

**Evaluating and Enhancing Ethiopian e-Government Portal
Functionality in Knowledge Management Perspective**

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Declaration

I certify that except where due acknowledgement and citation has been made, the work is that of the author alone; the work has not been submitted previously, in whole or in part, to qualify for any other academic award; the content of the thesis is the result of work which has been carried out since the official commencement date of the approved research program; any editorial work, published or unpublished, carried out by a third party is acknowledged; and, ethics procedures and guidelines have been followed.

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Approval Sheet

This Independent Research Paper entitled *Evaluating and Enhancing Ethiopian e-Government Portal Functionality in Knowledge Management Perspective* has been read and approved as the requirements of the Department of Information Science in partial fulfillment for the award of the Degree of Master in Information and Knowledge Management, Jimma University, Jimma, Ethiopia.

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For my mother, Zerfinesh Dulo Duka

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List of Abbreviations

C2G	Citizen-to-government
CD	Compact Disk
CRM	Customer Relationship Management
EGDI	E-Government Development Index
FAQ	Frequently Asked Questions
G2C	Government-to-citizen
G2G	Government-to-government
ICT	Information Communication Technology
ICAO	International Civil Aviation Organization
IS	Information Science
IT	Information Technology
JU	Jimma University
K-ACT	Knowledge Access, Creation and Transfer Model
KM	Knowledge Management
LAN	Local Area Network
LDC	Least developed country
MCIT	Ministry of Communication and Information Technology
MoI	Ministry of Industry
MoE	Ministry of Education
MoFA	Ministry of Foreign Affairs
MoFED	Ministry of Finance and Economic Development
MoLSA	Ministry of Labor and Social Affairs
MoT	Ministry of Trade
NADRA	National Database and Registration Authority
PC	Personal Computer

SMS.....Short Message Service

SPSS..... Statistical Package for the Social Science

UN.....United Nations

Abstract

Knowledge Management (KM) is an important consideration in e-Government portals to ensure that knowledge flows efficiently between governments, individuals and organizations. A crucial aspect of e-Government portals that has not been addressed adequately is the extent to which KM have been implemented and identifying the direction to enhance e-Government portal. Evaluation model known as KM model for e-Government with three KM broad subsystems/mechanisms for portals: Knowledge Collection, Organization and Application were employed. Each mechanism is characterized by a set of processes/categories and sub-categories representing the KM features for supporting subsystems. Using this model, evaluation checklist was developed based on analysis of the literature and best experience of other countries e-Government portals and applied it, to seven ministry level organization e-Government portals with the objective of investigating the extent to which KM mechanisms have been implemented and identifies direction to enhance portals. Moreover, survey questioner and interview guide was used. The research results indicate that on average, e-Government portals featured (available and functional) about 55.92% of the KM mechanisms. As a developing country and as a beginner to have government portals in integrated form and lack for technology introduction in Ethiopia, the finding has shown good performance, even though portals were not intentionally developed with the understanding of KM. The evaluation also offered potential areas of improvement on the basis of the KM model of e-Government. Based on the finding, the degree of application of ICT for KM practice found to be low (43.06%). Surprisingly, the ICT contribution for KM practice in the research entities showed up above average (55.1%), despite the fact that, it is less used in the research entities. However, the finding confirmed that this contribution has less (39.08%) in supporting for Ethiopian e-Government portal enhancement. Therefore, the researcher argues that implementing KM is necessary to support the collection, organization and application of knowledge between portals and their users to offer a single point of entry to multiple government information and services. This study provides an insight into the situation of KM processes in e-Government portals of Ethiopian ministries. This area requires further work, in particular in elaborating the relationship between e-government and KM.

Chapter One

1. Introduction

1.1. Background

Knowledge is widely recognized as a strategic asset in improving organizational performance. As one of the major management strategies in recent times, Knowledge Management (KM) has attracted the attention of various organizations which aim to enhance their business efficiency, performance and competitiveness. In particular, Wiig (1997) emphasized the need for managing knowledge from an organizational perspective. According to Wiig (1997), the objectives of KM are to make the enterprise behave intelligently to realize the best value of its knowledge assets, and to secure its viability and overall success. To meet these objectives, knowledge must be created, transformed, and eventually disseminated and shared (Smith, 2001).

Essentially, governments are large organizations that need to deal with significant amounts of knowledge. Further, many governments have seen launching KM projects to meet the needs of the public who are increasingly demanding high standards of quality, courtesy and responsiveness. In conjunction with such efforts are e-Government portal initiatives that promote more efficient processes by facilitating improved access, via information technology, to information and services, and at the same time fostering better relationships with their citizens, businesses and other organizations. So, KM through e-Government portal plays a key role in ensuring that knowledge flows efficiently between the government and these groups.

The management of knowledge, particularly that generated and required by government, is increasingly important, as nations face the challenges of the knowledge economy (United Nations 2010). Although technology is not the only tool available to address the challenges of knowledge management (KM) (Davenport & Prusak 2000) it is an important facilitator. As such, governments around the world seek to take advantage of emerging technologies, in particular the e-Government portal, as a platform to provide both information and services to the public.

The portal, however, not only provides opportunities to government to offer information and services online to users, but also provides challenges to government to ensure that the portal

delivers in a form that addresses user needs and facilitates the management of requisite/necessary knowledge. It should be noted that the government website must meet the information, knowledge and services needs of both internal government users and those external to government (United Nations 2010). The portal is also expected to provide users with what might be termed a “self-service” technology that facilitates the relationship between government and portal users, by allowing users to address their knowledge needs without a requirement for government agent intervention.

Progress in online service delivery continues in most countries around the world. The United Nations e-Government Survey 2012 finds that many have 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. Countries where e-Government initiatives are implemented typically employ web portals as the gateway to the government and its services. Due to the lack of social cues and interpersonal interaction on the Web (Nah, F., Siau, K., & Tian, Y., 2005), quality of knowledge and services delivered to the public as well as knowledge related to user/customer request management becomes even more important.

A 2012 United Nations study of the development of e-Government identified the level of e-Government in 190 nations. The study outlined four stages of e-government, spanning from emergence to connected services (emerging, enhanced, transactional and connected). In 2012 no country had a true single-sign-on integrated/connected portal. The United States, Republic of Korea, Israel, Australia, Norway, Denmark, Bahrain, Qatar, United Arab Emirates and New Zealand are among the few that come close to a pure one-stop shop portal with information, services and participation services integrated on one site. It is somewhat noteworthy that the above emerging leaders group includes some developing countries that have begun to catch up with higher-income countries, such as Kazakhstan; Chile, Malaysia, Colombia, Barbados and Cyprus. But most developing nations were either at the emerging or the enhanced stage, thus providing very few transactional services to their citizens.

As part of their effort to advance citizen services, developed countries are paying greater attention to the concepts of an integrated government portal and the re-engineering of back-

office processes in designing their e-Government capabilities. e-Government strategies are geared towards user centric solutions, which serve to synergize governance processes and systems across multiple public administration domains. The United States was found, as before, a best practice example of an integrated portal that provides easy to navigate design and collects and consolidates all information and services for citizens in one place, including agency services at the state and local level, which vastly increases the effectiveness of user search and uptake. Mexico upgraded its offerings in 2011 to include a comprehensive search service, which indexes federal, state and municipal web portals daily. With more than 400 million registries in its index, the national portal greatly expanded online services to citizens, including an open government initiative, special offerings for vulnerable groups, and a facility for the anonymous reporting of issues of concern to authorities. It allows for greater inclusion of the citizen through social media such as Twitter and Facebook and is among the select 19 per cent of world countries providing a single sign-on service (United Nations 2012)

Therefore, many governmental portals have already been set up either for internal, inter-departmental, or government-to-citizen communication. From developing country regions, for example, Hong Kong's government has individual portal solutions for almost every government department, as well as a portal for electronic service delivery to citizens (Zhitian Zhou, Feipeng Gao, 2007). In recent years, in Ethiopia the Ministry of Communications and Information Technology (MCIT) has missioned to develop, deploy and use ICT to improve the livelihood of Ethiopians and optimize its contribution to the development of the country. The Ministry has thus undertaken a number of e-Government assignments to avail government services online and improve the access to the general public. According to the information from Ethiopian e-Government portal, about 40 Ethiopian government organizations (ministry offices, authorities, national and regional agencies and different bureaus) has been integrated in providing electronic information to interested bodies. Moreover around 33 e-services are currently integrated with portal. As a result, now a day's Ethiopian e-Government construction has got rapid development, and above the country level in most government organizations have set up and incorporated in portal which is administered by MCIT. However, from an overall point of view, Ethiopian current e-Government portal construction and development is not satisfactory, which emphasis on publicity, and limited focus on government services and its functionality and ignore

knowledge management, cannot meet administrative information sharing needs of the government(inter-organization, inter-department), particularly administrative information sharing needs of the community, social participation is low. How to manage all government knowledge resources effectively in the portal, how to make users to facilitate the retrieval of information through e-Government portal system, preserving, dissemination and sharing better government services, and how to enhance the image of the government are not give due attention and it is urgent need for the e-Government portal construction and development with knowledge management perspective.

So this study aimed to evaluate the extent to which government organisations with emphasis to the Ministry offices incorporated in Ethiopian e-Government portal (those are located in Addis Ababa, the capital city of Ethiopia) practice KM in e-Government portal. As part of the investigation, the study will focus on to what extent this tool used to implement KM in the research entities. In this regard, Information Technology (IT) that enhances information and knowledge managements is considered vital resources (tools) in KM implementation (Heisig, 2009).

The study lays its foundation on KM model of e-Government already proven in other parts of the world. There are many models in KM literature but very little were found KM in relation to e-Government. Model adopted for this study favour a study approach to Knowledge Management in e-Government portal by giving complete coverage of KM mechanisms that could possibly implemented in government electronic service delivery. It is upon this basis that this study adopted a KM model of e-Government.

1.2. Statement of the Problem

The problem being addressed in this research is that there are misconceptions that due to lack of organized digital resource management (production and storage) and cooperation, government organisations could not successfully implement KM in e-Government portal. Having observed the nature of organized digital resource constraints in Ethiopian context, considering resource limitation in terms of lack of skilled personals (MCIT 2011), the researcher identified a set of variables from successful KM model for e-Government and investigated to what extent these

were implemented for practicing KM in portal of organizations operating in Ethiopian e-Government portal.

Arising from a literature search, the researcher realised that successful KM implementation demands certain enablers (Mertins, Heisig & Vorbeck, 2001:4 and Chong, Chong & Wong, 2009). These include ICTs, knowledge-oriented organisational culture, organisational structures, positive HR practices, experienced and educated personnel and leadership support. So in this study the researcher was interested to examine the application of ICT enablers for KM practice and its support for portal enhancement. Yum Hui Yuen (2007) argued that with the explosion of digital connectivity, government agencies all over the world are using ICT applications to increase productivity, improve accountability, enhance transparency and facilitate public sector reform. This author realized that improved knowledge management (KM) is essential to governmental agencies at the national, regional or local levels, because governmental organizations are basically knowledge based organizations and KM has also become one of the initiatives within most countries' e-Government Plans.

Ondari-Okemwa (2004) believed that due to low levels of literacy, lack of political goodwill and low access to computers and the internet, most developing countries could not successfully implement KM. But, Conceição, P., et.al. (1997) also argued that due to their underdeveloped telecommunication infrastructure, organisations of the developing economy have to find innovative ways to convert knowledge and technology into assets. They realized that managing knowledge asset through citizen participation mechanisms would be a better ways to overcome the limitation of underdeveloped telecommunication infrastructure and the best way to achieve this could be employing e-Government portal.

So organisations of the developing economy, should adopt KM in e-Government portal in order to alleviate the problems of knowledge gathering, storage, retrieval, preservation, dissemination and sharing which helps to solve the problem of shortage of skills and low productivity. Furthermore, most developing nations including Ethiopia face shortage of skills necessary for economic sustainability. The effects of the brain drain has seen developing countries losing highly qualified and competent doctors, engineers, nurses and educators to developed countries.

So in this regard managing knowledge through portal create an opportunities to acquire knowledge of an experienced and professional personals.

Borghoff U. M. & Pareschi R., (1998) argued that a considerable amount of explicit knowledge is scattered throughout various documents within public and governmental organizations and people minds working there. In many cases the possibility to efficiently access (retrieve) and reuse this knowledge is limited. As a result of this, most knowledge is not sufficiently exploited, shared and subsequently forgotten in relatively short time after it has been introduced to, invented/discovered within the organization. Therefore, in the approaching information society especially here in Ethiopia, it is vitally important for knowledge intensive organizations as public and governmental institutions to make the best use of information gathered from various information resources inside the organizations and from external sources by managing their knowledge digitally through e-Government portal.

A web-based service particularly e-Government has been started by different developed country governments and extensive researches have been carried out with respect to KM implementation. From the very few KM literature in agriculture industry and e-Government researches produced here in Ethiopia, it is obvious that very little researches has been done and none at all related with KM and e-Government, as a result it is evident that organisations operating in Ethiopia, developing countries in generally remain outside the radar of KM scholars. Arising from the gap in KM literature this study was conducted in terms of KM implementation in e-Government portal, ICT application for KM practice, and ICT base KM practice support for portal development.

1.2.1. Research Questions

This study investigated KM practices of Ethiopian e-Government portal focusing on the Ministry offices and examining their ICTs application for KM practice and its contribution to portal development with the following three underlying research questions:

- ❖ What is the extent of KM implementation in Ethiopian e-Government portal?
- ❖ To what extents are research entities operating in e-Government portal use ICTs for KM practice?

- ❖ To what extents the contribution of ICTs for KM, support for portal enhancement?

1.3. Significance of the Study

The study desire is to present the KM practice in Ethiopian e-Government portal. This would lead to a broadening of KM theory. With fully investigation of e-Government portal from the KM perspective in Ethiopian context and with ICT tools application in Government organizations for KM practice plus with the contribution of ICTs for KM support for portal enhancement, the study provide an opportunity towards a deeper understanding of how KM plays a great role when implemented with e-Government portal towards the development of knowledge-based society.

This research conducted with the aim of understanding the importance of KM for e-Government portal. Since the investigation carried out to evaluate the extent of KM implementation in Ethiopian e-Government portal service, the application of ICT for KM practice and its contribution and support on ministry level government organization for sustainable knowledge rich portal development, its findings could be used by researchers and practitioners to improve KM implementation in any of web based Government and Non-Government organization service delivery in general and e-Government portal in particular. Moreover, the outcome of the research would also benefit the organization (be it private and public) that are in need of improving their performance by having best practice of others.

Considering the benefits arising out of successful KM implementation in Ethiopian e-Government portal, the organizations involved in the portal and the society in general gain a lot from knowledge based/rich portal. The benefits of Knowledge rich e-Government portal to organizations are numerous among them is increased organizational learning whereby continuous learning and teaching is built into the employees job, improving information sharing, dissemination, preservation, and service delivery, encouraging citizen participation in the decision-making process and making government more accountable and transparent. So policy makers will be aware of the benefits of KM in e-Government portal and gaps created due to lack of intentionally practicing KM from the research outcome.

1.4. Research Objectives

1.4.1. General Objective

The general objective of this study is to evaluate Ethiopian e-Government portal functionality in KM Perspective and to identify direction to enhance portal functionality.

1.4.2. Specific Objective

This study was conducted based on the following specific objectives:

- ❖ To evaluate the extent of KM implementation in Ethiopian e-Government portal.
- ❖ To identify gaps created and direction to enhance the functionality of Ethiopian e-Government portal to make it suitable for KM.
- ❖ To evaluate the extent of application of ICTs for KM practice
- ❖ To evaluate the contribution of ICTs for KM practice and its support to enhance Ethiopian e-Government portal.

In order to achieve these objectives, the study undertaken on Ethiopian e-Government portal web application service and in ministry level Ethiopian government offices which are currently operating in the portal so as to evaluate and identify direction to enhance the functionality of the portal in terms of KM perspective.

1.5. Scope

The study consider knowledge collection, organization and application subsystems as a knowledge management model of e-Government portal and employ ICTs as enablers (tools) of KM and find out its contribution for e-Government portal development. Therefore, the scope of the study is limited to an evaluation of KM implementation in Ethiopian e-Government portal in terms of KM model for e-Government portal as well as investigating the use of ICTs for KM practice and its contribution for portal enhancement.

The study is specifically about Knowledge Management implementation of Ethiopian e-Government portal. There is not an attempt at a general study of Knowledge Management, e-

Government portal and ICT. It is only the links between these aspects and KM for e-Government portal which will be admitted to this study.

1.6. Outline of the Research Report

This research report is presented in five main chapters. Chapter 1 is aimed at providing the context and background to the study. This is done through a clear statement of the research problem followed under the research question, research objectives and delimitation of the study. Chapter 2 provides the basis for understanding the literature review, workable definition based on the objective of the study as well as an overview of some of the notable countries e-Government portal best practices. The chapter reflects the overview of e-Government development throughout the major regions of the world up to East African e-Government development progress using statistical figures, stages of e-Government development, different models and the use and significance of KM in e-Government portal.

In Chapter 3, the research design process is thoroughly highlighted. The sampling procedures, methods of data analysis as well as the manner in which reliability and validity have been achieved through the data collecting instruments are also discussed in the chapter. The findings arising from the research investigation, incorporating data collected through both the survey questionnaires, evaluation checklist and interviews are presented in Chapter 4. Answering research question through attaining research objectives are explained and presented in the chapter. Finally, there is a detailed synthesis of the research report in the form of conclusion, and recommendations of this research in Chapter 5. Areas for future research investigations are also highlighted in this chapter.

Chapter Two

2. Literature Review

2.1. Introduction

The research objectives, question and problem has been described and contextualized in the previous chapter. In this chapter, the researcher reflects on the various studies conducted by other scholars which have a bearing on this study and places an overview of relevant e-Government and KM literature, including a definition and description of the term knowledge; Knowledge Management; e-Government portal; e-government; uses and significances of e-government; stages of e-Government development; Global up to east Africa e-Government development progress; KM model for e-Government and notable e-Government portal best practices that are relevant to this research have been reviewed.

2.2. Knowledge

Knowledge is information that is organized, synthesized, or summarized to enhance comprehension, awareness, or understanding. That is, knowledge is a combination of metadata and an awareness of the context in which the metadata can be applied successfully (Bryan Bergeron, 2003). According to Nonaka I., Takeuchi H, (1995) knowledge life cycle hinges on the distinction between tacit and explicit knowledge. Explicit knowledge is a formal one and can be found in documents of an organization: reports, manuals, correspondence (internal and external), patents, pictures, tables (e.g. Excel sheets), images, video and sound recordings, software etc. Tacit knowledge is personal knowledge given by individual experience (and hidden in peoples' minds).

Hansen, Nohria and Tierney (1999) define knowledge as either a codification strategy or personalization strategy. A codification strategy is the knowledge that is codified using a people-to-documents approach, where it is extracted from the person who developed it, transferred into documents, stored in a database and reused for various purposes. A personalization strategy is the knowledge that focuses on the dialogue between individuals, brainstorming sessions, one-to-one conversations and problems being solved independently.

Knowledge has also been modeled in terms of a hierarchical structure whereby data are seen as facts, which then become meaningful information, which in turn becomes knowledge when it is interpreted, applied to a given context and thereby made meaningful (Alavi & Leidner 2001; Sternmark 2002; Martin 2008). Misra, Hariharan and Khaneja (2003), on the other hand, modeled the hierarchical structure of knowledge from the perspective of data to truth: data, information, knowledge, intelligence, wisdom and truth.

This research adopts a view of knowledge as a combination of experience, values, contextual information and expert insight, which not only exists in documents and repositories, but also is contained within peoples' minds and can be demonstrated through their actions and behaviors, and applied to meeting an organization's needs, and is a process, have a condition of access to information and that can generate new experiences and information (Alavi & Leidner 2001; Al-Alawi, Al-Marzooqi & Mohammed 2007).

More specifically, and drawing upon the above, for the purposes of this research, knowledge is defined and scoped to include those government knowledge resources (information and services) made explicit and available for users via a government portals/websites, which become meaningful to portal/website users when they interpret and apply them in context (Santinha & de Castro 2010).

2.3. Knowledge Management

Various authors have attempted to define the concept "Knowledge Management" with a view to reflecting its key focus. The majority of the definitions refer to the three main Knowledge Management processes, namely knowledge acquisition, sharing and application. Reference can be made to the definition by Pretorius and Steyn (2005) who noted that Knowledge Management is the acquisition, creation, packaging and application of knowledge.

Becker (2007:) defined Knowledge Management as the way data, information and knowledge are captured, stored and shared and how they are applied to help the organization strengthen its competitive advantage. This researcher adopted the definition by Tiwana A, (2000) as follows:

Knowledge management generally deals with several activities relevant in knowledge life cycle: identification, acquisition, development, dissemination (sharing), use and preservation of organization's knowledge. The researcher approach to knowledge management in e-Government portal context supports most of the activities mentioned.

One other definition which is more reflecting of the essence of this study is made by IBM and Lotus, defining Knowledge Management as a discipline that systematically leverages content (IT) and expertise to provide innovation, responsiveness, competency and efficiency (Call, 2005). Call argued that Knowledge Management was both “technical problem and cultural problem”.

The definition adopted in this study recognizes ICTs are important for Knowledge Management. Furthermore, the definition adopted in this study recognizes the main objective of Knowledge Management being to help knowledge workers dramatically leverage their productivity and deliver business value. Drucker (1991) also recognized this by indicating that it was “generally accepted in theory that the workers’ knowledge of their job is the starting point for improving productivity, quality and performance”.

2.4. E-Government Portals

A web portal is typically the implementation platform of an e-Government initiative, providing access to the government and its services. Yong and Koon (2003) discuss how governments, keen on adopting the right business models for e-Government initiatives have made the “portal model” the predominant choice. This is because portals offer a single point of entry to multiple agencies and accord users the opportunity to interact easily and seamlessly with these agencies.

Oana Matilda ABĂLUȚĂ (2008) argued that knowledge enhanced e-Government portal aims at improving public services, democratic processes and support to public policies through knowledge enhanced ICT based solutions. e-Government portal is not only about reforming the work processes within and among governmental institutions, but is rather about improving its services to and collaboration with citizens, the business and professional community, and non-profit and nongovernmental organisations such as associations, trade unions, political parties, churches, and public interest groups.

As emphasized by Oana M. A (2008) Using World Wide Web portal to create one-stop shops is one currently popular e-Government approach to improving the delivery of public services to citizens. The basic idea of these portals is to provide a single, convenient place to take care of all the steps of a complex administrative process involving multiple government offices, bringing the services of these offices to the citizen instead of requiring the citizen to run from office to office.

Much literature exists in the study of the nature and classification of portals including Dias (2001) who classified portals by their functions as: (1) horizontal or public portals; (2) vertical, corporate or enterprise portals. Dias emphasizes two main functions of a corporate portal: decision support and collaborative processing. These functions connect users to all available information, and also to everyone they need in order to accomplish their goals. Examples of portals belonging to this category are knowledge portals and enterprise information portals.

Daniel and Ward (2006) argue that e-Government portals are similar to enterprise information portals since they provide a variety of features such as improved access to information, increased collaboration, greater use of existing applications and effective integration between applications. In addition, e-Government portals allow users access to, and interaction with, a range of internal and external applications and information sources. An ideal e-Government portal is often referred to as the “one-stop” portal (Tambouris & Wimmer, 2005) and is a direct consequence of the integrated delivery of information and services to customers of the government. Such portals assume the key attributes of enterprise information portals, enabling the government to unlock internally and externally stored information, providing users with a single gateway to personalized information necessary to make informed decisions, and enabling collaboration (Dias, 2001).

Web portals can deliver government services with various levels of interaction. Three levels are usually identified, according to Oana M. A (2008): information, communication, and transactions. Information services deliver government information via static web pages and pages generated from databases to citizens, tourists, businesses, associations, public administration, and other government users. Communication services use groupware technology such as e-mail, discussion forums and chat to facilitate dialogue, participation and feedback in

planning and policy-making procedures. Transaction services use online forms, workflow and payment systems to allow citizens and business partners to take care of their business with government online. Typical applications of transaction services for citizens include applying for social benefits, registering automobiles, filing changes of address or applying for building permits. For businesses, perhaps the application of greatest current interest is the online procurement of government contracts.

e-Government portals, as one-stop portals, therefore will typically offer the following features: Intuitive classification and searching, information subscription, information assistants, collaborative information sharing, security and privacy, customization and personalization, information directories, multiple information delivery channels, access to a variety of information and services, connectivity to different departmental services via a single access point, retrieval of services based on need and without knowledge of underlying departments (Dias, 2001; Tambouris & Wimmer, 2005).

Moreover, as discussed by Christian Wagner, Karen Cheung, Fion Lee, Rachael Ip, (2003) portals do not create any information (and knowledge), but they can collect, organize, and distribute it; thus they are focal points for information (and knowledge) exchange. Apart from providing functions specifically contributing to knowledge exchange, portals can provide their users many features, such as, email, chat rooms, personalized news, and a search engine, many of which benefit knowledge management.

2.5. Definition of e-Government

This section examines definitions of e-Government drawn from the present literature. e-Government means different things to different people. Some researchers define e-Government as another technology wave and in terms of specific actions such as using a video conference to interact with citizens or other government services delivered through a website (Criado & Ramilo 2003; Donzelli & Bresciani 2003). As Choudrie, Ghinea and Weerakkody (2004) stated, “e-Government includes the use of all information and communications technologies (ICT) from fax machines to wireless palm pilots to facilitate the daily administration of government”.

For the purposes of this research, a definition of e-Government scoped to include only the use of the Internet, particularly via portals, has been adopted as follows:

Electronic Government (e-Government) addresses the means by which contemporary governments around the world provide information, knowledge resources and services to users, specifically citizens, businesses and other government agencies. Whilst such provision can proceed by various electronic channels, e-Government is scoped for the purpose of this research as the utilization of the Internet, particularly via portals, to improve and enhance government operations, to disseminate government information, knowledge resources and services, to acquire knowledge through the portals, and to establish relationships between governments and their stakeholders, particularly citizens, employees, business sectors and government agencies (Azizan, Smith, Cooper 2011).

2.6. Users of e-Government Portal

E-Government provides many services to users, particularly citizens, businesses and other government agencies. The services provided are not intended to replace over-the counter services (Shackleton, Fisher & Dawson 2006) but to increase customer satisfaction with the service quality of government agencies (Donovan, Brown & Bellulo 2002; Evangelidis 2004). Although Vassilakis, Lepouras and Halatsis (2007) argue that provision of government services through the web only is considered traditional and inadequate, the web has still become the preferred channel for users seeking to access government information and services.

To facilitate these service outcomes, many governments (including the Ethiopia Government studied in the present research) have created one-stop government portals, as a door to all government information and services. Note that this research will not evaluate the specific types or quality of e-services provided by the Ethiopian e-Government portal. Rather, it aims to investigate KM practices of Ethiopian e-Government portal focusing on the Ministry offices portals. Some examples of portals which have been integrated in Ethiopian one-stop government portals are shown in Appendix F.

In the context of e-government, users are particularly diverse. According to Grimsley and Meehan (2007) users are more than customers. They are clients to the government agencies,

where the relationship is governed by professional and ethical codes. One of the important aspects of e-Government is how it brings users closer to their governments.

Some researchers identify the users of e-Government in terms of the relationship between users and the government (iDA Singapore 2001; Turban & King 2003; Tan, Pan & Lim 2005; Evans & Yen 2006), namely Government-to-Citizens (G2C), Government-to-Business (G2B), Government-to-Employees (G2E), Government-to-Government (G2G) and Citizen-to- Citizen (C2C). Table 2.2 summarizes these various descriptions of the users of e-government.

Table 2.1: Users of e-Government

Users	Description
<p>G2C</p> <p>Government-to-Citizen</p>	<p>Objective: To provide satisfactory service to citizens in order to improve the government-citizens relationship.</p> <p>Activities: For information access such as benefits, policies, loans, educational materials and other government information. Allows government agencies to talk, listen, relate and continuously communicate with the citizens, supporting and improving public services. For individual business such as social services, loan, taxes and other services. Allows customers to access government by use of multiple channels such as PC, web TV, mobile phone or wireless device and to participate by sending an e-mail or contribute to an online discussion forum.</p>
<p>G2B</p> <p>Government-to-Business</p>	<p>Objective: To provide better services to businesses such as eliminating redundant collections of data and reducing transaction costs.</p> <p>Activities: Providing a single portal and an integrated database. Entering the e-market to gain cost-efficient benefits. Allows e-transaction initiatives such as e-procurement and the development of an e-marketplace for government.</p>
<p>G2G</p>	<p>Objective: To enhance cooperation and collaboration between</p>

Government-to-Government	governments of different levels and various physical locations. Activities: Sharing or integrating federal and local government databases, as well as integrating separate systems. Enhancing collaboration or cooperation such as grants, law enforcement, public safety, emergency management, shared databases, resources, pool skills and capabilities, enhancing the efficiency and effectiveness of processes.
G2E Government-to-Employee	Objective: To improve internal efficiency and effectiveness of government administration. Activities: Reorganizing internal operational processes to adopt the best commercial practices. Providing services to internal employees such as training, payroll, travel, reimbursement and other services.

Source: Expanded from Ndou (2004) and Siau and Long (2005) (cited at Azizan N. 2011)

Based on the definitions outlined above for both Knowledge Management and e-Government, this research identifies users in terms of the relationship between users and government, and follows researchers who identify four major types of relationship, namely: G2C, G2B, G2G and G2E. Note, that in these relationships this research embraces the notion that communication can be two-way. As stated by Fang (2002, p. 2), “one of the most important aspects of e-Government is how it brings citizens and businesses closer to their governments.” Therefore, it is relevant to identify types of stakeholders so that the government can provide better services according to users (Tan, Pan & Lim 2005).

2.7. Stages of e-Government Portal Development

The stages of e-Government development reflect the evolution of e-Government from the immature to the mature, where the latter offers full integration of public services (Irani, Al-Sebie & Elliman 2006). The stages are used to define explicit theories of e-Government relative to its growth and development (Coursey & Norris 2008). Models that utilize these stages predict that e-Government evolves from the information provision website to a fully developed form of e-Government that entails an interactive and transactional portal (Irani, Al-Sebie & Elliman 2006).

According to United Nation 2012 survey there are four stages of government online service development such as emerging, enhanced, transactional and connected.

Stage 1:

Emerging information services: Government websites provide information on public policy, governance, laws, regulations, relevant documentation and types of government services provided. They have links to ministries, departments and other branches of government. Citizens are easily able to obtain information on what is new in the national government and ministries and can follow links to archived information. It is sometimes called informative (Static web pages, one-way external communication. Lower level of strategic implications and fewer resources needed. Launch Intranet development). Features like Web pages, online advertising, passive catalogue-like information, internal email, basic internal administrative processes such as payroll and accounts are expected from the portal under stage one.

Stage 2:

Enhanced information services: Government websites deliver enhanced one-way or simple two-way e-communication between government and citizen, such as downloadable forms for government services and applications. The sites have audio and video capabilities and are multi-lingual, among others. It is sometimes called interactive (Bidirectional communication and simple administrative tasks online. Allows for the development of e-democracy. Needs more resources and strategic planning. Full Intranet development). Features like Forums, FAQs, files and forms download, links and search engines, ERP system deployment are expected from the portal under stage two.

Stage 3:

Transactional services: Government websites engage in two-way communication with their citizens, including requesting and receiving inputs on government policies, programs, regulations, etc. Some form of electronic authentication of the citizen's identity is required to successfully complete the exchange. Government websites process non-financial transactions, e.g. e-voting, downloading and uploading forms, filing taxes online or applying for certificates,

licenses and permits, E-voting, e-banking, debts and e-procurement. They also handle financial transactions, i.e. where money is transferred on a secure network to government. It is Bidirectional communication and added value operations (money or sensitive information). Internal process re-engineering. Launch CRM system. Develop business strategies.

Stage 4:

Connected services: Government websites have changed the way governments communicate with their citizens. They are proactive in requesting information and opinions from the citizens using Web 2.0 and other interactive tools. E-services and e-solutions cut across the departments and ministries in a seamless manner. Information, data and knowledge are transferred from government agencies through integrated applications. Governments have moved from a government-centric to a citizen-centric approach, where eservices are targeted to citizens through life cycle events and segmented groups to provide tailor-made services. Governments create an environment that empowers citizens to be more involved with government activities so as to have a voice in decision-making. It is sometimes called Integration stage (Seamless administration and interoperability in the provision of public services, horizontal and vertical cooperation, develop communities, Exploitation of CRM systems, KM systems deployment) Features like Intranet and extranet, integrated IS between organizations, real-time file traceability, secure information exchange devices are expected from the portal under stage four.

According to the 2012 Survey, African governments face difficulty in moving to the transactional and connected stages of e-Government development.

2.8. Overview of Global e-Government Development

The United Nations Survey 2012 assessment of progress indicates that e-Government is increasingly being viewed among countries in the vanguard as going beyond service delivery towards a framework for a smart, inclusive and sustainable growth for future generations. In countries that follow that trend, a focus on institutional integration coupled with online citizen orientation in public service continues to be dominant. Both in terms of information and services, the citizen is increasingly viewed as ‘an active customer of public services’ with borrowed private sector concepts being applied to improve public sector governance systems.

According to the 2012 United Nations e-Government Survey rankings, the Republic of Korea is the world leader (0.9283) followed by the Netherlands (0.9125), the United Kingdom (0.8960) and Denmark (0.8889), with the United States, Canada, France, Norway, Singapore and Sweden close behind. The steady improvement in all the indicators of the e-Government development index has led to a world average of 0.4877 as compared to 0.4406 in 2010. This reflects that countries in general have improved their online service delivery to cater to citizens' needs. On a regional level, Europe (0.7188) and Eastern Asia (0.6344) lead, followed by Northern America (0.8559), South Asia (0.3464) and Africa (0.2762).

A key driver for this approach is the need to achieve efficiency in government at the same time that services are being expanded. Advances in technology, which allow data sharing and efficient streamlining of cross-agency governance systems are forming the back end of integrated portals where citizens find a myriad of relevant information arranged by theme, life cycle or other preferred use. The trend towards personalization of services has gained momentum with more countries tailoring substance and presentation in accord with varied preferences. Multichannel service delivery features were found on several portals in 2012 through which the government conducted business with citizens. Citizen inclusion is also expanding both horizontally and vertically with more governments around the world in 2012 accepting and promoting the need to inform – and involve – the citizen in the public decision making process (United Nation 2012).

In 2012, the United Nations e-Government assessment focused on the concept of integrated services that exploit inter-linkages among different public services on a functionally and/or thematically similar one-stop-shop portal, thereby improving and facilitating citizen experience, allowing for back-office integration across governmental departments and strengthening institutional arrangements. Single sign-on integrated services on portals can organizationally transform public service delivery at both the front and the back end. They can increase functional productivity in governments by identifying and improving governance processes and mechanisms across several departments, leading to greater efficiency and effectiveness of services along with needed cost savings. With a focus on governance solutions that enhance service delivery and streamline public sector efficiency, the United Nations e-Government rankings in 2012 reflect an assessment of which countries are undertaking their e-Government development with a view to integrated, user-centric public service delivery.

The 2012 Survey assesses web portals with a view to the provision of e-information, e-services, which range from interactive to transactional to networked services, e-participation, and features that are the conduit for service flow from government to citizen and consequently a reflection of attention to governance processes. Indicators grouped along the four stages of the model (emerging, enhanced, transactional and connected) range from static information such as links to ministries/departments, archived information, and regional/local government services; to unidirectional government-to-citizen (G2C) information flows such as online policies, laws and regulation, reports, newsletters, and downloadable databases, among other things; to two-way financial and non-financial transactional services and advanced technical features such as mobile apps; and to integrated and participatory services characterized by an integration of government-to-government (G2G), government-to-citizen, and citizen-to-government (C2G) interactions in the last stage.

The United Nations Survey 2012 finds that models of an integrated portal differ across countries and regions. While a few countries are progressing towards one national integrated portal, others have developed their e-Government offerings with a view to more than one portal, with thematic and/or functional services integrated in a manner that finds e-information separate from e-services or e-participation.

Though each of these have integrated services across various departments on the thematic or functional portal, they nevertheless make less convenient the user search for government information, services and participation in one place. The United Nations e-Government Survey 2012 differentiates these as ‘integrated services’ from a single ‘integrated portal.’

In 2012 no country had a true single-sign-on integrated portal. The United States, Republic of Korea, Israel, Australia, Norway, Denmark, Bahrain, Qatar, United Arab Emirates and New Zealand are among the few that come close to a pure one-stop shop portal with information, services and participation services integrated on one site.

Most countries from the European Union (EU) follow the approach of separate portals for their information, service and participation offerings. In several European countries e-Government services focus on the nationally organized one-stop channel for the provision of 20 basic e-

services essential to their citizens while the government-provided information forms a separate portal with information services integrated on it from across all sectors.

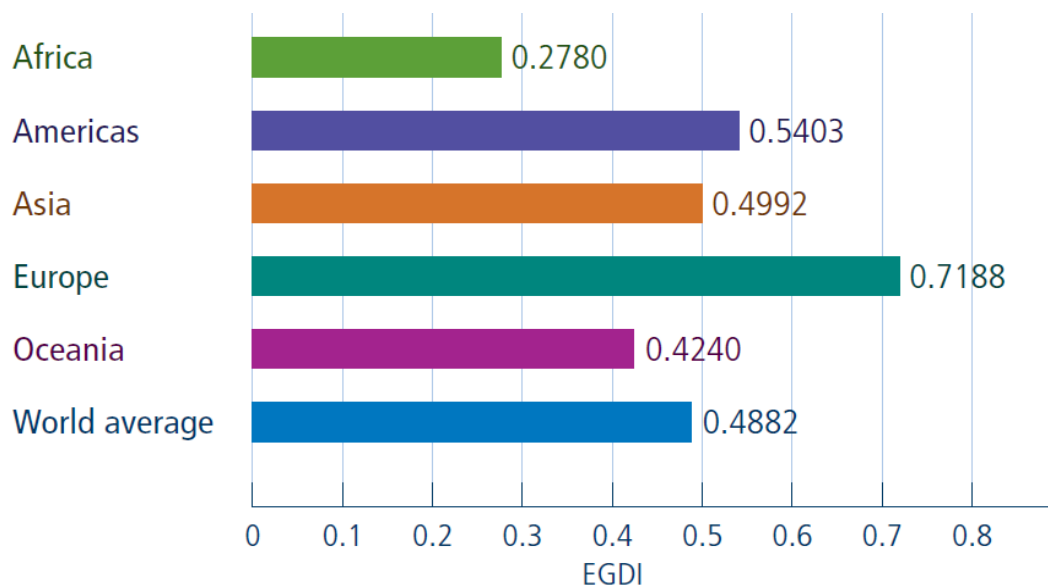
Lessons of experience from the assessment in 2012 indicate that more services have been integrated across sectors and agencies. While this trend is likely to continue it seems that increasingly complex public sector services in the future will be ‘cloud-based’ with service providers able to address innovation and productivity upgrades without costly investments by the government. Cloud service equips governments with greater efficiency by helping them scale up their services, including storage capacity, as it evolves. Among the main challenges for large-scale adoption of cloud based government services are the integrity of service, data security and privacy, and regulatory environment in most countries around the world, which will need continued reform in governance systems and a continued focus on strengthening institutional linkages.

2.9. Regional Averages in e-Government Development

Sustained integration, expansion and consolidation of government online offerings led to more than a 10 per cent increase in the world average of e-Government development compared to two years ago. The region of Europe (0.7188) shows the highest e-Government development followed by the Americas (0.5403).

Figure 2.1 highlights that despite considerable strides towards bridging the digital divide, infrastructure and human capital limitations in several parts of the world impinge upon the ability of governments to spread and the citizens to partake of the benefits of information technology in the delivery of services. With a history of high levels of functional education and widespread telephony infrastructure, Europe and the Americas as a whole remain far ahead of the rest of the world regions. Asia, which is home to around three-fifths of the world citizens, has nevertheless only around 70 percent of the level of e-Government in Europe while the level of services in Africa barely squares off at 40 percent of those in Europe.

Figure 2.1 Regional Averages in e-Government Development

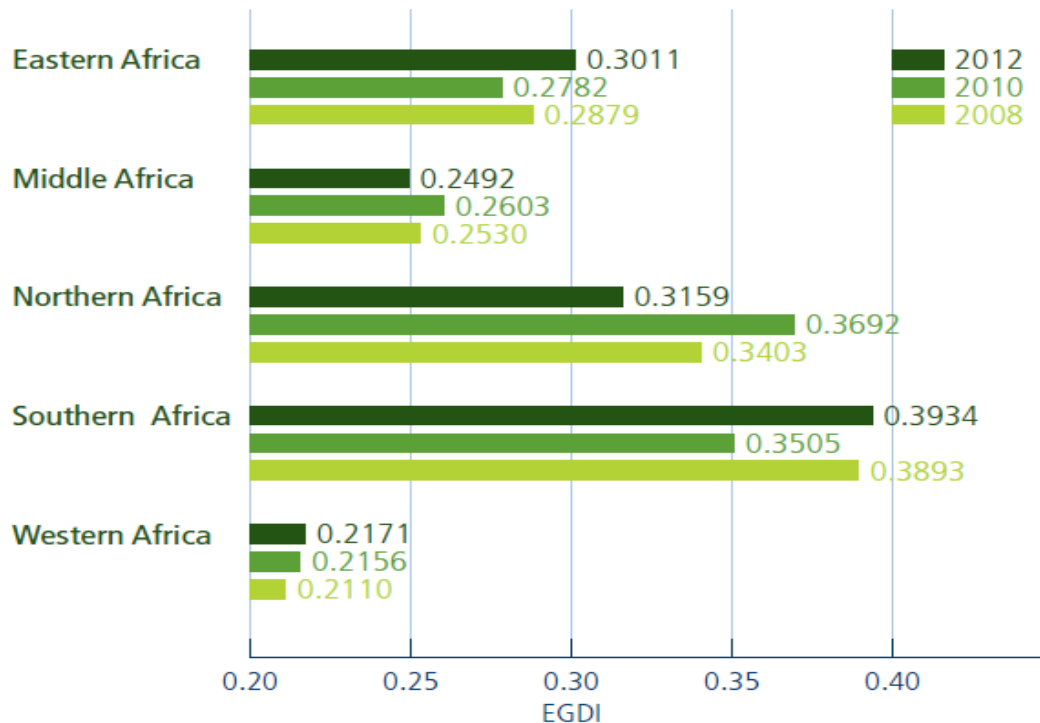


Source: United Nation e-Government Survey (2012)

2.10. E-Government in Africa

The key challenge for the e-Government development of Africa remains the widespread lack of infrastructure and functional literacy. Despite recent expansion in mobile telephony, most countries in Africa remain at the tail end of the digital divide. These challenges have translated into a lower than world average e-Government development for all sub-regions. Southern Africa (0.3934) consistently outpaces all other sub-regions. Though there has been some improvement in all sub-regions, except for Northern Africa and Middle Africa, it has been minimal, with the least e-ready sub-region being Western Africa (0.2171). (see figure 2.2)

Figure 2.2 Trends in e-Government Development in Africa 2008-2012



Source: United Nation e-Government Survey (2012)

According to the survey 2012, Africa has seen improvement in e-Government with countries in the region looking to increase their online presence through developing websites for government ministries and agencies. Table 2.3 below, shows that Seychelles (0.5192) climbed several points to number one in the region in 2012 followed by Mauritius (0.5066) and South Africa (0.4869). It is notable that all of the African leaders increased their e-Government development index value in 2012 but lost in comparative performance around the world, except for Kenya and Morocco, which gained in the world rankings from 124 to 119 and from 126 to 120 respectively. Tunisia (0.4833) and Egypt (0.4611) declined in rank substantially as did Cape Verde (0.4297) because their improvements did not keep pace with those of other countries around the world.

Table 2.2 Top Ranked Countries in Africa

Rank	Country	E-gov. development index		World e-gov. development ranking	
		2012	2010	2012	2010
1	Seychelles	0.5192	0.4179	84	104
2	Mauritius	0.5066	0.4645	93	77
3	South Africa	0.4869	0.4306	101	97
4	Tunisia	0.4833	0.4826	103	66
5	Egypt	0.4611	0.4518	107	86
6	Cape Verde	0.4297	0.4054	118	108
7	Kenya	0.4212	0.3338	119	124
8	Morocco	0.4209	0.3287	120	126
9	Botswana	0.4186	0.3637	121	117
10	Namibia	0.3937	0.3314	123	125
Regional Average		0.2780	0.2733		
World Average		0.4882	0.4406		

Source: United Nation e-Government Survey (2012)

2.11. E-Government Development in Eastern Africa

As shown in table 2.4 below, in 2012, Seychelles undertook further consolidation of infrastructure and its e-Government development. Major improvements in mobile telecommunication and integration of thematic services in education, health, and finance with the national portal allowed it to improve its world ranking. Mauritius improved its offerings around 10 per cent with the national portal providing facilities for services such as appointments for vehicle inspections, scholarships and work permits. Although it ranked 2nd in the Eastern Africa region, its efforts could not keep pace in comparison to peers, leading to a decline in its global ranking.

Table 2.3 e-Government Development in Eastern Africa

Country	E-gov. development index		World e-gov. development ranking	
	2012	2010	2012	2010
Seychelles	0.5192	0.4179	84	104
Mauritius	0.5066	0.4645	93	77
Kenya	0.4212	0.3338	119	124
Zimbabwe	0.3583	0.3230	133	129
United Rep. of Tanzania	0.3311	0.2926	139	137
Rwanda	0.3291	0.2749	140	148
Uganda	0.3185	0.2812	143	142
Madagascar	0.3054	0.2890	148	139
Zambia	0.2910	0.2810	154	143
Mozambique	0.2786	0.2288	158	161
Malawi	0.2740	0.2357	159	159
Comoros	0.2358	0.2327	171	160
Ethiopia	0.2306	0.2033	172	172
Burundi	0.2288	0.2014	173	174
Djibouti	0.2228	0.2059	176	170
Eritrea	0.2043	0.1859	180	175
Somalia	0.0640	0.0000	190	N/A
Sub Regional Average	0.3011	0.2782		
World Average	0.4882	0.4406		

Source: United Nation e-Government Survey (2012)

According to the survey, online services of Mozambique have gained ground in attempting to consolidate all information into one complete site, though this site lacks transactional services. Integrated services across sectors, including important legislation, are available. They include obtaining an identity card, registration of motor vehicles, finding private employment

recruitment agencies, and the payment of taxes, to name a few. Progress on back-office integration can be found from the linkages to the various ministries and institutions of the government. Lack of infrastructure, especially broadband, remains a critical factor impeding the e-Government efforts in other countries of this sub-region such as Mozambique and Rwanda as well, despite their progress in expanding services.

According to the survey Ethiopia has shown progress. Total ranking of Ethiopia in 2012 (0.2306) and 2010 (0.2033) evaluation is 172 from 193 countries in E-Readiness index. Nevertheless, there are also positive achievements that Ethiopia made especially on the web measure index and E-Participation. The 2012 UN E-Government Survey shows that, in 2010 evaluation Ethiopia ranked 111 on web measure index and in 2012 rank 80 from 193 countries. In "E-Participation" Ethiopia ranked 135 in 2010 evaluation and 19 in 2012 evaluation. This shows that Ethiopia has been working hard to make improvement though still lag in the general evaluation.

2.12. E-Government Framework

Electronic government is a general concept in the world, referring to the government's effective use of modern information and communication technologies, through various information services (such as telephone and the internet, public computer stations etc.), the government department, enterprises, and civil society organizations in its more convenient time, place and manner, the provision of automated information and other services consisting of a responsive, efficient and accountable, with a higher quality of service the government (Lovelock,P.and S.Cartledge, 1999 and Lovelock,P., T.Clark and B. A. Petrazzini, 1996).

According to Zhitian Zhou, Feipeng Gao (2007) e-Government framework of the general structure is composed of 2 supporting systems and 3 layers, 2 supporting systems are supporting policies and supporting technical standards, and 3 layers are information infrastructure layer, information management layer and information application services layer.

- ❖ Supporting policies system. The supporting policies system means that all existing policies the government is enacting. It is fundamental basis to build e-Government processes and standards.

- ❖ Supporting technical standards system. The workflow of e-Government needs information standardization and reliable security technology standards. Technical standards including electronic signatures, certification bill network security standards and others, is the second supporting system of e-government.
- ❖ Information infrastructure layer. e-Government is established based on information technology. Information infrastructure layer includes: network technology, multimedia technology, internet technology, security control, database, data warehouse, data mining and online analytical processing technology, collaborative work skills, information exchange cross-platform technology, system integration technology, electronic payment technology, and so on.
- ❖ Information management layer. Information management layer includes: office automation management systems, collaborative systems, decision support systems, and information resources agency. This layer is mainly internal network work.
- ❖ Information application service layer. Information application service layer is built on information management layer, through the establishment of common external site on the Internet, belonging to the external Internet of the e-government. Information application service layer includes: information and online information collection, electronic procurement and tendering, electronic benefits payments, electronic tax, e-business, e-declaration, and so on.

2.13. Knowledge Management and e-Government

It is only recently that knowledge management (KM) has started making entry to public sector. In United Kingdom, for example, e-Envoy whose office was set up in 1999 and replaced by eGovernment Unit in 2004, introduced the knowledge network in 2000 followed by knowledge enhanced government (KEG). A development agency like the World Bank also set up a knowledge management secretariat and has come out with a knowledge assessment methodology (KAM). One of the important reasons for this development has been the emergence of information and communication technologies (ICTs) in the last decade (Misra, D.C., 2007).

Knowledge Management has been credited by KM scholars for the emergence of the knowledge economy. In this regard, Amabile and Kramer (2007) have observed that the modern entity

“demands knowledge work from its people”. So this knowledge can be easily acquired, stored, processed, shared and disseminated by using e-Government portals to the knowledge seeker and all people in general. It has also been highlighted by Andresen and Lichtenberger (2007) that “in a globalising environment, a workforce with superior skills is a primary vehicle for sustainable competitive advantage”. This skill can be developed by managing knowledge through portal. These authors have insisted that knowledge has become the new weapon which organisations employ for sustainable competitive advantage.

E-Government involves the use of Internet-based technologies to provide convenient access to government information and services, and to open new ways of engaging citizens and enterprises. However, e-Government initiatives are not without challenges. For one, as people become more accustomed to the convenience and speed at which these interactions take place, the demand for better and even faster access to information and integrated service delivery also rises. Furthermore, the exponential growth of transactions represents an opportunity governments could seize to study usage patterns, understand users and prepare for the future. KM is therefore seen as a compelling strategy to dovetail e-Government initiatives to achieve at least three objectives. First is to cater to users’ increasing expectations for better service delivery and information access (Harman & Brelade, 2001). Second is the move towards an anticipatory government that is forward-looking (Misra, D.C., Hariharan, R., & Khaneja, M, 2003). Third is to facilitate interactions between all entities of the e-Government and its constituents (Goh, D.H., Chua, A., Luyt, B., and Lee, C.S, 2008).

An important component in an e-Government initiative is customer relationship management (CRM). Peng and Chen (2005) define CRM as an information system that helps enterprises manage customer/citizen/user relationships, and assert CRM’s importance in e-governments as a mode of managing various governmental functions to increase customer satisfaction and loyalty. In addition, Accenture’s (2003) study of e-Government portals found that CRM underpins e-Governments, and that this belief was growing amongst government executives. The study emphasizes that “as governments rethink their strategies to focus on delivering value, they must also create a customer impact.” The CRM strategy thus goes hand in hand with the customer-centric approach of e-government. One benefit of applying CRM principles to e-Government is that services provided to customers can be aligned in accordance to their preferences.

Furthermore, CRM allows for better integration, transparency and access to information to the customer. This, in part, helps build closer ties between the government and its customers.

2.14. The Significance of Knowledge Management in e-Government

e-Government as a virtual organization to provide public management and public service, not normally engaged in the creation of material resources, have knowledge management system significant features. Knowledge management basing on the e-Government environment is a new management concept and management methods, playing an important role in promoting the transformation of government functions, improving the government's efficiency and image. Specifically, the significance of implementation of knowledge management in e-Government can be divided into the following three aspects (Zhitian Zhou, Feipeng Gao, 2007).

2.14.1. To Be Conducive to Enhance Governments' Competence

During the process of economic globalization, the competition of national comprehensive power is mainly reflected in the economic competition, and economic competitiveness depends on government's competition level. Under e-Government environment, knowledge management swooped knowledge as the most important resource to maximize access and use of knowledge to improve the competitive power of the government, the government stressed that knowledge management knowledge at the core, take corresponding measures to encourage staff to work in continuous self-improvement and enhance the sense of competition, thereby enhancing the government's overall competitiveness, innovation capacity and contingency forces.

2.14.2. To Be Conducive to Raise Governments' Service Quality

Knowledge management running in e-Government environment, is an electronic workflow to be controlled, stressed the cooperation between different departments and staff's awareness of cooperation. Knowledge management circulates around knowledge acquisition, knowledge analysis, knowledge processing, knowledge distribution and other means, to realize standardization of service experience and chief process, to increase government office

efficiency and the quality of services as per the information gathered by the researcher from State Information Construction Promotion Office at <http://www.cei.gov.cn>.

2.14.3. To Be Conducive to Promote Healthy Development of e-Government

During the process of governance of modern governments, knowledge management is indispensable. Knowledge management plays a very important role in the shift of the government management paradigm and improving governments' administrative capacity. Divorcing from knowledge management, would lead to various information resources isolated running, and that the electronic government is unable to form an organic whole. Knowledge management can build an effective knowledge precipitation, clear up various channels of information flow, realize knowledge sharing, and promote e-government's development.

2.15. Knowledge Management Model

In order to transform knowledge into a valuable organizational asset, knowledge, experience, and expertise must be formalized, distributed, shared, and applied. KM is considered as a key part of the strategy to use expertise to create a sustainable competitive advantage in today's business environment especially through e-Government portal in order to experience the benefit of KM to all citizen equally. Many authors, most notably Zhitian Zhou and Feipeng Gao (2007), Schwartz, Divitini & Brashethvik, (2000), Tiwana (2000), Nah, F., Siau, K., & Tian, Y. (2005), Davenport and Prusak's (2000), Goh, D.H., Chua, A., Luyt, B., and Lee, C.S. (2008) and Wiig (1997) have proposed models for the KM process. In all the models presented below, it is assumed that steps and activities are somewhat concurrent, sometimes repeated, and not always in linear sequence but with missing some of KM mechanisms which is an important element to manage knowledge in e-Government portal. So according to the researcher material searching is concerned, the researcher analyzed different KM models for e-Government environment which is proposed by the above missioned authors and plane to adopt the model developed by Zhitian Zhou and Feipeng Gao (2007) which is best suited for this research purpose and encompass all KM

elements which is necessary to evaluate the extent of KM practice in Ethiopian e-Government portal.

Governments can increase their effectiveness in delivering value through e-Government initiatives via their portals by treating various entities as “customers”. KM becomes an important component in this effort by providing the mechanisms for creating, capturing, transforming and using knowledge. In addition, e-Government service must facilitate collaboration and knowledge flows between themselves and their users, and also between a user and other users. In this section, the researcher review KM models that attempt to capture KM mechanisms in portals and other websites.

As its name suggests, the Acquisition, Organisation, and Distribution (AOD) model of Schwartz, Divitini & Brashethvik, (2000) identifies three components for Internet-based KM: (1) Acquisition: Collecting and storing knowledge from members of the organisation or other resources; (2) Organisation: Structuring, indexing and formatting the acquired knowledge; (3) Distribution: Retrieving relevant knowledge for the person who needs it at the right time. The focus of this model is on how organisational knowledge can be delivered to the necessary point of action through multiple electronic delivery channels (push or pull mechanisms), mail and instant messaging. The AOD model however, lacks a cross-flow of knowledge across organisational boundaries, such as between the organisation and its customers and their model ignores other details of KM practices for e-Government like knowledge recognition, accumulation, classification, depot, map, sharing, exchange and creation.

Tiwana (2000) argues that successful websites are centred on managing customer knowledge and proposes a customer knowledge cycle that comprises three phases running in parallel: (1) Acquisition: Development and creation of insights, skills and relationships supported by data capture tools and information technology; (2) Sharing: Disseminating and making available what is already known; (3) Utilisation: Integrating learning into the organisation by applying (at least in part) whatever is broadly available throughout the organisation to new situations. This model also lacks some of KM activities which is important to manage knowledge in government electronic services.

Building upon Tiwana's (2000) work, Nah, et al. (2005) identifies a need for both knowledge acquisition and dissemination to occur between organisations and their customers. They considered Davenport and Prusak's (2000) outline of KM processes which include knowledge generation, knowledge codification, and knowledge transfer. They view the transfer of knowledge across organisational boundaries as desirable to facilitate exchanging and sharing of information between user communities and the organisation. The resulting Internet-based Customer Knowledge Management model resembles Tiwana's (2000) model but replaces the knowledge utilisation component with knowledge dissemination because the former is internal to the organisation while the latter suggests both internal and external knowledge flows. The components in this model are: (1) Knowledge dissemination: Delivering knowledge to potential customers; (2) Knowledge acquisition: Acquisition of customer knowledge; (3) Knowledge sharing: Enabling mechanisms for users to provide online knowledge to peers.

Goh, D.H., Chua, A., Luyt, B., and Lee, C.S. (2008) Knowledge Access, Creation and Transfer model attempts to extend existing work in this area by proposing three mechanisms for KM on Web portals:

- ❖ **Knowledge Access** is the mechanism through which users obtain access to the knowledge in the portal. The emphasis is on the tools that support the individual user's acquisition of knowledge from the portal and replaces the distribution, sharing and dissemination components in the other models that suggest a mix of portal-to individual and individual-to-individual-via-portal approaches to sharing knowledge.
- ❖ **Knowledge Creation** expands from Nah, et al.'s (2005) acquisition component to include both the acquisition of knowledge about the user as well as the acquisition of knowledge from the user. While the Access mechanism provides tools for portal-to user knowledge flows, this component supports user-to-portal flows.
- ❖ **Knowledge Transfer** supports user-to-user flows of knowledge. Here, the focus is on tools for knowledge sharing among individuals and organisations who have access to the portal. Like Knowledge Access, this mechanism distinguishes between the parties involved in knowledge sharing, unlike the components in the other models reviewed earlier.

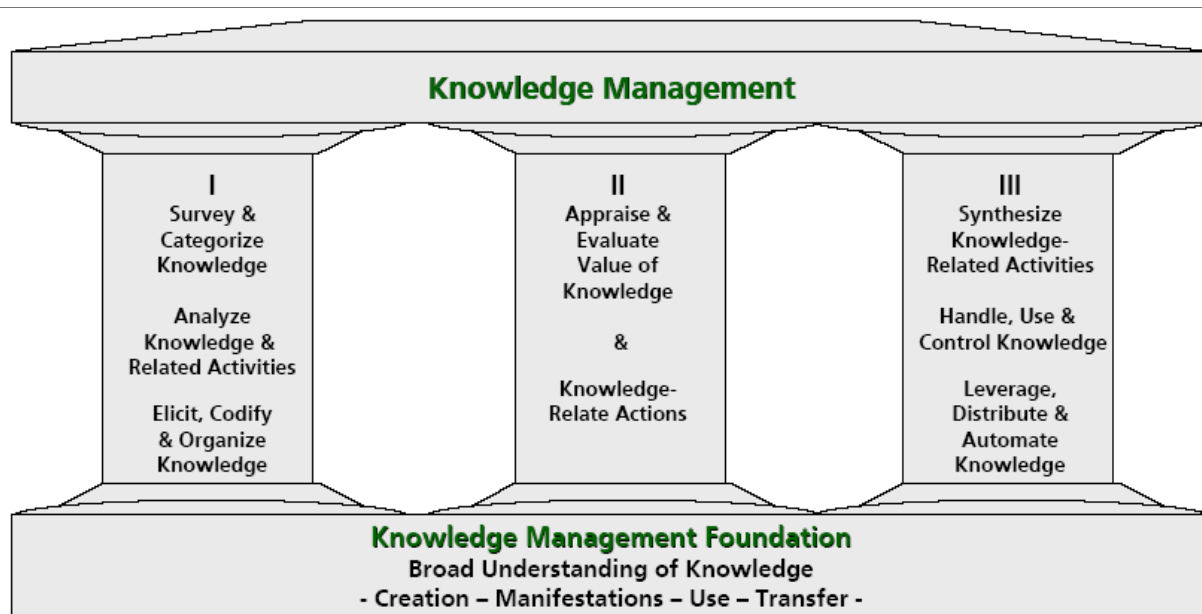
Also Wiig's (1997) KM framework proposes three KM pillars which represent the major functions needed to manage knowledge. The pillars are based on a broad understanding of knowledge creation, manifestation, use, and transfer.

Karl Wiig is one of the pioneers in the field of Knowledge Management. His overarching framework is based on three pillars and a foundation. Wiig proposes that the foundation of Knowledge Management is comprised of the way knowledge is: Created; used in problem solving and decision making; manifested cognitively as well as in culture; technology and procedures.

- ❖ Pillar I, Exploring knowledge: includes surveying, categorizing, analyzing, codifying and organizing knowledge;
- ❖ Pillar II, Finding the Value of Knowledge : includes appraising and evaluating; and
- ❖ Pillar III, Actively managing Knowledge: includes synthesizing knowledge-related activities, handling, using and controlling, leveraging, distributing and automating, implementing and monitoring knowledge-related activities.

Even though Wiig's model comprises all necessary elements of KM, he emphasized the need for managing knowledge from an administrative/organizational perspective not from electronic KM perspective. This framework summarizes the main areas on which a KM initiative focuses.

Figur.2.3 Pillars of Knowledge Management (Wiig 1993)



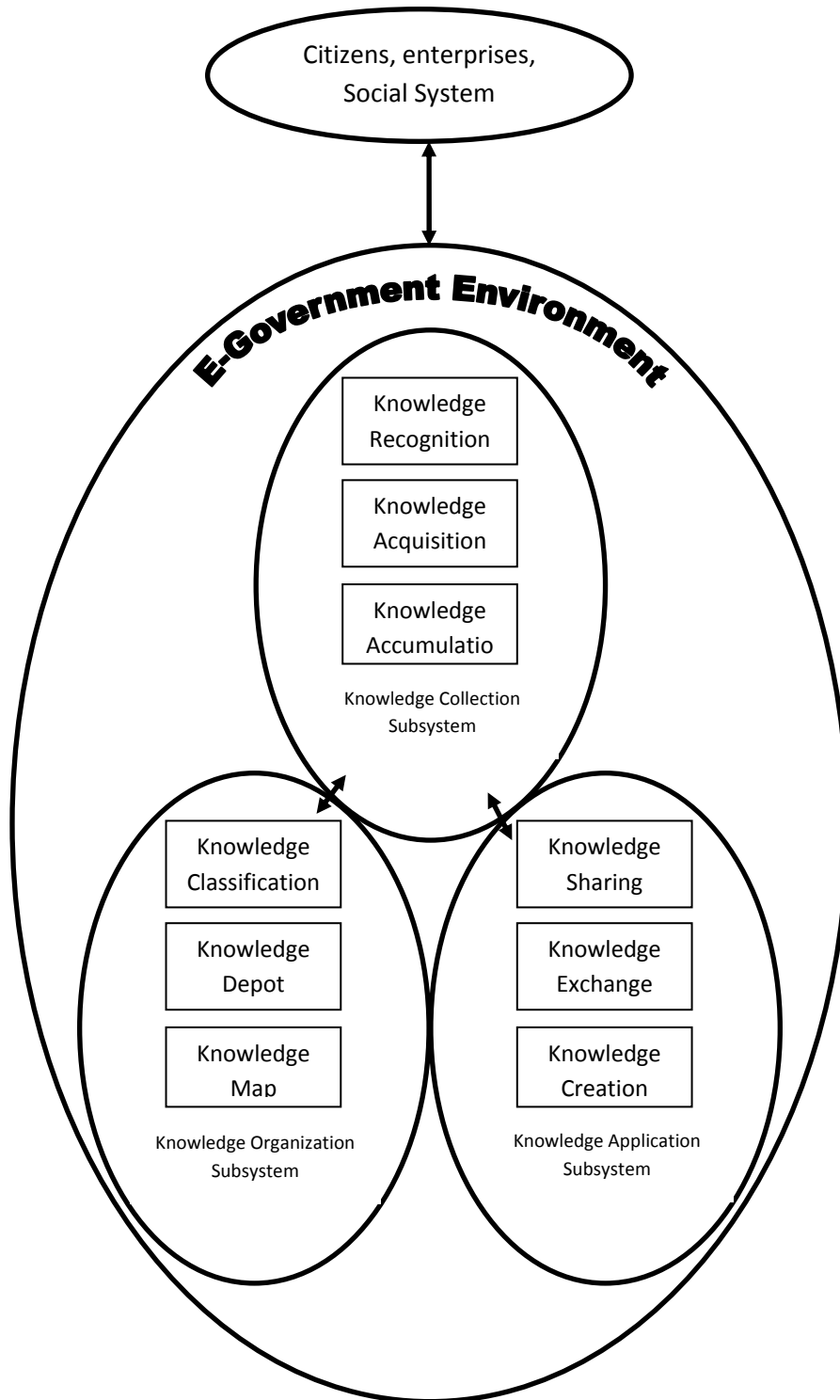
Source: Three pillars of KM by Wing (1993) (cited at Wu Jinxi and Liu Jisheng)

Zhitian Zhou and Feipeng Gao (2007) present a model that identifies the relevant dimensions of KM mechanisms in Web portals as shown in fig 2 below. This model can be used to investigate the extent of KM practice on the Web in various domains, including e-Government portal.

The researcher observed that while the Internet-based Customer Knowledge Management model (Nah, et al., 2005) has its strengths when compared to the other models (Schwartz et al., 2000; Tiwana, 2000), it is more applicable to e-commerce Web sites, and does not include all necessary KM activities that could be potentially useful for e-Government portal.

Zhitian Zhou and Feipeng Gao (2007) presents an extensive model consisting of three KM process in e-Government with detail supporting activities. According to Zhitian Zhou and Feipeng Gao, on the basis of the software environment and the hardware environment of e-government, a knowledge management conceptual model composed of a knowledge-collection subsystem, a knowledge organization subsystem and a knowledge application subsystem. There are interdependent and mutually supporting relationships between three subsystems.

Figur.2.4 Knowledge Management Model of e-Government



Source: Knowledge Management and e-Government, Zhitian Z. and Feipeng G. (2007).

2.15.1. Knowledge Collection Subsystem

Knowledge collection subsystem is an input system of e-Government knowledge management system, which is the foundation of knowledge management. The system focuses on the field of government knowledge. Its initial collection contains a wealth of knowledge and the information resources need to be identified and used by the other two systems. The subsystem includes knowledge recognition, knowledge acquisition and knowledge accumulation three knowledge management processes.

- ❖ **Knowledge Recognition.** Knowledge recognition is the first step in knowledge management. From the perspective of cognitive theory analysis, knowledge can be divided into explicit knowledge and tacit knowledge. Explicit knowledge can be used strictly to the data, formulas, language, and other expression symbols easy to be stored, exchanged and shared. Tacit knowledge is highly personalized and hard-formatted knowledge and it is rooted in personal experience, intuition, insight and values. Both overt or tacit knowledge is not the natural visibility, therefore, we must identify, make it transparent to create and lay the foundation for applications Shu-bsien Liao(2003).
- ❖ **Knowledge Acquisition.** Knowledge acquisition refers to access to knowledge from the external of the organization and to make it easy to use for the organization. e-Government means access to knowledge through database, Internet and networking forum, BBS, BLOG, tele-education, search engines, network data mining Shu-bsien Liao(2003). In this regard Knowledge management of e-Government is to capture the necessary knowledge and skills needed in government affair, does not have to care about where the knowledge is. It can easily access knowledge in a computer database, flows on the network and in the server to help the government to achieve maximum efficiency and scientific decision-making.
- ❖ **Knowledge Accumulation.** Knowledge creation process of exporting the knowledge assets must be precipitated and stored in electronic government to be conducive to knowledge application and knowledge innovation. The dominant knowledge systems produced through knowledge creation process and portfolio formation, can be stored in the e-Government knowledge base in the form of documents. The biggest feature of tacit knowledge is hardly clear expressed by the symbol system. The governments need to particularly concern the staff

holding tacit knowledge, in an effort to cultivate their loyalty and the sense of belonging, and to encourage them to accumulate knowledge.

2.15.2. Knowledge Organization Subsystem

Knowledge organization subsystem is the core of knowledge management, to orderly process medley of knowledge. The subsystem is a bridge connecting knowledge collection subsystem with knowledge application subsystem, and its function can directly influence the function of knowledge application subsystem, even the success of the entire knowledge management system. The subsystem includes knowledge classification, knowledge depot and knowledge map, three knowledge management processes.

- ❖ **Knowledge Classification.** Knowledge classification is the base of effective application of knowledge. In the e-Government activities, a lot of complicated knowledge will be produced. Knowledge classification according to contents and application is very useful for Civil servants in the administrative work, to rapidly get the retrieval of necessary knowledge and improve knowledge searching efficiency. They can further find or create new knowledge through knowledge mergers and knowledge decomposition.
- ❖ **Knowledge Depot.** Knowledge depot is the government's electronic information databases. Knowledge depot generally include 3 kinds of contents: First, the government's electronic knowledge resources, including the institution, experience and wisdom of management and operation of e-government; Second, the internal organization of resources, including the e-Government organizational structure, regulations, internal research literature, the department's internal information, etc.; Third, intelligence resources, including international policy developments, policy feedback, user demand and other details. In short, knowledge depot will make the organization's information and knowledge orderly, be conducive to the sharing and exchange of knowledge, the collaboration and communication among organizations.
- ❖ **Knowledge Map.** Knowledge map is the navigation system of electronic knowledge resources, which provides a learning environment and the road, to help staff and community users quickly find the necessary knowledge resources, show the distribution of resources of the whole e-Government knowledge. Knowledge Map can also provide the system of

knowledge depot browse and navigation for users, describe the flow of knowledge in e-government, express the knowledge of administrative process through charts. Knowledge map is a guide to the knowledge depot, as well as the key link constituting the knowledge management system.

2.15.3. Knowledge Application Subsystem

Knowledge application subsystem is an output system constituting the knowledge management system. Its user interface is the ultimate visible part. The subsystem colligates the results of the other two subsystems, clean up and organize related information, provide it to different power users. It can also create new knowledge on the basis of the other two subsystems. The subsystem includes knowledge sharing, knowledge exchange, and knowledge creation three knowledge management processes.

- ❖ **Knowledge Sharing.** Knowledge sharing means that the information and knowledge of electronic government is as open as possible, so that each of a public officer has access to and uses the knowledge and information provided by other persons. Knowledge is power; this power is not from confidential knowledge, but from sharing knowledge. The biggest difference between knowledge and other curable material is its enlarging role through sharing. Owners will not lose their knowledge through sharing and free access to knowledge; instead knowledge will become more and more, access to the innovation effects of knowledge accumulation. In addition, knowledge is subjective; a kind of knowledge or experience may be not valuable to a person, but is very valuable to another person. Knowledge sharing is very conducive to the progress of the whole learning organization.
- ❖ **Knowledge Exchange.** The key point of knowledge management is to establish the organizational structure and culture in e-Government convenient to exchange knowledge for officials, and make the exchange and communication efficient through certain mechanism Maryam A, Dorothy E L (2001) and Juan C. Fernandez (2002). Knowledge and information will be improved and the knowledge owner will be inspired in the process of integration and exchange. Another function of knowledge exchange is to spread implicit knowledge in certain degrees.

❖ **Knowledge Creation.** Knowledge can be created through the interaction between visible knowledge and implicit knowledge, which is known as Knowledge conversion. In the e-Government environment, knowledge creation is a process of knowledge conversion, which includes four models (the socialization, externalization, combination and internalization). Specifically, socialization is referring to transformation from tacit knowledge to tacit knowledge; it is a process of sharing of experiences and pooling tacit knowledge. Externalization means that tacit knowledge converts to explicit knowledge, which is a process expressing tacit knowledge by concepts and language. Combination refers to create new knowledge through screening, adding, composition and classification, which is a process synthesizing the explicit knowledge system through the independent composition of explicit knowledge Shu-bsien Liao(2003). Internalization is a process the individuals absorbing explicit knowledge and converting it to tacit knowledge.

As shown above numerous researchers have proposed several KM models. Many of these models are prescriptive, providing direction on the type of KM procedure without providing specific details on how those procedures should be accomplished and lack some of KM activities which is necessary to evaluate the extent of KM practice in Ethiopian e-Government portal. Because of this reason and the nature of this research the researcher will adopt the model of Zhitian Zhou, et al. (2007). Which is best suited for this research purpose and encompass all KM elements which is necessary to evaluate the extent of KM practice in Ethiopian e-Government portal.

2.16. E-Government Portal Best Practices

As highlighted above in section 2.8 the UN survey revealed that the Republic of Korea is the world leader followed by the Netherlands and other eight countries. Moreover, according to the survey report the following are some of the countries who have shown notable performance and/or features integrated in their government portals from different region of the world.

2.16.1. Republic Of Korea: World Leader in e-Government Development 2012

The Government's main website (<http://www.korea.go.kr>) has developed into an integrated portal where citizens can find almost every service they want, on both national and local level. The main government portal is a gateway to services through multiple channels, by theme and subjects; citizens can also have a customized channel by inputting their own age, gender and services of interest. Back-office integration across many departments brings together a powerful search engine offering advanced categorizing function, which can list results by websites, services, and news, including at the local level.

A key reason for continued leadership in world e-Government progress is significant development and provision of downloadable mobile applications that are available from its national portal. The cross sector mobile apps for citizens are both iPhone and android compatible including for e-Learning, which allows students to learn on their mobile phone in areas such as social studies, math and English. For employment opportunities, Jobcast provides information on availability of jobs in the Republic of Korea along with the relevant legislation governing labour.

2.16.2. USA.Gov Leads in Integrated Portals

Usa.gov is perhaps the best example of a highly integrated portal. It is carefully organized, starting from a sufficient level of abstraction for the citizen who does not need to know, say, exactly for which form he/she is looking. Yet by drilling down through increasing levels of specificity, the citizen ultimately and with remarkably little effort arrives at a very specific item or service. This process is aided on virtually every page by "Popular Topics," "In Focus," and other helpful boxes that bubble up content that is likely to be relevant. In the event that the citizen cannot find what he/she needs by browsing, a comprehensive, detailed and searchable FAQ is available. Failing that, the citizen can use the general advanced search feature, which indexes dozens of federal and even state and municipal websites. Finally, the site provides myriad ways for the citizen to communicate with the government on any topic, ranging from technical support for the site to substantive policy issues.

2.16.3. Seychelles Portal: Leads in Eastern Africa

The Government of Seychelles took the initiative to enhance its e-Government service offerings in line with an integrated and interdependent strategic approach, which focuses on ICT infrastructure, legal and regulatory framework, human resource development, ICT industry and improvements in the efficiency of the government. It aims at making “Seychelles globally competitive, with a modern ICT enabled economy and a knowledge-based Information Society where strong, efficient and sustainable improvements in social, economic, cultural, good governance and regional integration are achieved through the deployment and effective application of ICT”. Seychelles hosts its integrated portal (<http://www.egov.sc>) through its SeyGo Connect for residents, citizens and businesses which branches out into an e-services gateway, providing a one stop-shop services ranging from thematic, sectorial, life cycle services to single sign-on tailored for the individual user.

2.16.4. Mexico Portal: Alternative Approach

Mexico takes an alternative approach to e-services. Its portal (<http://www.gob.mx>), simply speaking, is a search engine with integrating services that respond to users’ specific search criteria. It contains information filtering features that allow users to filter content in order to narrow down searches for specific information. The portal has the ability to filter information by image, videos or news, following the style of Google’s main filtering features, as well as being able to filter through other themes such as laws at state and federal levels. Users are also able to filter information that narrows down search results to those that are near the user. A translation feature allows users to translate their searches into the various languages that Google offers. Another feature is ‘The Government Recommends’ side-bar that suggests useful pages to users so they can quickly gain access to information.

2.16.5. Tunisia National Portal

The national government portal (<http://www.tunisie.gov.tn>) provides a ‘Most Used Services’ section on the home page that provides quick access for citizens to information on services such as obtaining a driver license, and acquiring personal and home loans. Information regarding

government services is also laid out by sector, providing quick and efficient access to comprehensive data.

2.16.6. Kazakhstan Portal: Integrated Services

The official homepage (<http://www.e.gov.kz>) provides more than 1300 codes, laws, decrees, and orders with all legislation integrated into the main site. Each e-service has several icons stating whether this service can be paid online or obtained through electronic signature. There are other convenient sites such as ePay (<http://www.epay.gov.kz>) and eLicense (<http://www.elicense.kz>) where citizens can get specific services and payments. Another site, (<http://www.goszakup.gov.kz>), offers participation online in almost all procurement procedures. The main driver behind the improvement in services is the electronic public procurement portal featuring digitization of 59 e-services of state bodies, the e-license database, frequent open public web conferences, often with the with active participation of high-level government officials, and blog platforms in many ministries and agencies.

2.16.7. China Portal: Enhancing Transparency and Openness

China has been making efforts to improve the level of its Government portal by providing comprehensive information, more integrated services of different sectors, and interactions between government officials and citizens. One thing worth mentioning is China's endeavor to promote the open government initiative. In order to improve transparency, there is a separate section on the government's main portal (<http://www.gov.cn>) that enables citizens to search for and refer to archived policy documents and notifications of different sectors.

2.16.8. Brazil Portal: Expanding Services

Brazil's national portal (<http://www.brasil.gov.br>) has looked to further build upon its strengths by offering greater access and improvement of services to citizens and increasing transparency of government actions. The layout of the national portal is thematic with a 'For' section, which targets the student, worker and business person with a supplemental 'About' section differentiated by topics such as health, education, environment and citizenship. Government services, such as payment of income taxes, fines, utilities and application for social welfare

benefits, are easily accessible in an A to Z search from the national portal, which connects users to the various ministries and government departments. An innovative feature of the national portal is ‘MeuBrasil’ (My Brazil), where users can personalize queries by choosing their favorite themes that allow updated and user-tailored content. An innovative approach is noticeable on the linked Ministry of Health portal, (<http://portal.saude.gov.br/portal/saude/default.cfm>). Here, through a live webcast, radio users can receive the latest news and information on health issues while a micro site offers health crisis information. At the time of assessment, available material related to dengue fever, informing on symptoms and methods of prevention and providing a map showing the risk of the disease in each state of the country.

2.16.9. India Portal: Looks to Sustainable Development by Including All

In addition to the national portal (<http://www.indg.in>), the Government has also developed an India Development Gateway. This is “the National portal of India developed as a single-window access to information and services, with the specific objective of reaching the ‘un-reached’ rural communities of India, especially women and the poor. It catalyzes the use of ICT tools for knowledge sharing, leading to development.” (http://www.indg.in/india/about-c-dac/view?set_language=en). A variant of the National Portal, but targeted towards a specific group of people, this site contains specific topics aimed at the rural poor: agriculture, rural energy, etc., and features forum discussions and an “ask an expert” section. Making it available in English and in eight local dialects, the government’s main objective is to stimulate women, the poor, and people in the remote rural areas to use technology to their own advantage.

2.16.10. Pakistan in the Forefront of e-Passport

In Pakistan, the Ministry of Interior and the National Database and Registration Authority (NADRA) (<http://www.nadra.gov.pk>) have introduced a chip-based e-passport that would help further secure the identity of the citizens, making Pakistan one of the first countries in the world to issue the Multi-biometric e-Passport compliant with ICAO standards. The e-Passport solution uses security features on the data page supported by sophisticated technology and business logic,

which makes it one of the most modern passports of this era. NADRA has already issued the passports to millions of Pakistani citizens.

2.16.11. Israel Portal: Consolidates e-Services

Israel has improved its e-Government development and has now become the leading country in the Western Asia region. The Government portal (<http://www.gov.il/firstGov>) is well organized. Citizens can access information on government services in three different ways: by target audience, topics and life events. Citizens can also use the portal's electronic identity management feature 'My Gov' to filter content that interests them and to access the full range of online government services and make online payments.

2.16.12. Qatar's Hukoomi: Working Towards Integration

Hukoomi, Qatar's official government gateway (<http://portal.www.gov.qa/wps/portal/frontpage>) that integrates government services, programs and initiatives. Among its goals are to improve efficiency, responsiveness to users and accessible to all. Accessible through the Internet as well as a mobile device, Hukoomi integrates back-office processes to allow easy access to over 100 topics and articles with detailed information about Qatari law and society. The portal provides direct links to sub-portals, such as on the employment and recruitment service and e-tendering; and links to application forms from a wide range of government ministries, agencies and public services.

2.16.13. Colombia: e-Government Portal

Colombia's government portal contains numerous participation features (E-participation) for citizens to use to engage with government. Citizens can employ tools such as online forums, blogs and online polls. The portal also allows users to participate through social networking features such as Facebook, Twitter, Wordpress, YouTube and Flickr, where they can post comments and express their views.

Chapter Three

3. Methodology

3.1. Study Design

Since the study was guided by the KM model to e-Government, the researcher observed that this Owing to the fact that there has not been any similar study observed in Ethiopia (as far as the researcher materials searching are concerned), the researcher realised that in order to arrive at a deeper understanding of KM for e-Government in the research area, a combination of both quantitative and qualitative research techniques into a mixed research design approach was essential. This was done considering the argument by Maree (2007) that combining qualitative and quantitative research methods allows for a more complete analysis of the research situation.

Since the study was guided by the KM model to e-Government, the researcher observed that this could best be addressed through a survey questionnaire and evaluation checklist, it was also noted that the survey and checklist might not fully reflect the underlying factors which prevail in the research area. So the researcher decided to include a qualitative research approach in the form of interviews in order to capture other KM and e-Government portal issues to supplement the finding which the survey questionnaire and evaluation checklist would fail to capture.

The key important benefit offered by the application of the quantitative-qualitative paradigm (mixed research design) was the issue of triangulation. According to Babbie *et al.* (2006), triangulation is the use of multiple methods where the researcher combines different methods and investigations in the same study, this allowing the observers to partially overcome the deficiencies that flow from one research design method.

3.2. Research Population

The aim of this study is evaluating KM implementation of Ethiopian e-Government portal and application of ICT for KM practice and its contribution to enhance government electronic service delivery of ministry level organization. For this study Ethiopian Ministry level offices were selected to undertake the research. The main reason behind selecting ministry level organizations

as per the information gathered and from researcher familiarity about the area; is that they are the first organizations who have been participated in both pre-capacity building for e-Government readiness programme and the first in incorporating some of their information service delivery through e-Government portal. According to the information gathered from Ethiopian e-Government portal, general information on the number of ministry level Government organization that currently operating are 15. For this study the target population is all 15 Ethiopian ministry level government offices (ICT directorial staff) who are currently operating in e-Government portal.

3.3. Sampling Techniques

Due to cost related to budget, time, equipment and material constraints the researcher selected appropriate samples from the general population. Since there are around 15 ministry level organizations which can be incorporated in this study, it was imperative to select particular entities upon which the respondents for the study would be drawn.

The sampling approach employed in this study was purposive with some elements of proportional stratified and simple random sampling. In this respect, non-probability sampling methods were complemented by probability sampling techniques where necessary. In this study sampling was basically influenced by the relevance of the study elements in terms of the research objectives. Thus, purposive sampling was favored in this study as it allowed for variation and enabled particular choices to be made relative to a particular research situation (White, 2000).

Since the main purpose of the research is to investigate the extent of KM practice in Ethiopian e-Government portal and to examine the extent of ICT application and its degree of contribution to e-Government portal features, the organization who participated in the research should be the one in which knowledge played a great role or intensively use knowledge to perform their day to day activities with ICT application. That is way the researcher prefers to use purposive sampling. Due to the nature of each individual organization ICT directorate staff size, the proportional stratified sampling technique was employed.

3.3.1. Sampling

This research focused on ministry level Ethiopian government organization. These government offices were purposively selected to participate in the study by taking in to consideration of the following reason: their primary participation in pre-capacity building for e-Government readiness programme, as the first in incorporating some of their e-information service delivery through portal, their current operating in e-Government portal, their relatively intensive application of ICTs for KM related practice, the availability of relevant departments for research focus, by observing the availability of trained professionals or capacity of their key personnel (knowledge workers).

In order to arrive at an in-depth investigation of KM implementation of e-Government portal, the portal was evaluated based on the KM model for e-Government which is adopted for this study and is developed by Zhitian Z., Feipeng G. (see section 2.15). To determine the extent of KM implementation in Ethiopian e-Government portal, to examine the extent of ICT application for KM practice and its contribution to support for e-Government portal enhancement, sample was taken from the target population and then sampling techniques were implemented for both qualitative and quantitative study.

ICT directorate staffs were selected purposively from each selected research entities to conduct quantitative data gathering. The ICT/e-Government director or delegated personal or in some research entities management level position holder who work closely with ICT team were contacted for qualitative study (interview) and one e-Government focal person from all ministry offices were also contacted for evaluation of Ethiopian e-Government portal using portal evaluation checklist. Based on the scope and research interest, for this study the target population was ministry level Ethiopian government offices which are currently operating in e-Government portal. As highlighted above a combination of probability and none-probability sampling were used to draw sample and select among 15 research entities as indicated in table 3.1 below.

Table 3.1: Sampling Research Entities:

Offices	Respondents	Sample
❖ All Ministry offices that are currently participating in portal.	❖ ICT Director, ❖ e-Government focal personal ❖ IT and related professionals (who are working in ICT Directorate)	❖ Seven ministry offices was sampled to represent; ❖ Respondents drawn from all the seven offices to complete question, evaluation checklist and for interview.

The respondents identified according to table 3.1 are the key knowledge workers in the research entities. In seven research entities, the ICT Director or delegated management level positioned staff of these entities participated in the interview session with the researcher while the identified respondents (as knowledge workers) completed a survey questionnaire and e-Government focal personal from each selected ministry offices participated in evaluating portal using evaluation checklist. The interview was conducted to validate the research data provided by the knowledge workers and enhance the depth of the findings. The Ministry offices and respondents were sampled based on the following sampling procedures.

3.3.1.1. Sampling Procedure to Select Ministry Offices (Strata)

Step 1: the Ministry offices were stratified according to their pre-organization. All ministry offices currently incorporated in Ethiopian e-Government portal are target organization. This makes 15 strata.

Step 2: the researcher decided on a sample of seven ministry offices (strata).

Step 3: by employing lottery method seven strata was drawn into the sample namely MCIT, MoFED, MoT, MoI, MoLSA, MoE and MoFA.

3.3.1.2. Sampling Procedure to Select Respondents from Each Stratum

The targeted respondents for the survey questionnaire and evaluation checklist process were the IT and related professionals and e-Government focal personal working in each of the sampled organization ICT Directorate. Proportional stratified sampling technique was employed and samples were down from the strata based on proportional allocation under which the sizes of the samples from the different strata are kept proportional to the sizes of the strata for the completion of the research questionnaire in each stratum. Referring to C.R. Kothari (2004) the following calculation is performed to determine the sample size from each stratum.

P_i represents the proportion of population included in stratum i,

n represents the total sample size,

N represents a total population size of stratum,

The number of elements selected from stratum i is $n \cdot P_i$.

Based on the sample size table the researcher want a sample of size $n = 80$ to be drawn from a population of size $N = 105$ it is because of many researchers (and research texts) suggest that the first column within the table should suffice (Confidence Level = 95%, Margin of Error = 5%).

Which is divided into seven strata of size $N_1 = 15$, $N_2 = 51$, $N_3 = 13$, $N_4 = 5$, $N_5 = 6$, $N_6 = 7$ and $N_7 = 8$ of MCIT, MoFED, MoT, MoI, MoLSA, MoE and MoFA offices respectively. Adopting proportional allocation, the researcher has got the sample sizes as under for the different strata.

For strata with $N_1 = 15$, we have $P_1 = 15/105$ and hence $n_1 = n \cdot P_1 = 80 (15/105) = 11$. Similarly, for the other strata the sample size is prepared in the following table.

Table 3.2: Sample size from each stratum

Strata <i>i</i>		N	n	$P_i(N/105)$	$n=(n*P_i)$	Collected Questioner
MCIT	N1	15	80	0.14	11	10
MoFED	N2	51	80	0.47	38	32
MoT	N3	13	80	0.12	10	9
MoI	N4	5	80	0.05	4	4
MoWSA	N5	6	80	0.06	4	4
MoE	N6	7	80	0.06	5	5
MoFA	N7	8	80	0.10	8	8
Total		105			80	72

From each stratum the researcher selected units that are convenient, close at hand and easy to reach for completion of research questionnaire. Convenient sampling technique was used.

Regarding interview and portal evaluation, from each ministry offices one respondent who is at management level position was purposively selected for interview. And also one knowledge worker who is the focal person for e-Government portal from each seven strata ICT Directorate was purposively selected to evaluate his/her ministry office portal which is integrated in Ethiopian e-Government portal. The researcher employed purposive sampling techniques to particularly select respondents for both interview and a given ministry e-Government portal evaluation. This is because the researcher believed that involving technical personal who is directly responsible for portal and actually working on it, provide true reflection of the current KM implementation status of the portal as well as to get complete picture of efforts made on e-Government portal and organization ICT application with regard to KM implementation the researcher contacted the respective management level knowledge worker. So that for this particular part of the study sampling was not influenced by the convenience of accessing the study elements (respondents), but was influenced by the relevance of the study elements in terms of the research objectives.

3.4. Data Collection

Due to the nature of the research design adopted for this study, both quantitative and qualitative data collection methods were employed to collect primary and secondary data. The primary data for this study was collected by employing a structured survey questionnaire and evaluation checklist from knowledge workers (e-Government focal personal, who are technical personals and actually given the responsibility of managing their ministry offices e-Government portal) in the sampled organizations. Moreover, interview was conducted with ICT/e-Government director or in some research entities management level position holder. So the researcher employed questionnaire, checklist and interview to collect primary data from the research entities. In addition to that, secondary data sources especially documents for this study were examined, documents such as Ethiopian e-Government Strategy, Implementation Plan and different reports regarding e-Government portal to enrich the primary data.

3.5. Data Collection Process

In order to collect data from the sampled organization, the researcher first acquired formal letter from his department and then contacted organizations in person and requested permission from management of all sample organizations. This process took between two to three months to finalise. Realising that some entities might be unwilling to participate in the study, the researcher initially identified as many entities as possible from ministry office level government organization.

The survey questionnaire and interview guide were attached with request letter for permission/cooperation to conduct the research. After receiving confirmation that the entities permission for the study to commence, the researcher visited the entities to deliver individual survey questionnaires and evaluation checklist to the identified number of professional staff and conduct one-to-one interviews with management level personals. The respondents were given at least a week to complete the survey questionnaires and evaluation checklist. The researcher personally collected all survey questionnaires and checklists from the research entities.

3.6. Validity and Reliability of the Instruments

The validity and reliability of the instruments were determined by the researcher before they were administered. The drafts for the two sets of assessment tools such as survey questionnaire, evaluation checklist and interview guides were first sent to experts in the area of research, Knowledge Management and evaluation within Jimma University, Information Science department, who read and made necessary changes before the instruments were pre-tested at MCIT, being one of the ministry level office involved in the study population. The drafts were then pre-tested on two knowledge worker, one portal administrator and one on management level staff. The pre-test groups were completely different from the actual group members used in the main study. After the pre-test, the instruments (appendices A, B and C) were produced after corrections made during the pre-test that were based on questions raised by the respondents.

Furthermore, the survey questionnaire and evaluation checklists items with missing answers were not considered. The combination of the quantitative and qualitative research design techniques ensured that the measurement instruments remained valid. Babbie E. (2006) indicated that the best solution towards the construction of valid measures is to use several different measures in order to tap the different aspects of the measured phenomenon. This is the reason why the survey questionnaires and evaluation checklist have been used in conjunction with interviews and document analysis in this study.

3.7. Data Analysis

The study employed the qualitative and quantitative components to investigate the extent of Knowledge Management implementation of Ethiopian e-Government Portal and to identify direction to enhance the portal functionality. Kanbur (2001) stated that there was a growing recognition on a sensible combination of qualitative and quantitative methods of data analysis that can help solve problems associated with each type of method taken separately. It was in view of these considerations and in line with the quantitative-qualitative research design paradigm adapted in this study, both quantitative and qualitative data analysis methods were employed.

3.7.1. Quantitative Data Analysis

Data collected using the structured questionnaires and evaluation checklist was analysed using descriptive statistics methods. For frequency count distribution, tables was used and for graphical representations of data, pie-charts and column chart were used in this study for the purposes of analysing responses provided through the survey questionnaires and evaluation checklist. After collecting the research data through the survey questionnaire and evaluation checklist, Statistical Program for Social Sciences (SPSS) and for interactive presentation Microsoft Excel software packages was used for computation and production of table and chart.

3.7.1.1. Evaluation of e-Government Portal

Ethiopian e-Government portal was thoroughly evaluated in terms of Knowledge Management elements based on the knowledge management model of e-Government portal adopted for this study (see section 2.15) which is an extensive model consisting of three KM process in e-Government with detail supporting activities namely knowledge collection subsystem, a knowledge organization subsystem and a knowledge application subsystem. Based on the model subsystem, sub-element discussion and through literature review, the checklist was developed with detail items or KM features identified for each subsystems/sub-elements to evaluate the extent of KM implementation in Ethiopian e-Government portal and then the quantitative data is collected and analysed using descriptive statistics methods.

3.7.2. Qualitative Data Analysis

Booth et al (1998) urged that qualitative method was often more appropriate for capturing the social and institutional context of people's lives/work than the quantitative method. It was in view of these considerations that the study employed the qualitative components for the study. The interview transcripts was analysed based on the main research constructs with the survey questionnaires and evaluation checklist. The main aim of the interviews was to substantiate and supplement the findings from the quantitative research process.

3.8. Documents Analysis

To enhance the finding through questionnaire, evaluation checklist and interview, the researcher examined different secondary data sources such as Ethiopian e-Government Strategy, e-Government Implementation Plan, and different reports regarding e-Government portal, relevant documents for the research.

3.9. Ethical Considerations

The researcher maintain due care and diligence to ensure that the information that the respondents provided will remain as confidential as possible. In this regard, the identity of the responding professionals will be protected by withholding the names of persons who participated in the study. All data were collected solely pertain to the key research objectives of this study and to answer three research questions mentioned above. The responding companies also have an opportunity to access the research results once the data analysis process complete.

Chapter Four

4. Result and Discussion

This section presents the statistical data analysis on the study. It is organized using headings and subheadings under response rate, evaluation of Ethiopian e-Government portal, application of ICTs for KM practice and contribution of ICTs and its support to enhance portal.

Arising from the data collected through the survey questionnaires and evaluation checklist, the research results are presented in the form of tables, pie-chart and columnar chart. The analysis is also enriched by interviews. It should be noted that in the presentation of research data from the interview process and portal evaluation, the participating entities are not referred by names, but the ministry office name is used. (See Appendix A for evaluation checklist, Appendix B for survey questionnaire, Appendix C for interview guide).

4.1. Response Rate

Arising from the quantitative research data, the researcher provides a biographical description of the respondents in terms of profession, higher academic qualifications, work experience, age and gender as presented in tables 4.2, 4.3, 4.4, 4.5 and 4.6 below:

4.1.1. Ministry Offices and Subjects of the Study

4.1.1.1. Questionnaire Participants of the Study

Of the 7 ministry offices (Ministry of Communication and Information Technology (MCIT), Ministry of Finance and Economic Development (MoFED), Ministry of Trade (MoT), Ministry of Industry (MoI), Ministry of Labor and Social Affairs (MoLSA), Ministry of Education (MoE) and Ministry of Foreign Affairs (MoFA) ICT Directorate) 80 subjects involved in the study. Due to respondent unwillingness to complete questionnaire and continues long time unavailability in their office, about eight (8) questionnaire was not responded, six from MoFED, one from both MCIT and MoT. Nonetheless, 72 (90%) subjects responded to the questionnaires distributed and collected. This figure comprised of 63(87.5%) Technical Staff/Worker and 6(8.3%) Team Leader, as shown in table 4.1 below. Among 87.5% of Technical Staff (professionals) 40.3%

(29), 12.5% (9) and 11.1% (7) were the highest respondents from MoFED, MoT and MCIT respectively. This is because they have relatively large staff number and highly cooperative to the study, while 3 (4.2%) as the lowest respondents from MoI. This could not be surprising because MoI happened to be one of the newly established ministry offices and that had very kin in implementing ICT and even on ICT team establishment.

Table 4.1: Ministry Offices and Questionnaire Participants Involved in the Study

Organization	Manager		Team Leader		Technical Staff		Consultant		Total	
	Count	Percentage	Count	Percentage	Count	Percentage	Count	Percentage	Count	Percentage
MCIT	0	-	2	2.8%	8	11.1%	0	.0%	10	13.9%
MoFED	0	-	1	1.4%	29	40.3%	2	2.8%	32	44.4%
MoT	0	-	0	-	9	12.5%	0	-	9	12.5%
MoI	0	-	1	1.4%	3	4.2%	0	-	4	5.6%
MoLSA	0	-	0	-	4	5.6%	0	-	4	5.6%
MoE	0	-	0	-	5	6.9%	0	-	5	6.9%
MoFA	1	1.4%	2	2.8%	5	6.9%	0	-	8	11.1%
Total	1	1.4%	6	8.3%	63	87.5%	2	2.8%	72	100%

The second most participating respondents were team leaders, 6 were involved in the study. The highest again was from both MCIT and MoFA that had 2 respondents from each, equally and 1 from both MoFED and MoI. However, it was surprising having zero (0) respondents as the lowest team leader responses from MoT, MoLSA and MoE. Only one management level ICT staff responded for research questionnaire from MoFA. Regarding consultants, only two respondents were found from MoFED. Consultants are the one who are highly experienced professional in the field of information technology and hired to accomplish specific project tasks together with other permanent ICT staffs.

4.1.2. Professions of Respondents

Table 4.2: Respondents Involved in the Study Based on their Profession

Profession	Frequency	Percent
Information Technology	65	90.3
Business Administration	3	4.2
Statistics	1	1.4
Others	3	4.2
Total	72	100.0

Among the 72 respondents involved in the study, table 4.2 above shows the professions of ICT staff in all 7 ministry offices were consisted from four main categories. The professions of ICT staff according to table 4.2 Information Technology professionals 65 (90.3%), Business Administration 3(4.2%), Statistics 1(1.4%), and others who are Electrical Engineers 3(4.2%). The researcher found out that both Business Administration and Statistics professionals has trained and certified with Cisco, A+ and Microsoft certifications, Website development and participated on e-Government portal readiness capacity building program. According to Bryan Bergeron (2003) in the realm of Knowledge Management, employees and managers who contribute significantly to the intellectual capital of the company are called knowledge workers. He also said “The typical knowledge worker works in intellectual property, engineering, programming, and other occupations that involve more thought than physical labor, managers at all levels can be considered knowledge workers”. So the researcher considers all the respondents including manager and team leaders as a knowledge worker.

4.1.3. Academic Qualifications of Respondents

Table 4.3: Academic Qualifications of Respondents Involved in the Study

Qualification	Frequency	Percent
Diploma	18	25.0

Bachelor's Degree	51	70.8
Master's Degree	3	4.2
Total	72	100.0

While the researcher acknowledges that knowledge workers are generally highly knowledgeable and competent, it is interesting to note from table 4.3 that the ministry offices with the highest percentage of highly qualified respondents has Bachelor's Degree with 70.8% (51) and 25.0% (18) respondents were diploma holders from different disciplines that comprises Information Technology and Business Administration. Only 4.2% (3) respondents have postgraduate master degrees. Surprisingly, the result shows that no knowledge Worker with PhD in information science/system or in any other discipline. It may not be surprising that no respondents were found with Knowledge/Information Management qualification. This is because of the fact that the KM field of study is new for our country.

4.1.4. Experience of Respondents

Table 4.4: Experience of Respondents Involved in the Study

Work Experience	Frequency	Percent
Less than 4 years	18	25.0
5 - 10 years	43	59.7
11 - 15 years	4	5.6
Above 15 years	7	9.7
Total	72	100.0

Of the 72 respondents in table 4.4, 43 (59.7%) were with work experiences between 5-10 years, 18 (25.0%) less than 4 years, 7 (9.7%) above 15 years and 4 (5.6%) of the respondents between 11-15 years of working experiences.

4.1.5. Age Range of Respondents

Table 4.5: Age Range of Respondents Involved in the Study

Age Category	Frequency	Percent	Cumulative Percent
25 years and younger	13	18.1	18.1
26 to 35 years	39	54.2	72.2
36 to 45 year	18	25.0	97.2
46 years or older	2	2.8	100.0
Total	72	100.0	

As shown in the table 4.5, of the 72 respondents, 39 (54.2%) were within the age range of 26-35 years, i.e., 54.2% followed by the age range 36-45 years 18 (25.0%) and 25 years and younger 13 (18.1%), whereas, the least 2 (2.8%) were 46 years or older. The result shows that the ministry offices were concentrated with staff with age range below 35 years 72.2%, which depicted that availability of potential and young knowledge worker. The problem is as confirmed by MCIT 2011 report, governments across the world face the issues in retaining talented IT staff due to small IT staff size within ministries, available skill sets are not diverse, as a result evaluating and working on diverse technologies and solutions is difficult.

4.1.6. Gender of Respondents

Table 4.6: Gender of Respondents Involved in the Study

Gender Category	Frequency	Percent
Male	50	69.4
Female	22	30.6
Total	72	100.0

As highlighted in the above table 4.6, it is apparent that both gender categories are represented in all the research entities except MoFA. It is because of no female ICT staff members in MoFA.

The table shows that the male respondents constitute 69.4% and their females' counterparts were 30.6% respondents.

4.2. Interview and Portal Evaluating Participants of the Study

From each ministry offices, one respondent who is at management level position and one knowledge worker who is the focal person for e-Government portal selected for interview and portal evaluation. Accordingly fourteen (14) subjects (seven interviewee and seven portal administrators) involved in the study. Nonetheless, because of MoI, ICT team leader unavailability in the office because of busy work schedule, six (6) interview sessions conducted successfully. And also because of busy work schedule the researcher made phone interview with MoLSA delegated staff. All seven (7) of the focal personal responded to the evaluation checklist.

This brought the total sampled subjects to 94 respondents from all ministry offices. Including 72 collected questionnaires, 6 interviews and 7 evaluations based on checklist, the total number of response was 85 (90.43%) as shown in table 4.7 below excluding 9 (9.57%) non-response rates. Considering the proportional involvement of the ministry offices and the sample size that was based on the sampling techniques highlighted in the methodology for this study, the researchers considered the 85 (90.43%) respondents as representative and reasonable enough to continue with the study for generalization.

Table 4.7: Ministry Offices and Questionnaire, Interview, Checklist Evaluation Participants Involved in the Study

Ministry offices	No. of responses for			
	Questioner	Interview	Checklist (evaluation)	Total
MCIT	10	1	1	12
MoFED	32	1	1	34
MoT	9	1	1	11
MoI	4	-	1	5
MoLSA	4	1	1	6
MoE	5	1	1	7

Ministry offices	No. of responses for			
	Questioner	Interview	Checklist (evaluation)	Total
MoFA	8	1	1	10
Total	72	6	7	85

4.3. Evaluating e-Government Portal from KM Perspective

The researcher adopted the knowledge management model of e-Government to evaluate the extent of KM implementation in Ethiopian e-Government portal. Based on the model three subsystems and nine sub-categories/element or KM processes (three in each subsystems) such as knowledge collection subsystem (knowledge recognition, knowledge acquisition and knowledge accumulation), knowledge organization subsystem (knowledge classification, knowledge depot and knowledge map) and knowledge application subsystem (knowledge sharing, knowledge exchange, and knowledge creation) checklist items were developed and used to evaluate the extent of KM implementation in Ethiopian e-Government portal. Items in the checklist corresponded to the model's subsystems and sub-categories. As Goh, D.H. et. Al (2006) and Stufflebeam, D.L. (2000) argued that checklists are considered valuable evaluation devices and have advantages such as reducing errors of omission, ensuring no feature overshadows another due to biases, and being easy to understand and use (cited in Goh D.H. et. al., 2008)

The development of checklist, including the elimination and inclusion of items was guided by functional and technical features that facilitate KM on the portal with reference to the comprehensive coverage of all areas identified in the model except knowledge recognition because this sub-element focuses on identification of tacit and explicit knowledge of an organization that could not be practiced using portal so that no electronic portal features support this sub element.

Given this scope, features such as knowledge recognition sub-element, domain or organization specific services and high level security features were not included in the checklist. The checklist is found in Appendix A.

Each of the portals was evaluated by one selected e-Government portal focal personnel from all 7 research entity reviewers independently. The reviewers were briefed in evaluation checklist elements, familiar with the objectives of the study and understood the concepts underlying KM implementation in portals. Moreover, there was communication between researcher and evaluator through phone about the elements when completing the evaluation checklist. Every item within each sub dimensions was marked as “Available and Functional” if it was found in the portal and functional, “Available but Not Functional” if it was found in the portal but not working and “Not Available” if it was not found. The items present were summed to obtain the level of support for that dimension/sub-dimension. In addition to the availability and functionality evaluation questions, the researcher included open ended questions. This is to ensure that all the gaps that might have happened should the checklist availability and functionality part be used alone would be covered by the data emanating from the checklist open ended questions and interviews as well.

Although some studies have explored the perspectives of KM, according to the researcher material searching is concerned, there has not been any such research evaluating portals based on the conceptual knowledge management model of e-Government that this research adopted. In this regard, some research has explored KM in government portals with a limited focus such as K-ACT model (Goh D.H. et. al., 2008), Knowledge Transfer Model (Azizan, N., Smith, R., and Cooper, V., 2011) whereas the model adopted for this study has complete elements to see every aspect of KM activities with respect to web portal features.

Due to this reason, the researcher couldn't able to compare Ethiopian e-Government portal performance with others, as a result each conclusions made in this research is in Ethiopian context based on the fact that Ethiopian e-Government portal is the beginner, as a web based one stop-shop government electronic service delivery system as well as difficulty in employing diverse technology (lack of technology) and trained professional availability by taking in to consideration of the assessment made by MCIT, in e-Government Strategy and Implementation Plan – Report.

The assessment revealed that almost all the ministries and agencies acknowledge that the biggest challenge to implement e-Government in Ethiopia is limited number of IT professionals to

support Ministries/Agencies in future plans and initiatives, lack of qualified employees, technical experts and capacity building. As the report emphasized, governments across the world face the issues in retaining talented IT staff due to small IT staff size within ministries, available skill sets are not diverse, as a result evaluating and working on diverse technologies and solutions is difficult. Some of the highly qualified staff such as software architects are either too expensive for the ministries to afford or even if they hire them, they are unable to utilize their services to the fullest as the amount of work a typical IT department handles only requires such specialized expertise sporadically (MCIT 2011). The List Developed Countries (LDCs) including Ethiopia remain hampered by a lack of infrastructure, both physical and human. Despite advances in mobile communication lack of functional skills limit user uptake. Lack of access to both ICT and education infrastructure in the developing countries is a major constraint on e-Government development (United Nations 2012).

This section presents the results of evaluation of the 7 ministry level Ethiopian e-Government portals. Some examples of portals that are incorporated in Ethiopian e-Government portal are found in Appendix F. Arising from the data collected through the evaluation checklist, the research results are presented in the form of tables and pie-charts. Hereunder follows the presentation and analysis of the research data of portal evaluation:

4.3.1. Knowledge Management Subsystems Scores

As table 4.8 below shows, the maximum possible score for the knowledge collection subsystems were 196. The mean score for knowledge collection features were 14.57 (52.04%) and 1.00 (3.57%) for availability and functionality and available but not functional features respectively, indicating that on average portals implemented approximately 16 features of the 28, or a difference of 44.39% from the maximum score. Put differently, 55.61% of knowledge collection features were found to be available in Ethiopian e-Government portal, among this only 1 (3.56%) feature was not functional. It appears that Ethiopian e-Government portal collection contains a wealth of knowledge and the information resources more than half (55.61%) based on the model based evaluation, this implies government organizations are attempting to understand their users and acquire and accumulate knowledge to be used for further knowledge organization and application subsystems of the portal. Moreover, as a beginner and first experiencing using

government electronic service delivery in unified form, the researcher believes that this figure is encouraging as well as motivate for feature endeavors.

Again referring to table 4.8 below, the maximum score for the knowledge organization Subsystems were 119. As revealed from the research data the mean score for knowledge organization features were 13.14 and 0.14 for availability and functionality and available but not functional features respectively, suggesting that 13 (78.15%) of the features in this subsystems were implemented. Only 4 (21.85%) features are not available. As discussed by Zhou Z., Gao F. (2007) the features under this subsystem is a bridge connecting knowledge collection subsystem with knowledge application subsystem, and also its function can directly influence the function of knowledge application subsystem, even the success of the entire knowledge management system. This would, in turn, mean that an achievement on knowledge organization subsystem would lead to successful implementation of KM in portal, so that the researcher concludes performance of Ethiopian e-Government portal regarding knowledge organization subsystems were highly inspiring and can be taken as an assurance for success of knowledge enhanced portal and the effort made to enrich portal was considerable.

Regarding knowledge application subsystems, Ethiopian e-Government portal performed poorly. the maximum score was 175 while the mean score for knowledge application features were 11.43 and 2.86 for availability and functionality and available but not functional features respectively, suggesting that only about 57.14% of knowledge application features were available. From which 11.43% available features were not functional, meaning that below half (45.71%) of the knowledge application features were available and functional. As it is an output system, its user interface is the ultimate visible part so as to share, exchange and create knowledge. Without having such a KM feature it wouldn't be possible to exploit the full potential of portal even if the portal has good collection of government knowledge. So that the attention should be given for this KM subsystem in order to enhance and make government knowledge rich portal. Online collaboration for information sharing and knowledge exchange and creation/conversion is by far important for the success of KM implementation of portal.

Table 4.8: Knowledge Management Subsystems Scores

KM Mechanism Score	Features Check	Obtained Score	Percentage	Mean
Knowledge Collection Subsystem (Maximum Score 196 (28 features*7))	Available and Functional	102	52.04%	14.57
	Available but not functional	7	3.57%	1.00
	Not available	87	44.39%	12.43
Subtotal		196		
Knowledge Organization Subsystem (Maximum Score 119 (17 features*7))	Available and Functional	92	77.31%	13.14
	Available but not functional	1	0.84%	0.14
	Not available	26	21.85%	3.71
Subtotal		119		
Knowledge Application Subsystem (Maximum Score 175(25 features*7))	Available and Functional	80	45.71%	11.43
	Available but not functional	20	11.43%	2.86
	Not available	75	42.86%	10.71
Subtotal		175		
Total		490		

4.3.2. Knowledge Collection Subsystem Scores

Further analysis of the sub-elements/category of knowledge collection subsystem scores presented as follows:

4.3.2.1. Knowledge Acquisition or Access

As shown in table 4.9 below, according to the response of portal evaluator, access to portal had perfect score, meaning that Ethiopian e-Government portal is 100% accessible if one made search about Ethiopia, government organization and related area moreover portal are listed on the first page of results listings of search engines and directories. Of 3 portal query features 2 (57.14%) are implemented in the portal and functional, in average only 1 (38.10%) feature is not implemented. According to the detail statistics presented in Appendix G, among 3 query features free text search feature was mostly (85.70%) implemented and the rest were implemented bellow half, 42.90% responses was obtained for both advanced search and search recommendations KM features of portals.

Of each of 4 users driven personalization, accessibility and information presentation KM features, in average 2 of each were implemented (with mean score of 1.86(46.43%), 1.57 (39.29%) and 2.00(50.00%) respectively) and 2 were not implemented/not available (with mean score of 1.86(46.43%), 2.43 (60.71%) and 1.71(42.86%) respectively) whereas insignificant amount of those features were available but not functional (with mean score of 0.29(7.14%) and 0.29(7.14%) for users driven personalization and information presentation respectively, interestingly zero score for accessibility). Suggesting that most portals provided membership sign-up features and options to specify types of information to be displayed for registered users regarding users driven personalization, 57.10% responses were obtained for both features. Regarding accessibility portals fully (100%) provided multilingual support. This finding is also supported by the study made by United Nations 2011, the report stated that several African countries have already undertaken twin actions: to reach in – to their nationals in their official language(s)–, and to reach out – to the rest of the world through English and/or other commonly spoken languages worldwide. These countries are Algeria, Botswana, Cameroon, Cape Verde, Chad, Egypt, Equatorial Guinea, Ethiopia, Madagascar, Mauritania, Morocco, Somalia, Sudan, and Tunisia. Minimal (42.90%) support for different version of the same interface and almost no support for the hearing and visually impaired were observed from the response. In addition to the known text content format, most portals used limited content types for presenting information to users. Among multimedia types, images (100%) were the most popularly used and the rest video (42.90%), audio (28.60%) and animations (28.60%) were minimally used for information presentation. (See Appendix G)

Electronic feedback features are available and functional across almost all the portal for users to provide feedback electronically, 85.70% responses indicates that most e-Government portals understand the importance of user feedback. Of 3 domain data acquisition features 2 (66.67%) of them are available and functional and one (33.33%) is not implemented/not available, interestingly all portals in Ethiopian e-Government portal fully (100%) implemented survey conducting features on portal of domain data acquisition KM feature (See Appendix G). Disappointingly, nearly zero mean score of availability and functionality was observed for three KM features of knowledge acquisition or access sub-element such as search result display, system-driven personalization and user information acquisition features of Ethiopian e-

Government portal; both features were not implemented. Meaning that 85.71%, 57.10% and 78.57% of the responses indicates a strong lack of result display, system driven personalization and user information acquisition features respectively.

In general the maximum score for the knowledge acquisition or access sub-elements were 175. The mean score for knowledge acquisition or access features were 12.14 and 0.71 for availability and functionality and available but not functional features respectively, suggesting that 13 (51.43%) which is more than half of the features in this KM process were implemented. Nevertheless, almost half 12 (48.57%) of the features were not implemented. This would, in turn, mean that knowledge acquisition features requires almost the same efforts doubled that have been seen so far for betterment of Ethiopian e-Government portal.

Table 4.9: Knowledge Acquisition or Access Scores

KM Features	No. of KM Features	Available and Functional			Available But Not Functional			Not Available		
		Obtained Score	%	Mean	Obtained Score	%	Mean	Obtained Score	%	Mean
Access to portal	1	7	100.00 %	1	0	0.00 %	-	0	0.00 %	-
Query	3	12	57.14 %	1.71	1	4.76 %	0.14	8	38.10 %	1.14
Results display	2	2	14.29 %	0.29	0	0.00 %	-	12	85.71 %	1.71
User-driven personalization	4	13	46.43 %	1.86	2	7.14 %	0.29	13	46.43 %	1.86
System-driven personalization	1	3	42.90 %	0.43	0	0.00 %	-	4	57.10 %	0.57
Accessibility	4	11	39.29 %	1.57	0	0.00 %	-	17	60.71 %	2.43
Information presentation	4	14	50.00 %	2	2	7.14 %	0.29	12	42.86 %	1.71
User Information Acquisition	2	3	21.43 %	0.43	0	0.00 %	-	11	78.57 %	1.57
Feedback	1	6	85.70 %	0.86	0	0.00 %	-	1	14.30 %	0.14
Domain Data Acquisition	3	14	66.67 %	2	0	0.00 %	-	7	33.33 %	1
Total	25	85	48.57 %	12.14	5	2.86 %	0.71	85	48.57 %	12.14

4.3.2.2. Knowledge Accumulation or Preservation

As shown in the following table 4.10, Of 3 portal knowledge accumulation or preservation features 80.95% are fully incorporated in the portal and functional. The maximum score for the knowledge accumulation or preservation mechanisms were 21. The mean score for knowledge accumulation or preservation features were 2.43 and 0.29 for availability and functionality and available but not functional features respectively, suggesting that in average 3 (90.48%) of the features in this KM process were implemented. This implies most portals were full featured with knowledge accumulation. In this regard particularly, referring Appendix G, portals fully (100%) provided knowledge upload feature and established knowledge base to store documents with 42.9% response rate for ideas from forum discussion preserved/archived, this shows, most portals didn't consider the importance of once idea or tacit knowledge accumulation through online discussion on some topics using forum.

Nevertheless, according to the data revealed through interview, the researcher found that similar response was given regarding discussion forum. During discussion on interview, question about the KM features that should be available to enhance the portal functionality with the followed question resulted on interview such as what was the reason that those features were not incorporated yet, the respondents from MoE says *“in our portal we have no discussion forums but we need to, it is simply because of privacy issues. We have discussed this issue in our department and decided not to incorporate forum in our portal. Even we didn't asked the opinions of higher officials because their response is predictable plus even if they are willing, we are convinced with the fact that our current staff is less in number so that we couldn't able to dedicate separate staffs to administer forums because unforeseen events like unwanted communication and offensive words might be used by participants and this needs continues monitoring. Nonetheless, technically incorporating discussion forums is simple; it is just a matter of making active”*

Table 4.10: Knowledge Accumulation or Preservation Scores

KM Features	No. of KM Features	Available and Functional			Available But Not Functional			Not Available		
		Obtained Score	%	Mean	Obtained Score	%	Mean	Obtained Score	%	Mean
Explicit knowledge accumulation	3	17	80.95%	2.43	2	9.52%	0.29	2	9.52%	0.29
Total		17	80.95%	2.43	2	9.52%	0.29	2	9.52%	0.29

4.3.3. Knowledge Organization Subsystems Scores

A more detailed analysis of the sub-elements/category within knowledge organization subsystems scores yielded the following observations.

4.3.3.1. Knowledge Classification

In order to measure the extent of knowledge classification implementation of the Ethiopian e-Government portal, the researcher identified five elements as shown in table 4.11. The table shows knowledge is 100% classified according to topics and hierarchy (level) e.g. department. Moreover knowledge classification fully (100%) helps to rapidly get the retrieval of necessary knowledge as well as improve knowledge searching efficiency. However, half of the portals (57.10%) implemented classification according to application, indicating that to certain extent some of the portals lack applications to give e-services for their users.

As a whole the maximum score for the knowledge classification, the sub-element of knowledge organization subsystem were 35. The mean score for Knowledge classification features were 4.57 for availability and functionality features, suggesting that 91.43% of the features were implemented and functional. Only 8.57% of the features are not implemented. This implies almost all portals understand the importance of knowledge classification and this finding assures that knowledge can be easily findable in Ethiopian e-Government portal.

Table 4.11: Knowledge Classification Scores

KM Features	No. of KM Features	Available and Functional			Available But Not Functional			Not Available		
		Obtained Score	%	Mean	Obtained Score	%	Mean	Obtained Score	%	Mean
Knowledge classified according to topics	1	7	100.00%	1.00	0	0.00%	0	0	0.00%	0
Knowledge classified according to hierarchy (level), e.g. department	1	7	100.00%	1.00	0	0.00%	0	0	0.00%	0
Knowledge classified according to application	1	4	57.10%	0.57	0	0.00%	0	3	42.90%	0.43
Knowledge Classification helps to rapidly get the retrieval of necessary knowledge	1	7	100.00%	1.00	0	0.00%	0	0	0.00%	0
Knowledge Classification improve knowledge searching efficiency	1	7	100.00%	1.00	0	0.00%	0	0	0.00%	0
Total		32	91.43%	4.57	7	0.00%	-	3	8.57%	0.43

4.3.3.2. Knowledge Depot

As shown in table 4.12 below, the researcher identified six sub-items. According to the portal evaluator response, out of 4 sub-elements the mean score for internal organization resources were 3.43 (85.71%), this shows that most Ethiopian portals were rich in resources. As the research data revealed in Appendix G particularly portals were full (100%) rich in organizational/departmental/national information (such consists of mission, vision, goal statements, organizational structure and activities/responsibilities), guidelines, procedures, laws, rules and regulations that govern the activities of a given ministry offices as well as 71.40% of government electronic information database also contain internal research literature, project and report archive and other detail information’s like addresses, opening hours, employees details, telephone numbers or contact information’s were available and accessible or functional.

Again referring to table 4.12 below, knowledge depot of portals contains 57.10% of institution, experience of management and operation of e-Government portal information and the rest (42.90%) does not have this government electric resources. This shows gaps on knowledge content of portal and ministry offices should work hard in this regard. Regarding intelligence resources like international policy developments, policy feedback and user demand satisfactory results were found, 71.40% portal contains this resource but still need improvement because 28.60% of the respondents says this resource is not available yet.

Generally the maximum score for the knowledge depot, the sub-element of knowledge organization subsystem were 42. The mean score for knowledge depot features were 4.71 for availability and functionality features, suggesting that 78.57% of the features were implemented and functional. But 21.43% of the features were not implemented, implies that the portal contains worthy amount of knowledge resources but still in order to make the portal rich with government electronic knowledge resources, a lot has to be done specially focusing on the items mentioned in the table 4.12 below, because without the actual digital knowledge resources, portal means camera without film and may be worthless. So, as much as possible complete list of knowledge should be presented in the portal.

Table 4.12: Knowledge Depot Scores

KM Features	No. items	Available and Functional			Available But Not Functional			Not Available		
		Obtained Score	%	Mean	Obtained Score	%	Mean	Obtained Score	%	Mean
Institution, experience of management and operation of e-Government portal information	1	4	57.10%	0.57	0	0.00%	0	3	42.90%	0.43
Internal organization resources	4	24	85.71%	3.43	0	0.00%	0	4	14.29%	0.57
Intelligence resources	1	5	71.40%	0.71	0	0.00%	0	2	28.60%	0.29
Total		33	78.57%	4.71	0	0.00%	0	9	21.43%	1.29

4.3.3.3. Knowledge Map

As shown in table 4.13 six sub-items identified to evaluate the extent of knowledge map implementation. According to the portal evaluator response, the portals navigation systems were 100% well developed and functional so that users can find resources easily, meaning that all navigation elements are visible. On the another hand knowledge browse features of portal like sitemap, index and glossary features of 66.67% with mean score of 2.00 implemented and functional and the rest 28.5 % with mean score 0.86 were not implemented. Referring to the detail from Appendix G most (71.40%) portals equally implemented both sitemap and index whereas 57.10% of portal has glossary features. Organizing and updating government websites are important and at the same time challenging, especially in developing countries, even though several basic changes to the layout of government websites could improve their organization. At present, the level of usability is generally low, at least as measured by some indicators such as availability of a glossary of words helping users understand the content of government websites (United Nations 2012).

71.40% respondents responded that the portals have friendly portal management features for portal system administrators. This is encouraging because administrator can understand portal features easily within short time and can made necessary amendments including updating/uploading resources, adding additional application features like e-services and/or activating already existed services which were not active before. Portals showed poor performance regarding expressing the knowledge of administrative process through charts, only 14.30% respondents responded this feature is available and working but the rest (85.7%) responded that this feature is not available in Ethiopian e-Government portal.

As compared with the above knowledge organization mechanisms, portals perform poor in terms of knowledge map. The maximum score for the knowledge map, the sub-element of knowledge organization subsystem were 42. The mean score for Knowledge map features were 3.86 for availability and functionality features, suggesting that 64.29% of the features were available and functional. But 33.33% of the features are not implemented. This implies especially the browsing features and knowledge administrative process of electronic knowledge resources, which provides a learning environment and the road to help staff and community users quickly find the

necessary knowledge resources are not fully supportive and it might be a cause for hiding information.

Table 4.13: Knowledge Map Scores

KM Features	No. of KM Features	Available and Functional			Available But Not Functional			Not Available		
		Obtained Score	%	Mean	Obtained Score	%	Mean	Obtained Score	%	Mean
Navigations visible/not hidden and easily findable	1	7	100.00%	1.00	0	0%	-	0	0.00%	-
Browse	3	14	66.67%	2.00	1	4.76%	0.14	6	28.57%	0.83
Express the knowledge administrative process through charts	1	1	14.30%	0.14	0	0%	-	6	85.70%	0.83
Friendly portal management features available for portal system administrators	1	5	71.40%	0.71	0	0%	-	2	28.60%	0.29
Total		27	64.29%	3.86	6	2.30%	0.14	14	33.33%	2.00

4.3.4. Knowledge Application Subsystems Scores

A more detailed analysis of the sub-elements/category of KM process scores within knowledge application yielded the following observations.

4.3.4.1. Knowledge Sharing

As shown in table 4.14 below, as per the data revealed through evaluation checklist, majority (42.90%) of the portals didn't implemented organization to user collaboration, features like ask-an-expert or similar features were only 28.60% are functional but the same number (28.60%) of respondents confirmed that this feature is available but not functional. On the other hand portals showed up a little bit better implementation in terms of user to user collaboration, in which portals implemented 57.14% but still 28.57% of those features were not available/not

implemented. Referring to Appendix G of knowledge application subsystems details, features like social tagging (85.71%), E-mail service (for individual communication) (71.43%), instant messaging (57.14%) and blogs (57.14%) showed good implementation status whereas the rest user to user collaboration features like discussion forums, mailing lists and wikis were 42.86% available and functional in the portal, indicating that there is at least basic levels of support for collaboration among users.

Information alerts KM features showed below half performance (table 4.14), only 46.94% of information alerts features were implemented and functional, in contrast almost equal percent (44.90%) of the respondents responded, those features were not implemented. Referring to Appendix G of knowledge application subsystem details, two portal features such as newsletters (85.71%) and RSS feeds (57.14%) have seen implemented and functional better than the other information alert features of Ethiopian e-Government portal. The other three portal features such as E-mail alerts, “What’s New” information and events calendar were available and functional in equal amount (42.86%) but the remaining update frequency of documents and mobile alerts features shows less (28.57%) implementation though they are functional.

Regarding resource sharing, interestingly there were 71.43% implementation showed up and the rest were not implemented, indicates portals provided links to other websites for more information plus information/knowledge contributed by other users were accessibility to any other users through portal. As shown in Appendix G of knowledge application subsystem details, all (100.00%) portals provided links to other websites for more information but regarding user contributed knowledge accessibility only 42.86% of portals implemented and functional, meaning that the rest (57.14%) didn’t make the user contributed knowledge accessibility. As knowledge sharing platform Ethiopian e-Government portal should facilitate knowledge accessibility.

The maximum score for the knowledge sharing, the sub-element of knowledge application subsystem were 119. The mean score for knowledge sharing features were 9.00 and 1.86 for availability and functionality and available but not functional features, suggesting that more than half (52.94%) of the knowledge sharing features were available and functional and 10.92% of the features were already implemented but not yet functional, which in total constitutes 63.86%

implemented features. But 36.13% with mean score 6.14 of the features were not implemented. As Zhitian Zhou and Feipeng Gao (2007) argued that information and knowledge of e-Government should be as open as possible, so that each of a public officer has access to and uses the knowledge and information provided by other persons. Knowledge is power; this power is not from confidential knowledge, but from sharing knowledge. In view of this, therefore, and based on the statistics and especially considering the Ethiopian context, which is discussed at the beginning of this section (section 4.2), the researcher observed that knowledge sharing portals feature implementation status is more than half and which is promising but still needs more work to build Ethiopian e-Government portal capability and to enhance users contribution.

Table 4.14: Knowledge Sharing Scores

KM Features	No. of KM Features	Available and Functional			Available But Not Functional			Not Available		
		Obtained Score	%	Mean	Obtained Score	%	Mean	Obtained Score	%	Mean
Organization to user collaboration	1	2	28.60%	0.29	2	28.60%	0.29	3	42.90%	0.43
User to user collaboration	7	28	57.14%	4.00	7	14.29%	1.00	14	28.57%	2.00
Information Alerts	7	23	46.94%	3.29	4	8.16%	0.57	22	44.90%	3.14
Resource Sharing	2	10	71.43%	1.43	0	0.00%	-	4	28.57%	0.57
Total		63	52.94%	9.00	13	10.92%	1.86	43	36.13%	6.14

4.3.4.2. Knowledge Exchange

As shown in table 4.15, sub-features were identified and used for evaluation. According to the evaluation response, knowledge exchange features of portals were poorly implemented; inter department or office, inter organization and group mail features were only implemented 14.30%, 28.60% and 28.60% respectively, disappointingly the opposite 85.70%, 71.40% and 57.10% of

the features were not implemented/not available yet. Moreover respondent's responded, only 28.60% of organizational structure and culture in e-Government portal were convenient to exchange knowledge for officials but the rest 71.40% of research data confirmed that organizational structure and culture in e-Government portal were not convenient for knowledge exchange.

As a whole the maximum score for the knowledge exchange, the sub-element of knowledge application subsystem were 28. The mean score for knowledge sharing features were 1.00 for availability and functionality features, suggesting that in average only 1 (25.00%) of the features was available and functional. But 71.43% with mean score 2.86 of the features were not implemented. This shows that portals highly lack knowledge exchange features.

Moreover, the key point of knowledge management in portal is to establish the culture in e-Government convenient to exchange knowledge for officials, and make the exchange and communication efficient through certain mechanism Maryam A, Dorothy E L (2001) and Juan C. Fernandez (2002). As also argued by Zhitian Z. and Feipeng G. (2007) knowledge and information will be improved and the knowledge owner will be inspired in the process of integration and exchange as well as knowledge exchange can be used to spread implicit knowledge in certain degrees. Having this argument in mind, the researcher can deduce that, Ethiopian e-Government portal missed the power of knowledge creating culture, which portal could be exploited for knowledge exchange purpose. The lack of knowledge exchange features in Ethiopian e-Government portal further became a cause for developing poor culture of knowledge exchange, poorly motivated knowledge contributing parties to pay more attention as well as become an obstacle to improve knowledge resources to enhance portal functionality.

Table 4.15: Knowledge Exchange Scores

KM Features	No. of KM Features	Available and Functional			Available But Not Functional			Not Available		
		Obtained Score	%	Mean	Obtained Score	%	Mean	Obtained Score	%	Mean
Inter-dept.	1	1	14.30%	0.14	0	0.00%	-	6	85.70%	0.86

KM Features	No. of KM Features	Available and Functional			Available But Not Functional			Not Available		
		Obtained Score	%	Mean	Obtained Score	%	Mean	Obtained Score	%	Mean
Inter-org.	1	2	28.60%	0.29	0	0.00%	-	5	71.40%	0.71
Culture in e-Gov.	1	2	28.60%	0.29	0	0.00%	-	5	71.40%	0.71
Group mail	1	2	28.60%	0.29	1	14.30%	0.14	4	57.10%	0.57
Total		7	25.00%	1.00	1	3.57%	0.14	20	71.43%	2.86

Keys

Inter-dept. = Inter department/office knowledge exchange features (online community of practice)

Inter- org. = Inter organization knowledge exchange features (online community of practice)

Culture in e-Gov. = Organizational structure and culture in e-Government portal convenient to exchange knowledge for officials

Group mail = Group mail feature

4.3.4.3. Knowledge Creation or Conversion

As shown in table 4.16 below, according to the evaluation response, Combination features of portals were fully (100%) implemented, suggesting Ethiopian e-Government portal fully equipped with functional knowledge uploading, sorting/composition, screening/selection and adding feature. Disappointingly, externalization features like interactive chat, video discussion forums and experience sharing (Bulletin Board) features in which tacit knowledge converts to explicit knowledge, with a process expressing tacit knowledge by written concepts and language/voice were only implemented 14.29% and functional but to same extent (28.57%) those features were available but not functional. More than half (57.14%) of this features were not available in the portal. Referring to Appendix G of knowledge application subsystem details, the KM features of externalization such as 28.57% of interactive chat and 14.29% of experience sharing features like electronic bulletin board were only available and functional but as a research data reveals, only one portal tried to implement a video discussion forum which was not

functional. This indicates that portals strongly lack knowledge externalization features which is one of the central part of KM activities that must be practiced in the portal so as to convert tacit knowledge to explicit and retain or accumulate knowledge within this conversion process to enrich portal with users experience moreover to get an opportunity to exploit users untapped potential gained through lots of professional, work and social experiences.

In general, the maximum score for the knowledge creation or conversion, the sub-element of knowledge application subsystem were 28. The mean score for knowledge creation or conversion features were 1.43 and 0.86 for availability and functionality and available and functional features respectively, suggesting that 57.14% of the features were available; among this only 35.71% were functional. But 42.86% with mean score 1.71 of the features were not available. This shows that portals highly lack creation or conversion features. Here also the researcher made the same deduction as above, portals power was not exploited for knowledge creation or conversion. So attention should be given for knowledge conversion features because portal can become rich whenever people or users participate to materialize both tacit and explicit knowledge through the implementation of those KM features of portal.

Table 4.16: Knowledge Creation or Conversion Scores

KM Features	No. of Features	Available and Functional			Available But Not Functional			Not Available		
		Obtained Score	%	Mean	Obtained Score	%	Mean	Obtained Score	%	Mean
Externalization	3	3	14.29%	0.43	6	28.57%	0.86	12	57.14%	1.71
Combination	1	7	100.00%	1.00	0	0.00%	-	0	0.00%	-
Total		10	35.71%	1.43	6	21.43%	0.86	12	42.86%	1.71

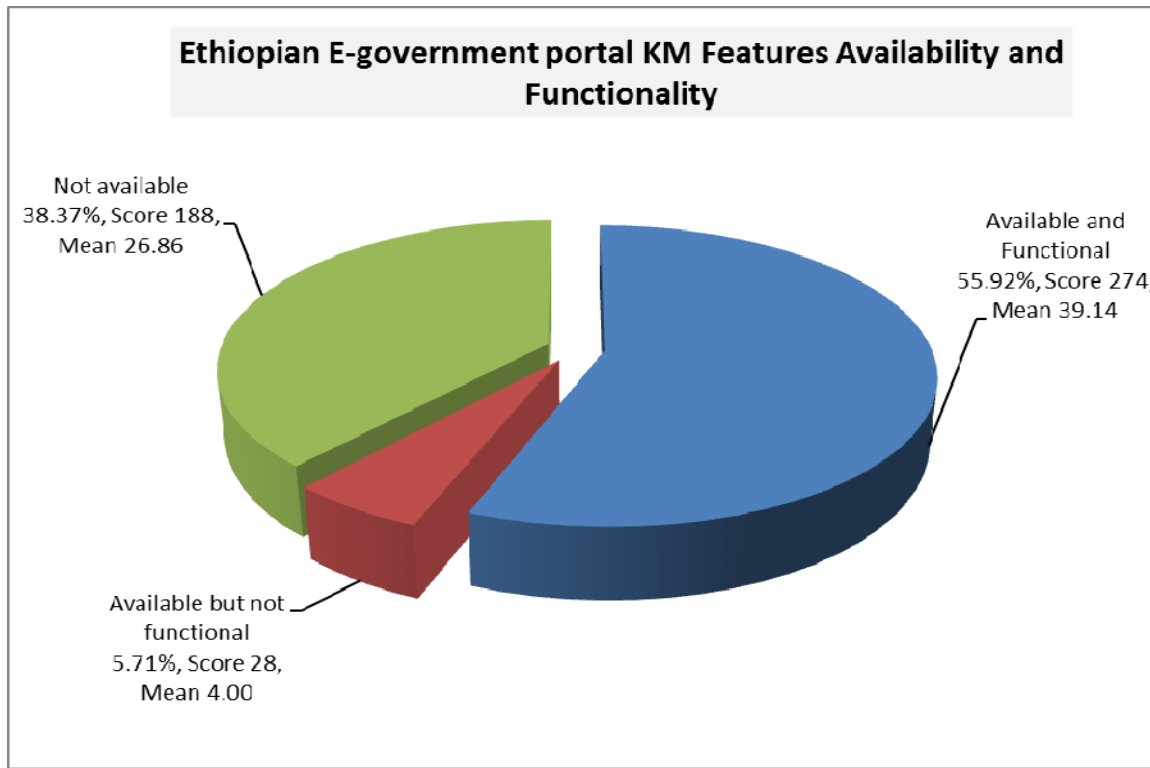
4.3.5. Overall Ethiopian e-Government Portal KM Implementation Score

The first research question was “What is the extent of KM implementation in Ethiopian e-Government portal?”

Taking all KM subsystems scores into consideration, chart 4.1 provided descriptive analyses on KM implementation of Ethiopian e-Government portals organizing by percentage, maximum score and mean score of KM features in terms of available and functional, available but not functional and not available. With mean score of 39.14, Ethiopian e-Government portal were implemented 55.92% of the KM features, suggesting that out of 70 KM features identified based on the model adopted for this study, in average 39 features were implemented and functional. Moreover, 5.71% or in average 4 KM features were available or integrated within portal but for some reason not yet functional or active to be used by the public/portal users. The rest 38.37% of KM features were not available or not implemented which is in average about 27 features.

As a developing country and as a beginner to have government portals in integrated form and lack for technology introduction in Ethiopia, besides as confirmed by United Nations 2012 survey “Lack of access to both ICT and education infrastructure in the developing countries is a major constraint on e-Government development”, researcher observed that the finding has shown good performance in KM implementation of Ethiopian e-Government portal, even though portals were not intentionally developed with the understanding of managing knowledge. Nevertheless, as shown in not availability part of the chart still a lot has to be done to enhance and make the portal knowledge rich portal so that everybody can experience the benefit out of it and contribute for government current movement of transparency and anticorruption. The increasing role of e-Government in promoting inclusive and participatory development has gone hand-in-hand with the growing demands for transparency and accountability in all regions of the world, to strengthen public service and advance equitable, people-centered development. For example Brazil’s national portal has looked to further build upon its strengths by offering greater access and improvement of services to citizens and increasing transparency of government actions (United Nations, 2012). Aside from being an enabler of socio-economic development, ICT also supports Ethiopia’s on-going process of democratization and sound governance (MCIT).

Chart 4.1: Ethiopian e-Government Portal KM Features Scores



4.4. Open-ended Responses

4.4.1. Directions to Enhance Ethiopian e-Government Portal

With the aim of showing the direction to enhance the functionality of Ethiopian e-Government portal to make it suitable for KM, the researcher collected qualitative data in the form of open ended question from both portal evaluator and knowledge worker. The finding is presented as follows:

Disappointingly, it can be said that almost no checklist respondents were responded for open ended question which was included in portal evaluation checklist to supplement the quantitative finding collected through checklist availability and functionality checking part. Nevertheless, only two respondents responded for some of the questions. The researcher also found that the response is not as such satisfactory and some of the questions answered negligently. The responses are presented as follows:

Respondents were asked their awareness about KM, the first respondent from MoT clearly indicated that not familiar with KM concepts but respondents from MoE stated the following:

I am not familiar with the terminology of KM, but directly or indirectly I have been involved in KM work particularly as an organization we have been doing some KM works.

Respondents were also asked to identify new features required to enhance Ethiopian e-Government portal and problem of not incorporating those features with their suggestive solutions.

They stated features like support for visually impaired, hearing impaired and video incorporation would enhance portal. The major problems that the respondents think, that might be a cause for not yet incorporated in portal were lack of preparedness, connectivity speed limitation and they were not certain about the technology used to develop portal might support those features.

They suggested, if efforts made to add latest feature possible and having clear KM policy framework would solve the problem. Moreover, respondents mentioned that content development, bandwidth management (more bandwidth should be allowed to increase accessibility and availability) and continues upgrading the portal to the newer version of technology which was used to develop portals would enhance the functionality of Ethiopian e-Government portal. Because the newer version might come up with some extended additional functionality and that would self-improve KM features available.

On the other hand, knowledge workers with an open-ended question through questionnaire were asked to identify any KM features which are currently available in Ethiopian e-Government portal; which of them (among the identified one) they and/or their organizations currently using and the new KM features they think should be available which is not yet incorporated to enhance the functionality of Ethiopian e-Government portal.

Unexpectedly only 13(18.06%) of 72 respondents responded for the above three questions. Among 13 respondents 7 of them responded only the first question and the rest half (3) responded the first two questions and the remaining half (3) answered for all the three questions.

From the open-ended responses to the question, knowledge workers response consolidated and presented as follows:

Respondents identified the following features were currently available in portal: discussion forums, chat, blogs, knowledge upload, member login, search, e-services (transactional), ask experts, exchange features, announcements, important links, feedbacks, RSS feeds/news updates, multilingual support, frequently asked questions and knowledge resources like documents, statistics, multimedia's were identified. Suggesting most portals has implemented knowledge access or acquisition, accumulation, sharing, exchange, depot and conversion features. Surprisingly e-service was only identified by respondents from MoE.

In order to supplement this finding the same question were asked through interview and the findings are also consistent with those emanating from the interview process. When probed through interview question the respondents from MoE stated that *"we have e-services that we manage with our sector offices like student examination result, student university assignments and field of study notification based on the student request both online (web based) and using SMS"*.

In addition to that calendar and photo gallery were identified by MoFA, vacancy announcement and application features was identified by MoFED as a currently available features of portal. Base on the interview conducted with MoT respondents, confirmed that they are in process of making trade licensing and registration system (*"ye nigid fekadina mizigeba"*) online, so that any trade registration made and license given for specific business person in any place of Ethiopia will be captured centrally, hence ease trade management process, which also will be incorporated in portal.

Knowledge sharing (electronic documents, news, links), knowledge accumulation (archive, upload features) and knowledge acquisition (member login, photo gallery) were the most frequently used KM features and also e-services, forums and multimedia resources were among the mentioned KM features that the respondents were currently using.

The respondents believe that voice and video discussion forums with good bandwidth, SMS service for employees and resource last updated information features incorporation or integration

enhance the functionality of Ethiopian e-Government portal. Moreover, through interview process the participants identified some more features that will contribute for the advancement of portal, and presented as follows:

Mobile access: (which is in process of incorporating in Ethiopian e-Government portal), when we develop portal the assumption was people can assess portal using Personal Computer (PC) but as you see because of the advancement of telecommunication technology here in Ethiopia most citizens started using mobile technology. As a result the interest might come to access portals using mobile device so making the portal accessible through mobile devices would enhance functionality and usability. (Response from MCIT)

Multimedia contents: the knowledge in multimedia format is less used to disseminate information through portal. This is not only seen in our portal but also seen in other government portals as well. This is may be because of peoples are in fear of exposing their identity. If knowledge contributing parties especially government civil servants encouraged to produce multimedia contents as much as possible and then upload on the portal, will enriched portal with knowledge. (Response from MoE)

E-Payments: especially for our customer online payment rather than coming in person to process payment would help a lot because we are working to making trade licensing and registration system online in which our customer submit all the required information to be registered and get license, they only required to come to take their documents and if necessary to renew their license, if e-payment is in place. (Response from MoT)

Organized Frequently Asked Questions (FAQ): we already have FAQ in our portal in static form but if portal would have systems/features that dynamically manage FAQ in organized manner. In which the customer or user can ask new question if it is not available in statically presented FAQ place and notify appropriate office to answer for new FAQ question and also archive after each and every questions and answers based on their frequency, will enhance portal functionality. (Response from MoLSA)

To summarize the finding, both evaluation checklist, survey questionnaire and interview participant indicated that KM features like voice and video discussion forums with good bandwidth, SMS service for employees, resource last updated information features, support for visually impaired, hearing impaired and video content uploading features plus if efforts made on content development, bandwidth management (more bandwidth should be allowed to increase accessibility and availability) and continues upgrading the portal to the newer version of technology which was used to develop portals, mobile access, rich multimedia contents, E-payments and organized FAQ features would enhance the functionality of Ethiopian e-Government portal so that KM will better be practiced and more user will be entertained.

4.4.2. Problems Identified and Solutions Employed

The researcher tries to get the opinion of interviewee regarding the problem they have been faced in relation to Ethiopian e-Government portal and the solution they employed plus their suggestion that might solve the identified problems by asking question: Do you experience any problems in Ethiopian e-Government portal in your organization? And how do you go about solving such a problem? According to the response the following important gaps have been seen that hinders portals performing as expected:

*The biggest challenge was coordination, coordination with ministry offices. Usually technology is not a challenge for us. We have the power of maximizing portal technology as much as we can but coordination, the quality of knowledge contents and content update frequency, meaning that making new items availability are the biggest problem as we have seen so far. As a solution we have been conducting meeting with all portal participating government organization every six month in person and with state government every 15 days using video conferencing. Moreover we communicate with email whenever necessary to tackle the problems occurred and improvements required.
(Response from MCIT)*

The respondent from MoE says, In our ministry office employees/colleagues produce a number of knowledge resources but the resources are just deployed in individual machine (office computer) or else they put it with CD, because of busy work schedule and less

number of staff we also couldn't able to go through every department to collect the resources, we don't even know when they produce the knowledge resources. This is the most challenging part, making information available. As a result most pages say under construction. To overcome this problem we tried to insist departments in different meeting and discussions to give us the resources in softcopy form. In addition to this we have faced the following problem when using/administering portal:

- ❖ Portal has similar structure as other ministry portals so that we couldn't able to modify the structure based on the formation/structure of our ministry offices and the knowledge contents we have.*
- ❖ While uploading contents we face problems like connection error, unable to upload, timeout and the like. So in this case we don't know and couldn't able to fix the problem because the server can't be accessed locally.*
- ❖ We appreciate the effort made by MCIT to secure portals and taking a responsibility of administering portals in one secure data location but it has been really difficult for us to make same features active/functional and they are restricted to implement without the consent of developers and administering ministry offices or MCIT, which also require long process.*
- ❖ Slow and sometimes not accessible: for instance last time one Ph.D. student came from Germany to get information from our office, which was actually available in our portal but he couldn't able to access portal outside (from Germany).*

The respondent from MoFA says I have seen problems related to portal look and feel, most of our customer/visitors are diplomats / ambassadors and we know what look and feel our customers prefer to see but portals developed without taking in to consideration of our customer interest. We have also seen content redundancy problem, the same contents are uploaded to portal. The one we already have in our own portal. Moreover, we haven't seen the importance of having the same portal in two places with different look and feel but with similar resources. Incompatibility is another problem; I have also seen the portal is not compatible with different browsers as a result information presentation is varied in different browsers. Couldn't able to upload large size video (more than 16MB) and images, hence require high download time.

The respondent from MoFED says, Document missing has been seen. This is may be when the portals were migrated to new technology. So attention should be given for sustainable availability of knowledge contents. As I have Observed less access privileged is another problem. We know that MCIT did this for security purpose but it should be moderated so that we could make some management tasks locally.

Both MoT and MoLSA confirmed that the problem they have seen in relation to Ethiopian e-Government portal is coordination between ministry offices especially with administering or MCIT and portal developers (eSystem Africa and Africom).

Suggestion given to overcome the problem mentioned was summarized as follows:

Target visitor need assessment has to be made in order to identify who they are, understand what kind of look and feel they prefer to see, the portal structures the organization must have should be taken into consideration.

More security features should be developed/ implemented in both hardware and software form and moderated, to same extent flexible local access management privilege should be given.

Some of the problems created because of technology limitation. Technology used to develop portal couldn't able to support large size video and image uploading. So upgrading to newer technology or changing the technological platform of portal given as suggestive solution.

To summarize the finding, the government organization who are operating in Ethiopian e-Government portal has been encountered gaps such as coordination, knowledge content quality, update frequency, similar structure of portal which do not considered a given organization structure, difficulty in uploading contents, limited access privilege for instance couldn't able to modify basic features locally, slow and sometimes not accessible outside Ethiopia, portal look and feel, content redundancy, browser incompatibility, doesn't support large size video, and document missing among the gaps which were identified by interviewee. The respondents were also mentioned meeting every six month in person, communication with email when something occurs, every 15 days meeting using video conferencing, insisting employees to provide knowledge resources with softcopy were employed as a solution to overcome problems

mentioned. Moreover, respondents suggested that implementing high level security portal features to give moderated access privilege, migrating to the latest technology that could support all the technological limitations mentioned (like uploading large size contents) and need assessments has to be carried out in order to identify and understand the visitor/customer preference of each portal participation organization so as to bridge the gap created and to give sustainable solution. This finding is also supported by United Nations survey, the more citizen-centric personalized e-Government services are, with strong user focus, the more their uptake is likely to increase. Citizens tend to prefer services focused on their personal needs. Interest among different citizens and citizen groups in using specific e-services depends on their personal situation. For example, e-services needed by unemployed people are very different from those services needed by retirees. To make e-services more relevant to citizens, some governments have begun to identify and segment their base and group their services around citizens' needs and situations based on a life-event or themed approach (United Nations 2012).

4.5. Knowledge Workers View of Ethiopian e-Government Portal

In order to supplement the finding from portal evaluator, the researcher also tries to get the knowledge workers opinion to realize the extent of KM implementation in Ethiopian e-Government portal through research questionnaire. The first question was about whether they have been used or browsed Ethiopian e-Government portal or not, followed by for what purpose they have been using portal. As shown in table 4.17 below, the respondents responded that 51(70.8%) of them have used or browsed portal and out of this 42(82.4%), 19(37.3%), 11(21.6%) and 7(7.8%) respondents indicated that they use portal for the purpose of knowledge acquisition or access, knowledge sharing, knowledge exchange and knowledge accumulation or preservation respectively and also for one other purpose such as e-service. Suggesting that most portals mostly implemented knowledge access, sharing and exchange features.

Table 4.17: Experience and Purpose of Using Ethiopian e-Government Portal

Items	Choice	Count	%
Have you used/seen/viewed/browsed Ethiopian e-Government portal	Yes	51	70.8%
	No	21	29.2%
Total		72	100.0%
For what purpose do you and/or your organization use Ethiopian e- Government portal	Knowledge sharing	19	37.3%
	Knowledge exchange	11	21.6%
	Knowledge accumulation/preservation	4	7.8%
	Knowledge acquisition/access.	42	82.4%
	Others	1	2.0%
	Maximum score		51

4.6. Application of ICTs for KM Practice

In order to attain the research objective of “To evaluate the extent of application of ICTs for KM practice” first the researcher assesses the level of awareness for the concept of KM and initiatives associated with KM in research entities and then the possible and applicable ICT tools for KM practice is identified and respondents were asked to indicate extent of application of ICT tools for KM practice in their organization using survey questionnaire. As highlighted above at the beginning of this chapter the researcher also employed interviews to supplement the finding through questionnaire. Hereunder follows the presentation and analysis of the research data:

4.6.1. KM Initiative and Awareness

Respondents were asked on a YES or NO response question to indicate the level of awareness about KM in the sampled ministry offices. The data for this analysis was collected by asking respondents whether they had heard about the concept “Knowledge Management” in their organization. Moreover, four elements plus one open ended (others) were mentioned and

respondents were to indicate in terms of YES or NO responses if these four elements were associated with KM initiatives in their organizations. The elements are ICT connectivity systems, information systems developed internally for KM as a KM portal, intranets used as a KM system tools, programs designed to develop the skills of employees and finally others which requires the respondents to specify if there is any other KM initiatives in their organization other than the four mentioned.

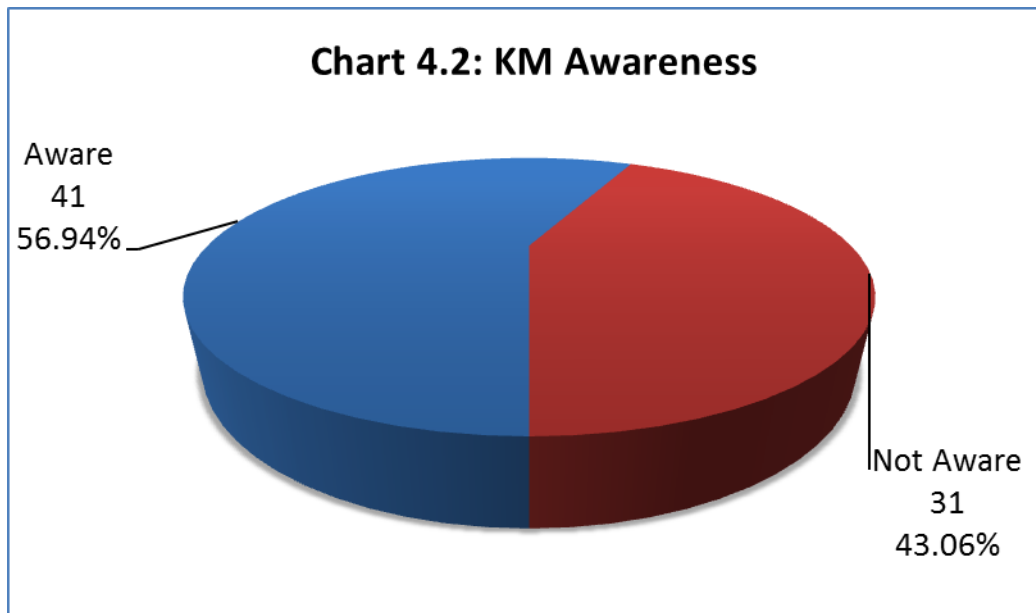
The researcher also used the interview process to determine the level of awareness about KM in selected ministry offices. The question was: Have you ever heard about the concept Knowledge Management in your organization? What do you know about KM mechanisms? And have you ever practiced KM in your organization? Does your organization implement any Knowledge Management strategy? And how is it implemented? And if yes, who is responsible for Knowledge Management initiatives in your organization?

The pie-chart in chart 4.2 below reflects the awareness level of KM in the research entities. The research data reveal that 41(56.94%) of the respondents have heard about the concept KM in their organizations. 31(43.06%) of the respondents never heard about the concept of KM. This is not surprising because the KM field of study is new for our country; the researcher used the data from the interviews in order to corroborate the above findings.

The interviews from all research entities showed that respondents assumed, they were familiar with KM but they associate KM with only using organization employee (tacit) knowledge sharing in the form of best practice therefor KM for them is equivalent with knowledge sharing. As a result to answer the followed question with good understanding, the researcher briefed about KM mechanisms. Furthermore, the respondents confirmed that KM was approached informally especially using traditional KM practices like meeting, after action review, experience sharing and trainings were mentioned. Again after brief discussion about ICT based KM the respondents mentioned practices such as knowledge dissemination using website/ portal (All 6 respondents), IP messaging and database (MoT), knowledge preservation using file server (MoFA), ftp server (MoE), knowledge sharing using E-mail service (All 6 respondents), video conferencing (MCIT), intranet (MoE), knowledge access using internet (All 6 respondents) and knowledge exchange using group mail (MCIT, MoE, MoFA and MoFED) has been practiced.

There was no KM strategy in place within all research entities and respondents also admitted that no efforts have been seen to introduce KM formally. However, having the finding from questionnaire participants, researcher concludes that KM awareness was more than half (56.94%) which is satisfactory though it has not been practiced formally and considering the newness of KM field of study in Ethiopia.

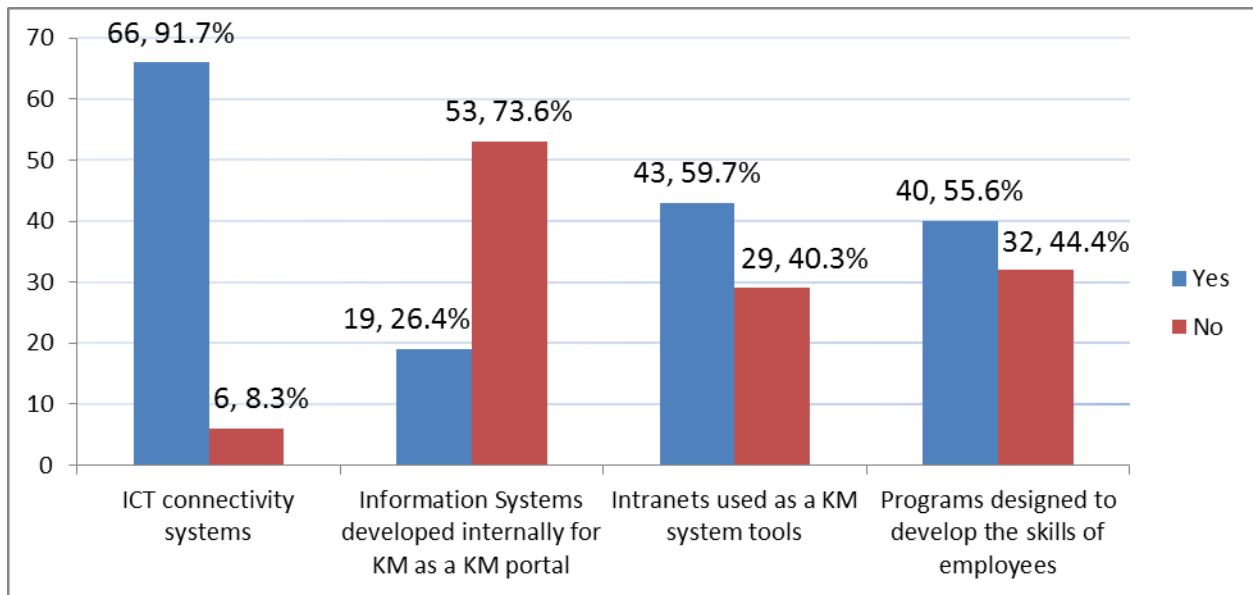
Chart 4.2: KM Awareness



The column-chart in chart 4.3 below reveals the degree of association of KM initiatives in the organization. Of 72 respondents for each KM initiatives, the majority 66(91.7%) associated KM with ICT connectivity systems while 43(59.7%) associated KM with intranets used as a KM system tools and also 40 (55.6%) associated KM with programs designed to develop the skills of employees. Very little 19 (26.4%) respondents associated KM with information systems developed internally for KM as a KM portal. Emerged from the interview result since KM has not been practiced intentionally, they couldn't be able to see the importance of having separate KM portal. 91.7% connectivity system assentation with KM may resulted due to the current government directions on expanding technology infrastructures especially commitment to create transparency through one-stop shop electronic government service. This is encouraging because since portal can achieve its intended objective and better satisfy users whenever not only connectivity system is in place but also highly available and used for KM practice. High levels of

broadband connectivity ensured further enhancements in e-services, gaps in access to e-Government services are often associated with connectivity difficulties (United Nations, 2012). No respondents responded for the last open ended (others, please specify) options.

Chart 4.3: KM Initiatives Association



4.6.2. ICT Tools for KM

Having reflected on the findings about KM initiatives and awareness level in research entities, it is now important to reveal the extent of ICT application for KM practice in sampled ministry offices. To do that the researcher carefully identified twenty two (22) ICT tools that can be possibly applicable to practice KM in a given knowledge based organization and provided place for others that the respondents might use to specify if the tools were not among the identified one. Respondents were asked on a Yes (in use) or No (not in use) response question to indicate the ICT tools that they were currently using in their organizations for KM practice. On the same question with additional columns, respondents were also asked on “not available, but should be available” and “available, but should not be used” response question to indicate preferred ICT tools for KM practice.

Data regarding the application of ICT tools for KM practice was also collected through interviews whereby the interviewees were asked to mention any ICT tools used in their organizations for KM practice and the main purpose they use ICT tools in their organization? (Tools used in relation to the purpose).

The table 4.18 below shows the statistical description in terms of frequency and average percent of respondents for each ICT tools, the extent of application of ICT tools for KM in the research entities presented as follows:

As shown in the table 4.18, it is evident that all organization applied different ICT tools even though the degree of application varies. Almost all respondents indicated that they extensively used internet 61(91.67%) and office desktop computers 65(90.28%) for KM practice. The next highest used ICT tools presenting sequentially were company Laptops 60(83.33%), both office telephones and E-mail used with the same rate 57(79.17%), intranet 56(77.78%), group mail/ mailing lists 47(65.28%), video conferencing 46 (63.89%) and personal cell-phones 45(62.50%). Less than half of the respondents were confirmed that they use the remaining ICT tools.

Furthermore, research data reflected that discussion forums (52.78%), computer-based training or e-Learning (43.06%), video discussion forums (37.5%) and extranet (33.33%) ICT tools were not currently available for use but respondents prefer these tools should be available and used for KM practice. Amazingly respondents responded that social tagging or networking (2.78%) and wikis (2.78%) should not be used for KM though they were currently available and in use in their organization. This is may be social networking has been abused by irresponsible people and it is unknowingly time-consuming, whereas wikis also may be abused by non-responsible people because of the nature of wikis is anybody can update the content and the respondents my think that this tools are not the reliable knowledge source, so that it shouldn't be used to practice KM in their organization.

Table 4.18: Application of ICT Tools for KM Practice

ICT Tools	ICT tools currently							
	In use		Not in use		Not available, but should be available		Available, but should not be used	
	Frequency	%	Frequency	%	Frequency	%	Frequency	%
Internet	66	91.67%	0	0.00%	6	8.33%	0	0.00%
Office desktop computers	65	90.28%	4	5.56%	3	4.17%	0	0.00%
Company Laptops	60	83.33%	9	12.50%	3	4.17%	0	0.00%
Office telephones	57	79.17%	12	16.67%	3	4.17%	0	0.00%
E-mail	57	79.17%	10	13.89%	5	6.94%	0	0.00%
Intranet	56	77.78%	1	1.39%	15	20.83%	0	0.00%
Group mail/Mailing lists	47	65.28%	10	13.89%	15	20.83%	0	0.00%
Video conferencing	46	63.89%	18	25.00%	8	11.11%	0	0.00%
Personal cell-phones	45	62.50%	23	31.94%	4	5.56%	0	0.00%
Extranet	31	43.06%	17	23.61%	24	33.33%	0	0.00%
Social tagging (social networking)	24	33.33%	32	44.44%	14	19.44%	2	2.78%
Company cell-phones	20	27.78%	38	52.78%	14	19.44%	0	0.00%
Computer-based training/E-learning	20	27.78%	21	29.17%	31	43.06%	0	0.00%
Instant messaging	19	26.39%	36	50.00%	17	23.61%	0	0.00%
Interactive Chat	17	23.61%	35	48.61%	20	27.78%	0	0.00%
Bulletin Board (for experience sharing)	17	23.61%	39	54.17%	16	22.22%	0	0.00%
Electronic Guestbook (feedback)	10	13.89%	43	59.72%	19	26.39%	0	0.00%
Video discussion forums	10	13.89%	35	48.61%	27	37.50%	0	0.00%
Mobile alerts	6	8.33%	48	66.67%	18	25.00%	0	0.00%
Discussion forums	4	5.56%	30	41.67%	38	52.78%	0	0.00%
Blogs	4	5.56%	47	65.28%	21	29.17%	0	0.00%
Wikis	1	1.39%	64	88.89%	5	6.94%	2	2.78%
Average ICT Usage (in percent)		43.06%		36.11%		20.58%		0.25%

The second research question is “To what extents are research entities operating in e-Government portal use ICTs for KM practice?” To answer this question statistics on the extent of ICT tools usage have been captured in table 4.18 above. Based on this finding, the average statistics confirms that out of 22 ICT tools, in average 43.06% of the tools were currently in use, suggesting that the degree of application of ICT for KM was less than half which again implies since KM can better be performed and attain its intended objectives whenever ICT becomes backbone, so the less application of ICTs for KM practice became an obstacle to start new and exploit existing KM initiative. In another hand, in average 36.11% of ICT tools were not in use, 20.58% not available but respondents prefer those tools should be used for KM practice and small amount (0.25%) were available but the respondents recommended them they should not be used for KM practice.

These findings are also consistent with those emanating from the interview process. In the interviews conducted with interviewee from MoFED, it was confirmed that the use of ICTs for KM involved tools such as internet, desktop computers, laptop computers, office telephone, e-mail, LAN and group mail, for the purpose of document sharing among staffs, information access, internally for help desk assistance and externally to give technical assistance for branch office on finance systems at country level. These tools including group mails except in MoT were used in all research entities so that researcher referred them as most commonly used ICT tools. In addition to that data center (server computers) was used as financial data storage in MoFED. The respondent indicated that *“almost all systems are becoming automated in our organization to support report management and central data preservation”*. When probed about for what purpose they using ICT tools, the respondent responded as follows:

“Apart from the previously mentioned most commonly used ICT tools, we especially use information systems for the purpose of capturing and managing financial data at country level. Those systems are deployed in our data center. Currently we implemented cash, fixed asset, inventory, payroll and purchasing management information systems. Using these systems, branch offices submit transaction and then subject matter specialist produce raw and consolidated data and write a report easily. Moreover the systems ease work life and relief the burden of collecting data from individual branch offices and also used for the purpose of securing and preserving data”.

Similar findings also emanated from the interviews conducted with interviewee from MoFA, MoE, MCIT, MoT, MoLSA regarding most commonly used ICT tools. Additionally, application server and file servers were used in MoFA for the purpose of file storage and deploying applications; intranet (isite application) and ftp server were used in MoE for the purpose of providing information of every directorate as a local website and file storage; internal portal and video conferencing were used in MCIT for the purpose of internal information dissemination and to communicate with state government; IP messaging, database and printer server were used in MoT for the purpose of communication, trade license registration and resource sharing.

4.7. Contribution of ICTs and its Support to Enhance Ethiopian e-Government Portal

Due to the fact that well featured e-Government portal is resulted from ICT based KM, the researcher used both the survey questionnaire and the interviews to assess whether ICTs contributed for KM as well as supported to enhanced portals. Having research finding from the above analysis of the extent of application of ICTs for KM, here using the survey questionnaires, the evaluation of ICTs contribution to build up and enhance service delivery through portals research objectives were achieved. This was measured based on a set of nineteen (19) positive statements (items) (for analysis purpose statements were categorized in to ten (10) broad categories) using a five-point Likert scale question ranging from strongly disagree (0) to strongly agree (4). The items included as part of this evaluations were characterized in two major category, one to assess the contribution of ICTs for KM and the second was to assess the supports made from ICTs contribution for betterment of Ethiopian e-Government portal (see Appendix G on the contribution of ICTs for KM and its support to portal development detail results of the statistical analyses). Furthermore, the contribution was investigated through the interviews. The interviewees were asked questions: Do you believe that ICT offers benefits to your organization in relation to KM? And which specific contributions/benefits can you mention which are currently realized in your organization? And do you believe that ICT based KM practice in your organization contribute for development of Ethiopian e-Government portal? How?

Table 4.19: Contribution of ICTs for KM and its Support for Portal Enhancement

Statements (Items)	No. of Items	SD		D		N		A		SA	
		Score	%	Score	%	Score	%	Score	%	Score	%
When new event and/or information related with my job is released I am informed with E-mail Alert, Group Mail and Mobile Alert	3	33	15.3 %	45	20.8 %	28	13.0 %	81	37.5 %	29	13.4 %
For immediate job related help I use Interactive Chat and video discussion (online face to face)	2	28	20.4 %	43	31.4 %	30	21.9 %	31	22.6 %	5	3.6 %
I use various ICT tools for inter department and inter organization knowledge exchange and job related communication	2	16	11.5 %	13	9.4 %	21	15.1 %	61	43.9 %	28	20.1 %
I use discussion forums for proposed solutions from archive discussions, to share my opinion and also to ask others opinion	3	60	27.8 %	63	29.2 %	16	7.4 %	66	30.6 %	11	5.1 %
ICT tools usage contributes for knowledge based outcomes	4	7	2.4 %	23	8.0 %	21	7.3 %	97	33.7 %	14	48.6 %
Sub-total (Contribution of ICT for KM)	14	14	14.5 %	18	18.8 %	11	11.6 %	33	33.7 %	21	21.4 %
I have been participating in my organization electronic service delivery through portal	1	4	5.6 %	20	27.8 %	17	23.6 %	23	31.9 %	8	11.1 %
My experience of using ICT tools for KM helps to contribute my knowledge in Ethiopian e-Government portal	1	5	7.0 %	15	21.1 %	21	29.6 %	20	28.2 %	10	14.1 %
I have been providing the same assistance or contribution on Ethiopian e- Government portal as I do in organizational KM initiatives	1	7	10.6 %	24	36.4 %	20	30.3 %	11	16.7 %	4	6.1 %
I have been getting support from Ethiopian e-Government portal as I have been getting from organizational KM initiatives	1	8	11.8 %	26	38.2 %	19	27.9 %	9	13.2 %	6	8.8 %
In my organization, ICT tool application/usage encourage me to contribute for KM initiatives through portal	1	7	10.4 %	21	31.3 %	17	25.4 %	19	28.4 %	3	4.5 %
Sub-total (ICT contribution support for portal enhancement)	5	31	9.0 %	10	30.8 %	94	27.3 %	82	23.8 %	31	9.0 %

Key

SA = Strongly Agreed

A = Agreed

N = Neutral (Undecided)

D = Disagreed

SD = Strongly Disagreed

From table 4.19 above, percentage of most respondents agreed on: when new event and/or information related with my job is released I am informed with e-mail alert, group mail and mobile alert (37.5%) (This view is supported by 51.39% e-mail alert, 40.28% group mail, 28.83% mobile alert respondents), I use various ICT tools for inter department and inter organization knowledge exchange and job related communication (43.9%) (This view is supported by 44.44% inter department and 43.28% inter organization respondents), I use discussion forums for proposed solutions from archived discussions, to share my opinion and also to ask others opinion (43.9%) (This view is supported by 36.11% proposed solutions from archived discussions, 26.39% to share my opinion and 29.17% to ask others opinion respondents), I have been participating in my organization electronic service delivery through portal (31.9%). Although, respondents strongly agreed on ICT tools usage contributes for knowledge based outcomes (48.6%) (This view is supported by 26.39% improved my ability to create and share knowledge, 27.78% offers an opportunity for the development of my technical/work skills and expertise, 50.00% encouraged me to learn and teach others better ways of performing tasks and 30.56% increases my organization efficiency by managing knowledge to improve organizational processes outcomes respondents).

The research data also reveal that percentage of most respondents disagreed on: for immediate job related help I use interactive chat and video discussion (online face to face) (31.4%) (27.14% interactive chat and 35.82% video discussion found disagreed), I have been providing the same assistance or contribution on Ethiopian e-Government portal as I do in organizational/local KM initiatives (36.4%), I have been getting support from Ethiopian e- Government portal as I have been getting from organizational KM initiatives (38.2%), In my organization and ICT tool application/usage encourage me to contribute for KM initiatives through portal (31.3%) but were

neutral or undecided on, my experience of using ICT tools for KM helps to contribute my knowledge in Ethiopian e- Government portal (29.6%).

The third research question is “To what extents the contribution of ICTs for KM, support for portal enhancement?” To answer this question, statistics on the contribution of ICTs for KM and its support for portal enhancement have been presented in table 4.19 above. Based on this finding, the percentage of statistics confirms that in average 55.1% of respondents were positive about ICTs contribution for KM practice in the sampled research entities (33.7% agreed followed by 21.4% strongly agreed respondents). Nevertheless, arising from the research data this contribution couldn’t be supportive for portal enhancement, because most (39.8%) of the respondents were negatively responded (30.8% disagreed followed by 9.0% strongly disagreed respondents). Suggesting that ICT contribution for KM practice in the organization is above average and encouraging, though it is not satisfactorily or less (43.06%) used in the research entities (see table 4.18) but again the finding confirmed that this contribution has less (32.8%) to do with supporting for Ethiopian e-Government portal enhancement. This is may perhaps be because of the e-Government portal focal personal are the only person who are dedicated to administer the knowledge resources and features; the other staffs seems like not involved in this responsibility due to their daily workload; the habit of using portal could be another cause. Moreover, the less or in some cases nil, participation of ministry offices staffs in the design and development of their portal, since portals are developed by third parties; and also because of portals deployed centrally and administered by other ministry office staffs could be a cause.

Though all research entities were implementing KM informally through KM related practices (using both traditional and ICT based) (as mentioned in section 4.3.1) and less application of ICT for KM (as shown in table 4.18 above), the interview data confirm that all respondents believed that ICTs offer benefits for their organization in relation to KM. As reflected through the interviews conducted with research entities, all respondents stated that, the ICT based KM aligned practices implemented in the entities contributed for KM practices, the responses are consolidated as follows:

- ❖ Easy and timely information access and making available for public use
- ❖ Knowledgeable and well informed staff (with continuous knowledge empowerment)

- ❖ Ease communication for knowledge sharing
- ❖ Organization specific knowledge production including reports, manuals, policies, procedures, newsletters and research outputs
- ❖ Preservation and security of knowledge by taking backup
- ❖ Knowledge dissemination for public using portal

In addition to that contribution emerged from ICT based KM practice such as customer satisfaction, knowledge exchange among staff locally and with other wing of the ministry offices and reliable knowledge collection repository were mentioned by MOT; knowledge storage for future reference and best practice sharing was mentioned by MoFED; knowledge dissemination for local staff using isite and raw data capturing and dissemination especially for researchers were mentioned by MoE.

Again, as revealed from the interview discussion, all research entities believed that ICT based KM practice in their organization contributes for enhancement of Ethiopian e-Government portal. All respondents expressed the same opinions for how this contribution support for portal enhancement. Their views are summarized as follows:

All the contributions made by ICT tools has support for our portal in the way that the final output produced using ICT tools in the form of reports, rules, regulations, policies, research finding and other organization specific knowledge resources have been disseminated through portal and used by all interested citizens as well as available for foreigners especially in the case of MoFA. This would, in turn, mean that the contributions made by ICT tools enhances the knowledge access, accumulation, depot, sharing, exchange and dissemination features of Ethiopian e-Government portal.

Chapter Five

5. Conclusion and Recommendation

In line with the three research questions driving the research investigation, this study has managed to demonstrate the extent to which KM implemented in Ethiopian e-Government portal, research entities operating in Ethiopian e-Government portal apply ICTs for KM practice and its support for portal enhancement. Moreover, as discussed in chapter 4 conclusions made based on the finding is influenced by Ethiopian context. In this paper, the researcher contributes to the body of literature by implementing a conceptual model known as knowledge management model for e-Government. Owing to the diversity inherent in the field of KM, the conceptual model attempts to purify important concepts that are relevant to evaluating KM implementation levels in portals. In this paper, this is achieved through a thorough review and analysis of related literature. Using this model, the researcher constructed a checklist and demonstrates how it can be applied by evaluating seven Ethiopian ministry level portals. The evaluation provided insights into the state of KM processes in the portals, and also showed potential areas of improvement required with reference to the model adopted for this study. This chapter summarizes the finding and conclusions, and recommends potential areas to be improved and shows future directions.

5.1. Findings and Conclusion

Based on the research constructs, the evaluation found, Ethiopian e-Government portal were implemented more than half of the KM features. On average, portals implemented more than 55% of all features described in each mechanism. Thus, it is possible to conclude that KM is still a promising concept in e-Government portal. Nevertheless, as a developing country and as a beginner to have government portals in integrated form and lack for technology introduction in Ethiopia, researcher observed that generally the finding has shown good performance in the level of KM implementation of Ethiopian e-Government portal, even though portals were not intentionally developed with the understanding of knowledge management. On the other hand, as revealed by the research data 38% of the features identified are not implemented, suggests that still a lot has to be done to enhance and make the portal knowledge rich portal so that users can

experience the benefit out of it and contribute for government current movement of transparency and anticorruption.

It appears that Ethiopian e-Government portal collection contains a wealth of knowledge resources. On average, portals information resources found to be more than half (55.61%), this implies government organizations are attempting to understand their users and acquire and accumulate knowledge to be used for further knowledge organization and application subsystems of the portal. Moreover, as a beginner and first experiencing using government electronic service delivery in unified/integrated form, the researcher conclude that this figure is motivate for feature endeavors.

An achievement (On average 78.15%) of knowledge organization subsystem in portal would lead to successful implementation of KM in portal, thus it is possible to conclude that, the performance of Ethiopian e-Government portal were highly inspiring and can be taken as an assurance for success of knowledge enhanced portal.

The level of KM implementation in portals regarding knowledge application subsystems, were generally found to be low (45.71%). On average, portals implemented less than half of all features described in this mechanism. As it is an output system, its user interface is the ultimate visible part so as to share, exchange and create knowledge. Without having such a KM feature it wouldn't be possible to exploit the full potential of portal even if the portal has good collection of knowledge. Online collaboration for information sharing and knowledge exchange and creation/conversion is by far important for the success of KM implementation of portal.

Based on this finding, the degree of application of ICT for KM practice found to be low, this implies, since KM can better be performed and attain its intended objectives whenever ICT becomes backbone, the less application of ICTs for KM practice became an obstacle to start new and also exploit existing KM initiative. Surprisingly, the ICT contribution for KM practice in the organization showed up above average, In spite of the fact that it is not satisfactorily or less used in the research entities. However, the finding confirmed that this contribution has less on supporting for Ethiopian e-Government portal enhancement. This is may perhaps be because of the e-Government portal focal personal are the only person who are dedicated to administer the

knowledge resources and features, and the other staffs seems like not involved in this responsibility due to their daily workload, and the habit of using portal could be another cause. Moreover, the less or in some cases nil, participation of ministry offices staffs in the development of their portal, since portals were developed by third parties, and also deployed centrally and administered by other ministry office staffs.

In conclusion, the study finds that Ethiopian government organizations have begun to move from a decentralized single-purpose organization e-Government portal to an integrated unified whole-of-government portal. This approach supports the strengthening of institutional linkages with interconnected departments and divisions; greater efficiency and effectiveness of governance systems; and better public service delivery. However, the efforts of government organizations at office as well as departments levels are still affected by a lack of cooperation, lack of infrastructure and human resource capacity and a gap between e-services supply and demand, and culture of use and serve citizens using e-services. Providing a basis for improved e-Government portal with KM implementation has been the key contribution of this study to KM and e-Government theory.

5.2. Recommendations

Arising from the implications of the research findings as highlighted above, the researcher makes the following recommendations for effective KM implementation and enhancement of portals of the organizations operating in Ethiopian e-Government portal.

KM is a promising concept in e-Government portal due to the fact that the finding shows good performance in overall KM practice of Ethiopian e-Government portal. However, still more efforts required to put it in a better place. Accordingly, based on the finding of each subsystem performance of portals, especially focusing on the not available parts, stakeholders should take action for improvement. The KM model for e-Government can therefore be used as a guide to determine KM implementation gaps in e-Government portals.

Despite these results, it is important to note the progress made by governments to provide more services online via portals. The researcher argues however that parallel to such work, KM mechanisms should also be considered to ensure that these portals are user centric. KM in portal

can be utilized as a part of a strategy to identify needs and wants, measure satisfaction and quality of service, and design services.

The finding revealed that lots of gaps has seen obstacle for the success of e-Government portal intended objectives and in this regard different new KM features were proposed which would improve portal functionality. Accordingly, in addition to the entities participated in this research, all other government organizations that are currently operating in Ethiopian e-Government portal as well as other Government and Non-Government including public and private organizations that has implemented their portal or planned to have portal, should give due attention and work to address the gaps created, new KM features proposed and problems identified for betterment of their portal and to be proactive as well. Furthermore, Governments should pro-actively engage themselves in activities to increase awareness, promote and popularize portal and e-service usage. Otherwise, despite the high number of e-services available, their usage levels may remain below expectations.

In order to enhance portal, individuals (knowledge workers/staffs) as well as ICTs contribution required. The entities should give attention on improving the degree of application of ICT tools for KM related activities, in this regard especially attention should be given for tools which can be used for portal enhancement including some recommended features by United Nations e-Government survey like for instance provide tutorial to guide users how to access e-services and incorporation/linkage of non-government portal link to the government portal to increase usability and off-line access for older or less educated people to ease access. In addition to that integration of Ethiopian higher institution portals and promoting regional government offices up to 'Woreda' level to have and integrate their own portal is highly recommended so as to create citizen centric one-stop shop portal. Moreover, knowledge workers should be given a responsibility of working/using in portal, in all aspects of portal for instance portal development, easily inclusion or exclusion of features, change on look and feel and for some other advanced administration so as to exploit the knowledge workers potential and existing ICT resources towards portal development.

ICT application has been found to be low. Since successful implementation of KM in e-Government portal requires ICT based KM practice, so that, attention should be given to the

application of ICT tools to practice KM hence contribution would better be improved. In addition to that government organization should insist their staff as well as their users to actively participate in their portal services so that portal would be well developed and become knowledge reach portal.

5.3. Suggestion for Further Research

While the current model has service as an evaluation tool, the work here represents only a first step in measuring KM implementation levels in portals. Future work will need to examine the validity and reliability of the model items/KM features, with the objective of developing a robust instrument for portal evaluation. As this is a preliminary study, future models could be built to incorporate other elements of e-Government like organization specific e-service focus, social security management, and so on. How well e-Government portals protect individual privacy and how well they inform the public about what privacy rights they have should be taken into consideration in a more elaborate model for portal evaluation.

As the research data revealed, ICT application has found to be low. So this area requires further detail research work, particularly in elaborating the relationship between ICT application and the effect on organizational ICT based KM practice and hence its contribution for portal development in organisations operating in Ethiopian e-Government portal.

Future research should explore the broadening of practices by investigating KM in other e-Government initiatives in order to understand the extent of KM practice in organisations participating in different e-Government initiatives. The link between KM and e-Government initiatives like woredanet, schoolnet, agreenet and so on needs further investigations. It is obvious that there was a serious lack of understanding of what KM actually entailed in research entities and no idea about the importance of KM for e-Governments. This necessitates a thorough research strategy in order to broaden KM implementation with different e-Government initiatives.

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APPENDICES

APPENDIX A: Evaluation Check List of Ethiopian e-Government Portal

Jimma University.

School of Graduate Studies.

Department of Information Science.

Ethiopian e-Government Portal Evaluation Check List

Dear participant

This evaluation checklist is aimed at investigating the extent of Knowledge Management (KM) implementation in Ethiopian e-Government portal and to identify direction to enhance and make knowledge rich Ethiopian e-Government portal. The checklist is designed based on the model adopted from Zhitian Zhou and Feipeng Gao (Knowledge management model of e-government). So you are selected as *one of the seven professional evaluating personal*. In responding to this evaluation be assured that your identity will remain anonymous. None of the questions is aimed at identifying you as a person. In addition, all information supplied by you will be treated as confidential at all times and information provided by you will be reported in collated format (summary format) only. This research is independent and no Government and Non-Government organizations are behind this study. Your participation in this survey is of utmost important to this study. Please answer the questions honestly.

Please make a CROSS(X) for availability and functionality checking questions. Mark on “Available and Functional” if the KM features are found in the portal and functional, on “Available but Not Functional” if the KM features are found in the portal but not working and on “Not Available” if the KM features are not found. Write your answer for open ended questions. Please feel free to use extra paper if the space given is not enough. For queries regarding this evaluation checklist contact the researcher **Mr. Wondaferaw Yohannese** at +251911198733 or e-mail wondaferaw.yohannese@astu.edu.et

For the purposes of this study, the abbreviation **KM** refers to **Knowledge Management** (knowledge collection (acquisition and accumulation), knowledge organization (classification, depot and map) and knowledge application (sharing, exchange, and creation)) which is defined in terms of initiatives (tacit and/or explicit) that systematically leverage an organization’s **ICT tools**.

Basic terminologies:

- ❖ **KM features:** means the features available in Ethiopian e-Government portal like knowledge/information access and upload features, discussion forums, member login, knowledge resources itself and so on.
- ❖ **Knowledge Sharing:** means that the information and knowledge of electronic government is as open as possible, so that users has access to and uses the knowledge and information provided by other persons. (Features like discussion forums, blogs, wikis, ask experts are among knowledge sharing features).

- ❖ **Knowledge Exchange:** The key point of knowledge management is to establish the organizational structure and culture in e-Government portal convenient to exchange knowledge for officials, any users, and make the exchange and communication efficient through certain mechanism. (Features like, group mail and other inter organization and inter department knowledge exchange features are among the knowledge exchange features).

Thank you for your cooperation.

1. This part of check list is designed to evaluate the extent of KM implementation in Ethiopian e-Government portal. So you, as a professional evaluating personal are expected to check the listed KM features **availability** and **functionality (workability)** one by one and **mark all** that are applicable using **Cross (X) sign**.

Key:

A&F = Available and Functional

ANF = Available But Not Functional

NA = Not Available

KM activities	Features	A&F	ANF	NA
I. Knowledge collection subsystem				
1. Knowledge acquisition/ access.	1.1. Access to portal			
	1.1.1. Portal is listed on the first page of results listings of search engines and directories if one made search about Ethiopia, government organization and related area (e.g. Yahoo and Google)			
	1.2. Search			
	1.2.1. Query			
	1.2.1.1 Free text search provided			
	1.2.1.2 Advanced search provided			
	1.2.1.3 Search recommendations provided			
	1.2.2. Results display			
	2.2.2.1 Search results can be sorted			
	2.2.2.2 Users can search within results			
	1.3. Personalization			
	1.3.1. User-driven personalization			
	1.3.1.1 Membership sign-up provided			
	1.3.1.2 Registered users can create profiles			
	1.3.1.3 Registered users can create a collection of favorites			
	1.3.1.4 Registered users can specify types of information to be displayed			
	1.3.2. System-driven personalization			
1.3.2.1 Information tailored for specific				

KM activities	Features	A&F	ANF	NA
	users (e.g. seniors, working professionals, media, etc.)			
	1.4. Accessibility			
	1.4.1. Portal supports different versions of the same interface (e.g. text only, low graphics, etc.)			
	1.4.2. Multilingual support available			
	1.4.3. Portal supports visually impaired			
	1.4.4. Portal support hearing impaired			
	1.5. Information presentation			
	1.5.1. Images used as information aids			
	1.5.2. Video used as an information aids			
	1.5.3. Audio used as an information aids			
	1.5.4. Animation used as an information aids			
	1.6. User Information Acquisition			
	1.6.1. Portal acquires contact information			
	1.6.2. Portal acquires personal information			
	1.7. Feedback			
	1.7.1. Users can provide feedback electronically (Electronic Guestbook)			
	1.8. Domain Data Acquisition			
	1.8.1. Surveys are conducted on portal features			
	1.8.2. Surveys are conducted to elicit opinions on specific topics			
	1.8.3. Polls provided to rate documents			
2. Knowledge accumulation/preservation				
	2.1 Explicit knowledge accumulation/ preservation			
	2.1.1. Knowledge upload feature available			
	2.1.2. Knowledge base to store documents established/ available			
	2.1.3. Ideas from forums discussion preserved/archived			
II. Knowledge organization subsystem				
1. Knowledge classification				
	1.1 Knowledge classified according to topics			
	1.2 Knowledge classified according to hierarchy (level), e.g. by department and unit			
	1.3 Knowledge classified according to application			
	1.4 Classification helps to rapidly get the retrieval of necessary knowledge			
	1.5 Classification improve knowledge searching efficiency			
2. Knowledge depot				
	2.1 Government's electronic knowledge resources orderly available in government's electronic databases			
	2.1.1 The institution and experience of			

KM activities	Features	A&F	ANF	NA
	management and operation of e-Government portal information			
	2.2 Internal organization of resources orderly available,			
	2.2.1 Organizational/departmental/national information:- mission, vision, goal statements, organizational structure and activities/responsibilities			
	2.2.2 Addresses, opening hours, employees details, telephone numbers/contact information's			
	2.2.3 Laws, rules, regulations, guidelines and procedures			
	2.2.4 Internal research literature, project and report archiving			
	2.3 Intelligence resources orderly available,			
	2.3.1 International policy developments, policy feedback, user demand and other details.			
3. Knowledge map				
	3.1 All navigations visible/not hidden and easily findable			
	3.2 Browse			
	3.2.1 Glossary provided			
	3.2.2 Sitemap provided			
	3.2.3 Index provided			
	3.3 Express the knowledge administrative process through charts is available			
	3.4 Friendly portal management features available for portal system administrators			
III. Knowledge application subsystem				
1. Knowledge sharing				
	1.1 Online Collaboration			
	1.1.1 Organization to user collaboration			
	1.1.1.1 Ask-an-expert (or similar) features available			
	1.1.2 User to user collaboration			
	1.1.2.1 Social tagging available			
	1.1.2.2 Discussion forums available			
	1.1.2.3 Blogs available			
	1.1.2.4 Wikis available			
	1.1.2.5 Instant messaging available			
	1.1.2.6 Mailing lists provided			
	1.1.2.7 E-mail service (for individual communication) available			
	1.2 Information Alerts			
	1.2.1 Newsletters available			
	1.2.2 "What's New" information available			

KM activities	Features	A&F	ANF	NA	
	1.2.3 Events calendar provided				
	1.2.4 E-mail alerts provided				
	1.2.5 Mobile alerts available				
	1.2.6 Update frequency of documents indicated				
	1.2.7 Frequently updated works published (RSS feeds) available				
	1.3 Resource Sharing				
	1.3.1 Links provided to other websites for more information				
	1.3.2 Information/knowledge contributed by other users are accessibility				
2. Knowledge exchange					
	2.1 Inter department/office knowledge exchange features available (online community of practice)				
	2.2 Inter organization knowledge exchange features available (online community of practice)				
	2.3 Organizational structure and culture in e-Government portal convenient to exchange knowledge for officials				
	2.4 Group mail feature available				
3. Knowledge creation/ conversion					
	3.1 Externalization (tacit knowledge converts to explicit knowledge)				
	3.1.1 Interactive Chat				
	3.1.2 Video discussion forums available				
	3.1.3 Experience sharing features available (Bulletin Board)				
	3.2 Combination				
	3.2.1 Uploading, sorting, screening, adding, and composition feature available.				

2. Which KM features do you think is available in the Ethiopian e-Government portal which is not listed above? Please identify and **mark all** available and/or functional features.

KM features of portal	Availability		Functionality (if availability is Yes)	
	Yes	No	Yes	No

3. Have you ever heard about the concept Knowledge Management in your organization? If yes, to what extent is its practicality and/or the plan to implement it in future?

KM features required to enhance the functionality of Ethiopian e-Government portal

3.1. Which new KM features do you think should be incorporated in Ethiopian e-Government portal, which is not yet included to make the portal better? Please identify all applicable features.

No.	KM features of portal
1	
2	
3	
4	
5	
6	
7	
8	
9	
10	

3.1.1. If you identified some of additional features above, what do you think was the problem of not incorporating those features so far?

3.1.2. What do you think should be done to solve this problem? (What is your suggestion?)

3.2. What do you think should be done to enhance (make it better) the functionality of Ethiopian e-Government portal

Note: do you have any other things to say about the functionality of Ethiopian e-Government portal

APPENDIX B: Survey Questionnaire for Knowledge Worker

Jimma University.

School of Graduate Studies.

Department of Information Science.

Research Questionnaire

Dear participant

This questionnaire is aimed at investigating the extent of Knowledge Management (KM) implementation in Ethiopian e-Government portal as well as to evaluate the degree of application of ICTs and its support for KM practice and electronic service delivery within and among government organizations which are participating in electronic service delivery through portal. In responding to this questionnaire be assured that your identity will remain anonymous. None of the questions is aimed at identifying you as a person. In addition, all information supplied by you will be treated as confidential at all times and information provided by you will be reported in collated format (summary format) only. This research is independent and no Government and Non-Government organizations are behind this study. Your participation in this survey is of utmost important to this study. Please answer the questions honestly.

Please make a **CIRCLE(O)** for choice type questions and write your answer for open ended questions. Please feel free to use extra paper if the space given is not enough. For queries regarding this questionnaire contact the researcher **Mr Wondaferaw Yohannese at +251911198733** or e-mail **wondaferaw.yohannese@astu.edu.et**

For the purposes of this study, the abbreviation **KM** refers to **Knowledge Management** (knowledge collection (acquisition and accumulation), knowledge organization (classification, depot and map) and knowledge application (sharing, exchange, and creation)) which is defined in terms of initiatives (tacit and/or explicit) that systematically leverage an organization's **ICT tools**.

An ICT tool for this study **refers** to information systems and electronic tools that facilitate communication and information/knowledge flow within your organization (such as internet, intranet, telephones, video conferencing and so on).

Basic terminologies:

- ❖ **KM features:** means the features available in Ethiopian e-Government portal like discussion forums, member login, knowledge upload features, knowledge resources and so on.
- ❖ **Knowledge Sharing:** means that the information and knowledge of electronic government is as open as possible, so that users has access to and uses the knowledge and information provided by other persons. (Features like discussion forums, blogs, wikis, ask experts are among knowledge sharing features).
- ❖ **Knowledge Exchange:** The key point of knowledge management is to establish the organizational structure and culture in e-Government convenient to exchange knowledge for

officials, and make the exchange and communication efficient through certain mechanism. (Features like, group mail and other inter organization and inter department knowledge exchange features are among the knowledge exchange features).

Thank you for your cooperation.

I. Biographical Information: The questions in this section will be used for comparative purposes only, namely to compare groups of respondents in terms of their answers.

1. What is your **profession/field of study**?

- | | |
|----------------------------------|----------------------------|
| A. Information Technology | D. Business Administration |
| B. Knowledge Management | E. Mathematics |
| C. Information Management | F. Statistics |
| G. Others, Please specify: _____ | |

2. What is your **highest academic** qualification/level?

- | | |
|----------------------------------|--------------------|
| A. Diploma | C. Master's Degree |
| B. Bachelor's Degree | D. PhD Degree |
| E. Others, Please specify: _____ | |

3. To which **age category** do you belong?

- | | |
|-------------------------|----------------------|
| A. 25 years and younger | C. 36 to 45 year |
| B. 26 to 35 years | D. 46 years or older |

4. What is your **gender**?

- | | |
|---------|-----------|
| A. Male | B. Female |
|---------|-----------|

5. What is your current **position**?

- | | |
|----------------------------------|---|
| A. Manager | D. Consultant (hired for some project or tasks to complete) |
| B. Team Leader | |
| C. Technical Staff/Worker | |
| E. Others, Please specify: _____ | |

6. How many **completed years** of work experience do you have? (including in related area of position you are currently working)

- | | |
|----------------------|-------------------|
| A. Less than 4 years | C. 11 - 15 years |
| B. 5 - 10 years | D. Above 15 years |

I. KM implementation in e-Government portal: This part of the questionnaire is to evaluate the extent of KM implementation in Ethiopian e-Government portal.

4. Have you ever used/seen/viewed/browsed Ethiopian e-Government portal?

- A. Yes
- B. No

5. If **YES** (for the above question), for what purpose do you and/or your organization use Ethiopian e-Government portal? (select all that applies)

- A. Knowledge sharing
- B. Knowledge exchange
- C. Knowledge accumulation/preservation
- D. Knowledge acquisition/access.
- E. Others, Please specify: _____

6. Could you identify any **KM features** which are currently available in Ethiopian e-Government portal?

7. Which features (among the identified one above) you and/or your organization use?

8. Which features do you think should be available which is not yet incorporated to enhance the functionality of Ethiopian e-Government portal? Please identify all the necessary features.

II. Application of ICTs for KM Practice: The questions in this section will be used to evaluate the application of ICTs for KM implementation.

1. Have you ever heard about the concept Knowledge/Information Management in your organization?

- A. Yes
- B. No

2. Which of the following elements are associated with KM initiatives within your organization? Please **mark all** applicable options using **cross (X)** sign:

KM Elements	YES	NO
ICT connectivity systems		
Information Systems developed internally for KM as a KM portal		
Intranets used as a KM system tools		
Programs designed to develop the skills of employees		

Others (Please specify)

3. Which of the following **ICT tools** are you **currently** using in your organization for KM practice? And which **ICT tools** do you believe **should and shouldn't** be available and used by your organization for KM practice? Please **mark all** applicable options using cross (X) sign.

Key:

IU = In use

NU = No in use

NABSA = Not available, but should be available

ABSNA = Available, but should not be used

ICT tools	ICT tools currently:			
	IU	NU	NABSA	ABSNA
Office telephones				
Company cell-phones				
Personal cell-phones				
Mobile alerts				
Office desktop computers				
Company Laptops				
Intranet (Systems used for information communication within organization workgroups only)				
Internet				
Extranet (Systems used for information communication with specific external organization or				
Electronic Guestbook (feedback)				
Social tagging (social networking)				
Discussion forums				
Blogs				
Wikis				
E-mail				
Group mail/Mailing lists				
Instant messaging				
Interactive Chat				
Video conferencing (e.g. schoolnet, wordanet...)				
Video discussion forums (e.g. using Skype...)				
Bulletin Board (like for experience sharing)				
Computer-based training/E-learning programmers				
Others, currently in use (Please specify)				
<hr/>				

III. **Contribution of ICTs to build up and enhance service delivery through portal:** This section is meant to determine the contribution of ICT based KM initiatives for your organization to achieve **enhanced electronic service delivery** through portal.

1. To what extent do you **agree/ disagree** with each of the following statements? **Use the scale** provided to describe the extent to which the statement applies to you in your organization. Please **mark all** applicable options using **cross (X)** sign

Key: SA = Strongly Agreed, A = Agreed, N = Neutral (Undecided), D = Disagreed, SD = Strongly Disagreed

Statements	SD	D	N	A	SA
In my organization, whenever new event and/or information related with my job is released I am informed with:					
o E-mail Alert					
o Group Mail					
o Mobile Alert					
In my organization, for immediate job related help I use:					
o Interactive Chat					
o video discussion(online face to face)					
In my organization, for job related communication and knowledge resource exchange I use:					
o Various ICT tools for inter department/office knowledge exchange.					
o Various ICT tools for inter organization knowledge exchange.					
In my organization, I use discussion forums:					
o For proposed solutions for problems from previous archived discussions when I experience the same/related type of problems					
o To share my opinion for the problems when somebody posted for help.					
o When I face problems to do my job, I ask others opinion by posting questions and I have got positive responses.					
ICT tools usage:					
o Has been improved my ability to create and share knowledge					
o Offers an opportunity for the development of my technical/work skills and expertise					
o Encouraged me to learn and teach others better ways of performing tasks					
o increases my organization efficiency by managing knowledge to improve organizational processes					
I have been participating in my organization electronic service delivery through portal.					
My experience of using ICT tools for KM helps to contribute my knowledge in Ethiopian e-Government portal.					
I have been providing the same assistance or contribution on Ethiopian e-Government portal as I do in organizational (local) KM initiatives.					
I have been getting support from Ethiopian e-Government portal as I have been getting from organizational (local) KM initiatives.					
In my organization, ICT tool application/usage encourage me to contribute for KM initiatives through portal					

Thank you again for your cooperation.

APPENDIX C: Interview Guide for selected Management Position Holder

Interview Questions

1. Have you ever heard about the concept Knowledge Management in your organization?
2. What do you know about KM mechanisms?
3. Have you ever practiced KM in your organization?
4. Have you ever used Ethiopian e-Government portal?
5. Could you identify any KM features which are currently available in Ethiopian e-Government portal?
6. Which features (among the identified one above) you and/or your organization use?
(Please list out based on the most frequently used features)
7. Which features do you think should be available which is not yet incorporated to enhance the functionality of Ethiopian e-Government portal? Please identify all features.
8. Do you experience any problems in Ethiopian e-Government portal in your organization?
And how do you go about solving such a problem?
9. Does your organization implement any Knowledge Management strategy? And how is it implemented?
10. If Yes, Who is responsible for Knowledge Management initiatives in your organization?
11. Could you mention any ICT tools that are used in your organization for KM?
12. Mainly for what purpose do you use ICT tools in your organization? Could you please mention the tools used in relation to the purpose?
13. Do you believe that your organization has the appropriate ICT tools for effective KM?
14. Do you believe that ICT offers benefits to your organization in relation to KM? And which specific contributions/benefits can you mention which are currently realized in your organization?
15. Do you believe that ICT based KM practice in your organization contribute for development of Ethiopian e-Government portal? How?

APPENDIX D: Letter of Permission/Cooperation Request (from JU, IS Department)



JIMMA UNIVERSITY
ጅማ ዩኒቨርሲቲ

ቁጥር
Ref.No 15017/493/2005
ቀን
Date 22/06/2005

ላፋይናንስና ኢኮኖሚ ልማት ሚኒስቴር
አዲስ አበባ

ጉዳዩ፡- ትብብር ስለመጠየቅ፡፡

ተማሪ ወንድአፈራው ዮሐንስ በኢንፎርሜሽን ሳይንስ ት/ክፍል የሁለት አመት የድህረ ምረቃ ትምህርታቸውን ለማጠናቀቅ የመመረቁያ የጥናት ጽሁፋቸውን "Evaluating and Enhancing Ethiopian eGovernment Portal Functionality in Knowledge Management Perspective" በተሰኘ ርዕስ ላይ ለመስራት ተዘጋጅተው በሃደት ላይ ይገኛሉ፡፡

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ከድርጅታችሁ ለምርምር የተወሰዱ መረጃዎች ሚስጥራዊነታቸው ተጠብቆ ለምርምር አገልግሎት ብቻ እንደሚውሉ ት/ክፍሉ ይገልጻል፡፡

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ክፍል ጋራ



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APPENDIX E: To Whom It May Concern (from JU, IS Department)



JIMMA UNIVERSITY
ጅማ ዩኒቨርሲቲ

ቁጥር
Ref.No 15017/482/2005
ቀን
Date 22/08/2005

ለሚመለከተው ሁሉ

ተማሪ ወንድአፈራው ዮሐንስ በኢንፎርሜሽን ሳይንስ ት/ክፍል የሁለት አመት የድህረ ምረቃ ትምህርታቸውን ለማጠናቀቅ የመመረቁያ የጥናት ጽሁፋቸውን "Evaluating and Enhancing Ethiopian eGovernment Portal Functionality in Knowledge Management Perspective" በተሰኘ ርዕስ ላይ ለመስራት ተዘጋጅተው በሂደት ላይ ይገኛሉ።

በመሆኑም ተማሪው ለምርምር ስራቸው የሚያስፈልጓቸውን መረጃዎች ለመሰብሰብ የመንግስትና የግል ተቋማት ቢሮዎችን ማንካካታቸው አስፈላጊ እንደሚሆን ግልፅ ስለሆነ ጥያቄያቸውን ተቀብላችሁ የበኩላችሁን እገዛና እርዳታ እንደምታደርጉላቸው በመተማመን ለተሰጣቸው አገልግሎት ሁሉ ከወዲሁ ለማመስገን እንወዳለን።

ከድርጅታችሁ ለምርምር የተወሰዱ መረጃዎች ሚስጥራዊነታቸው ተጠብቆ ለምርምር አገልግሎት ብቻ እንደሚውሉ ት/ክፍሉ ይገልጻል።

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21/9/05
80-11/2

APPENDIX F: Some of Portals Incorporated in One-stop Ethiopian e-Government Portal: accessed January 2013

Government Offices	Portals
Ministry of Finance and Economic Development	http://www.mofed.gov.et/English
Ministry of Foreign Affairs	http://www.ethiopia.gov.et/English/MOFA
Ministry of Health	http://www.moh.gov.et/English
Ministry of Trade	http://www.ethiopia.gov.et/English/MOTI
Ethiopian Management Institute	http://www.emi.edu.et/
Social Security Agency	http://www.psssa.gov.et/web/pages/home
Ministry of Education	http://www.moe.gov.et/English
National Archives and Library Agency	http://www.nala.gov.et/
Ethiopian Protection Authority	http://www.epa.gov.et/
Ministry of Transport and Communications	http://www.motac.gov.et/
Federal Micro and Small Enterprise(MSE)	http://www.mse.org.et/
Tourism Ethiopia	http://www.tourismethiopia.gov.et/
Ministry of Communication and Information Technology	http://www.mcit.gov.et/
Ministry of Mines	http://www.mom.gov.et/
Public Procurement & Property Administration	http://www.ppa.gov.et/MOFED/faces/home.jsp
Federal Democratic Republic of Ethiopia House of Federation	http://www.hofethiopia.gov.et/
Ministry of Labour and Social Affairs	http://www.molsa.gov.et/
FDRE Ministry of Defence	http://www.fdredefenceforce.gov.et/
The FDRE Documents Authentication & Registration Office	http://www.daro.gov.et/
Ministry Of Justice	http://www.moj.gov.et/
Benishangul-Gumuz Region	http://www.benishangulgumuz.gov.et/
Great Ethiopia Renaissance Dam Project	http://www.gerd.gov.et/web/guest
Ethiopian Coffee Exporters Portal	http://www.ecea.org.et/
Ministry Of Agriculture	http://www.moa.gov.et/web/pages/home
Benishangul-Gumuz Capacity Building and Civil Service	http://www.bgrscbsb.gov.et/
Ethiopia E-Service	http://www.eservices.gov.et/

Source: Ethiopian e-Government portal (<http://www.ethiopia.gov.et>)

APPENDIX G: Knowledge Collection Subsystem Scores

KM Features	Available and Functional		Available but not functional		Not available	
	Score	%	Score	%	Score	%
Portal is listed on the first page of results if one made search about Ethiopia and related area	7	100.00%	0	0.00%	0	0.00%
Free text search provided	6	85.70%	1	14.30%	0	0.00%
Advanced search provided	3	42.90%	0	0.00%	4	57.10%
Search recommendations provided	3	42.90%	0	0.00%	4	57.10%
Search results can be sorted	1	14.30%	0	0.00%	6	85.70%
Users can search within results	1	14.30%	0	0.00%	6	85.70%
Membership sign-up provided	4	57.10%	2	28.60%	1	14.30%
Registered users can create profiles	3	42.90%	0	0.00%	4	57.10%
Registered users can create a collection of favorites	2	28.60%	0	0.00%	5	71.40%
Registered users can specify types of information to be displayed	4	57.10%	0	0.00%	3	42.90%
Information tailored for specific users (e.g. seniors...)	3	42.90%	0	0.00%	4	57.10%
Portal supports different versions of the same interface (e.g. text only, low graphics, etc.)	3	42.90%	0	0.00%	4	57.10%
Multilingual support available	7	100.00%	0	0.00%	0	0.00%
Portal supports visually impaired	1	14.30%	0	0.00%	6	85.70%
Portal support hearing impaired	0	0.00%	0	0.00%	7	100.00%
Images used as information aids	7	100.00%	0	0.00%	0	0.00%
Video used as information aids	3	42.90%	1	14.30%	3	42.90%
Audio used as information aids	2	28.60%	1	14.30%	4	57.10%
Animation used as information aids	2	28.60%	0	0.00%	5	71.40%
Portal acquires contact information	2	28.60%	0	0.00%	5	71.40%
Portal acquires personal information	1	14.30%	0	0.00%	6	85.70%
Users can provide feedback electronically (Electronic Guestbook)	6	85.70%	0	0.00%	1	14.30%
Surveys are conducted on portal features	7	100.00%	0	0.00%	0	0.00%
Surveys are conducted to elicit opinions on specific topics	4	57.10%	0	0.00%	3	42.90%
Polls provided to rate documents	3	42.90%	0	0.00%	4	57.10%
Knowledge upload feature available	7	100.00%	0	0.00%	0	0.00%
Knowledge base to store documents established	7	100.00%	0	0.00%	0	0.00%
Ideas from forum discussion preserved/archived	3	42.90%	2	28.60%	2	28.60%
Total	102	52.04%	7	3.57%	87	44.39%

APPENDIX G: Knowledge Organization Subsystem

KM Features	Available and Functional		Available but not functional		Not available	
	Score	%	Score	%	Score	%
Knowledge classified according to topics	7	100.00%	0	0.00%	0	0.00%
Knowledge classified according to hierarchy (level), e.g. department	7	100.00%	0	0.00%	0	0.00%
Knowledge classified according to application	4	57.10%	0	0.00%	3	42.90%
Knowledge Classification helps to rapidly get the retrieval of necessary knowledge	7	100.00%	0	0.00%	0	0.00%
Knowledge Classification improve knowledge searching efficiency	7	100.00%	0	0.00%	0	0.00%
Institution, experience of management and operation of e-Government portal information available	4	57.10%	0	0.00%	3	42.90%
Organizational/departmental/national information available	7	100.00%	0	0.00%	0	0.00%
Addresses, opening hours, employees details, telephone numbers/contact information's available	5	71.40%	0	0.00%	2	28.60%
Laws, rules, regulations, guidelines and procedures available	7	100.00%	0	0.00%	0	0.00%
Internal research literature, project and report archived	5	71.40%	0	0.00%	2	28.60%
International policy developments, policy feedback, user demand and other details available	5	71.40%	0	0.00%	2	28.60%
Navigations visible/not hidden and easily findable	7	100.00%	0	0.00%	0	0.00%
Glossary provided	4	57.10%	1	14.30%	2	28.60%
Sitemap provided	5	71.40%	0	0.00%	2	28.60%
Index provided	5	71.40%	0	0.00%	2	28.60%
Express the knowledge administrative process through charts	1	14.30%	0	0.00%	6	85.70%
Friendly portal management features available for portal system administrators	5	71.40%	0	0.00%	2	28.60%
Total	92	77.31%	1	0.84%	26	21.85%

APPENDIX G: Knowledge Application Subsystems

KM Features	Available and Functional		Available but not functional		Not available	
	Score	%	Score	%	Score	%
Ask-an-expert (or similar) features available	2	28.57%	2	28.57%	3	42.86%
Social tagging available	6	85.71%	0	0.00%	1	14.29%
Discussion forums available	3	42.86%	3	42.86%	1	14.29%
Blogs available	4	57.14%	2	28.57%	1	14.29%
Wikis available	3	42.86%	0	0.00%	4	57.14%
Instant messaging available	4	57.14%	2	28.57%	1	14.29%
Mailing lists provided	3	42.86%	0	0.00%	4	57.14%
E-mail service (for individual communication) available	5	71.43%	0	0.00%	2	28.57%
Newsletters available	6	85.71%	0	0.00%	1	14.29%
“What’s New” information available	3	42.86%	0	0.00%	4	57.14%
Events calendar provided	3	42.86%	2	28.57%	2	28.57%
E-mail alerts provided	3	42.86%	0	0.00%	4	57.14%
Mobile alerts available	2	28.57%	0	0.00%	5	71.43%
Update frequency of documents indicated	2	28.57%	1	14.29%	4	57.14%
Frequently updated works published (RSS feeds)	4	57.14%	1	14.29%	2	28.57%
Links provided to other websites for more information	7	100.00%	0	0.00%	0	0.00%
Information/knowledge contributed by other users are accessibility	3	42.86%	0	0.00%	4	57.14%
Inter department/office knowledge exchange features available (online community of practice)	1	14.29%	0	0.00%	6	85.71%
Inter organization knowledge exchange features available (online community of practice)	2	28.57%	0	0.00%	5	71.43%
Organizational structure and culture in e-Government portal convenient to exchange knowledge for officials	2	28.57%	0	0.00%	5	71.43%
Group mail feature available	2	28.57%	1	14.29%	4	57.14%
Interactive Chat	2	28.57%	4	57.14%	1	14.29%
Video discussion forums available	0	0.00%	1	14.29%	6	85.71%
Experience sharing features available (Bulletin Board)	1	14.29%	1	14.29%	5	71.43%
Uploading, sorting, screening, adding, and composition feature available.	7	100.00%	0	0.00%	0	0.00%
Total	80	45.71%	20	11.43%	75	42.86%

APPENDIX G: Contribution of ICTs for KM and its Support for Portal Enhancement

Statements (Items)	SD	%	D	%	N	%	A	%	SA	%
When new event and/or information related with my job is released I am informed with E-mail Alert	6	8.33%	8	11.11%	5	6.94%	37	51.39%	16	22.22%
When new event and/or information related with my job is released I am informed with Group Mail	6	8.33%	11	15.28%	13	18.06%	29	40.28%	13	18.06%
When new event and/or information related with my job is released I am informed with Mobile Alert	21	29.17%	26	36.11%	10	13.89%	15	20.83%	0	0.00%
For immediate job related help I use Interactive Chat	14	20.00%	19	27.14%	16	22.86%	20	28.57%	1	1.43%
For immediate job related help I use video discussion(online face to face)	14	20.90%	24	35.82%	14	20.90%	11	16.42%	4	5.97%
I use various ICT tools for inter department/office knowledge exchange and job related communication	12	16.67%	8	11.11%	6	8.33%	32	44.44%	14	19.44%
I use various ICT tools for inter organization knowledge exchange and job related communication	4	5.97%	5	7.46%	15	22.39%	29	43.28%	14	20.90%
I use discussion forums: for proposed solutions for problems from previous archived discussions when I experience the same/related type of problems	21	29.17%	21	29.17%	4	5.56%	26	36.11%	0	0.00%
I use discussion forums: to share my opinion for the problems when somebody posted for help.	20	27.78%	22	30.56%	5	6.94%	19	26.39%	6	8.33%
I use discussion forums: when I face problems to do my job, I ask others	19	26.39%	20	27.78%	7	9.72%	21	29.17%	5	6.94%

Statements (Items)	SD	%	D	%	N	%	A	%	SA	%
opinion by posting questions and I have got positive responses.										
ICT tools usage: has been improved my ability to create and share knowledge	2	2.78%	7	9.72%	6	8.33%	19	26.39%	38	52.78%
ICT tools usage: offers an opportunity for the development of my technical/work skills and expertise	2	2.78%	7	9.72%	6	8.33%	20	27.78%	37	51.39%
ICT tools usage: encouraged me to learn and teach others better ways of performing tasks	1	1.39%	2	2.78%	5	6.94%	36	50.00%	28	38.89%
ICT tools usage: increases my organization efficiency by managing knowledge to improve organizational processes	2	2.78%	7	9.72%	4	5.56%	22	30.56%	37	51.39%
I have been participating in my organization electronic service delivery through portal	4	5.56%	20	27.78%	17	23.61%	23	31.94%	8	11.11%
My experience of using ICT tools for KM helps to contribute my knowledge in Ethiopian e-Government portal	5	6.94%	15	20.83%	22	30.56%	20	27.78%	10	13.89%
I have been providing the same assistance or contribution on Ethiopian e- Government portal as I do in organizational KM initiatives	7	9.72%	22	30.56%	28	38.89%	11	15.28%	4	5.56%
I have been getting support from Ethiopian e- Government portal as I have been getting from organizational KM initiatives	8	11.11%	26	36.11%	23	31.94%	9	12.50%	6	8.33%
In my organization, ICT tool application/usage encourage me to contribute for KM initiatives through portal	7	9.72%	16	22.22%	17	23.61%	29	40.28%	3	4.17%