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A SURVEY OF INFORMATION AND COMMUNICATION TECHNOLOGY SKILLS APPROPRIATENESS AT THE DIRECTORATE OF e-GOVERNMENT IN KENYA

BY

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ABSTRACT

The aim of the study was to carry out a survey on the ICT skills appropriateness at the Directorate of e-Government in Kenya. The study was guided by the following research objectives: to investigate current methods of assessment of ICT skills possessed by the personnel at the Directorate of e-Government; to identify the skills-set possessed by the personnel at the Directorate of e-Government; to establish the required ICT Skills-set by e-Government personnel for smooth implementation of e-Government among the public organizations and sectors in Kenya; and to recommend the appropriate evaluation criteria for the appropriate ICT skills for e-Government personnel. The target population included all the ICT technical personnel in the established forty two (42) ministries at the Directorate of e-Government in Kenya as at November 2012. The study adopted a descriptive research design. The primary data was gathered through questionnaires, while secondary data was obtained from published documents and materials obtained from the Directorate of e-Government.

The key results of the study were: the Directorate identified core skills required for a specific role of the government at all times; the assessment methods were regarded as very appropriate as they enabled the Directorate in identifying the skills possessed and the gaps that needed further training; the ICT skills-sets were effective in equipping the staff with the necessary skills required in different places of work; and that the ICT skills-sets were being adequately utilized by the staff in their current employment. The study concludes that the most used skills assessment method was Supervisor assessment method and that demonstration and self assessment methods were the most important skills assessment methods. The study further concludes that e-service delivery and fundamentals of ICT modules were well understood by the staff and that all the existing modules were relevant and important in enabling service delivery at the Ministry level. The study makes the following recommendations, that the Directorate: finds ways on getting the appropriate skills assessment methods adopted by other governments in the developed world to benchmark and raise the bar in electronic service delivery at the Government level; trains the ICT staff on the emerging ICT trends to enable them develop new ways of service delivery through technology; and plans on how to incorporate the developing of new curricula relevant for the smooth functioning of Government operations. The Directorate of e-Government should evaluate the appropriateness of some of these ICT skills-set courses mentioned by staff on how they fit in the Directorate's role. For example, the respondents mentioned Applications Development.

Keywords: *e-Government, Information and Communication Technology, Skills, Appropriateness, Directorate of e-Government, Kenya.*

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LIST OF ABBREVIATIONS

AC	Anderson Consulting
DeG	Directorate of e-Government
EIPA	European Institute of Public Administration
EISI	Egyptian Information Society Initiative
EPAN	European Public Administration Network
FAQ	Frequently Asked Questions
G2B	Government-2-Business
G2C	Government-2-Citizen
G2E	Government-2-Employee
G2G	Government-2- Government
HRM	Human Resource Management
ICT	Information and Communication Technology
IM	Information Management
IS	Information Society
IT	Information Technology
KEeLAN	Key Elements of electronic Local Authorities' Network
M	Mean
NGO	Non-Governmental Organization
NII	National Information Infrastructure
OECD	Organization for Economic Cooperation and Development
OMB	Office of Management and Budget, The White House
PPP	Public-Private Partnerships
SD	Standard Deviation
T&D	Training and Development
UK	United Kingdom
UN	United Nations
UNDESA	United Nations Department of Economic and Social Affairs
UN-DPEPA	United Nations Division for Public Economics and Public Administration
UNESCAP	United Nations Economic & Social Commission for Asia and the Pacific
USA	United States of America
WSIS	World Summit on the Information Society

CHAPTER 1: INTRODUCTION

1.1 Overview

This chapter gives background information on e-Government, provides overview of e-Government in developed and developing countries, presents information on the e-Government structure and the Directorate of e-Government, identifies the research problem in order to fill the research gap and the objectives of the study. It also presents the research question, justification, significance, scope of the study and expected outcomes. The chapter concludes with the study assumptions and limitations, and definition of key terms.

1.2 Background of the Study

Information and communications technology (ICT) is an integral component of government operations and service delivery. ICT is increasingly used as a strategic tool to more efficiently support any Government's priorities and program delivery. An ICT skills assessment is the process of identifying, documenting and measuring knowledge, skills and behaviours by clearly defining what skills and the standard of performance that is required for a specific position both in the present and into the future to enable governments to identify skills gaps and implement strategies to address these gaps to enable sustained performance. Undertaking an ICT skills assessment encourages a consultative approach to identifying workforce skills and key areas of learning and development that the government department needs to concentrate on so as to deliver on its mandate. Kumar and Best (2006) defined e-Government as the use of Information and Communication Technologies (ICTs) in the public sector to improve its operations and delivery of services. Government organizations have public functions that are of general interest to citizens and businesses. While exercising their tasks like research, policy making, policy execution, democratic control, communication with the citizens, and internal administrative processes, information emerges. The use of Information and Communication Technology increased the possibility of providing this information regardless of place and time.

Electronic Government is commonly referred to as e-Government. e-Government information can be acquired by the use of a computer and a communication network. It therefore allows easier policy coordination among ministerial departments, public agencies, and layers of government (Leitner, 2003). Information and Communication Technology (ICT) has changed

the way most business units in the private sector conduct their operations by reducing costs and simplifying processes as some of the benefits reaped by the private sector through improved technology usage. The e-Government initiative focuses on increasing efficiency and at the same time reducing operational costs of public services offered.   All government agencies need to be equipped to quick start public services delivery through e-Government if there are appropriate employees with the required ICT skills. For successful implementation of e-Government, there needs to be in place adequate skills-set to facilitate the implementation. Kenya government has set its agenda clear especially through the vision 2030.   In order to attain this vision, it is important that the Government stocks the necessary ICT skills-set for the implementation and maintenance of e-Government.

In order to have a successful e-Government, the Information and Communication Technology (ICT) solutions, which are at the very core of the e-Government infrastructure, have to be reachable by all citizens (Reffat, 2006). The emergence of Information and Communication Technology has provided means for faster and better communication, efficient storage, retrieval and processing of data and exchange and utilization of information to its users, be they individuals, groups, businesses, organizations or governments. ICTs have to be used in order to create and deliver a service, which is useful and has an effective impact for the businesses and for the citizens. ICT has been defined as the integration of computer and communications technologies for the creation, processing, dissemination and transmission of information (Al-Qallaf & Al-Azmi, 2002).   Beynon-Davies (2002) also defined ICT as any technology used to support information gathering, processing, distribution and use. ICT consists of hardware, software, data and communication technology.

Electronic Government generally involves using ICTs to transform both back-end and front-end government processes and provides services, information and knowledge to all government customers. Electronic Government refers to government's use of technology, particularly web-based Internet applications to enhance the access to and delivery of government information and service to citizens, business partners, employees, other agencies, and government entities (Layne & Lee, 2001). It has the potential to help build better relationships between government and the public by making interaction with citizens smoother, easier, and more efficient.   Indeed, government agencies report using electronic commerce to improve core business operations and deliver information and services faster, cheaper, and to wider groups of customers.   In the context of OECD e-Government project, the term e-Government is defined as the use of

information and communication technologies, and particularly the internet, as a tool to achieve better government (OECD, 2003).

Electronic Government uses a range of information technologies, such as the Wide Area Networks, Internet, and Mobile Computing, to transform government operations in order to improve effectiveness, efficiency, service delivery and to promote democracy. Electronic Government is a fundamental element in the modernization of the Government of Kenya. It provides a common framework and direction across the public sector and enhances collaboration within and among public sector organizations and institutions, between Government and the business community, and between Government and the citizens that it serves in the implementation of Government Policies. It also identifies ways of developing the skills needed by public servants to realize the new opportunities offered by ICT advancement such as the internet (e-Government, 2004).

1.2.1   E-Government in developed and developing countries

The developed countries such as the US, Canada, UK, and Australia are so far leaders in e-Government (Annual Global Accenture Study, 2002), reaping the vast majority of initial gains of e-Government implementation. Actually, the gap between developed and developing countries in internet technological infrastructures, practices, and usage has been wider rather than narrower over recent years. Besides the lack of sufficient capital to build up expensive national information infrastructure (NII) on which e-Government is based, developing countries also lack the sufficient knowledge and skill to develop suitable and effective strategies for establishing and promoting e-Government.

An estimated 500 e-Government programs were launched in the year 2001 by governments worldwide (Palmer, 2002). Electronic Government strategies have had a tremendous impact on the way governments interact with their citizens. More than 75% of Australians file income taxes online, while the mayor of Minnesota receives about 13,000 e-mails from the public each week (Palmer, 2002). According to the 2002 Annual Global Accenture (former Anderson Consulting: AC) Study, Canada is the leader in e-Government implementation. The remaining top 10 countries are (in order): Singapore, the United States, Australia, Denmark, the United Kingdom, Finland, Hong Kong, Germany and Ireland. A survey by the United Nations found that of its 190 member states, only 36 out of the 169 available Web sites had one-stop portals

and less than 20 offered online transactions (Jackson, 2002). This clearly shows a big gap in current e-Government implementation status in different countries. A more recent study using the United Nations data empirically proves that e-Government development and implementation differ in three areas: income level, development status, and region (Siau & Long, 2005). In comparison with other countries, the United States along with Australia, Singapore, and Canada are the early leaders in the march toward e-Government.

Governments in the United Kingdom, France, Germany, Spain, Norway, Hong Kong, and New Zealand have vowed to change their policies toward the implementation of e-Government in order to take the full advantage of the digital information age. Other cautious implementers include Italy, Japan, Netherlands, and South Africa. Though there has been significant progress made in developed countries in e-Government implementation, many developing countries have been left behind with a long way to catch up. Estimating the extent of e-Government implementation in sub- Saharan African countries is difficult, as only a few benchmarks exist and these are exclusively focused on internet services. According to the so-called web measure index from the UN's worldwide e-Government Readiness Report, countries such as Mauritius, South Africa, Uganda, and Ghana are in the upper third; while countries including Zambia and Central African Republic do not statistically register on the scale (UN, 2005). These statements were also confirmed by the number of projects mentioned on the webpage of the Institute for e-Government (www.ifg.cc), which provides news about e-Government projects worldwide. Detailed internet searches which were carried out in January 2007 also confirm the insufficient state of e-Government implementation in sub-Saharan Africa. Although e-Government strategies exist in many countries (e.g. Republic of Ghana, 2003; Republic of Kenya– Cabinet Office – Office of the President, 2004; Republic of Uganda, 2004) they often repeat general e-Government rhetoric and say little about the actual state of implementation.

The goals of e-Government vary considerably among governments worldwide. Rightfully, the goals of e-Government are determined locally based on the political leadership of each government. However, key institutional stakeholders influence these goals among many countries. The World Summit for the Information Society Plan of Action recommends for governments to develop national e-Government initiatives and services, at all levels, adapted to the needs of citizens and businesses, to achieve a more efficient allocation of resources and public goods (WSIS, 2005). Furthermore, governments should support international cooperation initiatives in the field of e-Government, in order to enhance transparency, accountability and

efficiency at all levels of government (WSIS, 2005). As such, these approaches reorient governments to treat citizens as customers of government services and improve the day-to-day management of financial and budgetary systems.

Governments are embracing other such various forms of e-Government that: add channels of interaction among governments, businesses and citizens; improve the ability for government institutions to communicate, collaborate and otherwise work more efficiently and effectively with each other; streamline acquisition and procurement processes; reduce opportunities for corruption; and, increase the ability to capture revenue. Many of these e-Government programs are structural elements of economic development and public sector reforms to address human development issues in developing countries (Schware and Deane, 2003). Through e-Government, governments are expected to improve performance and outcomes. Governments expect to achieve such gains as (OECD, 2003): Online data collection to reduce data entry costs and automate error checking; reduce the communication costs with citizens; greater sharing of data within government and between governments and other such stakeholders as NGO's, international agencies, and private sector firms; greater re-use of data; and reduce government publication and distribution costs through online publication.

The e-Government is a fundamental element in the modernization of Government. The Kenyan e-Government Strategy is designed to achieve pre-determined set of goals and objectives, which are: better and efficient delivery of Government information and services to the citizens, promote productivity among public servants, encourage participation of citizens in Government and empower all Kenyans in line with development priorities outlined in the Economic Recovery Strategy for Wealth and Employment Creation (www.e-government.go.ke).

The e-Government systems incorporate two specific sub-systems: an internal communication sub-system (Intra-com) and an external communication one (Extra-com). There have to be strong linkages and extensive interoperability between these two subsystems. Intra-com applications are supporting service production processes (Agency to agency-A2A- applications) while the Extra-com applications are mainly supporting service delivery processes (Agency to citizens and businesses -A2C, B- applications). They are also receiving incoming information flows (inputs) from clients and providers stepping, in this way, on the service production grounds (Businesses and citizens to Agencies-B, C2A-applications). The framework is obviously modularized where it shows these modules and the relationship among them. The

reason is this framework shows more than just the common components of an e-Government strategy. The modules are: vision; strategic objectives; users; delivery modes; guiding principles; channels; priority areas; major initiatives; infrastructure; organization and guidelines. The framework is subdivided into two main parts: the front office pane and the back office pane. The Framework offers a comprehensive view of the e-Government programme and incorporates very important components of front office and back office views. It has been modularized for flexibility, extensibilities and customizability.

1.2.2 Kenyan e-Government Structure

The Kenyan Government setup e-Government structure to develop, coordinate and define ways so that electronic and information technology business strategies can assist Government to operate more effectively and efficiently in developing services to citizens. The e-Government structure is setup to plan, develop strategies and direct government wide activities to support other agencies and participate in the development, analysis and evaluation of government wide technology issues, policies and legislation.

The institutional framework for e-Government which has been put in place include (e-Government, 2004): the Cabinet Committee on ICT which oversees the implementation of the e-Government strategy; the Permanent Secretaries Committee which is charged with the coordination of the implementation of the e-Government initiatives, provision of the institutional support and ownership needed to marshal resources and manpower to expedite the implementation of e-Government; the Ministries' e-Government Committees that reviews the various ICT policy initiatives in the Ministries and undertakes audit of the ICT capacity, establishes support to the Ministerial Policy Mandate, identifies technical and institutional gaps and inadequacies, and makes recommendations on the way forward; the Directorate of e-Government under the Head of Public Service (currently the Steering Technical Team which serves as the e-Government Secretariat) is charged with the coordination and preparation of the e-Government Strategy including the implementation plan, and monitoring and evaluation of the process.

The core members of the Steering Technical Team consist of (e-Government, 2004): the Office of the President (Cabinet Office); Office of the President (Provincial Administration and National Security); the Central Bank of Kenya; the Department of Defense; Ministry of Health;

Directorate of Personnel Management; the Government Information Technology Service; the Ministry of Transport and Communications; the Ministry of Roads; Public Works and Housing; Ministry of Planning and National Development; and Ministry of Education, Science and Technology.

1.2.3   Directorate of e-Government

The Government of Kenya established the e-Government Programme in June 2004. It has since then committed itself towards achieving an effective and operational e-Government to facilitate better and efficient delivery of information and services to the citizens, promote productivity among public servants, encourage participation of citizens in Government and empower all Kenyans. One of the mandates of the Directorate of e-Government (DeG) is to build the capacity of technical staff, public servants and citizens to ensure successful implementation of e-Government (e-Government, 2004). The achievement of e-Government in Kenya has been one of the main priorities of the Government of Kenya towards the realization of national development goals and objectives for Wealth and Employment Creation, as stipulated in the Kenya Vision 2030.

The DeG has designated the ICT departments in counties and ministries as the implementation and operational focal points for the e-Government Strategy with the major role of ensuring effective automation of government services at all levels through the implementation of appropriate projects in line with the overall national strategy and based on the ICT maturity level of the respective ministry. Each ICT department is responsible for relevant ICT project implementation, user training and technical support services, taking into account the mandate of each ministry and county. All projects implemented at the county and ministry level follow the agreed government standards for development, maintenance and integration of systems within the Government of Kenya ICT strategic framework.

1.3   Statement of the Problem

The Kenyan government is moving towards becoming more efficient operationally by collaborating across traditional departments and has to become more responsive towards its citizens' needs. The government faces an increased pressure to form an effective e-Government. The e-Government is not only meant to bring public services online, but is also focused mainly

in reducing overall operational costs by transforming the e-Government into an organization that generates both social and economic value effectively. Thus, effectiveness and efficiency factors have to be investigated and prioritized. The implementation of e-Government requires strong leadership and a vision. It also requires a comprehensive strategy that is not only benchmarked on global best practices, but also sensitive to existing political and economic conditions and realities. For e-Government to become a reality, governments, in consultation with stakeholders, should follow a common nationwide strategic framework, which articulates the government's vision, targets and milestones, technical approach and standards for e-Government systems. Such a framework should also address information privacy, security, maintenance, and interface standards.

The Directorate of e-Government together with the external consultants developed an ICT curriculum for citizens which outlines the modules for citizens, content and assessment criteria. They also developed basic ICT curriculum for end users and proposed career progression plan for ICT Technical personnel. However, there has been no study which has sought to establish the skills appropriateness at the Directorate of e-Government in Kenya. The Directorate of e-Government management has faced challenges during project implementation because of the limited skills among its technical staff to deliver on projects. This study therefore sought to fill this research gap by conducting a survey on the ICT skills appropriateness at the Directorate of e-Government in Kenya.

1.4 Objective of the study

1.4.1 Study aim

The aim of the study was to carry out a survey on the ICT skills appropriateness at Directorate of e-Government in Kenya. This was because for the Directorate of e-Government to deliver on its mandate, it required better ICT skills-set for its technical personnel. The study focused on the Directorate of e-Government technical personnel in Kenya.

1.4.2 Specific objectives

The study was guided by the following specific research objectives:

i. To investigate current methods of assessment of ICT skills possessed by the personnel at the Directorate of e-Government;
ii. To identify the Skills-set possessed by the personnel at the Directorate of e-Government.
iii. To establish the required ICT Skills-set by e-Government personnel for smooth implementation of e-Government among the public organizations and sectors in Kenya; and
iv. To recommend the appropriate evaluation criteria for the appropriate ICT skills for e-Government personnel.

1.5 Research Question

The research questions for this study were:

i. What are the current methods of assessment of ICT skills possessed by the personnel at the Directorate of e-Government in Kenya for the ICT staff?
ii. What are the currently available ICT skills-set among personnel at the Directorate of e-Government in Kenya?
iii. What are the required ICT Skills-set among employees for smooth implementation of e-Government among the public organizations and sectors in Kenya?
iv. What evaluation criteria are suitable for the appropriate ICT skills for e-Government personnel?

1.6 Justification of the Study

The flow of information is essential for effective governance and managing the day-to-day business of government services since the government work is very information intensive. The production of most government services consists of creating and communicating information. Each tax payment, license renewal, birth, death, marriage, land purchase, and so on generates data that is collected, processed, stored, communicated, and analyzed by most governments. All

of this information is the basic ingredient for governments to govern, manage its resources, provide services, and account for its performance (Heeks, 1999). Information is a valuable national resource. It provides the public with knowledge of the government, society, and economy in past, present, and future. It is a way to ensure the accountability of government, to manage the government's operations, to maintain the healthy performance of the economy (OMB, 2000). With the appropriate skills, the Department would be able to competently deliver on its mandates efficiently and effectively thus promoting the smooth operations of government bodies and autonomous institutions.

Due to this, many such administrative reforms as transparency, accountability, and openness focus on improving information management practices. Government activities require information to support internal management, public administration and regulation, and public services, as well as to make information publicly available (Heeks, 1999). Citizens mandate that governments govern using quality information by putting management systems and controls in place to ensure that information is accurate, relevant, complete, economical, verifiable, accessible, simple, and secure. ICTs are the most cost effective means for capturing data from the internal operation of government organizations and for serving citizens. As part of the e-Government approach, ICTs create opportunities to reduce the costs of providing information and services to the public.

1.7   Significance of the Study

The study would be important to Government, Information and Communication Technology companies, and Researchers as well as Academicians. For the government, the finding would be useful in understanding the effects of adoption of ICT on the delivery of services to its citizens.

For Information and Communication Technology companies, the findings would enable them understand the impact of appropriate ICT skills on service delivery.

To academicians and researchers, the findings would contribute new knowledge for the strategic impact of ICT skills appropriateness on service delivery in government offices.

1.8   Scope of the study

The study focused on the Directorate of e-Government in Kenya, and covered the ICT technical personnel deployed into different government ministries and autonomous departments. The study analyzed the personnel ICT skills-set and compared it with the required ICT skills-set for smooth implementation of e-Government in Kenya and delivery on its mandate.

1.9   Expected Outcomes

The study gathered much information on ICT skills appropriateness for e-Government personnel for smooth implementation of e-Government among the public organizations and sectors in Kenya and came up with recommendations that would enhance Directorate of e-Government service delivery to its customers.

1.10   Study Assumptions and Limitations

The study assumed that the Directorate of e-Government personnel would be cooperative of the study as appropriate ICT skills for e-Government personnel would improve on e-Government efficiency, service delivery, and customer service. The study was limited to the Directorate of e-Government ICT technical personnel deployed at the designated ICT departments of identified ministries and autonomous departments.

1.11   Definitions of Key Terms

The following definitions were consistently used in this report.

e-Government:	This is the practice of public service provisioning to citizens, businesses, and other government agencies where government services can be accessed through the internet, mobile, fax, mail, telephone, and personal visits (World Bank, 2009).
Skills:	A skill is the learned capacity to carry out pre-determined results often with the minimum outlay of time, energy, or both. In other words the abilities that one possesses.

Government:	Government refers to the legislators, administrators, and arbitrators in the administrative bureaucracy who control a state at a given time, and to the system of government by which they are organized.
Training:	Training is a process which endeavors to impart knowledge, skills and attitudes necessary to perform job related tasks and aims at improving job performance.
ICT:	Information and Communication Technology is the integration of computers and communications technologies for the creation, processing, dissemination and transmission of information.
Citizens:	Citizens are defined as the general public to whom electronic services are provided and are involved in the government to citizen e-Government relationship.
Electronic Services:	Are the generic government services provided through the Internet to citizens, public and private employees.
Efficiency:	Is a measure of how well ICT resources are used to achieve the e-Government goal.
Effectiveness:	Is a measure of the attainment of the e-Government goal.

1.12 Summary

Information and Communication Technology has changed the way most business units in the private sector conduct their operations. ICT is now seeping through to the public sector which is labeled more conservative compared to the private sector through e-Government initiatives. Electronic Government initiatives are to ensure that the public sector not only keeps up with the race, but slowly take the lead in the transformation process that is affecting everything including societal structure.   Malaysian government has identified initiatives to implement the modernization of the public sector.   The e-Government initiative focuses on increasing efficiency and at the same time reducing operational costs of public services offered.

Chapter 1 has presented the background information to the study, statement of the problem, study objectives and research questions, justification and significance of the study, scope of the study, expected outcomes of the study and definition of terms. Chapter 2 contains the review of related literature and research related to the problem being investigated. The methodology and procedures used to gather data for the study are presented in Chapter 3. Chapter 4 deals with the study data presentation and analysis while Chapter 5 presents the study conclusion, recommendations and suggestions for further studies.

CHAPTER 2: LITERATURE REVIEW

2.1   Introduction

This chapter presents a review of the related literature on the subject under study presented by various researchers, scholars, analysts and authors. The literature review is based on the research objectives for the survey on the ICT Skills appropriateness at the Department of e-Government. Specifically the chapter reviews and presents literature on the importance of e-government and how e-government works, e-government components and sectors, e-government maturity models and framework. The chapter further reviews literature on e-government skills and competencies necessary for e-government implementation, and ICT skills and e-government assessment methodologies. The chapter concludes with literature review on relationships between employee skills and performance, employee training and development, and performance evaluation practices before presenting the conceptual framework for the study.

2.2   Theoretical Background

Electronic Government is the use of Information and Communication Technology (ICT) to transform government by making it more accessible, effective and accountable (Matavire, Chigona, Roode, Sewchurran, Zane Mukudu and Boamah-Abu, 2010). An e-Government is a complex socio-technical system in which heterogeneous stakeholders are interactively entangled to fulfill their best interests in providing services to the country's citizens (Nour et al., 2007). Evans and Yen (2006) points out that an e-Government indicates a system of effective provision of public services via information and communication technologies. It also implies electronic transaction between the government and other actors such as citizens or businesses in society through new technologies including the internet. The concept of an e-Government includes all applications of information and communication technologies that improve efficiency, effectiveness, transparency and accountability of daily administration of government (Sharma, 2007). Expanded from the definition of a simple electronic administration of central and local governments, the broader concept of an e-Government stands for a more citizen-friendly government that provides enhanced public services and improves productivity of the governments via extended networks and advanced technologies.

Allen *et al*, (2001) cites that the adaptive challenges of e-Government call for organizational structure and skills, new forms of leadership, transformation of public-private partnerships. Many developing countries suffer from the digital divide, and they are not able to deploy the appropriate infrastructure for e-Government deployment (World Bank, 2003). Ndou (2004) also notes that there are many challenges for e-Government development and implementation in developing countries such as: ICT infrastructure; Policy issues; human capital development; change management; strategy; leadership role; and partnership and collaboration.

Matavire *et al.,* (2010) indicates that e-Government implementations in developing countries are generally more problematic in comparison to those in the developed nations. They further posit that the key challenges to ICT implementation in Africa broadly consist of: the development of information and communications infrastructure; human resources development and employment creation; the current African position in the world economy; and insufficient legal and regulatory frameworks and government strategy. These sentiments are supported by Bhuiyan (2009) who adds corruption as an added challenge; especially where the developing country's political landscape is characterized by political elite who influence the direction of ICT initiatives. Matavire *et al*., (2010) further identifies access problems as part of the complexity of the digital divide. Access problems constitute mental access, skills access, material access and usage. ICT's in the developing world are often naively adopted without sufficient consideration of the social, cultural and historical context in which implementation occurs (Braa, Monteiro & Sahay, 2004). Kitaw (2006) goes on to add literacy levels to the list of challenges, stating that low literacy levels hinder the types of media available for e-Government implementations. Signore, Chesia and Pallotti (2005) categorized the challenges facing e-Government into social issues, economic issues and technological issues.

The availability of skilled workforce with good capacity for learning is essential for e-Government, along with other factors like leadership, regulatory frameworks, financial resources, organizational conditions, and information and technology infrastructure. This is in line with a popular opinion that staffing is one of the key factors in determining the success or failure of technology applications in any organization. Most e-Government readiness assessments involve determining the adequacy of human resources for e-Government in individual government Ministries and autonomous government agencies. Human resource planning for government is based on the agreed set of competencies required for e-Government. These skills are definitely not restricted to technical skills. Managers, for instance, require broad

skills to engage in e-Government decision-making (Lau, 2003). They span: Leadership, Technology Management, Information Management, Performance Assessment, Project Management and Information Technology. These skills are targeted at both specific categories of government employees like managers, IT specialists as well as public officers in general. Settles (2005) notes that the process of implementing e-Government solutions requires new managerial and technical skills to plan, evaluate, manage, finance and integrate information systems as part of government operations. The identified skill-sets may be provided to public officers by governments through formal education, informal education, and training programmes often carried out in partnership with private organizations and academic institutions.

2.3 Importance of e-Government

Xiong (2006) notes that e-Government will make the government more transparent, efficient, and enable government information and services to be delivered to citizens much faster and easier. One does not need to go to different government offices when a mouse click at his/her home or other locations will do the same work in minutes. One of the benefits of e-Government in developed countries is cost reduction in the transfer of information and online transactions (Dada, 2006). The e-Government has many advantages which serve as criteria for measuring the efficiency of administrative work and general quality. The essential task of government is governance which means the job of regulating society and not just working with marketing and sales. Electronic Governance is defined as the transformation of governance processes resulting from the continual and exponential introduction into society of more advanced digital technologies (Layne and Lee, 2001).

Developing a successful e-Government provides the following benefits: improving efficiency of administrative processes, as it will be more accurate, reliable, no data loss, and especially faster; increasing transparency, as all the information about the government and its agencies will be available, nothing ambiguous. And it will be accessed easily and from anywhere; improving services, which could be by making all the services available online, with no hassle of queuing or waiting, or choosing the wrong department. So citizens will feel that they are satisfied with such a new way of serving; decreasing corruption, every citizen will be dealt with as the other, no recommendation to citizens upon others. And the system will do exactly the rules; contributing to revenue growth, and/or cost reductions, citizens will feel comfortable with the e-services online, as it is fast and clear, so it would be an advantage to encourage them to do their

payments on time, which could contribute in the revenue growth; achieving specific policy outcomes, and contributing to economic policy objectives; and helping trust building between governments and citizens. This will help the e-Government to achieve the main idea from its existence. It makes tremendous sense for the government sector to adopt e-Government and embrace ICT advancements for streamlining its processes, connecting all the stakeholders, cutting costs, improving the delivery of services, and most importantly, realizing the vision of good governance.

2.4   How e-Government works

In getting the idea of e-Government acceptable to the many officials and those interested in the developed and developing countries, comes as a result of such conviction that technology and communications can transform government services received by citizens across in a queue waiting in line to services that are regularly available throughout the day and can be obtained directly through the lines of communication electronic online. It could be argued that the electronic government is a revolutionary electronic display material and political risks and if it does not absorb enough may be e-Government initiative is a waste of resources and fail to provide useful services, so it must be from the beginning to determine needs and potential obstacles such as poor infrastructure and humility of the educational system and the lack of means to communicate with technical or limited resources, expertise and information. The old fashioned model of ICT in government has been changed to new model, one of ICT supporting and transforming the external working of governance by processing and communicating information and data. Network communication technology has revolutionized how agents in the economy interact, transact, and share information with each other – namely government, businesses, and citizens. The new technology provides for multi-channel access, communication and interaction, including, among others, the usage of Wide Area Networks (WANs), the Internet, and mobile computing networks.

A recent study conducted by UNDESA (2012) presents a comparative assessment of the 190 United Nations Member States which are utilizing ICTs to support citizen centric service delivery and citizen participation in service delivery to ensure sustainable development. The Study evaluates the application of information and communication technologies by governments. This evaluation of e-Government readiness places citizens at the forefront, by focusing on the governmental services and products that primarily affect them. The study

showed that progress in online service delivery continued in most countries of the world with many having put in place e-Government initiatives and information and communication technologies applications for the people to further enhance public sector efficiencies and streamline governance systems to support sustainable development. In the world regional averages of e-Government development, Europe which got 0.7188 points showed the highest e-Government development followed by Americas (0.5403 points), Asia (0.4992 points), Oceania (0.4240 points), and Africa got 0.2780 points indicating Africa lags far behind the world average set at 0.4882 points. According to the study Seychelles (0.5192) climbed several points to number one in Africa followed by Mauritius (0.5066) and South Africa (0.4869) while Kenya (ranked 7 in Africa) and Morocco (ranked 8 in Africa) gained in the world rankings from 124 to 119 and from 126 to 120 respectively. The study further notes that since 2003 all regions of the world have steadily improved their e-Government development offerings moving from decentralized single purpose organizational model of e-Government to an integrated unified whole-of-government model for the people. The key challenge for the e-Government development in Africa is cited as lack of integration of administrative simplification with e-Government development plans, lack of infrastructure and human resource capacity, and a gap between electronic services supply and demand. The study also notes the main reasons for improvement as: the great investment in infrastructure connectivity notably the broadband infrastructure; and the strength in electronic information and electronic consultation enabling citizens to be more interactive with their Governments.

2.5   E-Government Components

A review of existing academic literature in the area of e-Government highlights the predominance of four main categories, which relate to the functions of government itself (Cook et al. 2002; Sakowicz, 2003).

The first category is e-services (Sakowicz, 2003). This term explains the electronic delivery of government information, services and programs over the internet (Ronaghan, 2002). Pardo (2000) claims that e-Government is about transforming government service delivery through the use of technology. Additionally, e-Government has been defined as the use of technology, particularly web-based applications, to improve access and to professionally deliver government services and information (Brown & Brudney, 2001). The quest to implement e-Government is

motivated by the policy goals of increased effectiveness, efficiency and information quality; improved interaction mechanisms; and better governance tools (Grant & Chau, 2005). Deakins and Dillon (2002) also explain that e-Government is a combination of IT capabilities, competencies and organizational administrative performance across both business-to-business and business-to-citizen activities, and encompasses a wide range of services: dissemination of information, trade with the private sector, services to enhance participatory democracy, and services for both individual citizens and businesses (Ebrahim & Irani, 2005). The notion of e-services highlights the innovative systems that enable greater citizen involvement and the high value placed on citizens as customers (Sakowicz, 2003).

The second category envisions e-Government as more than electronic service delivery, and is called e-management (Cook *et al.* 2002). E-management is the use of Information Technology (IT) to enhance the management of government, from reforming business processes to improving the flow of information within government organizations (Cook *et al.* 2002). Snider (2001) adds that e-Government uses IT to make government operate more effectively. The use of Information Technology (IT) implies the combination of ICT, people, information, management and processes to improve outcomes and service delivery in all of these areas (Heeks & Bhatnagar, 1999). Thus, this second category sees e-Government as able to harness ICT to improve all areas of government. E-management is also dependent on ICT providing behind-the-scenes support to the management and internal administrative functions of public organizations, electronic record maintenance, information management and the cross-departmental flow of information (Heeks, 2006a; Sakowicz, 2003). Furthermore, Chircu and Lee (2005) states that government organizations provide better services to their constituents via e-Government. Many activities can now be conducted online, such as renewing driver's licenses, applying for jobs and completing tax returns online (West, 2002). This second category takes the perspective of an 'information age' through the effective use of ICT, and that the public sector will be able to transform itself in response to this technological transformation. The valuable usage of ICTs necessitates a new organizational culture as well as new worker teams focused on organizational functioning, customer service and responding to citizen input (Sakowicz, 2003).

The third category is known as e-democracy (Sakowicz, 2003). This involves the use of electronic communication channels such as the internet and email to raise citizen participation in public decision-making practices (Cook et al. 2002). E-democracy focuses on the use of ICTs to

support democratic decision-making processes as well as to allow more effective and transparent engagement between government, citizens and businesses (Welch, Dawes & Gisler, 2004). Galindo (2006) views this e-democracy category as e-Government that is involved with developing democracy through the accessibility and usability it gives to officials and public sectors. Citizens can get the information and share democracy through e-Government online services (Greunz, Schopp & Haes, 2001). Prins (2001) sets e-Government as the delivery of online government services, which provides the occasion to increase the public's participation in democracy, increases communication between citizens and government, decreases the complexity of government bureaucracy and enhances agency responsiveness to citizens' requirements. Sakowicz (2003) explains a framework of e-democracy as based on ICTs being utilized as a tool to set agendas, establish priorities and develop policy in the government functions. He also mentions the importance of activities that improve citizen involvement, such as open meetings, feedback pulls, public surveys and community forums. Alcholzer and Schmutzer (2000) consider e-democracy to be an e-Government function aimed at establishing electronic polls and re-defining the functioning of democratic practices and procedures. The objectives of e-democracy are to provide citizen access to knowledge and information about political developments and to enable the evolution from inert information access to active citizen participation (Backus, 2001). In brief, when e-Government is implemented successfully, there will likely be the appearance of a new evolution of more politically aware and empowered persons (Sakowicz, 2003).

The last category is e-commerce as it considers e-Government to be the exchange of money for services and merchandise over the internet; for example, citizens can renew their vehicle registration, pay utility bills or taxes, and the government may buy office supplies or auction surplus equipment (Carter & Belanger 2004). Irani *et al.* (2005) argue that the strategy of e-Government in the public sector is aimed at developing the key structures and strategic plans governing communications with business and citizens and at reducing the costs of business processes. In many cases, the development of e-Government appears to be based on the imperatives of e-commerce (Stahl, 2005), and is thus associated with the business side of government interactions (Sakowicz, 2003). The reason why e-commerce is identified as a useful e-Government factor is that the objective of e-Government is to focus on the citizen and on overcoming the difficulties inherent to democratic administration, and the adoption of e-commerce is seen to have the potential to improve this situation (Stahl, 2005). As a result, e-Government is generally defined as the use of technology to develop information sharing,

service delivery, constituency and client participation and governance by transforming both internal and external connections (Fang, 2002).

As e-Government is embracing all the functions that a public administration is doing, different aspects of ICT have to be considered, and several components are included in e-Government research. One of these components, for instance, is ICT internal adoption, which refers to the use of ICT in public administration to change structures and processes of government organizations (Lambrinoudakis, Gritzalis, Dridi, & Pernul, 2003) aiming at improving internal efficiency. Other themes are the studies about internal business process re-engineering, IT management, IT project assessment, interoperability or the relation with other public administration levels, e-Government evaluation, etc. Janssen (2005) takes a more systematic approach identifying five main e-Government components: provision of ICT infrastructure and ICT skills to facilitate citizen's inclusion named e-society, automation of internal processes, providing citizens with better services (e-administration), including citizens in policy (e-participation), and changing the relation between politics and administration.

2.6   Sectors of e-Government

There are different sectors of e-Government based on using ICT to facilitate relationships between government and other key stakeholders. These include Government-to-Citizen (G2C), Government-to-Business (G2B), Government-to-Employee (G2E), and Government-to-Government (G2G).

2.6.1   Government-to-Citizen (G2C)

Government-to-Citizen e-Government focuses on making information accessible to citizens online. This is referred to as a citizen-centric e-Government when governments take further steps to provide online services organized around citizen needs. Many early designs of e-Government web sites organized the content, particularly the hyperlinks to government services, around the pre-existing structure of the ministry and its bureaucratic procedures. This proved to confuse citizens. Citizens would spend time searching to find information through a labyrinth of web pages that mirrored the organization and structure of the ministry. Since most citizens do not understand how the internal operations of a government ministry functions, the bureau-centric organization of a government web site caused greater levels of dissatisfaction with early

e-Government sites. Web visitors would use trial and error methods to navigate from page to page on the web site and not know for certain if the next click would lead them to the information they needed or to a dead end.

Learning lessons from e-commerce sites, developers of e-Government services adopted customer-centric approaches to help citizens become more satisfied with their online experience at government web sites. Typical practices of citizen-centric approach to e-Government include: organizing content around citizen needs; aligning the structure of the pages in the web site to reduce the number of clicks it takes to find information, access a service, or to complete a transaction; improving the affective qualities of the site; adding functions to facilitate the communication between citizens and the government; and, enabling the user to customize the site contents. A related Government-to-Citizen relationship is when the citizen is also interacting with government as a political actor and participant in democratic processes. Electronic voting (e-voting) and e-democracy systems support this type of relationship (Schware and Deane, 2003).

With Government-to-Citizen (G2C) applications, public organizations provide information, contact details and general services online. The most important purpose of these applications is to offer people different options and communication channels for public transactions (AlShihi, 2006). Furthermore, it focuses on the customer and the integration of electronic services such that public services can be provided based on the idea of a 'one-stop-shop' (Yong & Koon, 2003). This concept implies that citizens can undertake many tasks, in particular those that engage various agencies, without needing to initiate contact with each agency separately (Yong & Koon, 2003). According to the published report by the Organization of Economic Co-operation and Development (OECD) in 2003 entitled 'The e-Government imperative: Main findings', this G2C relationship includes information dissemination to the public, basic citizen services such as license renewals, ordering of birth/death/marriage certificates and filing of income tax returns, as well as assistance for such basic services as education, health care, hospital information, libraries and the like. Another example of G2C (Heeks, 2002) is a single tax payment system which was implemented in Mauritius to permit taxpayers to lodge their income tax forms via an electronic portal. Electronic Government can also assist in the development of a political relationship between government and its citizens as part of a democratic process, by providing for example participation in polls and voting online (Huang & Bwoma, 2003). Additionally, the major advantage of e-Government in this regard can be

specifically seen as facilitating direct contact between government and the public (Davies, 2007).

Bonham, Seifert & Thorson (2001) assert that the G2C function is beneficial to both the government and its citizens. Chan and Chung (2002) offer the example that e-Government ensures there is no need for citizens to inform all government organizations separately when they change their address. The use of an integrated e-Government gateway can help reduce departmental overheads and improve the information flow across government departments. Citizens would need to contact each relevant government organization individually to submit a change of address form if e-Government services were not established. In this regard, the use of an integrated G2C function is increasingly becoming a significant part of e-Government infrastructure, since it allows citizens to reduce their dealings with burdensome government processes to instead use a one-stop e-Government portal, and the government can manage all of its data while providing users (citizens) with the possibility to quickly and easily modify their requirements of the information resources (Ebrahim & Irani, 2005; Gupta & Sharma, 2002). The objectives of the G2C relationship include (Kostopoulos, 2004; Pappa & Stergioulas, 2006): individually provide one-stop online access to services and information. Citizens should be able to find what they require easily and quickly, and to access the information in minutes or seconds, instead of days or hours; disintermediation of civil service staff — delivering services directly to citizens; making content and services available online; providing services that are citizen rather than agency focused; and building and enhancing trust.

2.6.2   Government-to-Business (G2B)

Government-to-Business e-Government focuses on strategies using ICTs to facilitate government interactions with the private sector to procure goods and services and to coordinate transactions from private companies. One approach is known as electronic procurement (e-procurement). Because of the large number of purchases that governments make from the private sector, there is a need to develop faster and more cost-effective routines to handle the typical procedures for procurement. The typical tasks include: material planning, sourcing, purchasing and contract management (UNESCAP, 2006). Electronic procurement systems streamline the process of purchasing goods and services from the private sector through ICTs. Electronic procurement systems provide electronic catalogs or marketplaces to streamline online ordering and payment, announce calls for tender through electronic tendering solutions, and

support online bidding (Moon, 2002). Governments put e-procurement systems in place to improve document management, reduce costs, reduce processing times, improve access to markets for goods and services, and increase transparency of public decision-making.

Government-to-Business (G2B) transactions include various services exchanged between government and the business community, including dissemination of policies, memos, rules and regulations (Davies, 2007). Electronic Government is concerned with the electronic enablement of the relationship between the private sector and government organizations. The business services offered include obtaining current business information, downloading application forms, renewing licenses, registering businesses, obtaining permits, and payment of taxes (Fang, 2002). The services offered through G2B transactions also assist in business development, specifically the development of small and medium enterprises. Simplifying application procedures that would facilitate the approval process for SME requests would encourage business development (Chavan & Rathod, 2009). On the other hand, the economic return on the investment in e-Government can be determined via its impression on three cost phases of interaction with government: finding the related government processes, understanding the government processes and fulfilling the government processes (Welch, Hinnant & Moon, 2005). Heeks (2006b) argues that the government's interactions with business are far more important than those it has with citizens in terms of the overall rate of economic growth in the country.

The G2B application is beneficial to improving the quality and efficiency of transactions and communications between business and government (Metaxiotis & Psarras, 2004). Yong and Koon (2003) assert that G2B initiatives have been receiving a significant amount of attention from the public sector because of the dynamic nature of commercial movement and the potential for decreasing transaction costs through improved procurement systems. At a higher level, G2B services consist of e-procurement: an online government–supplier exchange for the purchase of goods and services by government (Yildiz, 2007). According to Seifert (2008), there are two primary motivating forces behind G2B applications. The first is the business community which performs many activities electronically such as procurement, sales and the hiring of staff. The second driver is the growing demand by policy-makers. The policy-makers aim to reduce the associated costs and to implement procurement effectively.

In general, e-procurement websites permit registered and qualified users to seek out other sellers or buyers of goods and services (Lindskog, 2004). The sellers and buyers may also indicate

prices or invite bids depending on their methods of selling/buying. Coleman (2005) explains e-procurement in some detail in terms of the government providing the opportunity for smaller businesses to bid in government procurement projects and ensuring the bidding process is transparent for all. An e-procurement system can also assist government to generate savings, as charges from the middle man are eliminated and buying agents overheads are lessened. The overall objectives of the G2B relationship are (Ma, Chung & Thorson, 2005; Mahmood, 2007; Miranda, 2000): reducing the loads on the interactions between businesses and government; providing a one-stop entry point of information to facilitate business development; increasing the ability of businesses to identify, examine and remark on government regulations and rules; reducing the time required of businesses to fulfill the obligations outlined in regulations, complete necessary paperwork etc; eliminating the paper trail and reducing the number of steps required in the communication process between government and business; and enhancing the national economy within global markets.

2.6.3   Government-to-Employee (G2E)

Government-to-Employee e-Government focuses on relationships within government among employees to coordinate internal operations and improve the internal efficiency of business processes. In general, national governments attempt to revise their internal processes to decrease administration costs across all government departments. The Government-to-Employee (G2E) attributes refer to the relationship between the government and its employees (Ndou, 2004) as well as to the strategic systems utilized to support the implementation of government objectives, human resource management and budgeting (Riley 2001). The services and data supplied by the government agencies to employees and the ways in which employees cooperate with the management level are enabled by G2E services (Golubeva & Merkuryeva, 2006). A significant innovation of this feature is the integration of employees and back office systems and processes (Millard, 2003). Therefore, G2E is a valuable way to bring employees together and to encourage knowledge sharing among them. This is argued to be 'e-learning' (Ndou, 2004).

E-learning is a G2E project which provides employees with the opportunity to access information about civil rights laws, compensation and training (Ndou, 2004). It is a good example of how employees in government agencies can improve their abilities and gain an understanding of organizational policies. Siau and Long (2005) explain that the objectives of G2E are to improve the internal efficiency and effectiveness of government administration, to

restructure internal operational processes to adopt the optimum commercial system and to offer internal services to employees such as payroll, reimbursement and training. For example, Kanthawongs (2004) describes one G2E e-Government initiatives in Thailand as the 'e-Parliament'. The e-parliament system aims to implement the use of IT and integrate internal systems into a single portal. As a result, it can encourage and facilitate the work of members of the Thai parliament with better efficiency (Kanthawongs & Lee, 2009).

However, Chavan and Rathod (2009) argue that G2E services also incorporate G2C services, such as the provision of human resource training and development that improves the bureaucracy's day-to-day functions and dealings with the public. Employees further are able to support and service the public far more efficiently and effectively when G2E applications are in place. In this case, the government performs as an employer and communicates with its employees, especially government officers, via IT to improve the internal management competence and reduce administrative expenses. Basic G2E applications provide (Chanana 2007): information to compute retirement advantages; access to essential content and applications; the ability to easily gather information from the field; collaboration with other government employees anytime, anywhere; opportunities for more effective cross-agency initiatives; and improved intra-agency information-sharing and team collaboration.

2.6.4 Government-to-Government (G2G)

Government-to-Government e-Government focuses on providing services to governments through intergovernmental relations. This includes activities to coordinate stakeholders from the national, state/provincial, and local government as in the case of humanitarian or crisis response.

Government-to-Government (G2G) interaction is the backbone of e-Government, and identifies the internal processes and data sharing among government sector organizations (Yong & Koon, 2003). The critical objectives of G2G applications are to reduce the associated costs, improve strategic decision-making and decentralize the power among all levels of government (local, provincial and national) (Heeks, 2006b). Riley (2001) describes how national governments rely on the other levels of government to deliver services and they assign individual responsibilities accordingly. In terms of the adoption of e-Government, Abdullah et al. (2006) assert that the G2G application is the most significant aspect of e-Government which involves the use of e-

Government to enhance both intra- and inter-government collaboration and cooperation (Davies, 2007; Yildiz, 2007).

G2G applications allow government agencies and departments to share information, databases, resources, capabilities and skills, thus increasing the effectiveness and efficiency of procedures (Ndou, 2004). Seifert (2008) states that there are many forces which enhance G2G initiatives; including the management of government information, legislation, and concern for improving the competence of government agencies. For example, in a single-point access service, cooperation and collaboration among different government agencies and departments are critical (Ndou, 2004) because the government must have up-to-date information across all departments, be able to respond accurately to queries and issues and to increase job satisfaction among its workforce (Rexed, 2008). G2G applications also allow government to communicate more effectively by reducing duplication and redundancy of information and communication (Evans & Yen, 2005).

The most successful methods of e-Government are characterized by a focus on both back office integration and front office service delivery (Kunstelj & Vintar, 2004). Irani, Love & Jones (2008) add that the transformation of back offices influences the outcomes and institutional effectiveness because the G2G methods adopted impact at two levels: the domestic and the international level (Evans & Yen, 2006). G2G methods used are related to transactions between local and national governments, and between the departmental and the organizational levels (Chavan & Rathod, 2009). At the same time, they can be used as a channel for international relations and diplomacy. The objectives of G2G can be summarized as follows (Chavan & Rathod, 2009): enabling all levels of government to work together more easily to effectively serve the needs of citizens and businesses; reducing the fractured nature of individual departments and agencies, moving towards a coherent and interconnected government organization; changing the culture of the civil service from reactive to proactive; having an open and accountable government; and providing cost-effective procurement.

2.7   E-Government maturity models

Assessment is vital to discovering the current state of e-Government development, working out the extent to which objectives within various strategies and action plans have been reached, ascertaining strengths and weaknesses, shaping new guidelines, looking for examples of best

practices and finally comparing different e-Government organizations at the national and international levels. Owing to the very nature of rapid evolution in this field, and disagreements on core definitions (Löfstedt, 2005), e-Government initiatives around the world are trying to develop structured assessment methodologies that will fit into the context of the countries where they are established. The vast literature of the e-Government research map sees e-Government as an incremental progression grounded on technological and organizational sophistication. Several classification schemes of the e-Government implementation and development steps have been used by scholars and practitioners worldwide.

According to UN-DPEPA Report (2002) the five stages of e-Government are: Stage 1 - One-way communication - basic website: In this stage the sites serve as a public information source, static information on the government is provided, FAQs may be found and contact information is provided; Stage 2 - Two-way communication - enhanced website: At this stage the access to specific information is regularly updated; a central government homepage may act as a portal to other department sites; useful documents may be downloaded or ordered online; search features, e-mail and areas for comments are accessible; Stage 3 - Interactive web presence- a national government website frequently acts as a portal: Users can search specialized databases; forms can be downloaded and/or submitted online and secure sites and passwords begin to emerge; Stage 4 - Portal personalization: At this point the users will be able to conduct complete and secure transactions online; the government website will allow users to customize a portal in order to directly access services based on specific needs and priorities and sites will be ultimately secure; Stage 5 - Fully integrated portal: The country provides all services and links through a single portal; no defined demarcation between various agencies and departments; all transactional services offered by government will be available online.

KEeLAN (2002) points out that the e-Government stages are classified by six categories as follows: Stage 0 – No web presence: Stage 1 – Information: online information about public service; Stage 2 – Interaction: downloading forms; Stage 3 – Two-way interaction: Processing of forms, including authentication; Stage 4 – Transaction: Full case handling (decision and delivery with payment); and Stage 5 – Service Integration: Online service delivery enabled by means of a secured network linked to various back-offices/service modules. KEeLAN is an acronym for Key Elements of Electronic Local Authorities' Network. The KEeLAN research is divided into two phases; measuring the e-Government stages and back office developments.

On the other hand, Deloitte Research cited in Silcock (2001) indicated that e-Government stages are divided into six categories. Stage 1 is the Information publishing as it creates websites by departments and agencies, One-way communication; Stage 2 is the Official two-way transactions and enables customers to have electronic interaction with government services such as renewing television licenses; Stage 3 is Multi-purpose portals and enables customers to obtain government services and information from a single point; Stage 4 is the Portal personalization as it provides customers with opportunities to customize portals according to their need; Stage 5 is Clustering of common services with portals becoming better, government departments will disappear where government will seek to gather common services to hurry the process of delivery; and Stage 6 is Full integration and enterprise transformation where Government departments will disappear others will appear, some departments will keep the same names but become entirely different internally.

According to Moon (2002), e-Government stages are in five classes. Stage 1 is Information dissemination: This is the most basic form of e-Government, which disseminates information by simply posting it on the web sites; Stage 2 is Two-way communication and it entails request and response where interaction occurs between governments and users; Stage 3 is service and financial transaction where transactions occur both between governments and individuals (e.g. obtaining visa), and between governments and businesses (i.e. ordering office facilities); Stage 4 is Vertical and horizontal integration which refers to integrating separate systems at different levels (vertical) and from different departments (horizontal); Stage 5 is Political (citizen) participation which involves Political participation where promotion of political participation is through services such as online voting and surveys.

Siau *et al.* (2005) suggested five different e-Government stage models capturing the whole vision of e-Government (using Meta-synthesis method). Siau *et al.* (2005) translated the stages within different models into one another and developed a new e-Government stage model. The new e-Government stage model has the following five stages: web presence, interaction, transaction, transformation, and e-democracy. Stage 1 is Web presence: This phase is the most basic form of e-Government where governments typically post simple and limited information through their web sites, such as the agency's vision and mission, office hours, contact information, and official documents. At first, most of the information is static. However, with the advancement of e-Government capability, the information posted can be more dynamic, specialized, and regularly updated. The main difference between this stage and other higher

stages is that in this stage, governments only provide information on the web sites and no interaction is possible. Stage 2 is Interaction: This phase provides simple interaction between the governments and the users. This includes basic search engines, e-mail systems, as well as official form downloads. Interaction, as the preliminary step of transaction, can be regarded as a transitional period between simple web presence and complete transaction. Stage 3 is Transaction: This phase enables users (including both individual citizens and business) to conduct complete online transactions. Citizens can conduct self-services online such as license applications, tax filing, and personal information updates. In addition, businesses can access online services such as fulfilling tax forms, applying licenses and reporting financial data. Online businesses such as obtaining order and making auctions are also possible. Stage 4 is Transformation: There is a "jump" between transformation and the previous three stages. Rather than automating and digitalizing current operational processes, this stage moves towards transforming the way that governments provide services. The transformation involves both vertical (i.e. governments in different levels) and horizontal integration (i.e. different departments or governments in different locations). For external interfaces, governments build a single and unified portal providing integrated and seamless services instead of separate and distributed services. To achieve this aim, governments should initiate an internal integration to re-engineer existing processes by reducing bottlenecks and intermediaries. Stage 5 is E-democracy: This is a long-term goal for e-Government development. By offering tools such as online voting, polling and surveys, governments attempt to improve political participation, citizen involvement, and politics transparencies. At the same time, e-Government gradually changes the way in which people make political decisions.

2.8   E-Government framework

Many researchers like Layne and Lee (2001) and Deloitte Research (2000) have developed stage-based approaches that consist of discrete phases of development. A network that connects all government agencies is needed to ensure that citizens enjoy the full benefits of e-Government, from the point of view of the e-Government infrastructure. Building this network requires planning across all public agencies and government and is a very expensive undertaking. Many factors must be considered when building such a government backbone. First to study the cost implications, a financial feasibility study is necessary. This cost-benefit analysis can help government decide either to open fractions of the government backbone and charge access fees to telecommunications carriers or operators to sustain operations, or to

altogether ride on an existing private network due to cost constraints. The benefits and risks of having one's own backbone that ensures government communications are open and secure and operating 24 hours a day, 7 days a week and 365 days a year. However to support the network full time, this may mean regular funding for upgrades and maintenance of the network, and for hiring a team. Some governments may decide that it is too costly and too time-consuming to build their own backbone. If governments want to immediately engage in e-Government, there may not be enough time or money to do so. Building a backbone may take years and billions of dollars to complete.

In South Korea, the New Korea Net-Government (NKN-G) was constructed to improve the efficiency of government operations and delivery of public services. It connects central and local governments, public institutions, research organizations and universities through optical fibers. The NKN-G was developed within the larger framework of the Korea National Information Infrastructure (NII), which was prompted in 1992 by the government's fear that unless an information infrastructure was built, its basic industries would not be able to compete in the global marketplace. It will be completed in 2015 (Jeong and King, 1996). The NII with the NKN-G allowing for simple and swift delivery of public services in support of the national government's goal of transparent, accountable, and efficient government was seen as part and parcel of Korea's national economic policy.

Governments around the world work with different e-Government budgets. The Brazilian government spent a mere US$200 million in 2000 while Europe spent US$7.8 billion for local, state and federal governments in the same year. Most developing nations may not be able to afford the cost of proprietary software and thus free or low-priced software hold a powerful appeal (Festa, 2001). Some countries like Germany, France, the United Kingdom, Italy, Spain, China, Singapore, Australia and Brazil have explicit policies on the use of open source software, while others are in the process of proposing legislation to this effect. In 2002, the German government announced that it has moved to standardize using Linux and an open source model at the federal, state and communal levels. This decision was made with three key objectives: avoiding monocultures to raise the level of IT security, lower dependency on single software vendors, and increase cost savings in software and operating costs (Galli, 2002). In an attempt to avoid reliance on U.S. companies particularly Microsoft, the Chinese government has moved to install the open source Linux operating system provided by Red Flag (Liu, 2002).

Egypt has taken an e-Government initiative since the introduction of the Ministry of Communication and Information Technology (MCIT) in 1999, as part of its plan to turn Egypt into an information-based society. The vision of e-Government initiative in Egypt is "delivering high quality government services to the public in the format that suits them" (EISI Government Team, 2003). Such vision relies mainly on three principles that include: citizen centric service delivery, community participation, and efficient allocation of government resources (EISI Government Team, 2003). Electronic Government vision – once articulated - led to formulate Egypt's e-Government strategy, directed mainly towards utilizing ICT to enhance government readiness; thus to realize a strong local program and to smoothly integrate in the global community (Darwish, 2007). The main projects guided by this strategy - related to the third principle of the national vision (efficient allocation of government resources) - are back office automation and automation of local governorates (EISI-Government Team, 2003). This proves the focus on automating back office over both central and local governmental agencies since the beginning of the Egyptian e-Government program.

2.9   E-Government Skills and Competencies

2.9.1   E-Government skills and competencies in public sector

A range of skills and competencies will need to be developed in public-sector organizations in order to properly implement and manage e-Government (Settles, 2005). The skills required for e-Government are not simply technical, as general managers also need broad skills to engage in the ICT decision- making process; necessary skills include a basic technical understanding (IT literacy), but also an understanding of information management and the information society. An emerging need seems to be the requirement for a new set of skills in the public service – both at the organizational and personal level – to cope with the structural challenges of modernization and transformation against the background of socio-economic considerations (EIPA, 2005). Leitner (2006) emphasized that apart from IT skills, the introduction of e-Government invariably leads to new types of non-technology skills, in particular 'softer' personal, communication and organizational skills. Traditional management skills need to be updated and strengthened to deal with the impact of e-Government, and additional competencies are needed in areas such as organizational change, co-operation and collaboration across departments, and public-private partnerships (Lau, 2003).

Khan *et al.* (2010) defined "e-Government skills" as the set of skills, knowledge, and concepts that are needed for effective access, locate, operate, manage, understand, and evaluate e-Government initiatives in different stages. Electronic Government competencies are defined by Career Executive Service Board of Philippines (2010) as the requisite ability to set a broad e-Government vision and show commitment to that vision by: articulating the positive impact of e-Government on efficiency, service quality, and customer service; and to identify the potential benefits of e-Government and how to achieve them; and the qualifications of executives to effectively develop, implement and manage e-Government programs and initiatives.

EPAN (2003) identified four sets of skills, both technical and managerial, as essential for e-Government: Information Technology (IT), Information Management (IM), Information Society (IS), and updated management skills. While the borders of these skill sets are blurred, they provide a useful framework for analysis (Lau, 2003). IT skills are the technical skills which are necessary to implement e-Government, and this skills set include basic IT literacy for all employees, and technical skills for IT specialists to design and implement technical elements (hardware, software, communication) of e-Government initiatives (Ojo *et al.,* 2007). IM skills span the deployment of knowledge resources within the public administration and the sharing of knowledge with partners and other stakeholders outside the organization, and this skills set are essential for coordination and collaboration within the organization in order to create a transparent image to the public (UK department for education, 2003). IS skills include the ability to use ICT resources to implement an e-Government strategy of an organization in accordance with its overall strategy, this skills sets involve understanding new technologies and their limits vis-à-vis the organization's service strategy (Repo, 2003). Updated Management Skills: since e-Government has a significant impact on the structure and processes of public administrations, traditional managerial skills are insufficient for new organizational needs; managers need skills to manage organizational changes resulting from e-Government, and they also need to improve customer responsiveness, develop accountability frameworks, create incentives for cooperation and manage relationships with the private sector (Ojo *et al.,* 2007). Each skill set is composed of several specific skills, the classification of specific skills into each skill set are adopted from the classification done by EPAN (2003).

Table 2-1   e-Government Skills identification in four skill sets

E-government skills identification in four skill sets		
1	**Information Technology skills**	Basic IT literacy Specialist IT skills
2	**Information management skills**	Information Management Privacy and security protection Information user service skills
3	**Information Society skills**	ICT vision abilities ICT strategy and planning Organizational change
4	**Updated management skills**	Risk management Communication and coordination Financing arrangements skills Public-private partnerships
Source: EPAN (2003), Parrado (2005), Capra et al. (2005)		

Basic ICT skills include the skills such as use of a PC, mobile devices, standard programs; and Specialist IT skills include the skills such as software development, web design, database design, the use of specialized programs; and also include the ability of maintenance of hardware and software systems; reception of problems reported by the users and the provision of technical fixes; and the training of end-users to make an appropriate use of technology and designing proper tools for continuous computer literacy policy (EIPA, 2005). Information User Service skill refers to the support of the customer organization, the end-user and the customers (citizens) in the use of information (Parrado, 2005). ICT vision ability is the ability to understand new ICT trends and strategic impacts; current, effective and operative use and exploitation of ICT; ability to support development of ICT culture (Capra *et al.,* 2005). ICT strategy and planning implies understanding the principles of the service strategy, facilitating the implementation of the e-Government service; and also implies understanding the business, the process and the overall strategy of the organization in order to better design the information system (Parrado, 2005). Organizational change management skill is the ability to understand and manage change process, organizational changes (integration, different customer approaches, communication, home working, etc.), development of process ownership and orientation towards transparency and cooperation (Culbertson, 2005). Communication skill refers to the ability to involve

stakeholders and maintain involvement and raise interest of public servants; coordination skill is the ability to manage "multi-objective" teams and multi- competence teams (Capra *et al.,* 2005). Public-private partnership is the ability to foster partnerships with private institutions (Al-Almaee, 2008).

To set up e-Government, a consideration of the IT skills of staff is required (Chutimaskul & Chongsuphajaisiddhi, 2004). Staff who possess IT technical knowledge in installing, configuring, planning and upholding the new technology in the context of government processes are directly helpful to the successful achievement of e-Government (Ruzaigi, 2003). They are also fast learners and can easily adjust themselves to new electronic methods. In contrast, a government organization that has fewer IT experts will not be able to easily deal with e-Government applications and consequently will need more time, and therefore will incur greater expense to understand the concepts. Chutimaskul and Chongsuphajaisiddhi (2004) state that staff in government agencies can be moved to different departments in order to match their qualifications with individual departments. For instance, there are many IT specialists in IT departments, since they have a lot of programming functions that require staff with significant IT knowledge. Thus, government agencies need to identify and consider the staffing issue as part of e-Government implementation. Carr and Gannon-Leary (2007) argue that if IT staffs have inadequate IT knowledge and skills, this can lead to the failure of IT projects in an organization. In relation to e-Government implementation, Chen *et al.* (2006) notes that low levels of computer literacy and dedication of resources may leave e-Government as a low priority due to the lack of IT knowledge among staff. Employees may not understand the 'big picture' and how the application of new technologies leads to a redefinition of organizational structures and power distribution as a result of a lack of skills with the new technologies (Wargin & Dobiey, 2001). Thus, the technological understanding and acceptance of employees must be employed by the management to strengthen the desire goals and images of the e-Government projects (Tseng *et. al.* 2008).

2.9.2 E-Government Readiness Assessment in Public Sector

E-readiness is defined by different studies as the preparedness of a country for e-Government in terms of its technological infrastructure, human resource development, and telecommunication infrastructure. It is also about the willingness of the government to take advantage of the opportunities made available by advancement in technology to improve the quality of life for the

citizens (UN, 2005). Being e-ready involves having the necessary legal and regulatory framework available to support e-Government and ensuring positive end user perspectives towards e-Government. This can make citizens embrace and be more willing to participate in e-Government (UN, 2005; Bagchi, Gallup and Cerveny, 2006). Due to its effectiveness managers in government and non-governmental organizations (NGOs) have been urged to measure and prepare for ICT integration by assessing the e-readiness of a society.

According to Parajuli (2007) the various stages or models reflect a transformation that starts from a nascent static online presence to fully integrated and interactive maturity. In addition, West (2002) asserts that there are four general stages of e-Government development while Hiller and Belanger (2001) present five stages in their study. The stages in both studies are similar, focusing around simple presentation of information, through transactional level services (including the provision of two way communications), through the clear integration of systems (with e-Government services not being separated from the whole) to real transformational e-Government made possible through services providing the capability for clear citizen participation in governance.

GeoSINC International (2002) identifies five main areas of activities that contribute to the overall e-readiness of a country: access and connectivity; training; education and public awareness; government leadership; business and private sector initiatives; and social development that builds up on the result of initiatives taken in other areas but should also be promoted. After a thorough investigation of 17 e-readiness models, the researcher identifies five key categories of assessment criteria: IT infrastructure, human resources, policies and regulations, environment (economical, political, cultural), and e-Government transformation (addressing internal factors affecting e-Government such as public websites and ICT usage by government). In studying e-Government in Latin America, Altman (2002) concludes that there is no direct relation between e-readiness and e-Government implementation in a country; this clarifies Janssen's (2005) recommendation to focus on the most particular factors to e-Government when attempting to measure it.

2.10 ICT Skills and e-Government Assessment Methodologies

2.10.1 Types of ICT Skills

A skill is the ability to perform a task to a pre-defined standard of competence and is acquired through formal and/or informal learning and through practice and experience (EU 2003). Schuppan (2008) sees skills as the knowledge, competencies and abilities of a person which are related to the tasks or job assigned to them.   The skills employers look for from ICT staff are commonly divided into two main types which include (Bosworth, 2000): the technical or 'hard', vocational skills; and generic or 'soft' skills. The technical skills requirements centre around operating systems, software products and increasingly on networking technology while the generic skills focus mainly on problem solving, communication, and team working.

Electronic Skills (e-Skills) are defined in different ways throughout different studies. Most often, e-skills are interpreted more directly as ICT skills (Lanvin, 2008).   ICT Skills are a set of techniques, methods, and basic knowledge that shape the work of ICT professionals. According to OECD (2004) there are three types of ICT skills: Basic skills - using generic tools like word processors, internet browsers and email clients; Advanced skills **-** using advanced and often sector-specific tools for the administration and manipulation of data and digital media; and Specialist or Professional skills **-** developing, maintaining and operating ICT systems. The European e-Skills Forum (2004) groups OECD's basic and advanced skills as user skills (the capabilities required for effective application of ICT systems and devices by the individual) and distinguishes this from 'practitioner skills' (OECD: specialist) which is the capabilities required for researching, developing and designing, managing, the producing, consulting, marketing and selling, the integrating, installing and administrating, the maintaining, supporting and service of ICT systems.

Another set of skills that is often cited is e-business skills. The e-business skills are the capabilities needed to exploit opportunities provided by ICT, notably the Internet, to ensure more efficient and effective performance of different types of organizations, to explore possibilities for new ways of conducting business and organizational processes, and to establish new businesses. According to the European e-Skills Forum (2004) e-business skills play an increasingly important role in an organization's competitiveness and are strategic in nature and are related to innovation management.

The skill needs of the ICT professionals are changing rapidly, as ICT develops and the range of new applications widens. Governments face the challenge of fostering the development of e-Government while there is still great uncertainty regarding fast moving technological change (Lau 2003). The technological changes call for update and strengthening of ICT skills of the professionals to be able to deal with the impacts of e-Government. Thus the skill gaps are often expanding. The European e-Skills Forum (2004) define the Skills gap as a competence shortfall between the current and needed skill levels of individual staff within organizations. A skills gap is a significant gap between an organization's skill needs and the current capabilities of its workforce (ASTD 2006). The existence of a skills gap implies the ICT Professionals do not have the required skills and would need retraining to enable them achieve the organizational objectives.

2.10.2 ICT Skills assessment

In today's world of rapidly changing technologies, it is vital that the Government maintain their competitive edge by stimulating and encouraging the supply of well skilled people. Undertaking an ICT skills assessment encourages a consultative approach to identifying workforce skills and key areas of learning and development. An ICT skills assessment is the process of identifying, documenting and measuring knowledge, skills and behaviors. By clearly defining what skills and the standard of performance that is required for a specific position (now and into the future), government institutions will be able to identify skills gaps and implement strategies to address those gaps to enable sustained performance.

The Government ICT Skills Assessment Cycle captures the common elements of skills assessment processes that are relevant to the government. Each business area needs to identify how these elements should be customized to meet their business needs as one size does not fit all. The cycle has five elements that describe key activities that need to be considered when undertaking an ICT skills assessment.

2.10.3 Skills assessment process

The following five activities take place when undertaking skills assessment:

Identify core skills and level of responsibility: This process enables the ICT manager to assess, identify and document the individual skills/competencies, knowledge and behaviors required for a specific role. The ICT manager can identify the 'required' skills/competencies and level of performance for the ICT role now and into the future. The manager communicates with the employee to confirm the skill/competency and performance requirements for the role.

Employee self assessment: This process enables the employee to reflect on their own skills/competencies and to assess and identify their individual level based on the skills/competencies required for a specific role. The employee undertakes a self assessment to identify the 'actual' skill level (what the individual believes is their level of competency). The employee completes this assessment.

Analyze skills gap report: This process enables the ICT manager to review the outcomes of the employee self assessment. The manager is to review the results and investigate any gaps. This may instigate a conversation between the manager and employee to refine the employee's assessment as the manager may believe the gap is more or less than what was originally assessed. The ICT manager communicates/negotiates with the employee to discuss the results.

Discuss anomalies and identify learning and development actions: This process enables the ICT manager to review the skills gap(s) - and/or surplus (es) - and discuss any anomalies. The ICT manager and employee discuss anomalies and identify possible learning and development activities which may include, but are not limited to: coaching/mentoring; internal training/research; external training such as formal courses, attendance at briefings/information sessions etc. Recommendations can be documented and an action plan created to ensure the appropriate development takes place. The manager has an open discussion with the employee to identify strategies to address any gaps including possible learning and development options.

Monitor and review: This process enables the ICT manager and employee to ensure that learning and development takes place to close the identified gap. For maximum benefit, the process should be reviewed on an annual basis. The ICT manager and employee should regularly discuss learning progress. All recommendations should be monitored through a performance development and planning process. A skills assessment process should be performed on an annual basis to ensure alignment between 'required' and 'actual' skills. This process can also assist with succession planning and career planning as well as planning for the

future of changing technologies. The manager and employee are responsible for ensuring regular skills assessments and learning and development actions take place. The manager is responsible for ensuring that the ICT skills assessment process is ongoing and reflects the workforce management needs of the organization.

An ICT skills assessment methodology will help: identify skills gaps; support workforce planning; develop strategies for addressing current and future skills gaps; support career planning and succession planning; align skill development to business goals and needs; enable greater return on learning and development investment and assist with the identification of future skills needed in the ICT industry over the next five to ten years.

2.10.4 Assessing Current Level of ICT Related Skills

An important element of developing an electronic service strategy is assessing the current capability of the organization to deliver it, in terms of the skills available compared to those needed. According to Parrado (2002) there are four approaches to assess the current level of skills available. The first one devised by the British Cabinet Office focuses on available skills and skills gaps; the second one, from the Canadian government, concentrates on competencies and jobs skills profiles; the third one, a proposal from KPMG for the German BundOnline initiative, does not tackle directly the issue of skills but offers an analysis of the readiness of an organization to deliver electronic services. The fourth one is a proposal by Parrado that builds up on the previous approaches.

The United Kingdom e-Business skills assessment toolkit (British Cabinet office, 2000) was developed as an instrument to help Departments identifying the skills gaps in their organization as part of the process of developing an electronic service strategy and to help the Cabinet Office in the UK to have a cross-government view of the skills dimensions of electronic service strategies, skills status, skills gaps and needed central solutions to tackle the skill gaps. The toolkit assesses separately two sets of skills: technical professional skills (merges IT and IM skills); and business system management skills; and does not address 'end user' skills. Each set of skills (technical and business) is broken down into 7 clusters or areas of skills. The toolkit uses the SFIA (Skills for Information Age) model with extensions as the basis for the categorization and definition of skills. The toolkit provides a very useful and detail checklist of almost every single skill that an e-government service would require. The toolkit is not clear

who should fill in the questionnaire, which is based on a self assessment exercise. While it would make sense that the HRM co-ordinates the exercise, extensive consultation with specialists and business managers will be required. The process of self assessing the needs of the organization in terms of skills seem to represent a burden for organizations, especially those ones that are unable or unwilling to undertake such an enterprise. Perhaps a more simplified version would be more workable at the operational level.

According to Treasury board of Canada Secretariat (2002), the Canada's IT Job competencies profile provide a common basis for comparing requirements for similar positions within and across departments and jurisdictions. The IT Competency Profiles and the accompanying assessment tools developed in Canada have the potential to provide the basis for an inventory of individual competencies and learning plans. Such an inventory would put both individual departments and the overall IT Community in a better position to predict skills gaps, allocate learning resources and do succession planning. The profile lists 52 IT competencies that have been used to illustrate the level of expertise and importance of each competency for one generic job of IT Unit Head. The 52 competencies or knowledge /skill factors are evaluated and rated by "level" on a scale of "N/A" to 5 as well as "importance" on a scale of A to D. Canada's competency-based approach identifies skills needed to do particular types of jobs; while the British Skills Assessment Toolkit is a generic tool that assesses whether the required skills exist in the organization: it does not matter whether these skills are in one particular job or not. Unlike the British toolkit, Canada's approach makes possible very detailed career and training plans customized for each individual in each hierarchical level and an overall assessment of specific capacities across the community. This richness of information entails a considerable amount of work, making it more suitable for agencies already used to the competencies approach and more generic job descriptions, but probably less suited for public agencies that still use traditional assessments of jobs. The types of information the competency-based approach can provide include whether a candidate for a position has the competencies and skills or has the potential to attain those competencies and skills required; the types of training and/or development an individual would need to qualify for a specific position or type of position; and whether there is a career path for the individual within the particular organization or whether they should expect to move outside that organization to achieve career goals. In contrast, the e-skills assessment toolkit has a broader focus and it provides information about whether the particular skills exist somewhere in the organization. It does not matter if these skills are possessed by a team or an individual position holder. The Canadian approach allows not only the organizational level HR

Planning possible with e-skills assessment but also significant HR Planning at the individual and group level in order to meet changing job requirements.

The Net-Readiness Analysis is devised by KPMG for the BundOnline 2005 strategy of the German Government. The Net- Readiness analysis is a self-assessment instrument that helps to evaluate the e-government capacity of an organization. The analysis is undertaken through a questionnaire that could be answered either by single individuals or teams of the organization. The analysis follows the four dimensions of a model (technology, learning skills, leadership and organization) in which each part accounts for 50 points and answers to 10 questions. This instrument offers a first approach to the e-capacity of a specific public organization, as it asks questions that have to be solved before any e-government strategy should start. Nevertheless, there are some problems associated with this regarding the question of ICT related skills. Firstly, skills represent a minor part of this assessment tool, and secondly, this instrument is based on numeric overall points that give a general idea of how 'agnostic' or 'visionary' an organization is in terms of e-government. An overall numeric mark does not help very much in terms of searching for the specific gaps of the system. Therefore, this instrument could be used as a starting point but in terms of skills more specific instruments should be used.

According to Parrado (2002), the British and the Canadian tools seem to be good instruments to tackle the assessment of ICT related skills for e-government but at the same time seem to be complicated and hard to use for inexperienced or very busy managers in these issues and their lists of skills and lists of questions are too long to persuade managers to undertake a self assessment exercise. Parrado (2002) further asserts that: There is no one best list of ICT related skills in order to ascertain the availability of them in a public organization as several sets and different clusters can help this task; The more detailed lists of skills are useful for those organizations that are used to work with skills for other organizations that enter this world, the *leit motive* should be - Keep it simple! and keep to the core of meaningful skills; Under this *leit motive,* one should choose the set of skills identified earlier or an alternative one with a few clusters of skills that are considered relevant for the organization.

2.11 E-Government challenges in developing countries

OECD (2005b) states that a common vision of Information and Communication Technology is essential to e-Government as a means to engage and co-ordinate government agencies and gain

support from political leaders. Experiences from OECD countries demonstrate that government agencies providing e-Government services cannot operate in isolation and co-ordination is needed for successful e-Government implementation to facilitate service delivery to the general public.   Until recently, e-Government initiatives in many OECD countries were driven by individual agencies and ministries within government seeking solutions to help meet their individual mandate. This was a positive development, since it led to the wide digitization of information and services.   The cross-cutting nature of e-Government requires central commitment to ensure co-ordination of action to ensure interoperability, avoid duplication, ensure coherent action in a range of crucial areas, such as security and privacy protection, and provide the framework and capacity for seamless services. The experience in OECD countries show that governments have increasingly moved from considering e-Government as a single function of government to recognizing the need for mainstreaming e-Government into overall efforts to improve government operations and delivery of services to its citizens. Barriers and challenges that slows down the implementation of the e-Government initiative needs to be made known so that it can be tackled at early stages.   Government agencies are developing websites for the purpose of web presence while unintentionally creating scattered clusters of static information on the Internet.   The formation of these decentralized services in turn gives customers the run-around when they are seeking public services. If there is not a top-down e-Government implementation framework present to ensure integrated and customer-centered online service delivery, this condition will progress for the worse.

One of the prominent challenges of e-Government identified in developing countries is low level of ICT literacy and skills of e-Government users. For those countries at an early stage of e-Government development, it is crucial to identify and provide ICT skills needed from the demand side.   The benefits enjoyed by developed countries as a result of implementation of e-Government are numerous and diverse. For example, the move towards a paperless government is justified by the numerous benefits associated with it like increased quality and efficiency of government services and operations, cost reduction, transparency, reduction in corruption, accountability, and improved decision making (Ndou, 2004). Heeks (2003) points out the rate of e-Government success in developing countries accounted for only 15%. He attributes the low rate to many challenges that span from human resources to technical and legal issues. Chen *et al.,* (2006) identified the importance of human capital development along side with improvement in management, ICT infrastructure, legal framework, and access to information,

strategy, and leadership role, cultural, and budgetary constraints as some of the main challenges faced by e-Government of developing countries.

2.12   Relationship between employee skills and their performance

Manpower Training and Development is a very important aspect of human resources management and employee skills development which must be embarked upon either proactively or reactively to meet any change brought about in the course of time and business operations of an organization (Paul and Anantharaman, 2003). The rationale behind it is to web the job and the job-holder together to achieve the organizational objectives.   The Human Resources constitute a dynamic and important resource available to an organization and as a result, desire considerable attention if the organization is to achieve its set objectives. Their careful acquisition, utilization and maintenance by an organization management are important in order to realize their full potential on the job and ensure the ultimate survival of the organization.

Training and Development is an aspect of human resources management in an organization which must be embarked upon either proactively or reactively to meet any change brought in the course of time. Training and Development is often described as a change agent whose purpose is to effect positive and permanent change in knowledge, skills and attitude for improved performance of an employee. It is commonly accepted that employees create an important source of competitive advantage for firms (Barney, 1998). As a result, it is important that a firm adopts human resource management (HRM) practices that make the best use of its employees. Prior research works on HRM has identified some immediate effects of HRM practices, known as HRM outcomes which may help to explain some of the variance in firm performance (Becker *et al.,* 2006). Human resource practices are the primary means by which firms can influence and shape the skills, attitudes, and behavior of its employees to do their work and thus achieve organizational goals (Collins & Clark, 2003).

Human resource practices are designed to improve the knowledge, skills, and abilities of employees; boost their motivation; minimize and eliminate loitering on the job; and enhance the retention of valuable employees. Those practices consist of employee recruitment and selection procedures; incentive compensation and performance management policies; and extensive employee training, participation and involvement in decision-making. According to Harel and Tzafrir (1996), human resource activities can influence an organization's performance through

improvement of employees' skills and quality (selection and training) and through the increase of employee motivation (incentive compensation). Human resource practices enhance organizational effectiveness and performance by attracting, identifying, and retaining employees with knowledge, skills, and abilities, and getting them to behave in a manner that will support the mission and objectives of the organization. Thus, the effectiveness of the practices depends on how it creates the appropriate attitudes and behaviors in employees, in addition to its implementation.

The widely accepted theoretical basis for the relationship between human resource management and organizational performance is the high-performance work system framework (Appelbaum *et al.*, 2000). At the core of a high-performance work system is an organization that enables non-managerial employees to participate in substantive decisions thus building their capacity and strengthening the decisions developed. The high-performance work system also requires supportive human resource practices that enhance worker skills and that provide incentives for workers to use their skills and participate in decisions because without skills, employees will be less productive.

2.13 Employee Training and Development

Training and development encompasses three main activities: training, education, and development of employees. Firms that offer training and employee development are making a visible investment in employees that increases employability for the individual employee (Waterman, 1994). Training has the distinct role in the achievement of an organizational goal by incorporating the interests of organization and the workforce (Stone, 2002). In a rapidly changing global market place, characterized by increased technological advancement, organizations demand a more flexible and competent workforce to be adaptive and to remain competitive in the market place. This therefore demands for a well qualified workforce that becomes a strategic objective if the organization is to achieve its objectives. Human resource training and development (T&D) system of an organization is a key mechanism in ensuring the knowledge, skills and attitudes that are necessary to achieve organizational goals and create competitive advantage (Peteraf, 1993). Employers invest in human capital after the start of employment, and normally this investment is called training, provided either by the firm itself on the job, or acquired by the worker (and the firm) through vocational training.

2.14 Performance Evaluation Practices

Performance appraisal is a formalized process of worker monitoring intended to be a management tool to improve the performance and productivity of workers (Shahzad, Bashir and Ramay, 2008). Performance appraisal is also a process of observing and evaluating employees' performance and providing feedback. It is a potentially important method for developing an effective workforce. Performance appraisal is also used as mechanism for improving employee performance hence ensuring achievement of set organizational goals. It is widely recognized as the primary human resource management intervention for providing feedback to individuals on their work-related achievements (Waddell *et al.*, 2000).

Performance appraisal can be used as an aid in making decisions pertaining to promotion, demotion, retention, transfer, and pay. It is also employed as a developmental guide for training needs assessment and employee feedback. Employee commitment and productivity can be improved with performance appraisal systems (Brown and Benson, 2003).

2.15 Conceptual Framework

The conceptual framework was derived essentially from the independent variables (ICT Skills appropriateness) in the study and how they influenced the dependent variable (the delivery of the e-Government Department's mandate).

Figure 2-1   Conceptual Framework
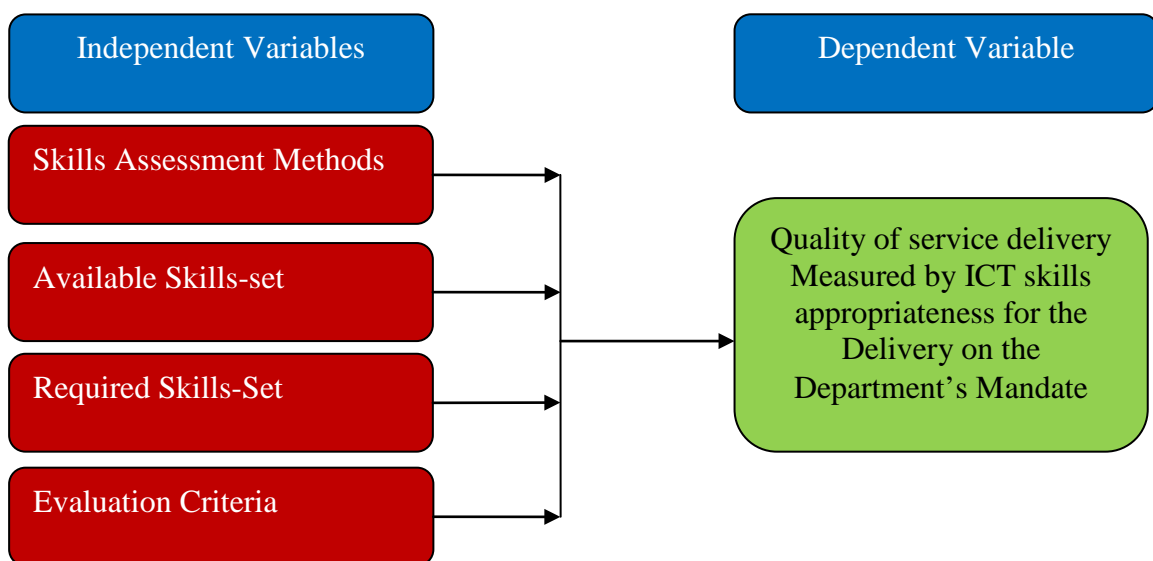
Source: (Author, 2013)

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The study looked at the current methods of assessment of ICT skills available at the Directorate of e-Government. This was measured by looking at the certifications attained by the staff and the capabilities possessed. The study specifically looked at the methods used in the assessment of skills during recruitment and selection of employees. The study sought to establish the accuracy levels to make sure that the employees recruited possess the appropriate skills for the delivery of organization's mandate. On the Skills-set possessed by the technical personnel, the study looked at the skills that the employees at the Directorate of e-Government possessed and compared them with the ideal skills for the delivery on the Directorate of e-Government objectives. After this, the study established the gap in the skills-set among the personnel which would inform the required ICT Skills-set by e-Government technical personnel for future delivery of the Directorate's mission. At the end of the exercise, the study developed appropriate evaluation criteria for the Directorate of e-Government.

CHAPTER 3: RESEARCH METHODOLOGY

3.1   Introduction

This chapter sets out various stages and phases that were followed in completing the study. It involved a blueprint for the collection, measurement and analysis of data. This section is an overall scheme, plan or structure conceived to aid the study in answering the raised research questions. In this section the research identifies the procedures and techniques that were used in the collection, processing and analysis of data. Specifically the following subsections were included; research design, target population, data collection and finally data analysis and interpretation.

3.2   Research Design

The research problem was studied through the use of a descriptive research design. According to Cooper and Schindler (2003), a descriptive study is concerned with finding out the what, where and how of a phenomenon. This study therefore was able to generalize the findings to all the organizations in the industry. The main focus of this study was quantitative. However some qualitative approach was used in order to gain a better understanding and possibly enable a better and more insightful interpretation of the results from the quantitative study.

3.3   Population of the Study

Target population is the specific population about which information is desired (Ngechu, 2004). The population of this study included all the ICT departments at the various ministries as at November 2012. The ICT technical personnel deployed at the various ministries, forty two (42) ministries, were included in the study. From the Directorate of e-Government's records, there were 227 employees out of whom 197 were on placement in various ministries.

Table 3-1   Population of the study

CATEGORY	POPULATION
Senior Management	49
Middle level managers	145
Other employees	33
Total	227

Source: (Directorate of e-Government, 2013)

3.4   Sampling and Sample size

A sample is a small subset of the population that has been chosen to be studied. Sample size is the number of cases or entities in the sample studied (Cooper & Schindler, 2006). Mugenda and Mugenda (2003) defines a sample as the smaller group obtained from the accessible population. This study applied stratified random sampling technique to select a representative sample for the study.

To avoid duplication and data redundancy, the study targeted 30% of the population. Mugenda and Mugenda (2003) say that a sample size of between 10-30% is good enough for the generalization of the findings to the whole population if the population is highly homogeneous. Therefore the sample size of this study was 69. The study used proportionate stratified random sampling technique to select the respondents for the study. The sampling frame was the job position at the Directorate.

Table 3-2   Sample Size

CATEGORY	Population	Proportion (30%)	Sample size
Senior Management	49	0.3	15
Middle level managers	145	0.3	44
Other employees	33	0.3	10
Total	227		69

Source: (Directorate of e-Government, 2013)

3.5   Instruments of data collection

The researcher used questionnaire as the main tool for data collection. The selection of this data was guided by the nature of the data to be collected, the time available as well as the objective of the study. The questionnaire contained closed and open questions. The structured questions were used in an effort to conserve time and money as well as to facilitate an easier analysis as they are in immediate usable form; while the unstructured questions were used so as to encourage the respondent to give an in-depth and felt response without feeling held back in revealing of any information. Questionnaires were used since the study was concerned with variable which cannot be directly observed such as views, opinions, perceptions and feeling of

the respondents. Such information was collected through the use of questionnaires (Touliatos & Compton, 1988).

The study considered questionnaires for they had advantages over other types of research instruments in that they were cheap, did not require as much effort from the questioner as verbal or telephone surveys, and often had standardized answers that made it simple to compile data. The questionnaire was designed to comprise of two sections. The first part included the demographic and operational characteristics designed to determine fundamental issues including the demographic characteristics of the respondent. The second part was devoted to the identification of the main issues of the study. The study utilized both primary and secondary data. Primary data was gathered through questionnaires, while secondary data was obtained from published documents and materials such as journals, periodicals, magazines and reports obtained from the Directorate of e-Government. These supplemented the primary data received from questionnaires.

3.6 Data Collection Method

This study collected quantitative data using a self-administered questionnaire. Nevertheless, where it proved difficult for the respondents to complete the questionnaires immediately, the questionnaires were left with the respondents and picked later.

Before the questionnaire was finally administered to participants, a pilot study was carried out to ensure that the questions were relevant, clearly understandable and made sense. The pilot study aimed at determining the reliability of the questionnaire including the wording, structure and sequence of the questions.

3.7 Pilot Study

The pilot study involved pre-testing the questionnaire on 4 respondents from the population. The respondents were conveniently selected since statistical conditions were not necessary in the pilot study (Cooper and Schindler, 2003). The purpose was to refine the questionnaire so that respondents in the major study would have no problem in answering the questions. The results of the pilot study were not included in the actual study.

3.8   Data Analysis Procedures

Before processing the responses, the completed questionnaires were edited for completeness and consistency. This is a process that starts immediately after data collection and ends at the point of interpretation of the process results (Obure, 2002). This included data sorting (re-arrangement of data questionnaires to allow some systematic handling), data editing to identify errors that might occur during data collection, cleaning of data to check for accuracy and completion. Data collected was purely quantitative and it was analyzed by descriptive analysis such as measure of central tendency and measure of dispersion.   The descriptive statistical tools helped in describing the data and determining the extent used. Data analysis used SPSS and Microsoft Excel tools to generate quantitative reports through tabulations, percentages, and measures of central tendency.

In addition, the researcher conducted a multiple regression analysis to establish the relationship among the independent and dependent variables. The following research model was used:

$$Y= \beta_0+\beta_1X_1+\beta_2X_2+\beta_3X_3+\beta_4X_4+\text{€}$$

Where Y= Quality of service delivery (Measured by ICT skills appropriateness for the Delivery on the Department's Mandate)

X_1= Skills assessment methods

X_2= Available skills-set

X_3= Required Skills-set

X_4= Evaluation Criteria

€= error

β_0, β_1, β_2, β_3, and β_4 were coefficients of determination for the variables.

Tables and graphs were used to present responses and facilitate comparison. Cooper and Schindler (2003) notes that the use of percentages is important for two reasons; first they simplify data by reducing all the numbers to range between 0 and 100. Second, they translate the data into standard form with a base of 100 for relative comparisons.   This generated quantitative reports through tabulations, percentages, and measure of central tendency.

3.9 Project study time plan

The study was completed within the stipulated six months in line with the MSC Project Guidelines and assumed that the activities outlined would proceed without any hindrance. Some of the project activities ran concurrently where possible. The tentative project activities, timeframe and expected outputs were as tabulated below:

Table 3-3   Study time plan

ACTIVITY NUMBER	ACTIVITY DESCRIPTION	ACTIVITY DURATION (WEEKS)	EXPECTED PRODUCT
	RESEARCH PROPOSAL		
1	Study planning and introductory meetings	½	Background information
2	Problem formulation	½	Problem statement
3	Objectives and Study questions clarification	½	Objectives and Research questions
4	Identification of Significance of the Study	½	Significance of the study
5	Literature Review	1	Literature review documentation
6	Research Methodology	1	Research Methodology
7	Research Proposal writing and Oral Presentation	2	Research Project Proposal
	STUDY IMPLEMENTATION		
8	Prepare and finalize Study Questionnaire	3	Study Questionnaire
9	Fieldwork (Data collection and interviews)	7	Study Raw Data
10	Data presentation and analysis	2	Study Findings
11	Oral Presentation of results	2	Study Results
	EVALUATION, ANALYSIS AND CONCLUSION OF STUDY		
12	Conclusions and recommendations based on study findings	2	Study Conclusion and Recommendations
13	Preparation of study report	2	Draft Research Project report
14	Oral Presentation of evaluation, analysis and conclusion	2	Final Research Project Report

The study started on October 4th, 2012 and was completed by April 3rd 2012. The tentative schedule was as indicated in the Gantt chart below.

Figure 3-1   Study Gantt Chart
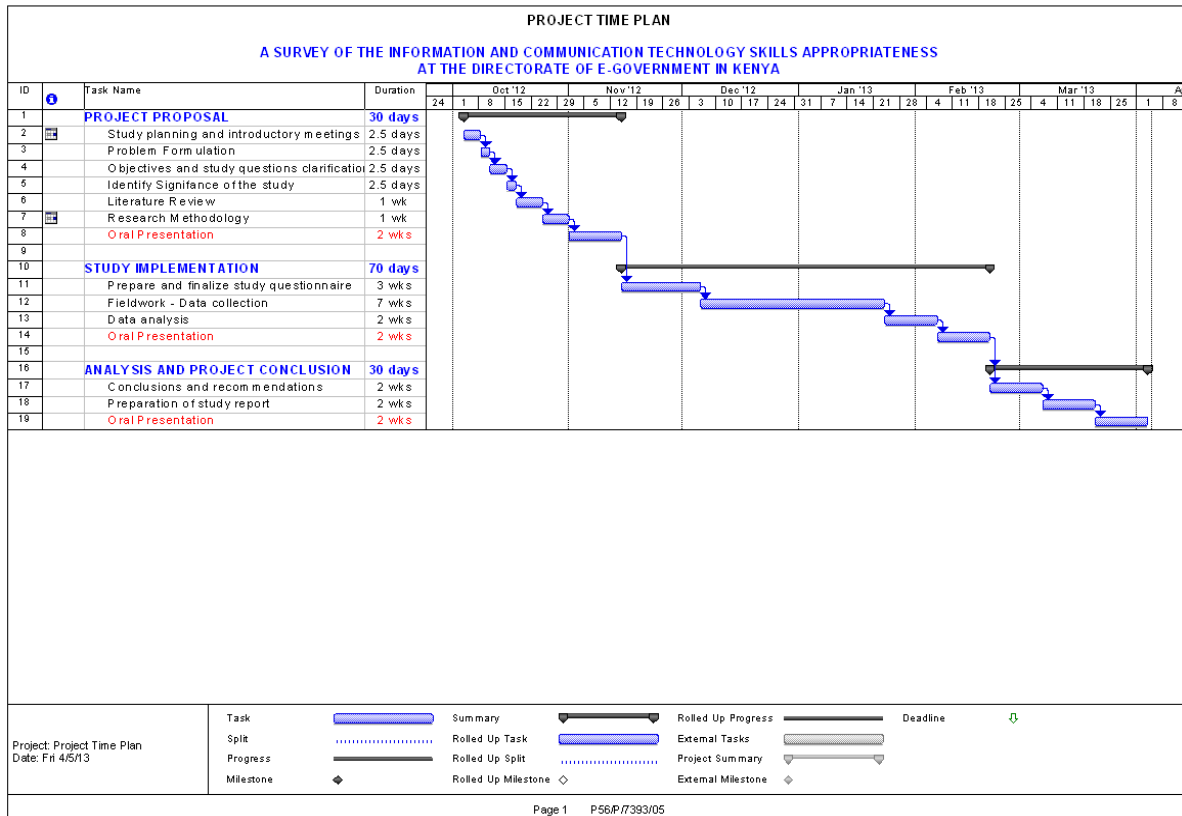
CHAPTER 4: DATA PRESENTATION AND ANALYSIS

4.1   Introduction

This chapter presents analysis of the data on the ICT skills appropriateness at the Directorate of e-Government in Kenya. The study targeted a sample of 69 respondents out of which 49 filled and returned the questionnaires giving a response rate of 71%. This response was good enough and representative of the population and conforms to Mugenda and Mugenda (2003) stipulation that a response rate of 50% is adequate for analysis and reporting; a rate of 60% is good and a response rate of 70% and above is excellent.

4.2   Demographic Information

4.2.1   Gender distribution of the respondents

The study sought to establish the gender distribution of the respondents that participated in the study. From the findings, majority (61%) of the respondents were Male while 39% were Female. These findings are well illustrated in the Figure 4-1 below:

Figure 4-1   Gender Distribution of the Respondents
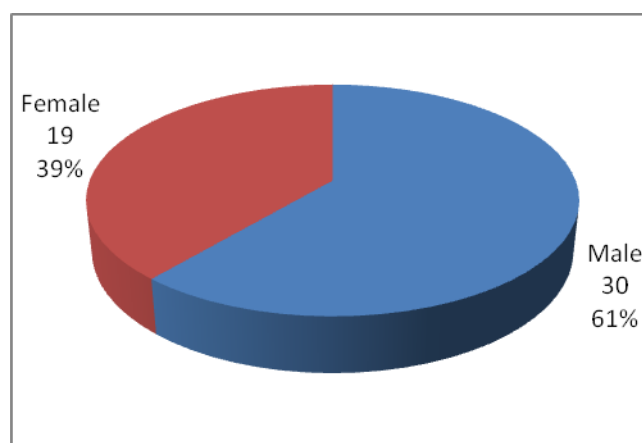
Source (Research Data, 2013)

4.2.2 Length of time worked with the Directorate of e-Government

The study further sought to establish the period of time that the respondents had worked with the Directorate of e-Government. From the findings, 49% of the respondents had worked with the Directorate of e-Government for a period of between 1-3 years followed by those who had worked for between 4-6 years at 31%. 16% had worked for between 7-10 years while 4% had worked for more than ten years. These findings indicate that the respondents had worked with the Directorate of e-Government for long enough hence were more conversant with information and communication technology skills appropriateness for the Department. In addition, the respondents had undergone through a skills assessment at one point in their engagement at the department hence they were more suited to provide the required data. These findings are well illustrated in the Figure 4-2 below.

Figure 4-2   Period worked with the Directorate of e-Government

	Less than 1 year	1-3 years	4-6 years	7-10 years	More than 10 years
■ Number of Respondents	0	24	15	8	2
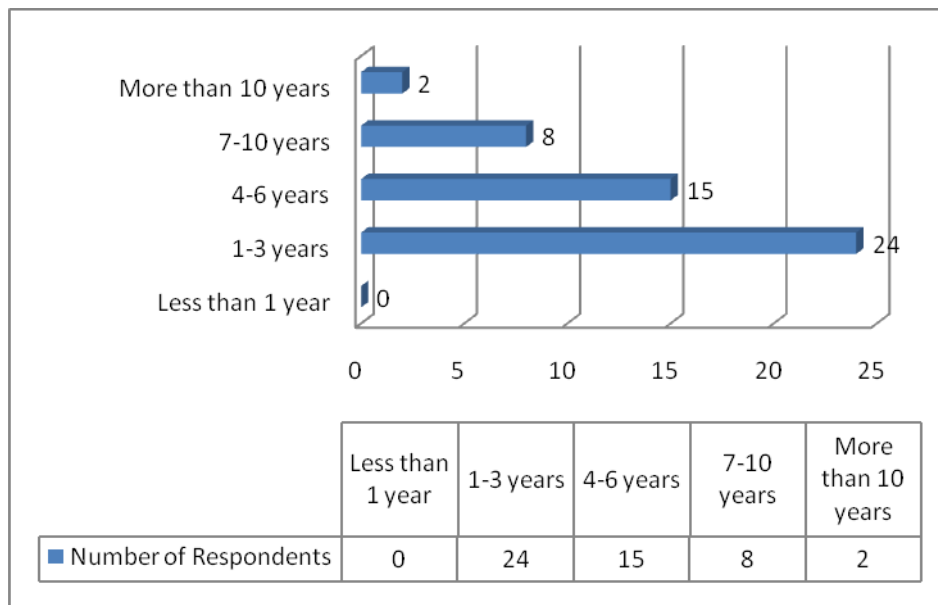
Source: (Research Data, 2013)

4.2.3 Highest level of education

The study sought to establish the highest level of education that the respondents had attained. From the findings, majority of the respondents (44%) had attained their Bachelors' degree followed by 25% who had attained a master's degree. In the third place were those holding college Diplomas at 10%. Postgraduate Diploma holders made up 8%, High School graduates

made up 6% while 4% had a college certificate. These findings are well illustrated in the Table 4-1 below.

Table 4-1   Highest level of education

LEVEL OF EDUCATION	FREQUENCY	PERCENT
High School Graduate	3	6%
College certificate	2	4%
College diploma	5	10%
Bachelors degree	21	44%
Postgraduate Diploma	4	8%
Masters Degree	12	25%
Doctorate degree	2	4%
Total	49	100%

Source: (Research Data, 2013)

4.3   Current Methods of Assessment

4.3.1   Identification of core skills

The study sought to establish the assessment methods currently applied at the Directorate of e-Government. The respondents were asked whether the Directorate identified core skills required for a specific role of the government at all times. From the findings, 92% of the respondents answered "yes" while 8% answered "no". These findings clearly indicate that the Directorate identified core skills required for a specific role of the government at all times so as to find out the best ways of filling the skills gaps noted. These findings are well illustrated in the Figure 4-3 below:

Figure 4-3   Core skills required for a specific role of the government
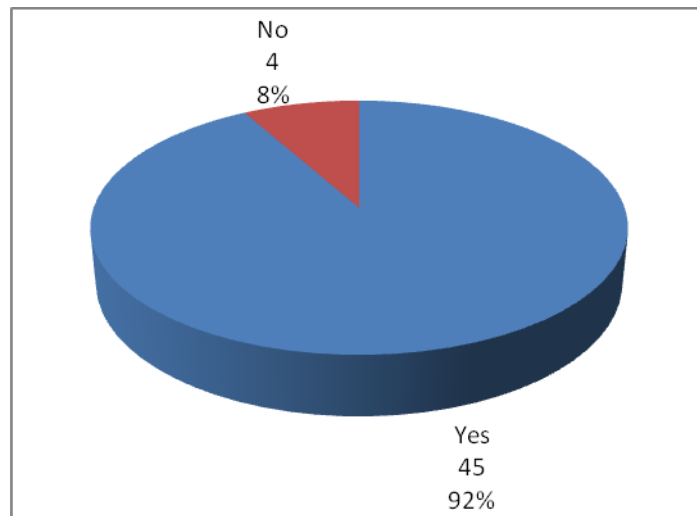
Source: (Research Data, 2013)

4.3.2   Skills Assessment Methods

The study sought to establish the skills assessment methods that were already in use at the Directorate of e-Government. To establish this, the study enumerated some of the common skills assessment methods for the respondents to tick the ones they used. From the findings of the study, majority of the respondents indicated that the most used skills assessment method was Supervisor assessment as supported with 82%. The second most used assessment method was self assessment at 78%. Analyzing Skills gap report came in third at 71% followed by Work output assessment at 67%. Frequent employee appraisals were also used to a large extent as supported by 63% of the respondents while time taken to complete a task assessment registered 61%. Group projects were also used to a great extent as supported with 53% of the respondents. The other assessment methods were used but not so much. These included demonstrations at 47%, Practical at 35%, assignments at 29%, Discussions at 27% and finally written examinations at 18%. The least used assessment method was written examination as it does not measure the practical skills possessed by the staff hence its limited effectiveness.   The respondents indicated that supervisor assessment was the one mostly used because the employees were under close supervision of their supervisors who assessed their day to day performance hence more accurate. However, every assessment involved self assessment where the respondents were allowed to evaluate their competence and proficiencies before their

supervisors assessed them. This was specifically meant to promote fairness in the assessment process so as to come up with the best way of skills development. These findings are well illustrated in the Table 4-2 below.

Table 4-2   Skills Assessment Methods

ASSESSMENT METHOD	FREQUENCY	PERCENT
Self Assessment	38	78%
Demonstrations	23	47%
Supervisor assessment	40	82%
Work output assessment	33	67%
Assignments	14	29%
Group projects	26	53%
Discussions	13	27%
Practical	17	35%
Time taken to complete a task assessment	30	61%
Analyzing Skills gap report	35	71%
Written examinations	9	18%
Frequent employee appraisals	31	63%

Source: (Research Data, 2013)

4.3.3   Skills assessment methods appropriateness in ICT Skills-Set Adequacy

The study sought to establish the skills assessment method appropriateness in assessing ICT skills-set adequacy. From the findings of the study, 53% of the respondents regarded the assessment methods as very appropriate, 45% said they were appropriate while 2% indicated that they did not know whether the assessment methods were appropriate or not. There was no respondent who indicated that the modules were less appropriate or not appropriate. These findings indicate that in the respondents' opinions, the assessment methods were very appropriate in the assessment of ICT Skills-set adequacy. These findings are well illustrated in the Figure 4-4 below:

Figure 4-4   Skills Assessment Methods Appropriateness in ICT Skills-Set Adequacy
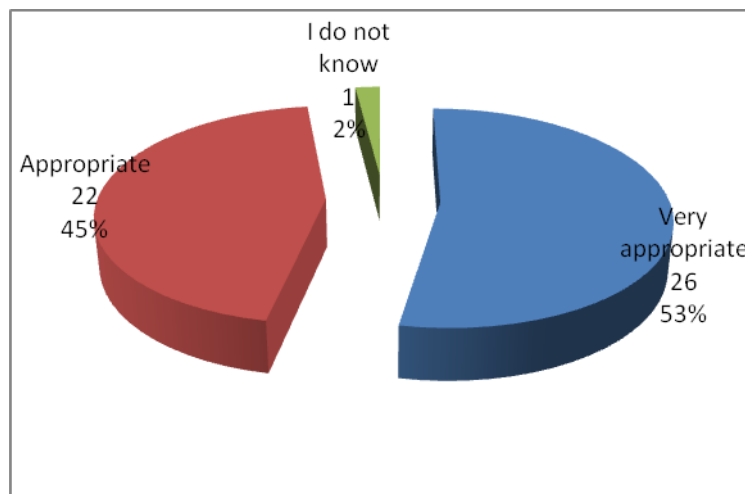
Source: (Research Data, 2013)

4.4   Skills-Set Possessed by the Directorate's Personnel

4.4.1   Level of proficiency rating by the Directorate's personnel

The study sought to establish the ICT skills-set possessed by the respondents. To ascertain this, the study enumerated different modules necessary for the smooth functioning of the Directorates operations. The respondents were required to rate their level of proficiency on a scale of 1-5, where 5= Understand it very well and 1= have no idea, in each module listed. To facilitate the analysis, the study computed mean and standard deviation. The findings were as indicated in the Table 4-3 below:

Table 4-3   Level of Proficiency rating by the Directorate's personnel

MODULE	MEAN	STD. DEVIATION
e-service delivery	4.8958	0.42474
Fundamentals of ICT	4.7500	0.66844
Database Management	4.1667	1.11724
Network Administration	4.0208	1.02084

MODULE	MEAN	STD. DEVIATION
Project management	4.1250	0.98121
ICT Security	3.8958	1.05668
Website Development	3.5833	0.79448
User support	3.9792	0.97827
System Administration	3.6667	1.19098
Application Development	3.5208	0.92229

Source: (Research Data, 2013)

From the research findings, the study established that e-service delivery and fundamentals of ICT modules were well understood by the respondents as indicated by a high mean score of 4.8958 and 4.7500 respectively. These were followed by Database Management, Network Administration and Project management with mean scores of 4.1667, 4.0208 and 4.1250 respectively. These were among the uniform duties performed by almost all the respondents in their respective places of work. The other modules were averagely understood by the respondents as supported by a mean score of between 3.8958 and 3.5208. These modules included ICT Security, Website Development, User support, System Administration and Application Development. These findings confirm that the employees at the Directorate of e-Government were multi-skilled. This is important in reducing the operating cost on the government and promoting efficient service delivery.

4.4.2 Effectiveness of Modules in Delivering Government Services

The study sought to establish the level of effectiveness of the ICT modules in the delivery of government services at the different ministries. Majority of the respondents (55%) indicated that the modules were very effective, 29% said they were effective while 16% indicated that the modules were moderately effective. There was no respondent who indicated that the modules were not effective and less effective. This meant that the respondents regarded the ICT modules available at the Directorate to be effective in enabling the ministries in the delivery of services to the citizens. The findings were as indicated in the Figure 4-5 below:

Figure 4-5   **Effectiveness of Modules in Delivering Government Services**
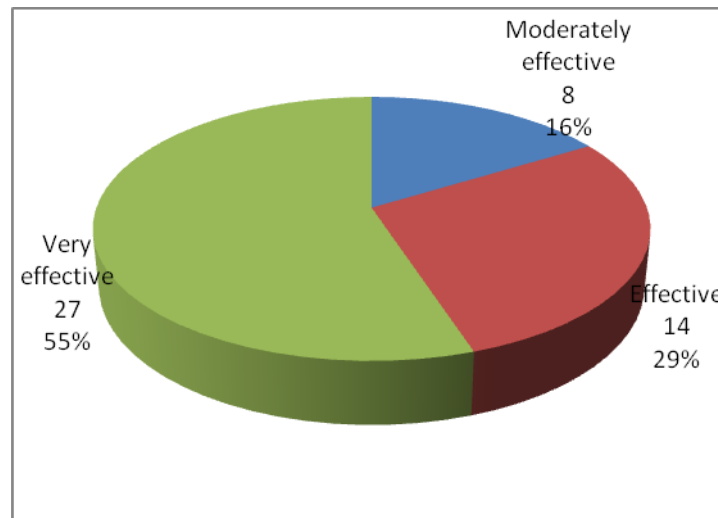
Source: (Research Data, 2013)

4.5   Required ICT Skills-Set by e-Government Personnel

The study sought to establish the ICT skills-set that the employees at the Directorate of e-Government required in order to deliver quality services to the ministry clients. To achieve this, the respondents were requested to rank skills-set in the order of importance in facilitating quality service delivery at the ministerial levels. The study then computed mean and standard deviation as the level of agreement ranged from 5= very important and 1= not important. The findings were as indicated in the Table 4-4 below:

Table 4-4   **Required ICT Skills-Set by e-Government Personnel**

MODULE	MEAN	STD. DEVIATION
e-service delivery	4.8958	0.37129
Fundamentals of ICT	4.6875	0.68901
Database Management	4.3125	0.62420
Network Administration	4.2917	0.61742
Project management	4.1875	0.81623
ICT Security	4.1875	0.93754
Website Development	3.8125	0.70428
User support	4.0208	1.06170

60

MODULE	MEAN	STD. DEVIATION
System Administration	4.2292	0.72169
Application Development	3.8750	1.02366

Source: (Research Data, 2013)

From the findings illustrated in the Table 4-4 above, the respondents indicated that all the existing modules were relevant and important in enabling service delivery at the Ministry level. However, the key modules for the Directorate included e-service delivery, Fundamentals of ICT and Database Management which posted mean scores of 4.8958, 4.6875 and 4.3125 respectively. Network Administration, System Administration, Project management, ICT Security and User support come in the second batch with mean scores of 4.2917, 4.2292, 4.1875, 4.1875 and 4.0208 respectively. The respondents were further asked to name other ICT skills that were necessary for the efficient service delivery at the Ministries in Kenya. The respondents indicated that the Directorate of e-Government needed to enhance their training especially on the upcoming courses in the market to enable them deliver services efficiently. These included CISCO, Oracle, ERP, Huawei among others. Further, the respondents indicated that the Directorate needed to train staff in their areas of specialization to promote efficiency among staff. Some of these courses included Applications Development so as to enable employees to develop appropriate applications for the smooth functioning of the Ministries and autonomous departments.

4.6 Appropriate Evaluation Criteria for the Appropriate ICT Skills-Set

The study sought to establish the appropriate criteria for the application of the ICT skills-set at the Directorate. The respondents were asked to indicate whether they believed their ICT skills-sets were being adequately utilized in their current employment. From the findings, 82% of the respondents answered yes while 18% answered no. These findings illustrate that the employee skills-sets were being adequately utilized at the Directorate. The findings were as indicated in the Figure 4-6 below:

Figure 4-6   Appropriate Evaluation Criteria for the Appropriate ICT Skills-Set
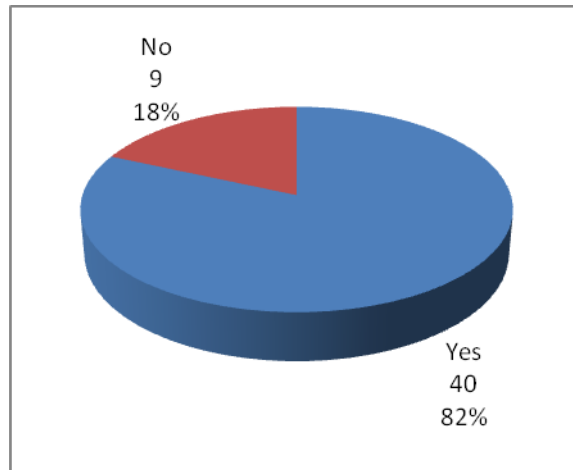
Source: (Research Data, 2013)

4.6.1   Ranking assessment methods in the order of importance

The respondents were asked to rank the ICT skills-set assessment methods in their order of importance. The study then computed mean and standard deviation as the level of agreement ranged from 5= very important and 1= not important. From the findings of the study, demonstrations and Self Assessment were ranked the most important with means of 4.6875 and 4.6458; Work output assessment and Practical came in second with mean scores of 4.5625 and 4.5208. Analyzing Skills gap report, time taken to complete a task assessment, assignments, group projects, supervisor assessment and discussions came in third with mean scores of 4.3333, 4.2917, 4.2083, 4.1042, 4.0833 and 4.0000 respectively. The least two were frequent employee appraisals and written examinations which scored mean scores of less than 4. They scored 3.9792 and 3.3958 respectively. The findings were as indicated in the Table 4-5 below:

Table 4-5   Ranking assessment methods in the order of importance

ASSESSMENT METHODS	MEAN	STD. DEVIATION
Self Assessment	4.6458	0.86269
Demonstrations	4.6875	0.55183
Work output assessment	4.5625	0.61562
Assignments	4.2083	0.77070
Supervisor assessment	4.0833	0.64687
Group projects	4.1042	0.88100
Discussions	4.0000	0.71459
Practical	4.5208	0.61849
Time taken to complete a task assessment	4.2917	0.77070
Analyzing Skills gap report	4.3333	0.78098
Written examinations	3.3958	1.02604
Frequent employee appraisals	3.9792	0.83767

Source: (Research Data, 2013)

4.7   Skills gap analysis

4.7.1   Level of proficiency vs skills-set required

The study sought to establish the relationship between the respondent's level of proficiency and the ICT skills-set required. To ascertain this, the study compared the computed means of the level of proficiency and the required ICT skills-set to establish whether there was significant skills-set gap. The findings were as indicated in the Table 4-6 below.

Table 4-6   Level of proficiency vs skills-set required

MODULE	CURRENT LEVEL OF PROFICIENCY MEAN	REQUIRED ICT SKILLS-SET MEAN	MEAN DIFFERENCE
e-service delivery	4.8958	4.8958	0.0000
Fundamentals of ICT	4.7500	4.6875	-0.0625
Database Management	4.1667	4.3125	0.1458
Network Administration	4.0208	4.2917	0.2709
Project management	4.1250	4.1875	0.0625
ICT Security	3.8958	4.1875	0.2917
Website Development	3.5833	3.8125	0.2292
User support	3.9792	4.0208	0.0416
System Administration	3.6667	4.2292	0.5625
Application Development	3.5208	3.8750	0.3542

From the tabulation, the study established three findings. The first finding is the high levels of knowledge in the skills possessed. The second finding is even higher levels of importance in the skills required for facilitating quality service delivery. The third finding is relatively similar levels of mean for e-service delivery and Fundamentals of ICT when the mean of level of proficiency and mean of skills-set required were compared. Though at first sight the differences in skill levels may appear relatively small, it must be born in mind that with the number of ICT technical staff at the Directorate of e-Government even a very slight change in these (mean) levels can only be brought about by a significant up-skilling exercise. These findings reflect the rapid changes in the ICT profession and the rapid changes in the information and communication technologies and the need to have more skills thus calling for the enhancement of staff training for effective service delivery.

4.7.2   ICT skills possessed vs years in service

In order to understand the skills gap among employees at the Directorate of e-Government, the study further conducted a skills gap analysis by conducting cross tabulation. From the findings, employees who had worked with the Directorate for more than ten years possessed more skills

as supported by a higher mean score of 4.3150 with a standard deviation of 0.01523 followed by those who had worked with the department for a period of between 7-10 years with a mean of 4.1206 and a standard deviation of 0.0915. The employees who had worked with the Directorate for between 1-3 years had average skills as supported by a mean of 3.1524 with a standard deviation of 0.9994. Employees with the least level of skills were those who had joined the Directorate within the past one year as shown by a low mean of 3.0514 and a standard deviation of 1.0253. The findings were as indicated in the Table 4-7 below:

Table 4-7   ICT skills possessed vs years in service

YEARS IN SERVICE	ICT SKILLS POSSESSED	
	MEAN	STANDARD DEVIATION
More than 10years	4.3150	0.0152
7-10 Years	4.1206	0.0915
4-6 Years	3.5928	0.8462
1-3 Years	3.1524	0.9994
Less than 1 Year	3.0514	1.0253

The trends of the skills gap analysis indicate that employees who have stayed with the department for longer had more skills than those who joined in the recent past. This was supported by the respondents views that they participated in the decision making processes that culminated in some of the ICT modules currently present at the Directorate of e-Government.

4.8   Inferential Statistics

In addition to the above analysis, the researcher conducted a multiple regression analysis so as to test relationship among variables (independent). The researcher applied the Statistical Package for Social Sciences (SPSS) aid in the computation of the measurements of the multiple regressions for the study.

Table 4-8   Model Summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.86[a]	0.7396	0.7264	0.23903

Predictors: (Constant), assessment methods, available skills-set, required skills-set, evaluation Criteria.
Dependent Variable: *Quality of Service Delivery*

Source: (Data analysis (SPSS), 2013)

Coefficient of determination explains the extent to which changes in the dependent variable can be explained by the change in the independent variables or the percentage of variation in the dependent variable (Quality of service delivery) that is explained by all the four independent variables (assessment methods, available skills-set, required skills-set and evaluation criteria).

The four independent variables that were studied, explain only 72.64% of the quality of service delivery at the Ministries with respect to ICT Skills-set as represented by the adjusted R^2. This therefore means that there are other factors not studied in this research which contributes to 27.36% of the quality of service delivery at the Ministries. Therefore, further research should be conducted to investigate these factors affecting (27.36%) of the quality of service delivery at the Ministries.

Table 4-9   ANOVA

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	121.8485	4	30.462	31.24	0.003
	Residual	42.8993	44	0.975		
	Total	164.7478	48			

Source: (Data analysis (SPSS), 2013)

The analysis of variance and the "F" statistic in the above Table 4-9 suggest that the model is fit and it is valid with the existing set of independent variables. The probability value of 0.003 ($p<0.05$) indicates that the regression was statistically significant in predicting how current

assessment methods, skills-set possessed by staff, required skills-set and appropriate evaluation criteria influenced quality of service delivery for ICT staff at the Directorate of e-Government.

Table 4-10   Coefficients of regression

Model		Un-Standardized Coefficients		Standardized Coefficients		
		B	Std. Error	Beta	t	Sig.
1	(Constant)	1.185	.635		1.866	.017
	Skills assessment methods	.568	.096	.051	5.917	.008
	Available skills set	.612	.070	.310	8.743	.011
	Required skills set	.537	.082	.339	6.549	.023
	Evaluation criteria	.749	.108	.081	6.935	.019

Based on the above coefficients of regression table, the equation for the regression line is:

$$Y = 1.185 + 0.568X_1 + 0.612X_2 + 0.537X_3 + 0.749X_4$$

where:

Y	=	Quality of Service delivery
X_1	=	Assessment methods
X_2	=	Available Skills-set
X_3	=	Required Skills-set
X_4	=	Evaluation criteria

The coefficient estimates calculated show that all of the independent variables have positive relationship with the quality of service delivery at the Directorate. Overall, evaluation criteria had the greatest effect (0.749) on quality of service delivery among staff at the Directorate followed by available skills-set (0.612) while required skills-set (0.537) had the least effect on quality of service delivery. In addition the table show that all the independent variables are statistically significant contributors to quality of service delivery at the Directorate with Available skills-set being the most significant with a t-value of 8.743.

The regression equation has established that taking all factors into account (Assessment methods, Available skills-set, Required skills-set and Evaluation criteria) constant at zero, quality of service delivery for staff at the Directorate will be 1.185 units. The findings presented

also show that taking all other independent variables at zero, a unit increase in Skills set assessment methods would lead to a 0.568 increase in the quality of service delivery among staff at the Department. Further, the findings show that a unit increase in available skills-set would lead to a 0.612 increase in quality of service delivery among staff at the Department. In addition, the findings show that a unit increase in required skills-set would lead to a 0.537 increase in quality of service delivery among staff at the Department. The study also found that a unit increase in the evaluation criteria would lead to a 0.749 increase in career quality of service delivery among staff at the Department. All the independent variables were significant as their p-values were all less than 0.05.

CHAPTER 5: CONCLUSION AND RECOMMENDATIONS

5.1 Introduction

This chapter seeks to summarize the study by highlighting the main purpose for the study, the important findings of the study, and recommendations based on the findings of the study as presented in the Chapter four above. It is hoped that the findings and the recommendations will assist executives at the Directorate of e-Government in handling future issues as regards ICT skills-set assessment. The study also gives recommendations on the evaluated skills assessment suitability and how these can be improved to ensure efficient service delivery.

5.2 Study originality and value

The study was one of the few that had been carried out to assess the ICT Skills appropriateness at the Directorate of e-Government in Kenya. The study is likely to be of great benefit to the players in the e-Government sector including the Government especially the Directorate of e-Government, Information and Communication Technology companies as well as academicians and researchers.

For the Government, the study findings would be useful in understanding the effects of adoption of ICT on the delivery of services to its citizen; for ICT companies, the findings would enable them understand the impact of appropriate ICT skills on service delivery; and for the Academicians and researchers the findings would contribute new knowledge for the strategic impact of ICT skills appropriateness on service delivery in government offices.

5.3 Conclusion

In this section, a discussion of the significant findings for each research question is presented. The study emphasized on the ICT skills appropriateness at the Directorate of e-Government. Explanations for the findings are based on the study results. Seventy one percent of the respondents participated in the study with 61% of the respondents being male while 39% were female. Majority of the respondents (49%) had worked with the Directorate of e-Government for a period of between 1-3 years and 44% had attained their bachelors' degree.

On the current methods of assessment of ICT skills possessed by the personnel at the Directorate of e-Government, the study concludes that the most used skills assessment method was supervisor assessment method as supported with 82%, followed by self assessment method at 78%. The least used assessment method was written examination (18%) as it does not measure the practical skills possessed by the staff hence its limited effectiveness. All the assessment methods were regarded as very appropriate and appropriately met the needs of the Government. All these activities in assessing the available skills positively contributed to the quality of service delivery among staff at the Directorate of e-Government.

On the currently available ICT skills-set among personnel at the Directorate of e-Government in Kenya, the study concludes that e-service delivery and fundamentals of ICT modules were well understood by respondents as indicated by a high mean score of 4.8958 and 4.7500 respectively. On the level of effectiveness of the ICT modules in the delivery of government services at the different ministries, 55% indicated that the modules were very effective, 29% said they were effective while 16% indicated that the modules were moderately effective. The findings indicated that the employees at the Directorate were multi-skilled which is important in reducing the operating cost on the government and promoting efficient service delivery. In addition, the study concludes that the ICT modules available at the Directorate of e-Government were effective in enabling the ministries in the delivery of services to the citizens. The skills were identified in line with the ICT needs of the Government departments hence their appropriateness in facilitating quality of service delivery among staff at the Directorate.

On the required ICT skills-set among employees for smooth implementation of e-Government among the public organizations and sectors in Kenya, the study concludes that all the existing modules were relevant and important in enabling service delivery at the Ministry level. However, the key modules for the Department included e-service delivery, fundamentals of ICT and Database Management which posted mean scores of 4.8958, 4.6875 and 4.3125 respectively. The other modules which were not available among many employees included Network Administration, System Administration, Project management and User support. The study further concludes that there is need to enhance the personnel training especially on the upcoming courses in the market to enable them to deliver services efficiently. The operating environment is very dynamic and in order to enable the Department of e-Government keep pace with the advancements in ICT, establishing the required ICT skills in order to enable the Department deliver quality service among staff, identifying required ICT skill set was important.

On the evaluation criteria suitable for the appropriate ICT skills for e-Government personnel, the study concludes that demonstrations and self assessment methods were the most important assessment methods as supported by mean scores of 4.6875 and 4.6458 respectively. Work output assessment and Practical came in second while analyzing Skills gap report, time taken to complete a task assessment, assignments, group projects, supervisor assessment and discussions came in third.

In relation to the conceptual framework, the study demonstrated that it is possible to use the model as a basis for assessing ICT skills appropriateness. A correlational analysis was performed between the dependent variable, quality of service delivery and the four independent variables for assessing the ICT skills appropriateness: skills assessment methods, available skills-set, required skills-set and evaluation criteria. Based on the findings all the four independent variables were significantly and positively correlated with the quality of service delivery. Available skills and Evaluation criteria were the two most significant contributors to Quality of Service delivery among staff at the Directorate of e-Government (Table 4-10).

5.4   Recommendations

Based on the findings presented in chapter four and the conclusions above, the study makes the following recommendations: the assessment methods currently applied at the Directorate of e-Government carefully identified core skills required for a specific role of the government ministries and autonomous departments at all times so as to find out the best ways of filling the skills gaps noted. This study would like to recommend that the Directorate finds ways on getting the appropriate skills assessment methods adopted by other governments in the developed world. This is important in benchmarking and raising the bar in electronic service delivery at the Government level. Further the study recommends that Directorate leaves out the written examinations assessment method because of its limited effectiveness. From the findings this assessment method ranked the least appropriate and in addition, it does not measure the practical skills possessed by the staff.

On the ICT skills-set possessed by the respondents, the study recommends that the Directorate enhances the ICT technical personnel training especially on the emerging ICT trends to enable them develop new ways of service delivery through technology. The respondents indicated that they wished the Directorate could train them in areas like Oracle, ERP and other software

development applications. By enhancing their training, the Directorate will be promoting innovation among their ICT technical staff which is important in the development and implementation of new information technology software necessary for the delivery of government electronic services in different Ministries.

On the ICT Skills-set required by the Directorate's ICT personnel, the study recommends that the Directorate plans on how to incorporate the developing of new curricula relevant for the smooth functioning of Government operations. However, in doing this, the study recommends that due care be taken to avoid taking on skills that will not add value to the operations of the Directorate. The Directorate should evaluate the appropriateness of some of these ICT skills-set courses mentioned by staff on how they fit in the Directorate's role. For example, the respondents mentioned Applications Development.

5.5   Suggestions for further studies

This study concentrated on the ICT skills appropriateness at Directorate of e-Government in Kenya. To achieve this the study sought to investigate current methods of assessment of ICT skills-set possessed by the personnel at the Directorate of e-Government; identify the Skills-set possessed by the personnel at the Directorate of e-Government; establish the required ICT Skills-set by e-Government personnel for smooth implementation of e-Government among the public organizations and sectors in Kenya; and recommend the appropriate evaluation criteria for the appropriate ICT skills-set for e-Government personnel.

This study therefore recommends that another study be carried out to determine factors affecting the implementation of e-government in Kenya. This will help bring to the fore the various challenges that the ICT technical staff are facing in the execution of their duties. Even if the ICT technical staff bore all the best skills that there may be in the world, unless these challenges are dealt with, the implementation of e-government strategy may not be an easy job.

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APPENDIX I: RESEARCH QUESTIONNAIRE

Please answer all questions.

SECTION A: DEMOGRAPHIC STATISTICS

1. Please indicate your gender (tick ($\sqrt{}$) as appropriate)

    Male   (   )   Female   (   )

2. How long have you been working for the Directorate of e-Government

    Less than 1 year (   )   1-3 years   (   )   4-6 years (   )

    7-10 years   (   )   More than 10 years (   )

3. What is your highest level of education?

    High School Graduate   (   )   College certificate   (   )

    College diploma   (   )   Bachelors degree   (   )

    Postgraduate Diploma   (   )   Masters Degree   (   )

    Doctorate degree   (   )

    Other (please specify) _____

SECTION B: CURRENT METHODS OF ASSESSMENT

4. Does the Directorate identify core skills required for a specific role of the government at all times?

    Yes   (   )   No   (   )

5. Below is a list of skills assessment methods, Please **<u>tick all</u>** that the Directorate has employed in its ICT skills-set assessment

    Self Assessment   (   )

    Demonstrations   (   )

    Supervisor assessment   (   )

    Work output assessment   (   )

    Assignments   (   )

    Group projects   (   )

    Discussions   (   )

Practical	(	)	
Time taken to complete a task assessment	(	)	
Analyzing Skills gap report	(	)	
Written examinations	(	)	
Frequent employee appraisals	(	)	

6. To what extent are these skills assessment methods appropriate in the establishment of the ICT skills-set adequacy at the Directorate?

   Very appropriate (   )   Appropriate   (   )   I do not know (   )

   Less appropriate (   )   Not appropriate (   )

SECTION C: SKILLS-SET POSSESSED BY THE PERSONNEL

7. Below are the different modules at the Directorate. On a scale of 1-5, please indicate the level of your knowledge on each module. (Where 5= understand it very well, 4= understand it well, 3 understand it averagely, 2= understand it to a small extent, and 1= have no idea).

Module	5	4	3	2	1
e-service delivery					
Fundamentals of ICT					
Database Management					
Network Administration					
Project management					
ICT Security					
Website Development					
User support					
System Administration					
Application Development					

8. How effective are these modules in delivering government services in the Ministries you work?

   Very effective   (   )   Effective   (   )

   Moderately effective (   )   Less effective (   ) Not effective ( )

SECTION D: REQUIRED ICT SKILLS-SET BY e-GOVERNMENT PERSONNEL

9. Using the list of skills-set below, please rank the skills set in the order of importance in facilitating quality service delivery at the ministerial levels. Use a scale of 5-1 where 5= very important, 4= important, 3= moderately important, 2= less important and 1= not important)

Module	5	4	3	2	1
e-service delivery					
Fundamentals of ICT					
Database Management					
Network Administration					
Project management					
ICT Security					
Website Development					
User support					
System Administration					
Application Development					

10. In order for the government ministries and autonomous departments to deliver quality services to their customers, it is important that they access relevant ICT services. In your opinion, what are the required skills-set to enable the Government deliver on its mandate?

_____

_____

_____

_____

SECTION E: THE APPROPRIATE EVALUATION CRITERIA FOR THE APPROPRIATE ICT SKILLS-SET

11. Do you believe your ICT skills-sets are being adequately utilized in your current employment?

Yes ( ) No ( ) I don't know ( )

Please explain your answer.

_____

_____

_____

12. On a scale of 5-1, (Where 5= very important, 4= important, 3= moderately important, 2= less important and 1= not important) please rank the following assessment methods in the order of importance.

	5	4	3	2	1
Self Assessment					
Demonstrations					
Work output assessment					
Assignments					
Supervisor assessment					
Group projects					
Discussions					
Practical					
Time taken to complete a task assessment					
Analyzing Skills gap report					
Written examinations					
Frequent employee appraisals					

APPENDIX II: INTRODUCTORY LETTER FROM THE UNIVERSITY OF NAIROBI

UNIVERSITY OF NAIROBI
COLLEGE OF BIOLOGICAL AND PHYSICAL SCIENCES
SCHOOL OF COMPUTING AND INFORMATICS

Telephone:	4447870/ 4444919/4446544	P. O. Box 30197
Telegrams:	"Varsity" Nairobi	00100 GPO
Email:	director-sci@uonbi.ac.ke	Nairobi, Kenya

Our Ref: UON/SCI/MSC(IS)/2005   20 November 2012

Directorate of e-Government
P.O. Box 62345, 00200
NAIROBI

Dear Sirs/Madam

ERASTUS K. NZIOKA – REG. NO.P56/P/7393/2005

The above named is a bona fide student pursuing a Master of Science in Information Systems degree at the School of Computing and Informatics, University of Nairobi. He is currently carrying out his research on the project entitled: **"A Framework for Assessment of Appropriate ICT Skills for e-Government Personnel : a Case Study of the Directorate of e-Government in Kenya"**.

We would be grateful if you could assist Mr. Mr. Nzioka as he gathers data for his research. If you have any queries about the exercise please do not hesitate to contact us. The information you provide will be solely for the project.

Yours faithfully

School of Computing & Informatics
University of NAIROBI
P. O. Box 30197
NAIROBI

PROF. W. OKELO-ODONGO
DIRECTOR
SCHOOL OF COMPUTING AND INFORMATICS

WOOBcom/Rear D My docs/Project Research letter

APPENDIX III: PERMISSION LETTER TO CARRY OUT THE SURVEY FROM DIRECTORATE OF E-GOVERNMENT, OFFICE OF THE PRESIDENT

OFFICE OF THE PRESIDENT

PERMANENT SECRETARY, SECRETARY TO THE CABINET

AND HEAD OF THE PUBLIC SERVICE

Telegraphic Address: "Rais"
Telephone: Nairobi 227411
When replying please quote

OP/DEG.15/5/1A

Ref. No.............................
and date

P.O. Box 62345-00200
NAIROBI

22nd **March 2013**............ 20 .....

ALL PERMANENT SECRETARIES

ATTN: ICT HEADS

RE: SURVEY: A FRAME WORK FOR ASSESSMENT OF APPROPRIATE ICT SKILLS e-GOVERNMENT PERSONNEL. A case of the Directorate of e-Government in Kenya: ERASTUS KIBASU NZIOKA: P56/P/7393/2005

The above named is a bonafide student at the University of Nairobi. He is pursuing MSC degree at the School of Computing and Informatics. He is currently carrying out a research on the above topic.

Kindly take a few minutes to interact with Mr. Nzioka and assist him gather the data he requires for his research. He shall be providing you with a website where the softcopy of the survey form is posted. You can also fill the hardcopy format which he shall be providing you with.

DR. KATHERINE GETAO,EBS
FOR: PERMANENT SECRETARY, SECRETARY TO THE CABINET AND HEAD OF THE PUBLIC SERVICE

APPENDIX IV: REQUEST LETTER FOR PERMISSION TO COLLECT DATA

ERASTUS K. NZIOKA

P.O. Box 1612, 00100, GPO, Nairobi, KENYA
Off. Tel: +254-020 268 9 970, Cellphone: 0722 766 698
E-mail: nziokaerustus@yahoo.com

March 13th 2013

ATTN: MADAM ZILPHER OWITI

Directorate of e-Government,
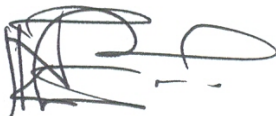P.O Box 62345- 00200,
NAIROBI, KENYA

Dear Madam,

REF: REQUEST FOR PERMISSION TO COLLECT DATA

Following the acceptance of my MSC proposal entitled "**A survey of ICT Skills appropriateness at the Directorate of e-Government in Kenya**" I am requesting for your permission to enable me collect the required data. The target population will include all the ICT technical personnel in the established forty two (42) ministries at the Directorate of e-Government in Kenya.

Attached are i) Project details, ii) Copy of letter from the University of Nairobi earlier released to your office, and iii) Questionnaire.

Respectfully yours,

ERASTUS KIBASU NZIOKA
P56/P/7393/2005