-study requiring the collection of quantifiable information from the sample (Sheila and Harry, 2005).

This study design was therefore chosen because it allows the use of multiple sources of data collection instruments such as questionnaires and interview schedules as utilized in the study. It was also used because it is suitable for quantifiable descriptive phenomena and allows the use of simple statistical analysis like percentages (Lorraine, Hughes & Tiger, 2009).

3.3   Area of Study

Uasin-Gishu County covers a surface area of 3,345 Km^2 with a population density of 267 per Km^2 which forms a national percentage of 2.3 with 202,291 households. The age distribution in the area is: 0-14 years (41.1%), 15-64 years (55.7%), 65 and above (2.9 %). The County headquarters is Eldoret. The number of districts are three; Eldoret East, Eldoret West and Wareng. The population is constituted of 448,994 male and 445,185 female (KNBS, 2010).

Uasin-Gishu County is located in the Midwest of Kenya's Rift valley. It is a cosmopolitan county bordering Kericho County to the south, Nandi to the South West, Bungoma to the West and Trans-zoia to the North. Other counties sharing borders with Uasin-Gishu are Elgeyo-Marakwet to the east and Baringo to the South East (Kiruga, 2013).

There are several issues that might influence the use of ICTs in the county. They are the presence of Eldoret town, vested with several institutions like hospitals, colleges and universities. The town is also a business hub that has various ICT providers. There are dozens of cybercafés and ICT learning institutions and several government offices.

This research covered Uasin-Gishu County whose districts are Eldoret East, Eldoret West and Wareng. The division offices are: Ainabkoi, Kapsaret, Kesses, Moiben, Soy and Turbo. There were fifty seven locations in total while the sub-locations numbered one hundred and one. This made a sample frame of one hundred and sixty seven members of the Provincial Administration (three DC's, six Do's, fifty seven Chiefs and one hundred and one Assistant Chiefs).

3.4   The Target Population

This research targeted Provincial Administration (PA) officers and the members of public (MoP) in Uasin-Gishu County. The targeted population of PA officers included District Commissioners, Division Officers, Chiefs and Assistant Chiefs in their areas of jurisdiction. The target number of the population of PA was one hundred and sixty four comprising of three DCs, six DOs, fifty seven Chiefs and one hundred and one Assistant Chiefs.

The targeted MoPs were the adult population (regardless of their gender) who at the time of research were found seeking services from PA offices. The MoP who were the target of the study were the total adult population in the county numbering 523,988 (KNBS, 2010).

3.5   Sample Size and Sampling Techniques

The study was carried out using purposive sampling for the Provincial Administration District Commissioners and DOs. Purposive sampling involved handpicking of cases for a specific reason (Bridget & Lewin, 2005).

This sampling method was resorted to because the DCs and the Dos were the higher levels of authority in the PA and had more information with regard to pursued objectives. The three DCs and six DOs were all chosen for the study as key informants.

The Chiefs and Assistant Chiefs were both sampled conveniently. This is a method of sampling whereby, a sample is obtained when the researcher selects whatever sampling units that are conveniently available (Maximiano & Roela, 2007). It was utilized because it is a non-probability form of sampling that is often the sampling method of choice in qualitative studies (Christine, 2010).

The total number of Chiefs in the county was fifty seven. Thirty percent of them were included in the study and comprised of 19 Chiefs, who were then divided among the six divisions in the county to obtain full representation and avoid bias. Three Chiefs were chosen from every division till the required sample size was obtained. The sampling was done based on those mostly accessible in every division. The targeted number of Assistant Chiefs was 101. Thirty percent of them were involved in this study, sample size of 30. They were divided equally among the six divisions so as to achieve equal representation. Five Assistant chiefs were sampled based on accessibility in every division till the required sample size of 30 was achieved.

The choice of 30 percent of the Chiefs and Assistant Chiefs to be part of the sample was because of their homogeneity, they play the same roles and under the same ministry. A homogenous population needs a selection of smaller samples (since the cases are very similar), enabling the researcher to collect more intensive data (Adams & Hafiz, 2005).

The Members of Public (MoP) studied were sampled from the county's adult population and its sample size was arrived at through the use of Yamane formula shown below:

$$n = \frac{N}{1 + N(e)^2} \tag{3.1}$$

Where: n = sample size, N= population size and e = the level of precision/or error limits

(*Source*: Yamane, 1967)

For this research, $N = 523988$ and $e = 0.1$

From equation (3.1), $n = \frac{523988}{1 + 523989 \quad (0.1)^2} = 100$

$$\tag{3.2}$$

The sample size was, therefore, 100 for MoP included in the research.

The county's population was known, the formula was considered suitable for determining an appropriate sample size. There were other factors that influenced the choice of this formula and this was because, according to Yamane (1967):

i. The minimal sample size can easily be determined that the researcher wants to investigate for any given population size. It also gives, at most, a confidence level of 95%.

ii. It gives the level of precision /sampling error which can be determined by using the formulae. Sampling error/level of precision is a range in which the value of the population is estimated to be and is usually expressed in percentage ($\pm 5\%$) that is usually required to be investigated by the researcher before sampling (Jan-Mara & Bas, 2010). This determination of level of precision helps in the elimination of such sampling errors.

iii. Confidence level ensures that, at least a certain percentage of the selected respondents have the true population value within the range of precision specified above. In practice, 95% confidence level with a $\pm 5\%$ precision rate is assumed to be reliable.

iv. The formula also gives the degree of variability in the attributes being measured. The degree of variability refers to the distribution of attributes in a population. It is expressed using the proportion or "p". A "p" of 0.5 or 50% indicates the greatest level of variability.

The choice of Yamane's (1967) formula was also influenced by other scientific formulae that give the level of precision and level of proportion depending on the sample size for example, Paler-Calmorin and Calmorin (2007) who compute a sample size based on 0.01

level of probability to a proportion of 0.05 and a standard value of 2.58 of 1% level of probability with 0.99 reliability level, p being the largest possible proportion (0.05).

The 100 MoP were sampled using non-probability sampling technique, specifically, convenient/opportunity sampling method. Opportunity sampling involves a sample being drawn from the part of the population which is close to hand. The sample is selected because it is readily available and convenient (Bridget & Lewin, 2005). This method had a weakness of being not representative, but was used because it was cheap and the researcher could have an alternative especially if respondents were not willing to participate in the research. To overcome this weakness, the researcher selected two MoP from every office till the 100th MoP was achieved.

The sample size comprised of 158 respondents (three DCs, six DOs, nineteen Chiefs, thirty Assistant Chiefs and 100 MoP) as presented in Table 3.1.

Table 3.1: Research Respondents

Categories of population	Target population	Sample size used
DCs	3	3
Dos	6	6
Chiefs	57	19
Assistant Chiefs	101	30
Members of Public	523,988	100
Total		158

Source: Field data, 2013

3.6   Data Collection Instruments

The research instruments utilized during this study were questionnaires with both open and close-ended questions, and interview schedules.

3.6.1   Questionnaire

The chiefs and assistant chiefs filled questionnaires because they were literate and were able to comprehend the research questions. Questionnaire as a data collection tool was used because it was quite popular in case of big inquiries. It had also been effectively utilized by private individuals, research workers, private and public organizations and governments as well (Kothari, 1990). Questionnaires were used because of the following reasons:

i.   Low cost involved especially when the universe is large and is widely spread geographically.

ii.   Free from the bias of the researcher since the answers are given in the respondents own words.

iii.   The respondents have adequate time to give well thought out answers.

iv.   Respondents who are not easily approachable are reached conveniently.

v.   Large samples are made use of and thus, making results more dependable and reliable.

This tool of data collection had some disadvantages, which are:

i.   Questionnaires have low rate of return of duly filled questionnaires.

ii.   It can be used only when respondents are educated and cooperating.

iii.   There was also the possibility of ambiguous replies or omission of replies.

These demerits of questionnaires were overcome by use of a questionnaire in a pilot survey so as to address ambiguity. Interview method was used to counter the low rate of responses, get sought out answers from conveniently sampled respondents and for those who were not in a position to read and answer the questionnaire on their own.

Both open and close-ended questionnaires were administered to the Provincial Administration Officers (Chiefs and Assistant Chiefs) because they were in a position to give reliable information due to their literacy level.

3.6.2   Interview schedule

The interview schedules were used on the DCs and DOs because they were key informants and allowed the researcher to probe them for detailed information. However, it was also used to collect information from the Members of Public because it allowed the researcher to collect information from both literate and illiterate respondents

3.7   Methods of Data Analysis and Presentation

Descriptive methods of data analysis were used to analyze collected data. It is an analysis that may be used in respect of one variable or in respect to two variables/bivariate analysis or in respect of more than two variables mostly described as multivariate analysis (Kothari, 1990). It involves the development of certain indices from the raw data and the working out of various measures that show the size and shape of a distribution

along with the study of measuring relationships between two or more variables. Percentage calculations were done in the study. Data was then presented in form of tables so as to allow efficient analysis, pie charts and descriptive presentations.

According to O'leary (2004), descriptive statistics are used to describe and summarize the basic features of the data in a study, and are used to present qualitative description in a manageable and intelligible form. Its main function is to provide measures of central tendency, dispersion, distribution and shape.

Descriptive statistics enable the researcher to summarize and organize data in an effective and meaningful way. They provide tools for describing collections of statistical observations and reducing information to an understandable form. They help social scientists develop explanations for complex social phenomena that deal with relationships between variables. They provide the tools to analyze present and interpret data (Nachmias & Nachmias, 2004).

3.8 Summary of the study

This chapter presented the methodology employed in the study, giving a detailed discussion on the research design, area of study, target population, sample size and sampling techniques, data collections instruments used in the study, and the methods of data analysis and presentation. The next chapter gives the presented data; how the data is analyzed and interpreted.

CHAPTER FOUR

DATA PRESENTATION, ANALYSIS AND INTERPRETATION

4.1   Introduction

This chapter deals with the presentation, analysis and interpretation of the data collected. For effective analysis, tables are used to present the data. It discusses the general information of the respondents and the findings as per the objectives of the study. The objectives were: To analyze Information and Communication Technology coverage by ICT infrastructure; to determine the forms of Information and Communication Technology used in Provincial Administration (PA); to assess the Information and Communication Technology usage in the area under study and to examine the challenges facing is adoption.

4.2   General Information of Respondents

The study sampled members of the Public (MoP) and Provincial Administration (PA) officers in Uasin-Gishu County. The outcome of the research recorded 100 percent of the sampled MoP respondents, who numbered 100. The sample size of PA officers was initially 58 but, eventually, a sample of 57 was used because one respondent who was purposefully sampled could not be reached during the entire research period. This changed the PA sample size from its initial 58 to 57. The total sample size used in data analysis was therefore 157.

The general information about this study's respondents was mainly on gender, age and level of ICT knowledge. Questionnaires were distributed to forty nine PA respondents after which, they were filled and collected. Interviews were administered to the MoP and

eight purposively sampled PA respondents (three DCs and six Dos). Table 4.1 shows the

number of respondents who participated in the research according to their gender.

Table 4.1: Gender of Respondents

Gender	Provincial Administration	Percentage (%)	Members of Public	Percentage (%)	Totals
MALE	50	87.7	59	59	109
FEMALE	7	12.3	41	41	48
Totals	57	100	100	100	157

Source: Field data, 2013

The respondents were also classified in terms of their age bracket and the level of ICT

knowledge. Table 4.2 illustrates the PA's classification

Table 4.2: Age Bracket and Level of ICT Knowledge for Provincial Administration (PA) respondents

Age bracket	Level of ICT knowledge			
	None	Basic	Advanced	Totals
31-35	0	5	1	6
36-40	1	7	0	8
41-45	4	10	0	14
46 and above	15	14	0	29
Totals	**20**	**36**	**1**	**57**
Percentages (%)	**35**	**63.2**	**1.8**	**100 (%)**

Source: Field data, 2013

The PA respondents had 35% of its respondents without ICT knowledge, sixty three percent with basic knowledge and one percent with advanced knowledge. This indicates that e-government has a base in terms of its adoption because there is sixty four percent (over half) of its respondents who know how to operate ICTs. The 35% who do not have Information and Communication Technology knowledge cannot operate computers thus, e-literacy become a hindering factors in e-government adoption in PA because they have a part of its population that cannot use computers.

Table 4.3: Age Bracket and ICT Knowledge of Members of Public (MoP)

Age Bracket	Level of ICT knowledge			Totals
	None	**Basic**	**Advanced**	
18-25	5	20	1	26
26-35	12	32	2	46
36-45	12	10	0	22
46 and above	4	2	0	6
Totals	**33**	**64**	**3**	**100**
Percentage (%)	**33**	**64**	**3**	**100**

Source: Field data, 2013

Table 4.3 shows that sixty five percent of the MoP respondents had ICT knowledge and thirty three percent had none. The middle age brackets had higher numbers for those who had none as well as those who had basic knowledge. From the age bracket and level of ICT of all respondents, it was noted that over half of the respondents had basic Information and Communication Technology knowledge which in turn is a supporting

factor in the adoption of e-government in the county. It also shows that computer literacy is spread across all age brackets indicating that age is not a major hindrance factor in terms of knowledge acquisition. However, the younger age brackets for both MoP and PA had advanced ICT knowledge indicating their ease in terms of embracing technology. Both the middle and older age brackets did not have advanced knowledge.

There were a few respondents who had advanced knowledge. The PA had only one respondent with advanced Information and Communication Technology knowledge a percentage of 1.8 while the MoP had three respondents, a percentage of 3 from the total of 100 respondents. This showed that, the number of ICT experts in the PA and among the MoP is too insignificant making e-government not embraced because of the knowledge gap needed for its absolute adoption, maintenance and utilization. These findings agree with prior studies, according to Bwalya (2009), in the process of adopting ICT policy, there was no adequate human resource base trained to handle e-government. This is because the tools of e-government do not seem to be friendly due to low literacy levels of the people thereby, affecting their attitude and willingness to go absolutely electronic.

Age and gender does not have much influence on the ability to adopt Information and Communication Technology. This in turn supports the e-government policy target that according to Kandiri (2010), aims at developing skills on ICT through capacity building and training because the policy appreciates competence through the development of e-government skilled workforce. The outcome has showed that, there is a larger number of the respondents both PA and MoP who can operate ICTs and the challenge remains when

the necessary tools to go electronic are inadequate thus pulling down the policy from its adoption.

4.3 Information and Communication Technology Infrastructure Coverage

To establish the level of ICT infrastructure coverage in the county, the PA respondents were asked to give the forms of Information and Communication infrastructure that cover their offices. The responses are illustrated in Table 4.4.

Table 4. 4: Forms of ICT Infrastructure used in Offices by 57 PA respondents

Form of ICT infrastructure	Frequencies	Percentages (%)
Mobile networks	52	91.1
Broadband	1	1.8
Broadband and Mobile	3	5.3
Mobile and landline	1	1.8
Totals	**57**	**100 (%)**

(*Source:* Field data, 2013)

The research established that all the offices of the Provincial Administration respondents had mobile networks fully operational. This shows that, mobile network access of PA offices was 100%. This is attributed to the fast diffusion of mobile phones at global level (Kenneth, 2006) and the relatively high mobile access in Kenya with its coverage being more than 50% in the year 2011 (Apoyo Consultria, 2011). The number of subscribers in Kenya has increased to 29.2 million between January and March 2012 (CCK, 2011) while mobile phones are a common place (The Kenya Internet usage and Marketing

Report, 2006).Mobile phone infrastructure grew so fast that by the year 2006, mobile networks had reached more than four million people (Mulwo & Kyalo, 2011).

There were four PA respondents (7%) that had broadband for internet in their offices. This is a small percentage in terms of its availability for use especially because they are mobile. The skewed nature of availability locks out other officers such as chiefs and assistant chiefs from accessing and using internet. This in turn affects the fast flow of information in and out of these offices (G2G) and between the PA and the citzen/MoP (G2C).

The presence of broadband was only limited to the district and divisional offices in the county. This has also been given by Mulwo and Kyalo (2011) who point out that ICT infrastructure, especially internet, was 3.1% of the total Kenyan population that had access to it. There was one office that had a fixed landline telephone, in Eldoret west district, and the office was formally the headquarters of Uasin-Gishu district. This explains the massive paperwork that is still present in PA officers and cues of citizens who have to physically visit these officers in search of services they need and in finding or disseminating information.

These findings agree with studies carried out by Mulwo and Kyalo (2011) who found that Kenya lacked adequate connectivity and network infrastructure because of limited penetration of the national physical telecommunication, specifically, the fixed landline. There were no cable networks, wireless nor Wi-Fi network services provided for PA offices despite its presence in towns. Kenya has limited ICT infrastructure acting as the main impediment to e-government (Bwalya, 2009). Most of the infrastructures do not

reach the bulk of the population, especially fixed land line and internet services (Ngalube, 2007). The finding of this study indicated the presence of low level broadband and fixed landline infrastructure in the county and the absence of both wireless and cable networks in PA offices.

The MoP who had mobile phones with fully operational networks was 82 percent. This indicated that it is the most available and used form of ICT infrastructure. With its full presence and use in PA, mobile infrastructure is the most stable and widely adopted and used Information and Communication Technology (Figure 4.1).
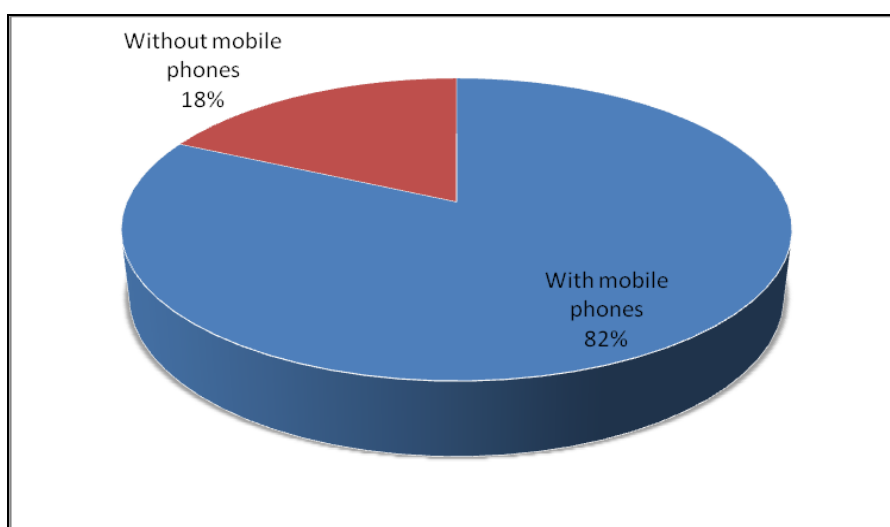
Figure 4.1: Ownership of mobile phones by MP

(*Source:* Field data, 2013)

From Figure 4.1, it was noted that, previous researches concurred with the findings. For instance, Christine (2013) found that only a few people in Kenya have a computer at home while mobile phones are mostly used since a large number of the population owns them. The number of internet users is increasing rapidly due to the number of internet

cafes, shops and access centers that are available particularly in the urban areas. Only a small percentage of the Kenyan population has access to internet infrastructure with only 3.1% internet users (Mulwo & Kyalo, 2011).

This result indicates that, e-government infrastructure is a challenge in PA in terms of its access. Only mobile network infrastructure was universally available. There was no indication of cable and wireless connections in PA offices. This answers the objective that sought to establish the level of ICT infrastructure coverage in Uasin-Gishu's Provincial Administration offices. Its coverage is therefore very low in terms of internet connection and this affects the interaction of Provincial Administration with other agencies such as G2G, G2C, G2B, and vice versa. This is because of its skewed availability and presence of personal rather than official mobile phones in use. This therefore negates the e-government policy objective that sought to have ICT infrastructure developed through interoperation of information systems hence maximum government offices connection with internet.

In relation to e-government policies in place; it evident that these plans have not reached PA' s in Uasin-Gishu County. The National terrestrial fiber optic network project and the Government common core networks meant to connect ICT infrastructure to districts and facilitate inter-ministerial sharing as reviewed in chapter two (2.2.1 and 2.2.2), has not been implemented because, the only infrastructures available were massive mobile networks, limited broadband and no cable nor wireless infrastructure cited throughout all the PA offices. This thus, just like other research reports indicates low ICT infrastructure

coverage and flopping e-government projects that are either stacked or slow in terms of its implementation, becoming another challenge.

4.4 Forms of Information and Communication Technology in Application

To determine the forms of ICTs used in the county, the PA respondents were asked to state the mode of communication they mostly use in the dissemination of vital information. The result was given by 57 respondents as shown in Table 4.5

Table 4. 5: Mode of Communication mostly used in dissemination of information by PA officers

Mode of Communication in Application	Frequency	Percentages (%)
Mobile phone	24	42.1
Letters/mails	20	35.1
Mobile phone and letters	11	19.3
Physical visits	1	1.8
Letters and e-mail	1	1.8
Totals	57	100

(*Source:* Field data, 2013)

From the total responses, 42.1 percent of the respondents used mobile phones. These mobile phones were personal assets. The high percentage use of mobile phones in the county can be attributed to a diffusion of ICT, specifically the mobile phone technology in Africa (Marcel, 2007). Mobile network coverage in Africa has had a remarkable success: the quality of its services has gone up and the cost has gone down. The massive use of mobile phone is due to the kind of network architecture present in the continent.

The network architecture is end-to-end and usually stands alone in terms of its provision. There is no interconnection and dependency experienced by its network providers. This has made wireless mobile phones more in use than any other ICTs (ITU, 2010).

By 2009, ninety percent of Africa's urban population and 48% of the rural population lived within the reach of mobile networks. Rapid growth of mobile infrastructure has therefore greatly expanded its access into the rural areas hence its popular use (ibid). Mobile phone usage is relatively high due to its highly build network infrastructure and presence of affordable mobile phones in the market. Its tendency of easy usage, mobility and more payment flexibility has also contributed to its wide adoption and use (Apoyo Consultria, 2010).

The use of letters/mails rated 35.1% while 19.3% used both mobile phones and letters whereas 1.8% used physical visits. There was also another 1.8% who used both email and letters. It was established that, with the current ICT level in the county, letters/mails carried the day with 31 out of 57 (35.1%) respondents citing that they use it to disseminate their information. This showed that, despite the effort to adopt ICTs, e-government is still far from its achievement. Having 57% of PA respondents using mails/letters indicates that the policy has just taken off. The advantages of using e-government are not yet embraced fully as well as its supporting gadgets and infrastructure.

The 100 MoP respondents also responded to the same question and the use of physical visits was 100% with a few, 32% of them citing the use of both physical visits and mobile phones. It was noted that the MoP who used mobile phones were only those who knew

the mobile contact number of the officer that they were seeking services from. The personal nature of the mobile phone hindered communication because the officers may not be willing to publicize their phone numbers. None cited the use of either e-mails or landlines. This was majorly because, on e-mail, relevant tools and infrastructure like computers and internet networks were not readily available especially for those respondents who had ICT knowledge. The fixed landline was not available in most of the PA offices because of its non-availability in terms of infrastructure connection.

There was a single fixed landline placed at a single district office. Despite its presence, no PA officer cited its use in dissemination of vital information. Figure 4.2 illustrates the percentages of the 57 PA respondents on availability of landline/fixed voice services.
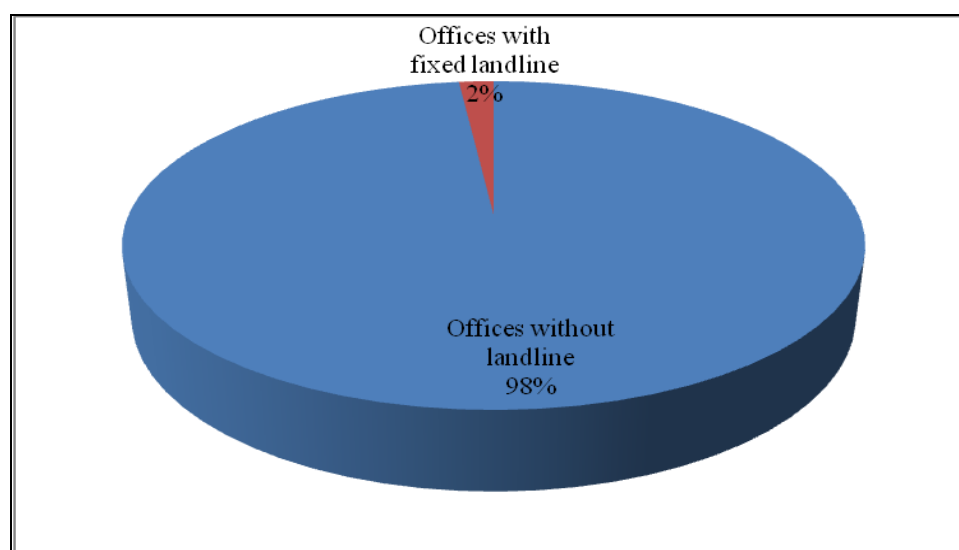
Figure 4.2: Offices' Status on Landline

(*Source:* Field data, 2013)

The land line was not used in the county because fixed line-copper based connection in Africa has had a very low penetration level that has in many cases fallen over time. This

allowed the provision of mobile network to be used as a ready substitute for it (Williams, 2011). The revolution of mobile technology has also overtaken fixed landlines because of its flexibility, portability and affordability.

The respondents were also asked to give the mode they use in internet connections in their offices. The responses of the 57 PA respondents are presented in Table 4.6.

Table 4. 6: Mode of Internet Connection used by PA Officers

Mode of internet connection	Frequencies	Percentages (%)
Broadband	5	8.8
None	52	91.2
Totals	**57**	**100 (%)**

(*Source:* Field data, 2013)

The use of internet in the county was as low as 8.8% of PA responses. The mode used was broadband whose availability was minimal. This was due to lack of the broadband gadgets and computers to support its use. It was noted that, broadband was available only in the district offices and the division offices specifically given to the DCs and the DOs to support e-government policy. They had laptops branded e-government.

Depicted in the outcome of the study, the major forms of ICT used are mobile phones supporting G2G transactions with limited G2C interactions because these mobile numbers were personal assets and depended on the willingness of the officers to share their numbers with the members of public. C2G interaction happens only when the MoP

know the number of the PA officer they wanted to seek service from or information reception and dissemination.

 The use of internet through broadband was very low present only in districts offices and division offices leaving out location and sub-location offices. It was also realized that the roll out of the e-government policy has reached only the divisions because of the DCs and the Dos have already been supplied with laptops' branded e-government indicating that the policy is still at some stage of implementation. This supported G2G interactions, basically to the higher authority of PA.

The use of mails and physical visits is a practice that suppresses adoption and use of ICT. This shows that regardless of the efforts in place to go electronic, there is a number of both PA and MoP who prefer manual governance than going digital forming part of the challenge of transformation. This was a clear practice that both the DCs and Dos agreed that paperwork and visits, despite presence of the policy is still part of their day to day practice in serving the public.

4.5   Information and Communication Technology Usage

In order to establish the mostly used form of ICT, the PA officers were asked how often they use internet for official email communication in their daily formal activities. The 57 responses are given in Table 4.7.

Table 4. 7: Use of internet by PA respondents

Use of internet	Frequencies	Percentages (%)
Always	2	3.51
Never	50	87.72
Sometimes	5	8.78
Totals	**57**	**100 (%)**

(*Source:* Field data, 2013)

The result obtained showed that only two officers, forming 3.5% out of fifty seven, always used it while five respondents (8.8%) used it sometimes. This was because they were computer literate andhad computers and broadband in their offices.

The rest of the PA officers, comprising of 87.7%, never used internet in their day-to-day formal activities because they either had the ICT knowledge but lacked the computers and broadband or had no knowledge on computers as well as access to computers and broadband.

The MoPs were asked if they used internet, specifically for e-mail functions. 71% affirmed their knowledge on e-mails while 29 percent did not have any ICT knowledge. These findings agree with those of Williams (2009) who, in their research, report that internet across Africa is very low with its penetration rates being a fraction of those in other regions. The use of internet is affected by infrastructure and tool availability. Out of 1.8 billion households' world-wide, only one third have internet access. In Africa, only 25% of homes have a computer while just 20% have access to internet (ITU, 2011). In Kenya3.1% of the population has access to internet (Mulwo &Kyalo, 2011). In Uasin-

Gishu county, 8% of the populace use internet, the main place of access being the workplace, a friend's house, educational centers, cybercafés and mobile phones (KNBS,2009).

It was noted that all the PA respondents used their mobile phones always in formal communication. This therefore indicated that the models favored in PA by use of mobile phone technology is G2G and C2G though citizen participation depended on the knowledge of officers mobile phone numbers and the willingness of these officers to publicize their phone numbers.

The use mobile phones is because, there are more than 6 billion cellular phones subscriptions and a global penetration of mobile network of 87 and 79percent in the developing world (ITU, 2011). This high mobile subscription as depicted in the outcome is also high in Kenya with more than four million six hundred thousand subscribers (Mulwo & Kyalo, 2011). In the county, there is 56.5% use of mobile phones (KNBS, 2009).

The C2G and vice versa was minimal because their mobile phones were personal. Internet usage was very low and was used to receive information by DCs and Dos. The reason for low use of internet is because of low ICT infrastructure coverage in the county's PA offices, specifically cable, fixed landline and wireless connections.

4.6   E-government Policy

This study sought to establish whether PA respondents knew of any existing policy on e-government. The responses are illustrated in Table 4.8.

Table 4. 8: PA Responses on E-government Policy

Knowledge on e-government policy	Frequency	Percentages (%)
Yes	31	54.39
No	10	17.54
Do not know	16	20.07
Totals	**57**	**100 (%)**

(*Source:* Field data, 2013)

It was established that 54% knew that there existed a government policy in support of the adoption of ICTs. The use of computers in offices was cited as the policy in place as well as the use of broadband for internet. Absence of an e-government policy rated 16% of the responses while 20% did not know if such a policy actually existed.

Policy ambiguity has also been a challenge given on previous research. Njuru (2011), in her research on implications of policy on e-government, notes that the government has failed in disseminating information about e-government objectives. The non-contextualization of e-government practices contribute to the delay in appropriate e-government adoption. Government and different stakeholders have not done the background check needed for the adoption of e-government (Bwalya, 2009).

This result indicated that, despite the time that e-government has been in place, there is still the presence of a section of the targeted implementers who are not aware of the policy. The use of computers in offices as a policy for internet to acquire and to disseminate information through e-mails, websites and social media was given by 54.4% PA respondents.

4.7   Factors Hindering/challenging the Adoption of ICTs

Both the MoP and PA respondents were asked to give the factors that they thought

hindered the adoption and use of Information and Communication Technology in PA.

Table 4.9 shows the result of the 57 PA respondents

Table 4. 9: Factors Hindering Adoption of ICT Among members of PA

Factors Hindering Adoption of ICTs	Frequencies	Percentages (%)
Lack of ICT gadgets	40	30
Lack of ICT knowledge/training	31	23
Lack of electricity/power supply	30	22
Lack of offices/temporary offices	10	7
Lack of ICT infrastructure	8	6
Inadequate funding	11	8
Poor policy implementation	2	2
Reluctance by main office	3	2

(*Source:* Field data, 2013)

The responses given matched with the responses to challenges facing ICT adoption. It

was found that there were myriad challenges all contributing towards hindrances of e-

government adoption.

Table 4.9 shows that thirty percent of the sampled PA respondents cited the absence of

ICT gadgets/tools which include lack of computers and official voice services like mobile

phones and landlines. It was observed that the Chiefs and Assistant Chiefs in the county

had no computers in their offices. Previous researches have also shown this trend

whereby, lack of basic e-government tools hindered adoption of e-government. According to Getau (2011), lack of access to the appropriate ICT equipment, which includes computers, software and telephone services, is a hindering factor. Kipsoi, Changach and Sang (2012), in their research on adoption of ICT in education management schools in Kenya concur with the outcome of this study that many government departments have not yet acquired infrastructure or computers.

Lack of basic knowledge in ICT and/or training had a percentage of twenty three. It was established that getting trained in Information and Communication Technology was a personal initiative. As shown in Table 4.2, thirty five percent of PA officers do not have the basic knowledge on ICTs. This is an indication that such respondents were not ready to embrace e-government. Ngalube (2007), in his research on accessibility of e-government, reports e-literacy as a challenge and shortage of ICT trained staff and the approaches used to train that do challenge its adoption. Getau (2011), Bwalya (2009) and Haliso (2011) separately reported that lack of ICT knowledge affects e-government adoption and use: when people have no knowledge on Information and Communication Technology, there are no chances of it being embraced.

Lack of electricity supply as a hindering factor rated twenty two percent. This was evident, especially in most of the offices located at the rural areas of the county. These offices were those of the Chiefs and Assistant Chiefs. Those in the rural parts of the county were the mostly vulnerable since their offices were located far away from the electricity supply grid. In addition, there was a division office that had no power supply. Those along highways and trading centers had electricity but most locational and sub-

locational offices were not connected. ICT is a technology that operates when powered with electricity. Without electricity, the supply of computers won't help in e-government adoption. Access to electricity in Uasin-Gishu County is still very low in many areas with most of the urban populace connected compared to the massive rural population that use alternative energy sources like wood, solar and biogas other than electricity. The number of households with access to electricity is 7,738, representing 15.6 percent of the total number of households in the area (Commission on Revenue Allocation, 2011). This therefore explains the lack of power supply as a hindering factor. The findings of this study also concurred with those of Kathuri and Nyasato (2007) and Communications Commission of Kenya (2008) who, in their studies, reported that the non-existence of electricity supply as well as its irregularity in most areas is a major barrier to the use of ICT, especially outside major towns.

The absence of officially allocated offices/presence of temporary offices constituted seven percent of the responses. There were respondents who did not have offices in their place of work hence allocation of ICT gadgets won't be appropriate because such tools will not have a safe storage and operational space. There were offices which were temporary: some iron sheet roofed and walled, some timber walled, and some makeshift containers converted into offices. Out of the 57 PA offices visited, it was noted that 8 (13.8%) rented their office setting but there were a number of offices under construction. This is a factor hindering the full adoption of e-government in the county.

Lack of ICT infrastructure was six percent. From Table 4.6, only 8 % of the PA officers had broadband that they used in accessing internet while the rest of the respondents had

no mode of internet connection. Wireless and cable networks were not cited hence their absolute absence in the county's PA offices. On voice services, there was a single fixed landline telephone in the whole county's PA offices. The mostly used were mobile phones that were personal assets in nature. Previous research has shown evidence that infrastructure is a major hindrance factor in ICT adoption. Matavire & Rode (2008) cited the development of ICT infrastructure as a major challenge while Mose & Magutu (2013) and Republic of Kenya (2005) gave both inadequate ICT infrastructure and support as factors impeding its adoption and use. Most of the existing telecommunication infrastructure does not reach the bulk of the population, specifically the fixed telephone services and internet (Ngalube, 2007). Information and Communication Technology infrastructure is essential to develop e-government projects but the current level of ICT penetration is still low (Kiula &Wafula, 2011).

Inadequate funding of the e-government policy made up eight percent of the responses given. It was noted that, there were inadequate funds to fully support the adoption of e-government. These inadequacies included lack of enough funds to purchase the ICT gadgets/ tools, and to pay ISP to lay down the required ICT infrastructure. It was established that the computers available within the county were inadequate. For instance, in the 57 PA offices included in this study, only nine had computers. Funding inadequacy is therefore attributed to it because if enough funds were allocated to the project computers and their accompanying requirements like internet services and voice services could be purchased for all officers.

The presence of Information and Communication Technology gadgets in some offices, mainly the higher level offices, puts the lower level offices, specifically the Chiefs and Assistant Chiefs' offices, in a disadvantageous position. According to Ngalube (2007) and Njuru (2011), financial constraints are a challenge hindering e-government adoption. Lack of adequate budgeting and high cost of installing and maintaining infrastructure hinder the adoption of e-government (Prakash, 2013). E-government is difficult to measure in terms of cost and it also has to compete with other pressing recurrent proposals in government. This makes governments reluctant to commit expenditure beyond budgeting horizons because e-government projects are multi-annual in nature. These inhibitors include cost of hardware, software, training and consultation (Rabaiah, 2010).

Poor policy implementation formed 2 percent of the responses. Those who knew that a policy existed cited the use of computers in offices and internet services for acquisition and dissemination of information. Prior research concurs with this outcome: for example, Njuru (2011), on challenges of adopting technology, reported that the Kenyan government has failed in disseminating information about e-government, sensitizing Kenyans on use of technology to access government services and providing incentives to encourage use of technology. According to Bwalya (2009), non-contextualization of e-government practices contribute to the delay in appropriate e-government adoption. Governments and different stakeholders needed to implement the policy have not done the background work needed for the smooth transition from traditional government to e-government practices. This was therefore an indication that the policy background check is shoddy since change management was not first considered. Mungai (2012), in his

research on challenges facing the adoption of e-government, establishes that there was lack of government commitment towards development of e- government policy to guide the ministries in developing their ICT infrastructure.

Reluctance by the main office to implement the policy came in at 2 percent of the total responses that hindered the adoption of ICT in the county. This has also been cited by previous researches: for instance, Mungai (2012) notes that there was low prioritization of e-government development in ministries in Kenya. Lack of computers in the offices of PA officers, fixed telephone lines and official mobile phones were the responses cited by those individuals who had basic or advanced knowledge on ICTs.

For the 100 MoP responses, this study found that there were four main responses. They are presented in Table 4.10

Table 4. 10: Factors Hindering the Adoption of E-government by the MoP

Factors hindering the adoption of ICTs	Frequencies	Percentages (%)
Lack of ICT gadgets	63	41
Lack of ICT knowledge	43	28
Absence of ISPs	21	14
Lack of official phone numbers, email addresses and fixed land lines	26	17

(*Source:* Field data, 2013)

The absence of ISPs was given by MoP respondents at 14 percent while lack of official mobile phone numbers, e-mail address and fixed landlines was rated at 17 percent. Lack of ICT gadgets (41%) and knowledge (28%) were common response for both PA and

MoP. It was also noted that there were areas that did not have internet service providers like cybercafés, especially in the rural areas, hence a hindering factor in the adoption of e-government. This result is supported by Apoyo Consultria (2011), who found that MoP can access internet through their mobile phones and cybercafés, though only eight percent of Uasin-Gishu's population use the internet despite the presence of wireless, cable and Wi-Fi network in the town to support opening up of cybercafés and connection to personal computers. These provisions are present in the urban areas, leaving out the vast rural population. This shows that, for both the MoP and the PA, factors that hinder the adoption of e-government are same, hindering both groups from its use as a form of communication.

The MoP and the PA had respondents that did not have the basic form of ICT knowledge. This was evident that, with this group of people, e-government will still remain hindered from its adoption and utilization. These findings are similar to those of Oketunji and Abdusalaam (2004), who carried out a study on factors hindering the adoption and use of ICTs in Nigeria's public libraries. They found that the factors hindering its adoption and use are: obsolete equipment, lack of maintenance of available gadgets, lack of technical support and lack of adequate training.

Cultural, organizational and human factors hinder the adoption of e-government. The cultural factors include reluctance to use ICTs and difficulty in training target staff. The human factors are lack of ICT qualified staff and the staff's level of skill. The organizational factors include the presence of inadequate existing e-government resources, lack of commitment by institutional management, lack of updated ICT infrastructure and total absence or presence of erratic power supply (Chisenga, 2004;

Haliso, 2011). All these findings concur with the outcome of the study that they lead to non-availability and under use of Information and Communication Technology facilities.

Previous research by Mokaya and Njuguna (2010) has also shown that financial capacity plays a major role in the adoption of Information and Communication Technology. In the process of adoption and use, financial capacity affects ICT adoption and use in that hand to mouth economic existence of people cannot allow them to its access and use (ibid). The level of economic existence for both institutions and individuals contributes to ICT adoption basing on the current financial status. The infrastructure is also not well developed to boost adoption. This is because infrastructure is one of the pre-requisite of ICT adoption and therefore, its poor state or lack of it would indefinitely affect access and use.

The expensive nature of broadband in Kenya and the high cost required to install fixed landline adds up to hinder the adoption of these infrastructure. There also exists a situation whereby the level of knowledge on the ICT system has a significant relationship with its adoption. The presence of weak financial capacity also limits institutions and individuals to their basic requirements while cost has a negative impact on the adoption and the use of ICT (Mokaya & Njuguna, 2010).

The security of sending documents online was a challenge that was cited by two senior PA officers' respondents that leads to main office reluctance to use e-government. This was attributed to the complex nature of ICT and the presence of many stakeholders. They argued that, due to the sensitive nature of the kind of information they deal with, it is not safe to send highly classified information via internet for its fear of leakage and misuse

by those who might access it. The high level of national intelligence security information cannot just be ignored, hence, a challenge in the process of ICT adoption. Privacy and security of information are challenges to e-government adoption, a reality reported in prior studies (Getau, 2011). E-government brings openness to the public sector agencies and the effort to improve bureaucratic accountability is often met by stiff resistance (UN, 2008).

An attitude change problem was also given. This, as established from this research, is a situation whereby the older officers were not willing to adopt the use of computers despite their knowledge on ICTs and the presence of Information and Communication Technology gadgets and infrastructure, preferring the use of letters/mails. Resilience due to negative attitudes towards ICTs is a challenge to adoption of e-government (Nripendra, Yogesh & Michn eals, 2007). Okiy (2005), in a study on strengthening information provision, cites the attitude problems as a hindering factor. The presence of attitude to the use of ICTs can affect the way they are used. In this case, the negative attitude present among employees leads to its rejection while the positive attitude leads to its quick adoption and use.

4.8   Summary of the chapter

This chapter presented the general information of respondents, ICT infrastructure coverage, forms of its infrastructure, ICT in application, its usage and the challenges facing the adoption of e-government. The next chapter gives the summary, conclusion and recommendations of the study.

CHAPTER FIVE

SUMMARY, CONCLUSION AND RECOMMENDATION

5.1   Introduction

This chapter discusses the background of the study, the objectives, area of study, literature reviewed, research design used, target population, sample size and sampling techniques, data collection instruments and methods of data analysis and presentation. It also gives the findings of the research in a summarized form as per the objectives of the study, recommendations and suggested areas for further research.

5.2   Summary

This study was about the assessment of e-government adoption in Kenyan public administration, specifically the case of Provincial Administration (PA) in Uasin-Gishu County. E-government is a recent reform that involves the adoption of ICTs in systems of governance that has cut across continents. Kenya having put in place projects in the process of its adoption, Vision 2013, a blue print development plan incorporating Information and Communication Technology as a measure to transform its economy into a globally competitive country is in place. The current level of ICT in the country, level of proliferation and the presence of training institutions led to the research problem because, despite presence and affordability of ICT, PA seems left behind and the research sought to asses these factors that hinder the adoption of e-government in PA.

The objectives of this study were: to analyze level of ICT infrastructure coverage, to determine the forms used asses its usage in the area of study and to investigate the

knowledge of PA officers on e-government and to examine the challenges facing the adoption of ICT. This study covered Uasin-Gishu County's administrative boundaries and targeted the adult members of the public (MoP), specifically those who sought services from the PA offices at the time of research and the PA Officers comprising of: DCs, Dos, Chiefs and Assistant chiefs. The field research took a period of three months: from 4[th]April to 30th June 2013.

The limiting factors encountered in the study were in the disbursement of data collection tools. The questionnaires were lost by PA respondents after dispatch. Follow up was used to recover lost questionnaires and interviews resorted to convince respondents to participate in the research.

The literature reviewed involved the seeking and citation of various meanings of e-government by different authors; the advantages of adopting e-government, key among them being efficient service delivery, transparency, access and delivery of timely information and accountability. Delivery models given include G2B, G2C and G2G.The challenges to e-government were economic, political and social-oriented.

The ICT infrastructures discussed are of internet and voice services. The internet infrastructures include cable networks, wireless and broadband. The voice service include mobile telephones and the fixed/landline. The use of these ICT showed that mobile telephone is the mostly used form which has provided an alternative to the limited copper based voice connections. Mobile technology revolution has led to its great adoption. There are e-government policies in place given and include the Kenya Education Network which promotes the use of ICT in teaching, learning and research in higher

institutions in the country, Pasha Centers/digital villages provide a host of services to the public through connection of internet to computers, cameras, provision of printers and fax machines.

The Open Systems theory was used as a guideline in the study. PA being a system has a communication pattern from the institution to the public, and vice versa, and from its different levels of command. Like the open system, there are demands and support from the environment and feedback from the institution to the environment. This can be effective and timely when ICT is used to give/get demands and support from and to all e-government models.

The research design adopted was case study, targeting the PA officers and MoP in Uasin-Gishu County. Yamane Taro's formula was used to calculate a sample size of the MoP using a precision/error limit of 0.1% in a total population of 523,988 to give 100 respondents sampled. The PA officers were sampled using purposive sampling (DCs and DOs) while the Chiefs and Assistant Chiefs were conveniently sampled by calculating 30% of 57 and 30% of 101 respectively giving 19 Chiefs and 30 Assistant Chiefs. The sample size was therefore 158.

The tools of data collection were interviews for purposively sampled PA respondents and MoP and questionnaires were used to obtain data from sampled Chiefs and Assistant Chief. Data was analyzed qualitatively and presented in form of tables and pie charts.

The level of ICT infrastructure coverage in PA offices in Uasin-Gishu County is very low. There is universal mobile internet infrastructure accessible in all offices and provided by several providers. Fixed copper-based /landline telephone was present only

in one PA office in the county. Internet was accessed using broadband and was present in the eight offices only; the DCs and the Dos offices.

The forms of ICTs mostly used in Uasin-Gishu County are individuals' mobile telephones and broadband for internet. There are no official mobile phones provided for officers. The broadband are only present at the district and division offices. There is also a single fixed land line in the whole county's PA offices. Physical visits and mails are still in place used as a major means of interaction in day to day official communication.

Mobile phones are always used by PA officers in their communication purposes. Internet access and usage is as low as 8% because of inadequate ICT infrastructure connectivity and provision of necessary tools to go electronic.

The challenges facing the adoption of ICTs were several. The basic ones for both MoP and PA were lack of ICT gadgets, knowledge and infrastructure, funding, security of sending documents online, poor policy implementation and attitude change problems.

The question on e-government policy was also asked and the findings showed that there are a number of PA officers who did not know whether a policy existed on e-government while others said there was no policy at all showing that its adoption still requires more efforts by policy makers and implementers for it to be fully adopted and operational. This research also established that e-government implementation policy is still on. There are laptops in place, branded e-government but present up to divisional level to support the policy implementation.

The major model of e-government fully supported and embraced despite its pitfalls in the county is the C2G whereby mobile phones are the mostly used either to deliver information or to receive information from the PA to the MoP and vice versa and G2G which is the two way communication between the different levels of PA e.g. Assistant Chiefs, Chiefs, DOs, and DCs.

5.3   Conclusion

E-government is a policy whose importance is of great magnitude. It eases the transfer of information between different groups, e.g. G2G, C2G, G2B, G2E, and avails needed information in a timely manner. From this research, e-government has just picked up in Uasin-Gishu County.

ICT infrastructure coverage is low in terms of internet connections and high in terms of voice service, specifically mobile telephone infrastructure. There is low internet usage, mobile phones and broadband for internet being the mostly used forms. The challenges hindering its adoption are both social and economic in nature.

E-government policy is not popularly known by some PA officers and its projects and plans have not been implemented fully in the county's PA offices. If these e-government master plans and ICT projects are implemented coupled with the daily revolution on technology, e-government will keep on pushing for its adoption. Despite challenges and loopholes, the government efforts will solve the factors that hinder ICT adoption in all sectors and therefore, a fast adoption process in the country. E-government thus continues to advance but its pace, spreed and impact will be determined by governments' effort and

the population in terms of infrastructure diffusion, accessibility, affordability and readiness to embrace ICTs.

5.4   Recommendations

Provincial Administration, being an important arm of government, should be an exemplary institution in the implementation of the e-government policy. PA is supposed to be restructured so as to act as a link between local and national government. The process of restructuring should, therefore, involve mainstreaming of ICT in its structures to allow fast information dissemination procedures.

Information and Communication Technology is an important revolution in governance. Its benefits include efficiency, improved services, better accessibility of public services and more transparency and accountability (Githae, 2013). To achieve these, the following are recommended:

i.   There should be a speedy construction of permanent offices for PA officers at all levels and allocation of the same to those officers who do not have officially allocated offices. This will, in turn, ensure the safety of ICT materials when its procurement time comes and these materials are presented to them.

ii.   This study's findings show that the training in ICT is still a personal initiative without government support. Despite the launch of the programme several years ago, it is recommended that all government ministries put in place programmes that will ensure the officers currently in office are trained on ICT so as to support

the policy. Also, during new recruitment exercises, basic knowledge on ICT should be made one of the primary requirements for entry.

iii. Electricity connection to offices should be made a priority. All offices at all levels should have a power supply. This in turn will ensure that when the ICT gadgets are finally delivered, its operational ability will be guaranteed.

iv. Official mobile phones should be given to officers with official mobile numbers so as to ensure that officers' private and personal communications are differentiated. Also, resources like airtime and data bundles should be adequately provided so as to ensure its proper utilization and private spending curbed.

v. A massive sensitization programme should be launched to ensure that officers understand the policy and their expectations in roles played to ensure absolute e-government adoption and utilization. The policy makers should ensure that, before implementation of any policy, there should first exist a proper design that can allow effective implementation. Proper ICT designs should be put in place to allow for effective e-government adoption and implementation.

vi. Since the Provincial administration's new role under the new constitution is to disseminate national policies, resolve conflict between societies, coordinate and maintain public security and act as a link between the national and the devolved government (Chake, 2011), ICT implementation should be a priority project in the institution because of the nature of roles it plays in service delivery both to the public and other government institutions like the police.

5.5   Suggestions for Further Research

The assessment of e-government in Uasin-Gishu County in this research has led to the following areas being suggested for further research:

i.   Similar studies in all counties/ districts should be carried out for e-government comparative analysis.

ii.   The analysis of the e-government policy since its launch in the country as well as the so far achieved targets in the process of its implementation. This brings into light how much more effort is needed in terms of funding and stakeholders needed for the policy to be achieved.

iii.   The PA and its ministry's commitment towards its full adoption and utilization of e-government.

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APPENDICES

Appendix 1: Budget

No	Items	Total Cost (Ksh)
1	Travelling and accommodation	30,000
2	Research Assistants	20,000
3	Foolscaps	3,500
4	Printing/Photocopying papers	10,000
5	Ball pens	500
6	Photocopying, Printing and binding	5,000
7	Internet browsing	4,000
8	Publication	2,000
9	Contingencies (10% of total budget)	7,500
	Grand Total	82,500

Appendix 2: Time Schedule

Time/Activities	June. 2012- Dec. 2012	April 2013- june. 2013	July. 2013- Aug. 2013	Sept. 2013 to Nov.2013
Proposal writing	▨			
Proposal defense and Data collection		▨		
Data Analysis/Thesis zero draft			▨	
Thesis 1stDraft			▨	
Thesis 2nd , 3rd , … final Draft and submission				▨

Appendix 3: Map of Uasin-Gishu County showing administrative boundaries
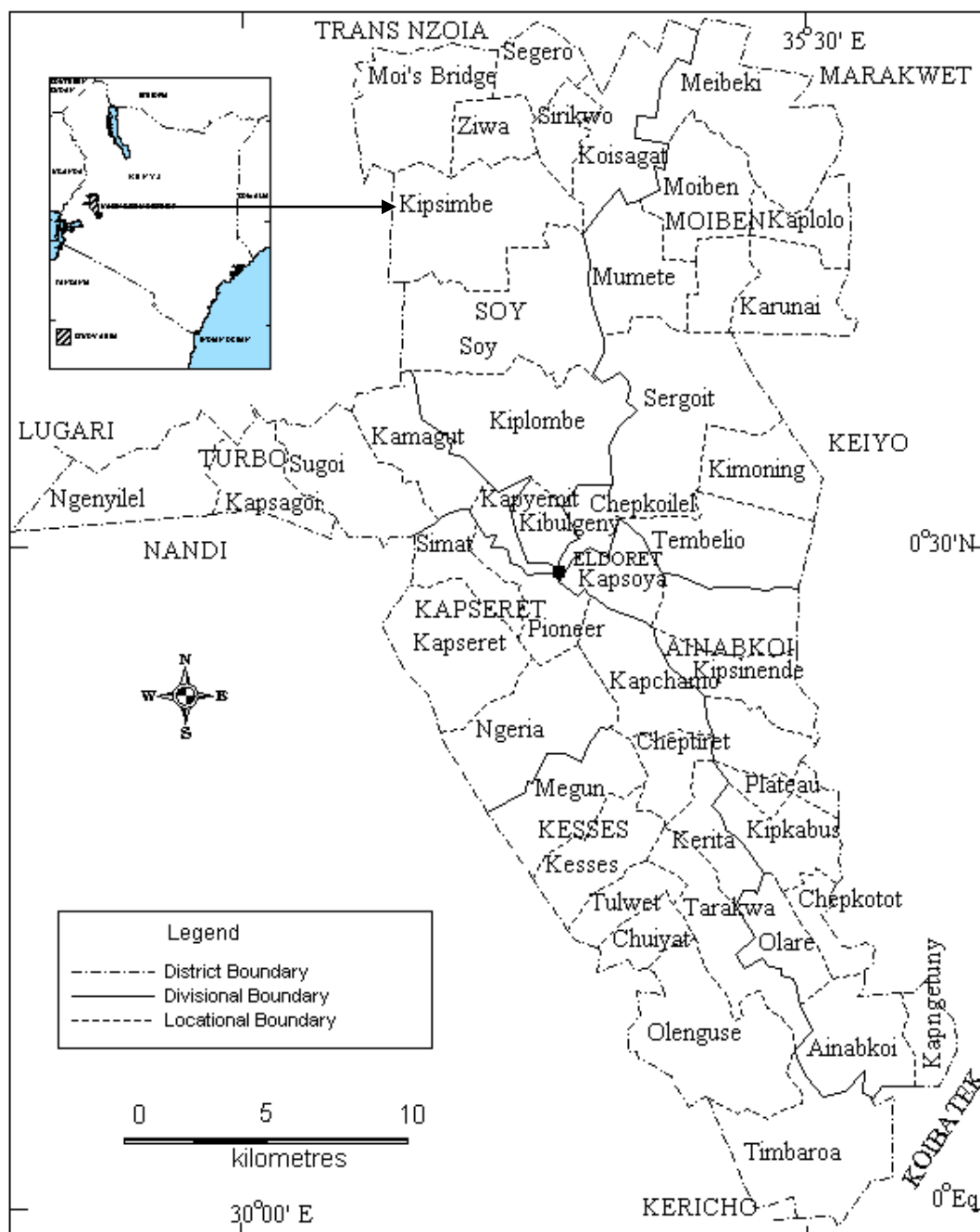
Source: Geography Department GIS Lab (Moi University)

Appendix 4: Questionnaire

RESEARCH QUESTIONNAIRE

FOR PROVINCIAL ADMINISTRATION OFFICERS ONLY

Hello: This questionnaire presented to you is part of a research investigating the adoption and utilization of e-government policy (use of ICTs) in the Kenyan Provincial Administration- Uasin Gishu County being a case study.

I am therefore kindly requesting for your assistance to provide me with information by filling the questionnaire. Be assured that the research is purely for academic reasons and no other use. Also, the research information will be treated with confidentiality and anonymity will be conferred. Your support will be highly appreciated. Eddah Heather K.

Instructions

Please tick only one answer in the box to indicate your response. Also, there are open questions that you will fill with your own answers.

 PART A: General information

1. What is your gender?

    Male ☐ Female ☐

2. What is your age bracket?

    Below 25 ☐ 26-30 ☐ 31-35 ☐ 36-40 ☐ 41-45 ☐ Above 46 ☐

3. What is your highest level of education?

   Certificate ☐   Diploma ☐   Bachelor's degree ☐ Master's degree ☐

   Doctoral degree ☐   others   ☐

4. For how long have you been in service in Kenyan provincial administration?

   Less than 5 years ☐ 6-10 years ☐ 11-15 years ☐ 16-20 years ☐

   Above 21 years ☐

5. What is your area of jurisdiction?

   District ☐   Division ☐   Location ☐   Sub-location ☐

   PART B

6. What is your level of knowledge on ICT?

   Basic ☐   Advanced ☐   None ☐

7. In your own opinion, what do you think are the factors that hinder the adoption and use of ICTs in Provincial Administration?

   …………………………………………………………………………………………

   …………………………………………………………………………………………

   …………………………………………………………………………………………

   …………………………………………………………………………………………

   …………………………………………………………………………………………

   ……………………………

8. What kinds of national ICT infrastructures are available in your office?

Mobile phone networks ☐ fixed/landline ☐ cable networks ☐

Broadband ☐ If more than one, name

them………………………………………………………………...

9. Do you have a mobile phone purposely for official use in your daily activities?

Yes ☐

No ☐

If yes, who are the users of the phone?

Government officials only ☐

Members of public only ☐

Both citizens and government officials ☐

Other………………………………..

10. Does your office have a fixed landline?

Yes ☐

No ☐

If yes, who are the regular users of the landline telephone?

Government officials only ☐

Citizens only ☐

Both citizen and government officials ☐

Others……………………………………….

11. What mode of internet connection do you use in your office?

Broadband ☐ Cable ☐ Wireless networks ☐ None ☐ Other ☐

12. In case of vital information for dissemination to higher levels of authority, what is the mode of communication do you mostly use?

Mobile phone ☐   Landline ☐   E-mail ☐

Messengers ☐   Letters/mails ☐   physical visit ☐

13. What kind of service connectivity is fully operational in your office?

Internet networks ☐   Landline telephone ☐   Mobile phone networks ☐

All the above ☐   Other………………………………………

14. How often do you use your personal mobile phone in your daily formal activities?

Always ☐   Sometimes ☐   Never ☐

15. How often do you use the land line in your daily formal activities?

Always ☐   Sometimes ☐   Never ☐

16. How often do you use internet for email in communication of information?

Always ☐   Sometimes ☐   Never ☐

17. Is there any government policy in place that encourages the use of ICT in Provincial Administration?

Yes ☐

No ☐

Do not know ☐

If yes, which ones do you know?

………

………

………

………………………………………………………………………………………………

Thank you for your cooperation.

Appendix 5: An interview schedule

FOR THE MEMBERS OF PUBLIC

Gender**…………………………..**

The guiding questions

1. What is your age bracket?

2. What is your highest level of education?

3. How do you communicate with the Provincial Administration?

4. Do you know of any official telephone number you can use to communicate with the Provincial administration officers?

5. What do you think are the reasons that mobile phones are not well utilized in Kenyan Provincial administration?

6. In your own opinion, what do you think are the reasons why internet is not used for communication purposes by officers?

7. Are you in a position to use internet for email and other services?

8. Do you have a mobile phone, if yes, is your network fully operational

Thank you for your cooperation.

Appendix 6: YAMANE Formula Table for Determining Sample Size

The following is Yamane's table showing the desired population size from the population and the levels of precision.

Size of Population	Sample size (n) for Precision (e) of:			
	+/- 3%	+/- 5%	+/- 7%	+/- 10%
500	a	222	145	83
600	a	240	152	86
700	a	255	158	88
800	a	267	163	89
900	a	277	166	90
1,000	a	286	169	91
2,000	714	333	185	95
3,000	811	353	191	97
4,000	870	364	194	98
5,000	909	370	196	98
6,000	938	375	197	98
7,000	959	378	198	99
8,000	976	381	199	99
9,000	989	383	200	99
10,000	1,000	385	200	99
15,000	1,034	390	201	99
20,000	1,053	392	204	100
25,000	1,064	394	204	100
50,000	1,087	397	204	100
100,000	1,099	398	204	100
Over 100,000	1,111	400	204	100

Where: a - Assumption of normal approximation is poor, the entire population should be sampled (Source: Yamane Taro, 1967).

Appendix 7: Research Authorization Letter

REPUBLIC OF KENYA

NATIONAL COUNCIL FOR SCIENCE AND TECHNOLOGY

Telephone: 254-020-2213471, 2241349, 254-020-2673550
Mobile: 0713 788 787 , 0735 404 245
Fax: 254-020-2213215
When replying please quote
secretary@ncst.go.ke

P.O. Box 30623-00100
NAIROBI-KENYA
Website: www.ncst.go.ke

Our Ref: **NCST/RCD/13/013/16**

Date: **4th April 2013**

Eddah Heather Kipchumba
Moi University
P.O.Box 3900-30100
Eldoret.

RE: RESEARCH AUTHORIZATION

Following your application dated **21st March, 2013** for authority to carry out research on *"Impending factors in the adoption of e-government in Kenyan public administration: A case study of provincial administration, Uasin Gishu County"* I am pleased to inform you that you have been authorized to undertake research in **Uasin Gishu County** for a period ending **30th June 2013.**

You are advised to report to **the District commissioners and District Education officers, Uasin Gishu 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.

DR. M. K. RUGUTT, PhD, HSC.
DEPUTY COUNCIL SECRETARY

Copy to:
The District Commissioners
The District Education Officers
Uasin Gishu County.

"The National Council for Science and Technology is Committed to the Promotion of Science and Technology for National Development".

Appendix 8: Research Permit

CONDITIONS

1. You must report to the District Commissioner and the District 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 with-out 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)/four(4) bound copies of your final report for Kenyans and non-Kenyans respectively.
6. The Government of Kenya reserves the right to modify the conditions of this permit including its cancellation without notice

GPK6055t3mt10/2011

REPUBLIC OF KENYA

RESEARCH CLEARANCE PERMIT

(CONDITIONS–see back page)

s

PAGE 2

THIS IS TO CERTIFY THAT:
Prof./Dr./Mr./Mrs./Miss/Institution
Eddah Heather Kipchumba
of (Address) Moi University
P.O.Box 3900-30100, Eldoret.
has been permitted to conduct research in

Location
District
County *Uasin Gishu*

on the topic: Impending factors in the adoption of e-government in Kenyan public administration. A case study of provincial administration, Uasin Gishu County.

for a period ending 30th June, 2013.

PAGE 3

Research Permit No. *NCST/RCD/13/013/16*
Date of issue 4th April, 2013
Fee received KSH. 1,000

Applicant's Signature

Secretary
National Council for
Science & Technology