



ADDIS ABABA UNIVERSITY
COLLEGE OF NATURAL SCIENCES
SCHOOL OF INFORMATION SCIENCE

***DESIGNING A KNOWLEDGE MANAGEMENT SYSTEM
FRAMEWORK FOR KNOWLEDGE SHARING***

*THE CASE OF ADDIS ABABA LAND HOLDING REGISTRATION AND
INFORMATION AGENCY*

ESHETU BIRRU YITEBAREK

Addis Ababa

June 2017

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DECLARATION

I declare that this thesis is my original work and has not been presented for a master degree in any other university. _____

This thesis has been submitted for examination with my approval as university advisor.

Advisor

DEDICATION

I would like to dedicate this research to my Father, who was always eager to see my academic success but was unable to see my achievement. At my childhood time, he said: “My gift is my advice to be a clever student what I have to give you. I would be happy if you take and use my advice”.

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List of Acronyms

AACADIS	Addis Ababa Cadastral Information System
AALHRIA	Addis Ababa Land Holding Registration and Information Agency
AAR	After Action Reviews/project summaries
COP	Communities of practice
KM	Knowledge Management
KMS	Knowledge Management System
MDD	Model Driven Development
OK	Organizational Knowledge
OOP	Object oriented Programming
RPRS	Real Property Registration System
RECS	Real Estate Cadastral System
SECI	Socialization, Externalization, Codification and Internalization
TK	Tacit Knowledge
UML	Unified Modeling Language

Abstract

This research investigated the practice of tacit knowledge sharing among employees of the Addis Ababa Land Holding Registration and Information Agency. It is the new way of established public land organization with all sub city branches for giving land related services with modern cadastral information system in the Addis Ababa city administration.

The objective of this study is to design a knowledge management system that promotes tacit knowledge sharing among employees in this organization. The study used a qualitative case study research method and design science research method that gathered the relevant requirements and designed a Knowledge Management System. Data was collected using data collection methods through interview, observation and document review. Seventeen employees with different years of work experience were selected for interview using purposive sampling methods.

The research identified organizational and individual factors that have direct influence on tacit knowledge sharing activities. The study proposed a Knowledge Management implementation model and a Knowledge Management System design Framework that serves as a blueprint to implement Knowledge Management in Addis Ababa Land Holding Registration and Information Agency.

The research findings are not generalizable to other contexts. It is because that this study is a qualitative type of research and only focused on the AALHRIA context. The researcher recommended basic things for the concerned bodies of AALHRIA which must be implemented for effective tacit knowledge sharing. The study has both theoretical and practical contributions. The researcher also recommended future researches for other researchers to further study in the area of tacit knowledge sharing on the public land sectors.

Key words: - Knowledge Management System, Tacit knowledge sharing.

CHAPTER ONE

INTRODUCTION

According to Kucza (2001), Knowledge Management is the overall task of managing the processes of knowledge creation, storage and sharing, as well as the related activities. Generally speaking, this has to include the identification of the current state, the determination of needs, and the improvement of affected processes in order to address these needs. Consequently, KM projects are improvement projects. Three main aspects have to be taken into account in these projects. The first is the management of general conditions in an organization (the cultural environment and the KM processes). The second is the provision of assistance for the direct, inter-human KM processes, i.e., communication. The third is the management of generation, distribution, access and use of knowledge coded into artifacts (documents, training, videos etc.), i.e., information management. Due to KM ranging under these different dimensions, it has to take into account or incorporate such activities as Business Process Re-engineering (BPR), Document Management Systems (DMS), Human Resource Management (HRM), Quality Management (QM), Product Data Management (PDM), and Information Management (IM), which all relate to KM.

1.1. Overview of Addis Ababa Land Holding Registration and Information Agency

This research mainly focused on the design of a knowledge management system framework for Addis Ababa Land Holding Registration and Information Agency in order to increase its knowledge sharing practices among all employees.

Addis Ababa Land Holding Registration and Information Agency is being headed by the board established at the level of deputy mayor of Addis Ababa city administration. This Agency was re-

established in 2015 in a new way with the aim of enabling the sector to play an important role in the land holding registration and information management of each parcel of the Addis Ababa city administration and building good governance by permanently changing the system of urban land registration and information management (proclamation number 45/2015). The objective of the Addis Ababa Land Holding Registration and Information Agency is to register each parcel of the city and giving land related services in a modern and effective land information system of urban land registration and information management which enables the realization of achieving development, growth and good governance of the Addis Ababa city administration.

Nowadays, land services are the burning issues for both the public and the government in Ethiopia (proclamation number 818/2014). Due to many reasons, the land holders of Addis Ababa city administration have several grievances on the land services. The Addis Ababa Land Holding Registration and Information Agency is becoming committed to foster these land services to minimize the corruptions and registering each parcel of the city within the modern land information system which is known as Addis Ababa Cadastral Information System (AA-CADIS). This AACADIS contained two main sub systems (RPRS & RECS). RPRS system is used to register the land ownership of non-spatial information and giving a service for about ownership transactions. The RECS system is also used to register geographical (spatial) information of each parcel of the city and giving a service of a parcel like merging and/or splitting request from the land holders.

This study will have a positive impact to help the Addis Ababa Land Holding Registration and Information Agency in regard to how the agency can manage its employees' knowledge. It emphasizes sharing of the knowledge among themselves and transfer of the employee's individual knowledge to organizational knowledge so as to provide a modern service to the public.

The basic aim of this research is to design the knowledge management system framework through the use of web 2.0 technologies for the Addis Ababa Land Holding Registration and Information agency that can get a sustainable benefit from its employees' knowledge so as to increase its entire organizational performance. This system design promotes the knowledge sharing culture throughout the organization by initiating the employees who share valuable knowledge. The proposed KMS system also advertized the employee who used the system frequently for the valuable or quality of knowledge and report for the high level knowledge managers to acknowledge the knowledge sharing practice. By doing so, the Addis Ababa Land Holding Registration and Information Agency will get sustainable competitive advantage from its employees' tacit knowledge.

1.2. Background of the Study

According to Morrissey (2005), knowledge can be thought as “information combined with experience, context, interpretation, reflection and is high-value form of information that is ready for application to decisions and actions in organizations.

In any organization, Morrissey (2005) classified in to two primary types of knowledge: tacit knowledge and explicit knowledge. Tacit knowledge can be defined as knowledge that is subconsciously understood and applied, difficult to articulate, developed from direct experience and action, and usually shared through highly interactive conversation, storytelling and shared experience. Examples of tacit knowledge include “‘best practice’ performed in an organization, management skills, technologies, and customer, market, and competitor intelligence.” Tacit knowledge is, by definition, hard to codify and store (Steve Morrissey, 2005). This study is concerned for designing a knowledge management system framework that can help to manage and share the knowledge.

Facilitating tacit knowledge sharing among individuals, such as the sharing of experiences, skills, know-how, or know-whom, and also retaining this knowledge in organizational memory has always been of interest to organizations (Taylor, 2007). However, finding the right conditions, incentives, and mechanisms for sharing this unstructured knowledge has long been a major issue of organizations and knowledge management (KM) research (Allen, 2008). Prior research shows that various factors affect the tacit knowledge sharing behavior of individuals in the forms of enablers, motivators, inhibitors, or facilitators (Chennamaneni and Teng, 2011; Joia and Lemos, 2010; Li et al., 2010).

Information Technology (IT) has been regarded as one of the main enablers of knowledge sharing activities (Huysman and Wulf, 2005). However, currently there is no consensus on whether IT can facilitate tacit knowledge sharing. Traditionally, IT has been criticized for ignoring one of the main components of KM which is “people”. It has been argued that traditional IT had been more focused on information management rather than facilitating interaction among the knowledge holders which is necessary for tacit knowledge sharing (Huysman and Wulf, 2005, Marwick, 2001). That is why researchers argued that for tacit knowledge sharing technologies are needed that provide free-form, real-time, and interactive communication and collaboration platforms (Mitri 2003; Marwick, 2001).

This research critically analyzed the role of IT, particularly social web tools, as well as the difficulties of tacit knowledge sharing utilizing information technology. The main goal of this study is to design a knowledge management system framework that facilitate sharing of tacit knowledge by using Intranet, web 2.0 technologies for Addis Ababa land holding and registration agency.

1.3. Problem statement

Many researches discussed that managers and academicians have recognized knowledge as a key source of competitive advantage in recent years (Grant, 1996; Zander and Kogut, 1995; Nonaka,

1994). Furthermore, many organizations have started focusing on Knowledge Management (KM), in order to be competitive in the business world. According to Drucker (1992), knowledge has been acknowledged as a major source of success for organizations. Coping with knowledge creation, transfer and exploitation will be significantly crucial for the survival and success of corporations (Nonaka and Hedlund, 1991).

The main challenge in organizational research is, whether it is possible to manage tacit knowledge, in order to facilitate the creation of new tacit knowledge and to externalize that tacit knowledge in a way that will be transferable to other individuals and how multinational companies can manage this (Irick, 2007).

Muluken Amare (2014) stated that there are organizations which are mainly dependent on tacit knowledge of employees who are working for a long time in a specific organization. In this regard, the success of the organization is directly related to the performance and the existence of those experienced employees. This is very challenging for such kinds of organizations because those experienced employees may leave the organization or retire.

Addis Ababa Land Holding Registration and Information agency is unique knowledge creating organization, because of its importance for the public. Land is a scarce and expensive resource for our country. This resource should be managed appropriately. Otherwise, it will have multifaceted and negative impact. To do so, land services should be modernized and become manageable.

In the Addis Ababa Land Holding Registration and Information agency, there are key employees and leaders who are very critical for the existence of the organizations. Most of the time the reason behind different decisions made by the organization in relation to land registration and information services delivered to customers is based on the tacit knowledge of those key employees. Even though there are some efforts to manage sharing of organizational knowledge, currently the organization is

facing a critical problem due to high employee turnover that unexpectedly happened in recent years. Therefore, knowledge management system is important for the Addis Ababa Land Holding Registration and Information agency to retain the tacit knowledge of these employees leaving to agency for whatever reason.

Knowledge sharing problem and high turnover of employees are the severe problem for this agency. It is the reason that tacit knowledge is hiding only in a few key employees. In such situations, it is difficult to make the organization performance sustainable. Therefore, to bring sustainable performance and good service, knowledge should be shared among all employees through the use of knowledge management system.

1.4. Research Questions

The following research questions are formulated to guide this study:

1. How does the agency manage its employees' tacit knowledge?
 - a. Does the organization have a principle to manage a tacit knowledge of its employees?
2. How effective are the knowledge management practices used in their day to day activities?
 - a. What are the factors that influence tacit knowledge sharing and knowledge management?
 - b. In what way employees share their knowledge with each other?
3. What are the needs and basic requirements to be incorporated in the design of the proposed KMS framework that can solve the knowledge sharing problem among employees within the organization?

1.5. Objective of the Research

1.5.1. General objective

The general objective of this research is to design a knowledge management system framework in order to capture the employees' tacit knowledge, sharing among all employees and transfer individual knowledge to organizational knowledge for the Addis Ababa Land Holding Registration and Information agency.

1.5.2. Specific Objectives

In order to achieve the general objective of this study, the following specific objectives are drawn:

- To assess the existing practices of knowledge management in the organization.
- To know the needs of the employee and collect their requirements with regard to tacit knowledge sharing activities through IT solutions.
- To motivate employees' participation in tacit knowledge sharing between them through the use of the proposed knowledge management system design.
- To evaluate the proposed design artifact through the use of design science evaluation method.

1.6. Significance of the study

This research attempted to investigate the current knowledge management practice of Addis Ababa Land Holding Registration and Information Agency and proposed a design of knowledge management system framework so as to manage tacit knowledge of the organizations. Therefore, the Addis Ababa Land Holding Registration and Information agency's management and employees can make use of the output of this study.

In this regard, it is used to solve the existing problem of the organization in relation to the challenge of capturing, creating, sharing and managing knowledge created in the organizations.

The findings of this research will help the Addis Ababa Land Holding Registration and Information agency.

- a) To see the need to keep the use of tacit knowledge management practices in order to increase its organizational performance.
- b) To see its weaknesses and strong parts in the use of its employees' tacit knowledge and works on the weaknesses in order to realize the goals of the organizations.
- c) To foster the sensitivity and importance of all employees which are crucial to the enhancement of organizational business processes but could be very difficult to detect from their personal and subjective perspectives.
- d) To retain the tacit knowledge of all employees and changed to its permanent organizational knowledge so as to understand the organizational knowledge simply by the new comer of the employees.
- e) Finally, it will help policy makers to know how to package tacit knowledge management to those at the grass root so that they can get their support in the realization of modern and effective knowledge management system.

It is believed that this study contributes on management of knowledge in the public organization at large. Moreover, this study can give its own contribution for other researchers as a ground work to carry out further work in the tacit knowledge management field of study.

1.7. Scope and limitation of the study

The main intent of this study is to design the knowledge management system framework and investigate the knowledge sharing practice in Addis Ababa Land Holding Registration and Information agency.

The output of the study would be more fruitful if it is conducted widely by including several similar public organizations in Ethiopia. However, due to time, labor and money constraints, the study is limited to treat the case only in the Addis Ababa Land Holding Registration and Information agency.

1.8. Organization of the Study

This research is organized into six chapters. The first chapter (introduction) included the overview of the study, background of the study, statement of the problem, objective of the study, significance of the study and scope of the study. The second chapter presented review of related literatures on tacit knowledge management, knowledge management system and web 2.0 technologies which discusses related works in the area and so on. The third chapter dealt with methodologies of the study in respect to the design science methodologies and procedures followed for the research design, sampling size and sampling techniques, data collection methods and method of data analysis and interpretations. The fourth chapter focused on the data presentation and discussion. The fifth chapter also provided the proposed KM implementation model, the new KMS design prototype and design evaluation. The last chapter presented conclusion, recommendations, future research and challenge of the study.

CHAPTER TWO

LITERATURE REVIEW

Different scholars defined knowledge in different ways according to their study and discipline. Knowledge is essential in everyday work. Everyone knows how to carry out his/her work and this knowledge can be reused later in similar tasks by adopting this knowledge to new situations. The general purpose of Knowledge Management (KM) is to make knowledge usable for more than one individual, e.g. for an organization as a whole; that is, to share it. New knowledge-based views on organizations suggest that it is knowledge that holds organizations together (Brown and Duguid 1998). KM has existed and has been used for a long time, although it was neither called by this name nor necessarily recognized as what it is until a few years ago (Davenport and Prusak 1998). The way of making knowledge available for others has evolved with time. It once started with family clans, where knowledge was passed on from father to son by a long process of learning. With the coming up of teamwork, people were supposed to work closer together to benefit from the synergy of their joint knowledge. Today's effort at knowledge being shared among large organizations which may be geographically spread over the world and active in different kinds of areas. First cases perform this sharing even among different organizations, e.g. use defined interfaces to mediate knowledge not only inside one specific organization but to also share parts of it among partners.

2.1. Definitions of Knowledge

Knowledge is very difficult to define and as a result, some scholars have tried to describe it as follows:

- “Valuable information from human mind, includes reflection, synthesis and context”(Davenport and Prusak, 1997);

- “a body of facts and principles accumulated by mankind in the course of time” (Clarke, 1992); and
- “data and/or information that have been organized and processed to convey understanding, experience, accumulated learning, and expertise as they apply to a current problem or activity” (Turban et al, 2006, p.52).

In many instances, the definition of knowledge has been viewed from its taxonomical perspective. Primarily, sources of knowledge are categorized into tacit and explicit forms (Polanyi, 1966; Nonaka, 1991). Tacit knowledge exists in the form of mental models, beliefs, values, assumptions and other know-how of individuals which are not easily conveyed (Polanyi, 1966; Nonaka, 1991; Bennet and Tomblin, 2006). On the other hand explicit knowledge resides in various forms of artifacts including procedures, texts, reports, memos and books (Nonaka, 1991; Bennet and Tomblin, 2006). In correspondence with tacit and explicit classification, knowledge is similarly viewed as softer and harder (Hildreth et al, 1999); informal and formal (Conklin, 1996); unstructured and structured (Hahn and Subramani, 2000) and symbiotic and semiotic (Sharif, 2008).

Notwithstanding these classifications, many knowledge management writers agree that both tacit and explicit forms of knowledge are inextricably intertwined (Nonaka, 1991). This interdependence of knowledge parts was represented as the duality of participation and reification (Wenger, 1998) and soft-hard duality (Hildreth et al, 1999). Yet another common agreement is the difficulty involved in exploiting softer knowledge (Polanyi, 1966; Nonaka, 1991; Hildreth et al, 1999).

2.2. Alternative Perspectives on Knowledge

There are the varieties of alternative perspectives on knowledge that are defined by different scholars. Knowledge is defined as a justified belief that increases an entity’s capacity for effective action. Knowledge may be viewed from several perspectives (Huber 1991; Nonaka 1994).

- (1) A state of mind
- (2) An object
- (3) A process
- (4) A condition of having access to information, or
- (5) A capability.

Knowledge has been described as “a state or fact of knowing with knowing being a condition of understanding gained through experience or study; the sum or range of what has been perceived, discovered, or learned” (Schubert et al. 1998). The perspective on knowledge as a state of mind focuses on enabling individuals to expand their personal knowledge and apply it to the organizations needs. A second view defines knowledge as an object (Carlsson et al. 1996; McQueen 1998; Zack 1998a). This perspective posits that knowledge can be viewed as a thing to be stored and manipulated (i.e., an object). Alternatively, knowledge can be viewed as a process of simultaneously knowing and acting (Carlsson et al. 1996; McQueen 1998; Zack 1998a). The process perspective focuses on the applying of expertise (Zack 1998a). The fourth view of knowledge is that of a condition of access to information (McQueen 1998). According to this view, organizational knowledge must be organized to facilitate access to and retrieval of content. This view may be thought of as an extension of the view of knowledge as an object, with a special emphasis on the accessibility of the knowledge objects. Finally, knowledge can be viewed as a capability with the potential for influencing future action (Carlsson et al. 1996). Watson (1999) builds upon the capability view by suggesting that knowledge is not so much a capability for specific action, but the capacity to use information; learning and experience result in an ability to interpret information and to ascertain what information is necessary in decision making.

These different views of knowledge lead to different perceptions of knowledge management (Carlsson et al. 1996). If knowledge is viewed as an object, or is equated with information access,

then knowledge management should focus on building and managing knowledge stocks. If knowledge is a process, then the implied knowledge management focus is on knowledge flow and the processes of creation, sharing, and distribution of knowledge. The view of knowledge as a capability suggests a knowledge management perspective centered on building core competencies, understanding the strategic advantage of know-how, and creating intellectual capital. The major implication of these various conceptions of knowledge is that each perspective suggests a different strategy for managing the knowledge and a different perspective of the role of systems in support of knowledge management.

2.3. Taxonomies of Knowledge

Knowledge is mostly classified as in to two parts. Drawing on the work of Polanyi (1962, 1967), Nonaka (1994) explicated two dimensions of knowledge in organizations: tacit and explicit. Rooted in action, experience, and involvement in a specific context, the tacit dimension of knowledge (henceforth referred to as tacit knowledge) is comprised of both cognitive and technical elements (Nonaka 1994). The cognitive element refers to an individual's mental models consisting of mental maps, beliefs, paradigms, and viewpoints. The technical component consists of concrete know-how, crafts, and skills that apply to a specific context. An example of tacit knowledge is knowledge of the best means of approaching a particular customer using flattery, using a hard sell, using a no-nonsense approach. The explicit dimension of knowledge (henceforth referred to as explicit knowledge) is articulated, codified, and communicated in symbolic form and/or natural language. An example is an owner's manual accompanying the purchase of an electronic product. The manual contains knowledge on the appropriate operation of the product.

Knowledge can also be viewed as existing in the individual or the collective (Nonaka 1994). Individual knowledge is created by and exists in the individual whereas social knowledge is created

by and inherent in the collective actions of a group. Both Nonaka and others (e.g., Spender1992, 1996a, and 1995b) rely heavily on the tacit-explicit, individual-collective knowledge distinction but do not provide a comprehensive explanation as to the interrelationships among the various knowledge-types. One potentially problematic aspect in the interpretation of this classification is the assumption that tacit knowledge is more valuable than explicit knowledge; this is tantamount to equating an inability to articulate knowledge with its worth. Few, with the exception of Bohn (1994), venture to suggest that explicit knowledge is more valuable than tacit knowledge, a view point that if accepted might favor a technology enabled knowledge management process (technology being used to aid in explicating, storing, and disseminating knowledge). Whether tacit or explicit knowledge is the more valuable may indeed miss the point. The two are not dichotomous states of knowledge, but mutually dependent and reinforcing qualities of knowledge: tacit knowledge forms the background necessary for assigning the structure to develop and interpret explicit knowledge (Polyani 1975). The inextricable linkage of tacit and explicit knowledge suggests that only individuals with a requisite level of shared knowledge can truly exchange knowledge: if tacit knowledge is necessary to the understanding of explicit knowledge, then in order for Individual X to understand Individual Y's knowledge, there must be some overlap in their underlying knowledge bases (a shared knowledge space) (Ivori and Linger1999; Tuomi1999). However, it is precisely in applying technology to increase "weak ties" (i.e., informal and casual contacts among individuals) in organizations (Pickering and King 1995), and thereby increase the breadth of knowledge sharing, that IT holds promise. Yet, absent a shared knowledge space, the real impact of IT on knowledge exchange is questionable. This is a paradox that IT researchers have somewhat eschewed, and that organizational researchers have used to question the application of IT to knowledge management. To add to the paradox, the very essence of the knowledge management challenge is to amalgamate knowledge across groups for which IT can play a major role. What is most at issue is the amount of contextual information necessary for one person or groups knowledge to be readily understood by another.

It may be argued that the greater the shared knowledge space, the less the context needed for individuals to share knowledge within the group and, hence, the higher the value of explicit knowledge and the greater the value of IT applied to knowledge management. On the other hand, the smaller the existing shared knowledge space in a group, the greater the need for contextual information, the less relevant will be explicit knowledge, and hence the less applicable will be IT to knowledge management.

The tacit-explicit knowledge classification is widely cited, although sundry other knowledge classifications exist that eschew the recondite subtleties of the tacit-explicit dimension. Some refer to knowledge as declarative (know-about or knowledge by acquaintance [Nolan Norton 1998]), procedural (know-how), causal (know-why), conditional (know-when), and relational (know-with) (Zack 1998c). A pragmatic approach to classifying knowledge simply attempts to identify types of knowledge that are useful to organizations. Examples include knowledge about customers, products, processes, and competitors, which can include best practices, know-how and heuristic rules, patterns, software code, business processes, and models; architectures, technology, and business frameworks; project experiences (proposals, work plans, and reports); and tools used to implement a process such as checklists and surveys (KPMG 1998b).

An understanding of the concept of knowledge and knowledge taxonomies is important because theoretical developments in the knowledge management area are influenced by the distinction among the different types of knowledge. Furthermore, the knowledge taxonomies discussed here can inform the design of knowledge management systems by calling attention to the need for support of different types of knowledge and the flows among these different types. Knowledge management may provide an opportunity for extending the scope of IT-based knowledge provision to include the different knowledge types.

2.4. Knowledge creation and transfer

From the organizational perspective, knowledge transfer is one of the most important aspects of knowledge management; and to leverage competitive advantage, the organizations need to facilitate effective knowledge transfer between employees. According to Nonaka and Takeuchi (1995) the knowledge conversion proceeds through four different modes:

- I. Socialization (conversion of tacit to tacit);
- II. Externalization (conversion of tacit to explicit);
- III. Combination (conversion of explicit to explicit); and
- IV. Internalization (conversion of explicit to tacit)

Nonaka and Takeuchi (SECI model) explain how the conversion between tacit and explicit knowledge are processed, especially its efficacy on the promotion of making tacit knowledge explicit (see fig 2.1).

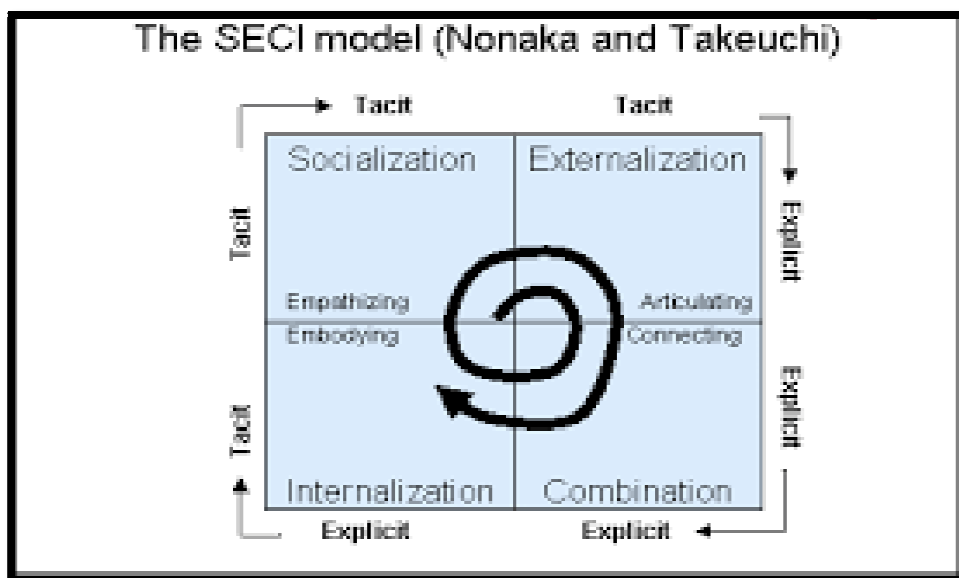


Fig 2.1. The SECI model

In the model, the basis of knowledge creation in organizations is continuous interaction (transfer) among individuals, and continuous conversion from tacit into explicit knowledge (and vice-versa) by individuals, supported by the group. The knowledge conversion process is represented as a spiral, the conversion modes succeeding indefinitely, creating new knowledge in the organizational environment.

2.5. Knowledge Management in Organizations

The recent interest in organizational knowledge has prompted the issue of managing the knowledge to the organizations benefit. Knowledge management refers to identifying and leveraging the collective knowledge in an organization to help the organization compete (von Krogh 1998). Knowledge management is purported to increase innovativeness and responsiveness (Hackbarth 1998). In the survey, the majority of organizations believed that much of the knowledge they needed existed inside the organization, but that identifying that it existed, finding it, and leveraging it remained problematic (Cranfield University 1998). Such problems maintaining, locating, and applying knowledge have led to systematic attempts to manage knowledge.

According to Davenport and Prusak (1998), most knowledge management projects have one of three aims:

1. to make knowledge visible and show the role of knowledge in an organization, mainly through maps, yellow pages, and hypertext tools;
2. to develop a knowledge-intensive culture by encouraging and aggregating behaviors such as knowledge sharing (as opposed to hoarding) and proactively seeking and offering knowledge;

3. To build a knowledge infrastructure—not only a technical system, but a web of connections among people given space, time, tools, and encouragement to interact and collaborate.

2.6. Knowledge management techniques and technologies

There are a wide range of knowledge management tools in use today by firms seeking to implement a knowledge management solution. These can be broadly classified in to two distinct categories: (i) Knowledge management techniques and (ii) Knowledge management technologies (Steve Morrissey, 2005).

2.6.1. Knowledge management techniques

Different scholars defined that knowledge management mechanisms are non-IT methods. According to Steve Morrissey (2005), Knowledge management techniques are most effective at capturing employees' tacit knowledge, although many of the management techniques below also provide an explicit knowledge capture component. These management techniques are particularly effective at capturing tacit knowledge because many of the knowledge management involve human interaction where contextual knowledge can be transferred. Under ideal circumstances, this type of contextual knowledge can be codified in a general form and shared with larger populations.

According to Morrissey (2005), the most common knowledge management techniques, in increasing order of sophistication, include:

- i) **Mentorship program**

One of the least sophisticated and easiest to implement forms of knowledge management is a mentorship program. A mentorship program allows experienced senior employees to share their knowledge and experience with junior employees can seek advice and counsel of their mentors when encountering a particular challenge which the mentor may have dealt with previously. While it is

impossible to accurately estimate the number of firms which have established mentorship programs (let alone informal mentorship program), many large corporations, including AT&T, Merrill Lynch, Federal Express, General Motors, J.C. Penny, Bell Labs, DuPont, and Sun Microsystems have acknowledged the benefits of their mentoring programs. “For the organization, mentoring serves to preserve ‘institutional memory’ by sharing information and experience from one to another. This need to pass along corporate learning and develop bench strength within the organization is particularly critical now that downsizing has created flat and lean organization and as baby boomers begin to retire, taking their know-how with them. Mentoring programs are an inexpensive way to inspire future leaders, improve management and staff relationships and prepare people to succeed an aging workforce.

Mentoring can served two distinct needs:

- functional, technical, and professional skills
- soft skills

Key employees—by virtue of either their position in the company or their expertise—serve as mentors for the skills element of the program. Senior management serves as coaches to assist employees in the development of soft skills, as well as to provide career guidance.

ii) **After Action Reviews/project summaries (AAR)**

It is a technique to evaluate and capture lessons learned upon completion of a project. It is originally developed and used extensively by the U.S. Army, an After action review is a discussion of a project or an activity that enables the individuals involved to learn for themselves what happened, why it happened, what went well, what needs improvement and what lessons can be learned from the experience. The spirit of an action review is one of openness and learning – it is not about problem

fixing or allocating blame. Lesson learned is not only tacitly shared on the spot by the individuals involved, but can be explicitly documented and shared with a wider audience.

Project summaries entail having the project team write a synopsis of their project work upon completion. Such a synopsis may include an overview of the problem the team had to solve, the different solutions considered, the selected solution, challenges the team had to overcome and the names of the employees who worked on the project. Project Summaries for multiple projects could be stored in a central location for all employees to be able to access. In this manner, future project teams could review past project summaries in attempt to find examples of similar projects or teams that faced similar challenges.

Advantages: The advantages of this technique are that it is relatively easy to implement and it addresses one way that an organization can leverage its past experience and alert employees to the vast amount of knowledge contained in the firm's experience base. This technique is inexpensive and suitable for a wide range of activities. In addition, the following points are considered as advantages (Steve Morrissey, 2005):

- a. It allows project team members to discover for themselves what happened, why it happened, and how to sustain strengths and improve on weaknesses.
- b. It is structured as an informal discussion with the main team members of the project.
- c. An AAR can also be conducted upon completion of the project or upon achievement of any key milestones of a long-duration project.
- d. It is not a critique or a complaint session. AAR maximizes learning by offering a platform for leaders and members to honestly talk about the project. It is not a full-scale evaluation report.

Disadvantages: It may be difficult to motivate employees to complete project summaries; project summaries can be limited by the information that can be recorded in writing.

iii) **Regular intra office (intra division) meeting**

According to Morrissey (2005), another technique which firms have used to get employees to share and transfer knowledge is through the use of regular intra-office or intra-division meetings. The purpose of these meetings is to bring together employees from different offices or different areas of the firm. Such interaction between disparate areas of the firm allows employees to exchange ideas and experiences and thus transfer knowledge between areas of the firm. In fact, off-site meetings are a great way to get people together, away from the office, to discuss important topics and share information. They can prove really valuable for networking with colleagues and learning about what's going on in other areas within the organization (Steve Morrissey, 2005).

Advantages: These meetings are relatively easy to conduct and such face-to-face interaction can help develop relationship between from different areas of the firm.

Disadvantages: Meetings can only be conducted on an infrequent basis, thus limiting the benefit of frequent interaction. Meetings only take place during scheduled meeting times, rather than during more pressing times when employees may have a greater need for interaction. The cost of holding off-site meetings can be expensive.

iv) **Storytelling**

Morrissey (2005) stated that readers may wonder why storytelling is categorized as one of Knowledge Management (KM) tools/techniques. Storytelling itself can date back to the origin of our social life; it is not just for KM, indeed. Storytelling is conveying of events in words, images, and sounds often by improvisation or embellishment. Stories or narratives have been shared in every

culture and in every land as a means of entertainment, education, preservation of culture, and in order to instill moral values.

In the context of KM, since its inception, storytelling has been used as a powerful way to share and transfer knowledge, especially experiential and tacit knowledge. It is literally about telling a story: a person who has valuable knowledge tells stories of his/her experience in front of people who want to gain knowledge. Though the method is quite simple, storytelling—when it is appropriately done—is able to share much deeper level of knowledge than just sharing information. Storytelling has a strong power to share one’s experience and lessons learned since effective stories can convey rich contexts along with contents (Steve Morrissey, 2005).

Storytelling has strong and unique benefits that most other KM tools/techniques rarely have.

Advantages: Storytelling can create memorable learning experience; storytelling can also be used to help more clearly communicate complicated ideas.

Disadvantages: Effective storytelling is a skill and not everyone can effectively communicate in this format; storytelling alone cannot convey the wealth of knowledge embedded in the firm’s entire knowledge base.

v) **Communities of practices (COPs)**

Morrissey (2005) described that COPs are groups of people who share a concern or a passion for something they do, and learn how to do it better as they interact regularly (Steve Morrissey, 2005). In the context of KM, COPs are formed—intentionally or spontaneously—to share and create common skills, knowledge, and expertise among employees.

Communities of practices (COPs) have its own characteristics that can exist in a division or department in an organization, across departments in an organization, or beyond boundaries of multiple

organizations, depending upon its objective. COPs are usually for sharing and developing common skills, knowledge, and expertise, such as a group of engineers working on similar problems, a network of surgeons exploring novel techniques, or a gathering of first-time managers helping each other. There are also some COPs that focus on generating new knowledge and innovation. The size of COPs varies from 2–3 people to thousands of people, and members of expertise could be either homogeneous or heterogeneous. For example, a Community of Practice (COP) for effective/efficient problem solving on a certain technological domain would have engineers in the same area, whereas a COP for improving quality of a certain product would have members from various areas, such as developers, marketers, and maintenance staff. The following three elements are crucial when one designs COPs.

- **The Domain:** A COP is not merely a club of friends or a network of connections between people. It has an identity defined by a shared domain of interest. Membership, therefore, implies a commitment to the domain and, therefore, a shared competence that distinguishes members from other people. The domain is not necessarily something recognized as "expertise" outside the community. They value their collective competence and learn from each other, even though few people outside the group may value or even recognize their expertise.
- **The Community:** In pursuing their interest in their domain, members engage in joint activities and discussions, help each other, and share information. A Platform that enables such activities is essential for a COP. It is based upon a relationship of trust between members that encourages frequent interactions to share and develop common knowledge.
- **The Practice:** COPs are not merely a community of interest—people who like certain kinds of movies, for instance. Members of a COP are practitioners. They develop a shared repertoire of resources: experiences, stories, tools, and ways of addressing recurring problems— in short, a shared practice. This takes time and sustained interaction.

It is the combination of these three elements that constitutes a COP. And it is by developing these three elements in parallel that one cultivates such a community. COPs can be either non IT or IT-based, depending on geography considerations of the members.

Advantages: Communities can be successful forums in which to share common business problems, to vet new ideas, to develop business standards and to initiate new employees.

Disadvantages: COPs have been implemented with varying degrees of success. Successful communities require strong leadership and an engaged membership. Unless a community has a leader who can devote a meaningful amount of time to maintain continued interest in the community, the interest and participation level of many communities tends to decline over time.

vi) Center of Excellence or Knowledge Centers:

According to Morrissey (2005), center of Excellence or Knowledge Centers are formal centralized “organizations whose job also consists of synthesizing and distributing the firm’s knowledge ... [these knowledge centers] continually digest the firm’s experience.” This center of excellence can help to centralize knowledge codification and help relieve some of the burden of knowledge capture from operating units. Additionally, centers of excellence often maintain databases of their work and sometimes publish their findings in white papers (or other similar publications) which are shared with the firms’ stakeholders as a means to transfer knowledge.

Advantages: Provide the firm with the opportunity for knowledge breakthroughs; enables the firm to formalize knowledge leadership in a particular area; centralizes knowledge capture; creates visibility for firm and experts in practice area.

Disadvantages: Maintaining centers of excellence can be expensive and benefits can be difficult to measure.

2.6.2. Knowledge management technologies

In addition to the above knowledge management techniques, there are also a host of knowledge management technologies. In contrast to knowledge management techniques, knowledge management technologies excel at capturing employees' explicit knowledge, but have difficulty capturing tacit or contextual knowledge. Morrissey (2005) classified knowledge management technologies into the following broad categories: (i) knowledge storage tools; (ii) search and retrieval tools; (iii) collaboration tools.

i) Knowledge storage tools:

Knowledge storage tools are also known as content databases, allow a firm to electronically collect and store information (Steve Morrissey, 2005). Examples of such storage tools include knowledge databases as well as corporate intranets which serve as a repository of project files and other knowledge created by users. The latest knowledge storage tools differ from earlier database or file systems in that these newer tools have more sophisticated organizational structures which allow users to more easily identify and locate desired information. In addition, the internet has allowed for global access to such knowledge databases so that employees can store and retrieve knowledge on a worldwide basis.

Advantages: Knowledge storage tools enable the firm to store explicit knowledge in multiple formats. Well designed tools also offer substantial flexibility and ability to integrate functionality with other knowledge management tools.

Disadvantages: These tools are often expensive and require substantial user training. If the tools are not easy to use, it may also be difficult to encourage employee use and adoption.

ii) Search and Retrieval tools:

These tools allow the user to easily search for and locate information within a knowledge database or other knowledge repository (Steve Morrissey, 2005). These tools also include tools which allow users to locate specific expertise (or external to) a firm. For example, an employee may be working on a project which deals with a specific challenge. Using an expertise locator tool, the employee could query the expertise database and identify other employees (internal or external to the firm) who may have experience or expertise in this particular field. These tools are particularly useful in helping employees locate others within a dispersed organization who may possess valuable knowledge relevant to their work.

Advantages: Search and retrieval tools can offer a powerful tool to locate documents or other information within a firm's knowledge base. Most tools require little training, are relatively easy to use and are inexpensive. These tools integrate well in to a firm's database products.

Disadvantages: Most search and retrieval tools are passive in nature and require the user to specify search terms. Also these tools usually cannot identify the specific knowledge context that the user is seeking.

iii) Collaboration tools

It allows employees to create a virtual, web-based workspace in which they can share and interact in an electronic environment. According to Morrissey (2005), such tools can provide a "collaborative workplace which can enable distributed teams to work together to accelerate and improve development and delivery of products and services, optimize collaborative business processes, and improve innovation, problem-solving, and decision-making." These tools allow dispersed project teams to exchange electronic files, discuss topics on-line, as well as store, retrieve and organize project work in a centralized location.

Advantages: Collaboration tools enable distributed learning and workflow. Most collaboration tools are relatively easy to use. These tools are flexible, can be used in a variety of situations and integrate well in to a firm's other knowledge management tools.

Disadvantages: The cost of some collaboration tools can be moderately expensive. Unless the firm is careful to embed collaboration tools in to the work process, the firm may have difficulty encouraging employee use.

2.7. Tacit Knowledge and KM Technologies

Traditionally, tacit knowledge of individuals was extracted through storytelling techniques where people sat around fire camps and swapped stories in village communities (Denning, 2000). Storytelling unveils unseen tacit knowledge and generates meanings from sentences, which are told messily from narratives to reminiscence. Storytelling is therefore capable to connect knowledge with emerging context, introduce masterly skills, provide meanings for association and structures, create an environment for dialogue, explain adaptive changes, reveal the creativity of an individual and reconstruct authenticity (Denning, 2000). Storytelling is therefore an effective learning technique for persuading people to externalize their values and beliefs, to share their knowledge, to work together, to change and to lead them into the future.

In his 'Knowledge Spiral Model', Nonaka (1991) noted that knowledge creation is a continuous process of interaction between tacit and explicit knowledge of human activities which twirl around socialization, externalization, combination and internalization stages. According to Nonaka (1991), socialization involves discussions and sharing of implicit knowledge, experiences and observations amongst individuals with no intention of transferring such ideas into explicit knowledge. Externalization involves various processes which translate tacit knowledge into explicit form while combination re-arranges existing explicit knowledge into a more structured form for an

organizational use. Finally, internalization converts explicit knowledge into tacit form by learning through codified knowledge and ascribe to it.

In this respect, tacit knowledge can be exploited through externalization whereas explicit knowledge can be acquired through internalization.

2.8. IT and Tacit knowledge sharing

According to Abdul Wahab et al, (2010), there is a major debate among researchers about whether information technology (IT) can have a role in tacit knowledge sharing among individuals. Social web researchers insist that tacit knowledge sharing by using IT is too limited if it is not absolutely impossible to achieve. IT can facilitate tacit knowledge sharing although it may not be as rich as face-to-face interactions. Each school has its own reasons and explanations. However, perspectives of the second school (advocators of IT contribution to tacit knowledge sharing) seem more reasonable and acceptable than the earlier one. Tacit knowledge cannot be regarded as a binary digit (0 or 1), pure tacit or pure explicit. The notion of the “degree of tacitness” or “the degree of explicitness” is more meaningful when examining the type of knowledge shared in a specific context. In addition, constraining tacit knowledge sharing mere to tacit-tacit conversion (socialization) may not be a good examination of tacit knowledge sharing phenomenon through IT assisted communications. All knowledge (including explicit knowledge) has components of tacit dimension. Therefore, every tacit-tacit as well as tacit-explicit conversions and vice versa could be regarded as a tacit knowledge sharing phenomenon. This is what misguided in the most investigation of IT- facilitated tacit knowledge sharing. Today, it can be argued that face-to-face communication is no longer the principal way of tacit knowledge sharing, particularly where experts are not always geographically collocated, but must change their experiential tacit knowledge. Therefore, today the use and optimization of IT for facilitating tacit knowledge sharing is almost inevitable. IT certainly can enable individuals to share their tacit knowledge (or at least the knowledge with low to medium

degree of tacitness) by supporting various conversions of tacit-explicit knowledge, although it may not be as rich as face-to-face interactions. It can provide a field that people freely express their personal new ideas, perspectives, and arguments. It can establish a positive dialog among experts enabling them socially interact about their job related issues. It can build an environment that allows experts locate each other and develop the domain of their professional network. And finally it makes information more available by then enables people to arrive at new insights, better interpretations, etc.

2.9. Web 2.0

The past decade blogs, wikis, RSS and mash ups have enriched the web, which transformed from a static collection of web pages to a collaborative network of applications, tools and people. These applications and tools empower users and become valuable as more people participate. The online opinion of individuals has become valuable for other individuals and for companies. Some call this empowerment of individuals on the internet the groundswell (Li & Bernoff, 2008), others describe it as wikinomics (Tapscott & Williams, 2006), but most use the term Web 2.0. O'Reilly (2006) was the first to talk about these developments on the web at a conference and called it Web 2.0. Since then the term Web 2.0 is widely used at the internet and by other media. Nonetheless, scholars cannot agree on a standard definition of Web 2.0 (Madden & Fox, 2006).

O'Reilly (2006) has since then defined Web 2.0 as: “the business revolution in the computer industry caused by the move to the internet as platform, and an attempt to understand the rules for success on that new platform. Chief among those rules is this: Build applications that harness network effects to get better the more people use them”. While the term Web 2.0 is widely used, the definition of O'Reilly is as said not a standard yet. The last sentence of the definition focuses on the applications, while Web 2.0 involves much more than applications that harness network effects.

Technology is just the enabler of the power of Web 2.0. The use of these technologies by an increasing number of people makes Web 2.0 powerful (Li & Bernoff, 2008). Hoegg et al. (2006) have tried to incorporate both the technological and social aspects in their definition of Corporate Web 2.0.

The philosophy of mutually maximizing collective intelligence and added value for each participant by formalized and dynamic information sharing and creation “Important in the last definition is the focus on sharing collective intelligence, which is one of the most important concepts of Web 2.0 (Wijaya et al., 2009, pp. 9-10). While being important on the internet, this concept can also be valuable for organizations.

2.10. Knowledge Management Systems

Knowledge management systems (KMS) refer to a class of information systems applied to managing organizational knowledge (Davenport and Prusak 1998; Malhotra 1999; O’Dell and Grayson 1998). That is, they are IT-based systems developed to support and enhance the organizational processes of knowledge creation, storage/retrieval, transfer, and application. While not all KM initiatives involve an implementation of IT, and admonitions against an emphasis on IT at the expense of the social and cultural facets of KM are not uncommon (Davenport and Prusak 1998; Malhotra 1999; O’Dell and Grayson 1998), many KM initiatives rely on IT as an important enabler. While IT does not apply to all of the issues of knowledge management, it can support KM in many ways. Indeed, there is no single role of IT in knowledge management just as there is no single technology comprising KMS.

2.11. KMS Development Methodologies

A KMS development methodology is defined as a framework for applying KMS development practices and, like all methodologies, consists of two parts: process and modeling language (ML)

(Ramsin and Paige, 2010). The process part defines the phases of system development along with the proper sequence for applying them, the roles which are responsible for performing the phases, the products of each phase and guidelines and metrics for progress monitoring and quality assurance. The Modeling Language which is the part of the methodology defines notational and semantic rules for expressing the products which are produced during the enactment of the process.

Ramsin and Paige (2010) added that even if existing methodologies strongly support a number of KMS development aspects, a comprehensive, all-encompassing and general-purpose KMS development methodology does not exist; hence, in many cases, KMS development methodologies should be custom-built (by applying methodology engineering approaches) to be capable of addressing the special KMS development needs of the organization.

Many knowledge management system development methodologies exist. Ramsin and Paige (2008) introduced seven methodologies. These methodologies were selected based on the following criteria: prominence in the field, concreteness and comprehensiveness, high degree of innovation and availability of adequate documentation on the methodology's process and ML. These methodologies are:-

I. Chalmeta and Grangel or Model-driven development (MDD) methodology

It provides high-level activities and techniques with the aim of applicability to diverse organizations (Chalmeta and Grangel, 2008). The phases of the methodology are as follows

Identification: Identifies and classifies the organizational knowledge blocks. Knowledge blocks are high-level knowledge elements which, unlike knowledge sources, may not be singly and directly used to extract knowledge.

Extraction: Aims at specifying procedures for knowledge extraction. To this aim, it first identifies the inputs of the procedures (explicit/implicit knowledge variables and the knowledge produced by the KMS itself). Then, the resources with the ability to produce these inputs are identified. Procedures are then identified by investigating the way that the sources can be used to produce the inputs.

Representation: Designs the organizational knowledge map through modeling at platform-independent model (PIM) and platform-specific model (PSM) levels. The following items are modeled at the PIM level: organizational knowledge blocks, recognized knowledge extraction procedures, inputs to knowledge extraction procedures and organizational knowledge sites. PSM-level models are produced by automatic transformation of PIM-level models.

Processing: Implements an operational KMS through modeling at the computation-independent model (CIM) level. The system will be a knowledge portal which provides the organizational knowledge map and the tools to access it.

Utilization: The system is used and maintained. Also, learning and continuous improvement mechanisms are determined.

II. Rubenstein-Montano et al. (KMS development methodology)

This methodology is specifically intended to overcome the weaknesses of a number of older KMS development methodologies (Rubenstein-Montano et al., 2001a). The base framework for this methodology was proposed in Rubenstein-Montano et al. (2001b). The phases of this methodology are as follows:

Strategize: Covers strategic planning, business requirements elicitation, cultural assessment and planning and specification of criteria for KM process evaluation.

Model: Covers logical and physical modeling through specifying the strengths and weaknesses of the organizational KM process, planning to achieve KM goals, developing the organizational knowledge map, determining the required software and hardware and designing the outline of the system.

Act: Aims at supporting the KM process through collecting and structuring organizational knowledge, and developing the KMS framework which supports knowledge storage, integration, creation and sharing.

Revise: Produces training documents for users and verifies and validates the KMS through practical usage of the system. Also, the knowledge acquired is investigated to assess its accuracy, precision and appropriateness regarding the organizational requirements.

Transfer: Aims at deploying and maintaining the KMS through KMS usage and verification, and also by monitoring KM activities. Based on the feedbacks and the weaknesses uncovered, returning to previous phases might become necessary.

III. Amine and Ahmed-Nacer (ontology-based agile methodology)

It aims at developing a KMS to reduce the risks of component-based development through managing the knowledge needed for component selection, update and maintenance (Amine and Ahmed-Nacer, 2011). The phases are as follows (the last four phases are iterative):

Initialization: Aims at understanding the problem domain ontologies through communicating with the customers and specifying the business/knowledge/cultural sources in the organization. Selecting the most appropriate tool for ontology modeling is also carried out in this phase.

Domain mapping: Continuously refines the problem domain ontologies into system domain concepts through constant communication with end-users and customers. Profiles and policies

identification: Specifies the authentication mechanisms and the level of system access allowed for each user.

Implementation and personalization: Implements and tests three items: the modules required to implement the concepts which were derived in previous phases, data gateways to bring in the data from external sources in the right format for the KMS and appropriate views for different users.

Validation: - Verifies and validates the system.

IV. Smuts et al. (Framework based model)

This methodology aims at expounding the KMS development process presented in Calabrese and Orlando (2006). The basis of the proposed methodology is a framework based on five principles: strategizing, evaluation, development, validation and implementation (Smuts et al., 2009).

V. Moteleb et al. (Iterative-Incremental based model)

This methodology aims at using practical experiences for developing KMSs in small organizations (Moteleb et al., 2009). The most significant strength of this methodology lies in the smooth logical-to-physical progression of the phases. The general life cycle of the methodology, the phases of which are listed below, is iterative-incremental:

Sense-making: Aims at investigating whether KMS development is a conceivable solution for the organizational problems. To this aim, it determines whether the problems can be mapped to the following three categories of problems: locating knowledge, communicating knowledge and interacting with knowledge.

Envisioning: Categorizes the conceivable solutions (in the three categories mentioned in the previous phase) through communicating with the stakeholders. The solutions will specify which knowledge

types should be located, and also the time and way to access and transfer the knowledge. Also, it determines which changes are required in the business processes.

Designing: Determines the organizational knowledge agents (sources), flows and interfaces. The system will then be designed based on the solutions presented in the previous phase and the agents, flows and interfaces identified.

Exploring: Specifies the appropriate technologies based on the technical, social and organizational features of the KMS, and also according to availability and cost.

VI. Sarnikar and Deokar (Development Process based model)

This methodology directs the development process based on the work flows within the organization (Sarnikar and Deokar, 2010). The phases of the methodology are as follows:

Business process model development: Investigates the organizational business process and specifies the business process tasks, their relationships and the individuals responsible for them.

Knowledge intensity identification: Prioritizes the tasks based on their knowledge intensity. The knowledge intensity of each task is determined based on the factors provided in Eppler et al. (2008).

Requirements identification: Aims at facilitating the detection of knowledge sources and sharing scenarios through investigating the knowledge required to perform the tasks. To this aim, knowledge requirements are examined from three perspectives: tacit/implicit, procedural/declarative and general/contextually-specific or technically-specific.

Knowledge sources identification: Develops the knowledge map which includes the internal and external knowledge sources. For this purpose, knowledge sources are classified using the classifications presented in Holsapple and Joshi (2004) or Becerra-Fernandez and Sabherwal (2001).

Knowledge reuse assessment: Reveals the knowledge flows by specifying knowledge creation and reuse scenarios (using the framework proposed in Markus (2001)).

Task-user knowledge profile development: Describes the knowledge-intensive tasks using the sample proposed in Abecker et al. (2000). This description can be used to determine, for each task, which knowledge should be transmitted to the user responsible for that task.

Task-specific KM components design: Designs the system components to support the tasks investigated in previous phases.

VII. Iglesias and Garijo (Multi-agent system model)

KMS can be considered as a multi-agent system in which knowledge is hidden in agents and their relationships. This agent-oriented methodology is not specifically targeted at developing a KMS, but can be effectively used for this purpose (Iglesias and Garijo, 2005).

Conceptualization: Obtains the initial view of the problem domain. To this aim, two techniques can be used: class-responsibility-collaboration (CRC) (analyzing the agents' goals, plans, knowledge and collaborators) and user-environment responsibility (UER) (analyzing the users, their environment and their collaborators).

Analysis: discovers system requirements through five steps: Detecting and analyzing the features of system agents, identifying and describing the tasks required to achieve the goals, analyzing the static relationships and the interactions among the agents and analyzing the knowledge required for evaluating the performance of knowledge-intensive tasks.

Design: Designs the system in three steps: agent network design, agent design and platform design.

Development and test: Develops the system code and tests the system.

Operation: The system is operated and maintained.

2.12. Related Works

There are some research works in the area of knowledge management system framework design which are similar with this study. The researcher focused on the research works which are appropriate and having a direct link with this study. Hence, the most related works are reviewed here respectively.

1. Designing a Knowledge Sharing Platform for Inter Organizations

Mindahun (2016) explored the existing practice of knowledge sharing and designed the knowledge sharing platform for the Ethiopian Chamber of commerce and sectoral associations. The main purpose of the research was to explore the existing knowledge sharing practice among member associations of Ethiopian Chamber of commerce and sectoral associations (ECCSA) and design a knowledge sharing platform to facilitate inter organizational knowledge sharing in achieving organizational success among member associations of Ethiopian Chamber of commerce and sectoral associations (ECCSA).

The study followed both qualitative case study and design science research methods. It used interview, observation and document analysis as a data collection method.

The finding of the research indicated that the inter-organizational knowledge sharing among the different member associations of ECCSA is carried out mostly through formal knowledge sharing rather than informal methods. Through formal means of inter-organization knowledge sharing was more of tacit in nature rather than being explicit knowledge. Informal knowledge sharing method among the different member associations allows them to obtain specific knowledge that solves tasks

related to problems. Designing appropriate ICT infrastructure enables and support members to use and share knowledge among associations.

In short, the researcher recommended that the ICT infrastructure that ECCSA and member associations used to enhance with the improvement of up to date technologies.

The work of Mindahun (2016) directly related on knowledge sharing functions. Mindahun (2016) designed a knowledge sharing platform for Ethiopian Chamber of commerce and sectoral associations (ECCSA). But this thesis focused on designing a KMS to facilitate a knowledge sharing for AALHRIA context.

2. Exploration study and design of a technology platform for knowledge sharing among health professionals to improve maternal and child healthcare.

Obsa Amente (2016) explored the knowledge sharing practice and designs a technology platform for knowledge sharing among health professionals to improve maternal and child health care. The specific objectives of the research were to explore the status of knowledge sharing among health professionals at Nekemte hospital MCH unit, develop sample content to be shared among professionals working in maternal and child healthcare unit at Nekemte hospital, design framework platform to demonstrate possibilities of knowledge sharing among health professionals and test user interface framework of the platform.

The study used the qualitative and the design science research methodology. In-depth interview method was also used as the data collection method.

According to the findings of the study, health professionals are knowingly and/or unknowingly share the knowledge each other. The researcher concluded that designing a technology platform is very important for the health professionals in order to improve maternal and child health care. The

researcher also put his directions of future work that other researchers to carry out further research on health professionals in different health departments.

Obsa Amente (2016) studied the way to design a framework that facilitating knowledge sharing. Obsa Amente (2016) designed a platform to demonstrate possibilities of knowledge sharing among health professionals for Nekemte Hospital. But this thesis focused on designing a KMS to facilitate a knowledge sharing for AALHRIA context.

3. Analysis and Design of Knowledge Management System for School of Information System at XYZ university

Yohannes Kurniawan and Siti Elda Hiererra (2014) studied about how to analyze and design knowledge management system for school of information systems at XYZ University. The research was qualitative and used literatures and direct observation as a data collection method.

According to the findings of the study,

- All management institutes possess a state of the modern information infrastructure;
- Sharing knowledge among teaching staff, students, and administration staff in all management institutes;
- The academic environment in generally is considered trustful in the sense that no one is hesitating nor being afraid of publishing knowledge;
- Each institute wants its internal documentation management and the level of information and knowledge sharing to improve;
- There is an increased demand for few strategies that help management institutions meet external and internal demands.

The researchers concluded that by proposing a web based knowledge management system design. The researcher recommended that the system design model can be implemented by other universities which want to implement the knowledge management system.

Yohannes Kurniawan and Siti Elda Hiererra (2014) designed a KMS system for school of information systems at XYZ University. But this thesis differs from Yohannes Kurniawan and Siti Elda Hiererra (2014) by designing a KMS to facilitate a tacit knowledge sharing for AALHRIA context.

2.13. Research Gap

Knowledge Management System facilitates knowledge sharing by overcoming distance and social barriers. It is difficult to create a knowledge sharing culture without considering some technological support tools (Ali & Ahmad, 2006). Although there is a general proposal for KMS architecture (see Gupta et al., 2008; Sureephong et al., 2007; Karadsheh et al., 2009), it cannot be directly implemented to solve KM problems in Addis Ababa land holding registration and information agency (AALHRIA). KMS development requires design of an architecture that fits to existing KM practices (McDermott & O'Dell, 2001).

This research fills the gap of the shortage of the public land sector knowledge management system design studies in Ethiopia. According to the researcher review, there is the absence of the study about knowledge management system design and its implementation especially in Addis Ababa land sectors. Hence, this study has practical contributions. The practical contribution is that the study explores the existing knowledge management practices and the agency KM demand. The researcher also used compare & contrast of different methods to evaluate the models that are appropriate to the Addis Ababa land holding registration and information agency context. And propose a design a

knowledge management system framework to promote tacit knowledge sharing by using intranet web 2.0 technologies for the Addis Ababa Land holding registration and information agency.

CHAPTER THREE

METHODOLOGY

According to Zina O’Leary (2004), methodology is the framework associated with a particular set of paradigmatic assumptions that researcher will use to conduct their research, i.e. scientific method, ethnography, action research. The researcher should have thought quite seriously about his/her research methodology to decide upon the most appropriate methods (Catherine Dawson 2009). The research has done under a set of methods and techniques. So as to be successful for the study, the researcher took care of his/her selection of methodologies that he/she has used.

Here in the methodology part, this study included research design, case study research method and design science research methodologies.

3.1. Research Design

Both qualitative case study and design science research methods are used in this research. The case study is a qualitative type which made use of a phenomenological approach to gather relevant data. The phenomenological approach concerns itself with understanding and interpreting the meaning that participants give to their everyday lives (De Vos, 1998). The aim of such method is not to generalize but to understand and interpret the meanings and intentions that underlie everyday human actions (De Vos, 1998).

Hevner et al. (2004) have presented a set of guidelines for design science research within the discipline of Information Systems. Design science research requires the creation of an innovative, purposeful artifact for a special problem domain. The artifact must be evaluated in order to ensure its utility for the specified problem. In order to form a novel research contribution, the artifact must either solve a problem that has not yet been solved, or provide a more effective solution. Both the

construction and evaluation of the artifact must be done rigorously, and the results of the research presented effectively both to technology-oriented and management-oriented audiences.

The case study of this research method is used to investigate the current knowledge management practice & knowledge sharing culture among all employees, gathering requirements from the employees for the new KMS system and exploring its benefits. The output of a case study is an input for design science research methodology. Based on the gathered relevant information through the case study which is an input for design science research methodology, the design science research method is used to design a framework of knowledge management system that facilitates tacit knowledge sharing through the use of intranet web 2.0 technologies (March & Smith, 1995; Hevner et al., 2004).

3.2. Study area

This study has taken place in the Addis Ababa Land Holding Registration and Information Agency (AALHRIA). AALHRIA is the public organization established by the proclamation number 22 & 33/2010 and re-established with proclamation number 45/2015 to give a land registration and management service for the Addis Ababa city administration land holders.

The researcher preferred to conduct this particular area of study is due to two reasons. In the first place, land services are now the burning issue for the government and the public. Addis Ababa city administration council had been passed the decision to transform the manual land services in to the modern technology based system. But the knowledge of the employees are scattered and is not yet manageable enough. Hence, managing knowledge through knowledge management system is very crucial for AALHRIA. Second, there is the absence of the study in the field of knowledge management system that can facilitate a tacit knowledge sharing in the land sectors. AALHRIA is one of the government land institution that provide land services through the use of technology based

system. Thus, it is such a situation that finally triggered the researcher to conduct a research on designing knowledge management system through web 2.0 technologies in order to facilitate the tacit knowledge sharing practice of the organization which is to be the effective vehicle of enhancing the opportunities and reduce the challenges related to organizational knowledge.

3.3. Target Population

AALHRIA has 835 total employees. However, 264 of them are project workers and 571 are permanent employees that are found in head quarter, branch offices of all sub cities and project offices. Thus, 571 permanent employees from Head quarter and all sub city branch offices have been taken as a target population for this research.

All core processes of the agency are selected to be studied. These core processes are right registration business process, cadastral registration business process and information system management business processes. So this study target population focused on these core processes to gather the relevant and appropriate requirements in order to propose the design of knowledge management system for the Addis Ababa Land holding registration and information agency (AALHRIA).

3.4. Sampling Design

In regard to the sampling design, this study applied purposive sampling for interview which is known as non-probability sampling. Kothari (2004) explained that non-probability sampling does not afford any basis for estimating the probability that each item in the population has of being included in the sample. In this type of sampling, items for the sample are selected deliberately by the researcher.

According to Kothari (2004), because the samples so selected using purposive sampling certainly do not possess the characteristic of random samples. Quota samples are essentially judgment samples and inferences drawn on their basis are not amenable to statistical treatment in a formal way.

The reason behind to choose purposive sampling is that the results obtained from an analysis of deliberately selected sample can be tolerably reliable and this type of sampling is very convenient and relatively inexpensive. Additionally, the nature of this study is to design the knowledge management system. So as to gather the relevant requirements that help the researcher dares to design meaningful artifacts; purposive sampling has a paramount role rather than others.

3.4.1. Sampling Size

An interview is conducted by selecting the interviewees such as, the Head of the Office directors, IT Experts, case team leaders, and sub city branch offices' IT case team leaders purposefully. The rationale behind choosing purposive sampling method for interview is to select key informants: purposive sampling can be very useful to reach a targeted sample quickly and with a purposive sample, it is likely to get the opinions of the target population.

Table 3.1. presents participants in the interview session from head office and sub city branches of AALHRIA.

No.	Location Name	Position of Interviewees	Quantity
1	AALHRIA Head quarter	Directors, Case team leaders and Senior IT experts	7
2	Bole Sub City Branch	IT Case team leader	1
3	Lideta Sub City Branch	IT Case team leader	1
4	Arada Sub City Branch	IT Case team leader	1
5	Kolfe Sub City Branch	IT Case team leader	1

6	Yeka Sub City Branch	IT Case team leader	1
7	Addis Ketema Sub City Branch	IT Case team leader	1
8	Kirkose Sub City Branch	IT Case team leader	1
9	Gulele Sub City Branch	IT Case team leader	1
10	Akaki Kaliti Sub City Branch	IT Case team leader	1
11	Nifas Silk Lafto Sub City Branch	IT Case team leader	1
Total			17

Table 3.1. Participant Employees for Interview

3.4.2. Inclusion criteria

The inclusion criterion for this study was being a technical staff (case team leaders, IT senior experts and directors) who are currently working as a permanent employees for Addis Ababa Land Holding Registration and Information Agency (Head quarter and sub city branch offices) and who have a minimum qualification of diploma in the field of their study with any years of experience.

3.4.3. Exclusion criteria

The exclusion criterion includes employees who do not fulfill the minimum qualification criteria that is diploma and the employees who are not directly interconnected with the core business process of the agency.

3.5. Data Collection Method

According to Seliger (2009), collection of data is critical to make use of methods which tend to generate high quality data since the quality of any research study depends highly on the quality of the data collected and the data collection methods.

Here, the study used primary and secondary data. In the case of primary data, open ended interview questions have been chosen as a data collection method because interview is extremely flexible and can be used to gather relevant information on almost any topic involving large or small numbers of people. It is also very cost effective, reduces bias and familiar to most people. Additionally, the researcher administered interview to get relevant and appropriate information through face-to-face surveys and discussions. Because interviews are particularly useful for getting the story behind a participants' experiences. In using these data collection methods, the researcher pursued in-depth information around the topic.

To gather secondary data, the researcher collected documents related to capturing knowledge and sharing knowledge in the organization including information technology infrastructure which is relevant to knowledge management technology. The researcher also used an observation to collect the relevant information. Thus, in consideration of the above perspectives the following research tools were used in this study.

This study used the interview guide attached in appendix I.

3.5.1. Interview

The main task in interviewing is to understand the meaning of what the interviewees say (Kvale, 1996). Interview can be prepared to make the researcher be aware of what is actually going on and how things are done so as to identify and emphasize why things occur in a specific situation.

Based on the above points, semi-structured interviews were conducted to understand the process used for managing knowledge during daily operation of the organization and the interviewees' perceptions of how to manage knowledge while performing their duty. A semi-structured interview is a qualitative method of inquiry that combines a pre-determined set of open questions (questions that prompt discussion) with the opportunity for the interviewer to explore particular themes or responses further (Kvale, 1996). According to McLeod, (2014), Open-ended questions enable the respondent to answer in as much detail as they like in their own words. Rich qualitative data is obtained as open questions allow the respondent to elaborate on their answer. This means the research can find out why a person holds a certain attitude.

The interview questions primarily focused on the current practice of knowledge management and tacit knowledge sharing culture in AALHRIA. The discussions has four elements namely tacit knowledge management practice, culture for sharing tacit knowledge, expliciting of individual knowledge to organizational knowledge and knowledge management systems.

The main reason for using interview is to collect qualitative data that is an input for the design science research methodology in order to design the knowledge management system artifact. Additionally interview helps the researcher to cross-check with documents and vice versa with each other. In this regard, the interviews were made i.e. the Head of the Office, three selected Directors, Case team leaders, senior IT experts in the head quarter; and IT case team leaders for each sub city branches as a key informant from Information Technology Directorate of the AALHRIA. Each key informant was interviewed independently and the researcher was jotting down notes.

The interviews were conducted at suitable times for participants, with the duration ranging 45–60 minutes. Each participant was informed about the overview of the research, and detailing the

participant's rights and responsibilities. Each participant asked a series of questions, with both the researcher and participant seeking clarification or more information whenever required.

3.5.2. Document Review

According to Hancock & Algozzine (2006) and Yin (2003), Documents are used as important data source for the research as they contain readily available data. The researcher gathered important documents (such as, proclamations, structure, manuals and standards) that can complement data collected through interview and open ended questionnaires. Document collection was done in parallel with other data collection methods. When the researcher undertook the interview discussion, there were ideas that require further explanation and were supported by documents. Documents that provide background information about AALHRIA such as organizational structure and proclamations were collected before the interview discussion.

3.5.3. Observation

In this study, observation is used as a data collection method because it is a method of data collection without interacting with the research participants (Hancock & Algozzine, 2006). Observation has its own advantage as data collection methods. The researcher used observation checklist to collect the data. Most of the observation was undertaken during the field visit for interview discussion. The researcher took notes personal interaction among employees to solve work related problems, use of communication tools like telephone for knowledge sharing and general work environment condition such as office layout, computer and internet access and document organization. Moreover, the researcher jotted down events and situations that appeared important but not included in the observation check list.

The observation checklist attached in appendix III.

3.6. Data Analysis Methods

Quantitative and qualitative data are analyzed in different ways. For qualitative data, the researcher might analyze as the research progresses, continually refining and re-organizing in light of the emerging results (Catherine Dawson, 2009). According to Yin (2003), Miles & Huberman (1984) and Cresswell, (1998), qualitative data analysis is generally a challenging task. Attride-Stirling, (2001, p. 386) explained that if qualitative research is to yield meaningful and useful results, it is imperative that the material under scrutiny is analyzed in a methodical manner, but unfortunately there is a regrettable lack of tools available to facilitate this task.

This study used thematic and comparative data analysis method. According to Dawson (2009), comparative and thematic analyses are often used in the same research, with the researcher moving backwards and forwards between transcripts, memos, notes and the research literature.

The reason behind using thematic analysis is to analyze data by theme. This type of analysis is highly inductive, that is, the themes emerge from the data and are not imposed upon by the researcher. In this type of analysis, the data collection and analysis take place simultaneously. Moreover, comparative analysis is also used because data from different people is compared and contrasted and the process continues until the researcher is satisfied that no new issues are arising (Catherine Dawson, 2009).

Data collected through digital voice recorder was manually written down and interpreted into English. To fit for the analysis, observation notes were also transcribed in narrative form.

3.7. Design Science Methodology

According to the definition of Kuhn (1996) and Lakatos (1978), research is as an activity that contributes to the understanding of a phenomenon. In the case of design science research, all or part

of the phenomenon may be created as opposed to natural occurring. The phenomenon is typically a set of behaviors of some entity (ies) that is found interesting by the researcher.

Design science is an outcome based information technology research methodology, which offers specific guidelines for evaluation and iteration within research projects. Design science research focuses on the development and performance of (designed) artifacts with the explicit intention of improving the functional performance of the artifact. Design science research is typically applied to categories of artifacts including algorithms, human/computer interfaces, design methodologies (including process models) and languages. Its application is most notable in the Engineering and Computer Science disciplines, though is not restricted to these and can be found in many disciplines and (Vaishnavi, and Kuechler, (2004/15)) fields.

Hevner et al. (2004) have presented a set of guidelines for design science research within the discipline of Information Systems. Design science research requires the creation of an innovative, purposeful artifact for a special problem domain. The artifact must be evaluated in order to ensure its utility for the specified problem. In order to form a novel research contribution, the artifact must either solve a problem that has not yet been solved, or provide a more effective solution. Both the construction and evaluation of the artifact must be done rigorously, and the results of the research presented effectively both to technology-oriented and management-oriented audiences.

3.7.1. Design Science Research Processes Models

According to Peffers et al, (2006), for IS researchers in which Design Science research offers an important paradigm for conducting applicable, yet rigorous, research, i.e., research that is closer to IS's applied *raison d'être*. A conceptual process could help researchers with a conceptual process for successfully carrying out Design Science research and a mental model for its presentation. For the

research community, including editors and reviewers, such a process and mental model could help them to recognize such research and to respect its objectives, processes, and outputs (Ken Peffers et al, 2006).

Different researchers have adopted different design science research process models. In this study, the researcher have made compare and contrast the design science research processes and adopted the appropriate relevant process model that is fitted to the research context.

There are around seven models which are re-known by the design science research process models researchers that are undertaken through the design science research processes in order to provide the convenient paradigm for the researchers and practioners. Table 3.2 shows different design science research process via the researchers based on the common elements of the design science research methodology respectively with their time sequence.

Objectives for a design science research process model	Archer (1984)	Takeda et al, (1990)	Eekels and Rooznburg (1991)	Nunamaker et al, (1991)	Walls et al, (1992)	Rossi et al, (2003)	Hevner et al, (2004)	Ken Peffers et al, (2006)
1. Problem Identification and motivation	Programming Data collection	Problem enumeration	Analysis	Construct a conceptual framework	Meta requirements Kernel theories	Identify a need	Important and relevant problems	Define problem Show importance
2. Objectives of a solution			Requirements				Implicit in “relevance”	What would a better artefact accomplish?
3. Design and Development	Analysis Synthesis Development	Suggestion Development	Synthesis, Tentative design proposals	Develop a system architecture Analyze and design the	Design method Meta method	Build	Iterative search process Artifact	Artifact

				system Build the system				
4. Demonstration			Simulation, Conditional Prediction	Experiment, Observe the system				Find suitable context Use artefact to solve problem
5. Evaluation		Confirmatory evaluation	Evaluation, Decision, Definite design		Testable design process/product hypothesis	Evaluate	Evaluate	Observe how effective, efficient Iterate back to design
6. Communication	Communication						Communication	Scholarly publications Professional

								publications
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Table 3.2. Design science research process models with the objectives of a design science research process in IS (Adopted from Ken Peffers et al, (2006)).

According to Ken Peffers et al, (2006) of the above comparison of the design science research process models, the researcher has selected the guidelines of Hevner et al, (2004). It is because of the suitability of the model that is appropriately fit this research context. The researcher can simply understand the guidelines and know how to apply those guidelines when and where he will use and in which circumstance of the research context.

The main reason behind to use Hevner et al, (2004) design science research process model is that they established seven guidelines in order to assist researchers, reviewers, editors, and readers to understand the requirements for effective design-science research. Hevner et al, (2004) also advised against mandatory or rote use of the guidelines. Researchers, reviewers, and editors must use their creative skills and judgment to determine when, where, and how to apply each of the guidelines in a specific research project.

Hevner et al, (2004) design science research process model also provides a suitable guidelines to use anywhere in the research project by the researcher free judgment. Design science is inherently a problem solving process. The fundamental principle of design-science research from which Hevner et al, (2004) seven guidelines are derived is that knowledge and understanding of a design problem and its solution are acquired in the building and application of an artifact. That is, design-science research requires the creation of an innovative, purposeful artifact.

Therefore, this study adopted the research procedures from Hevner et al, (2004) in order to design the Knowledge management system framework for Addis Ababa Land Holding registration and information agency as shown in Figure 2.

Design Science research procedure

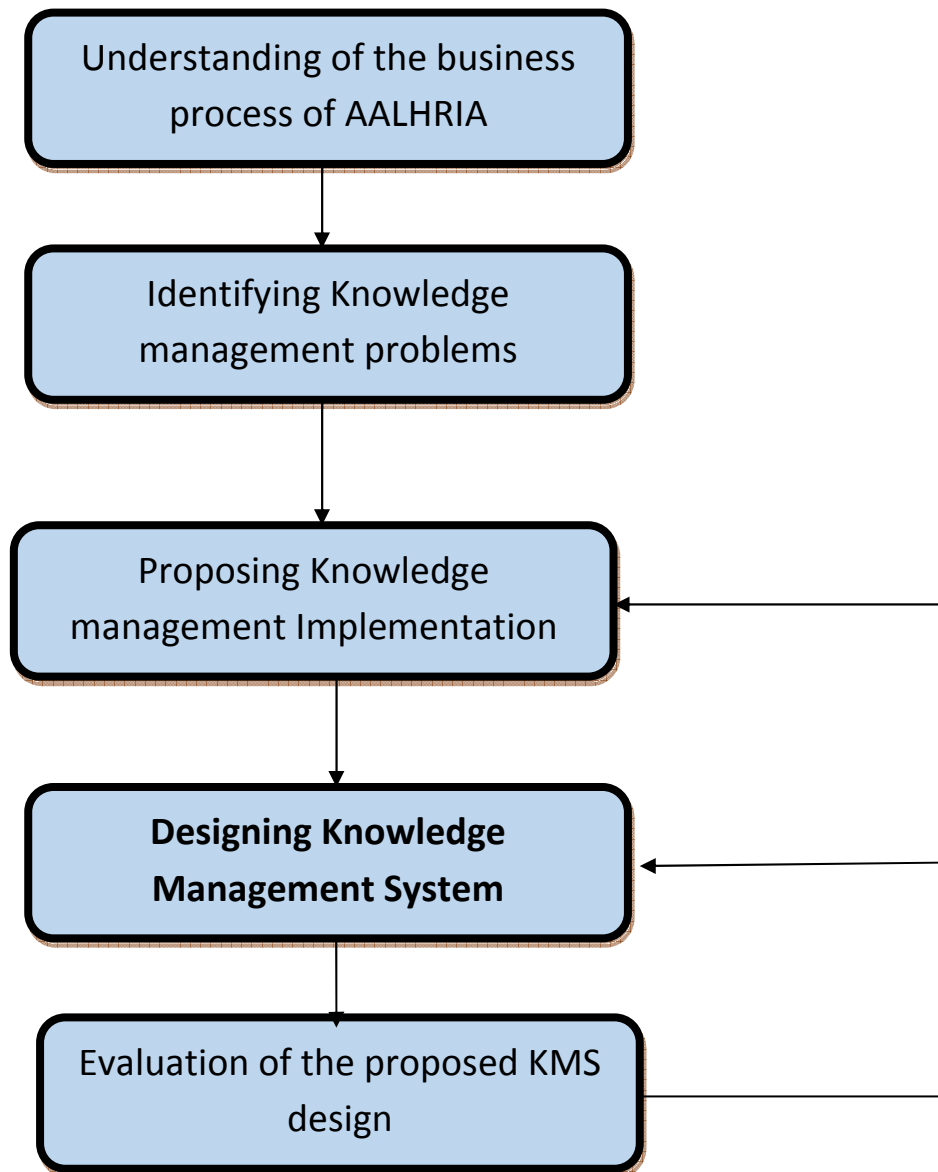


Fig 2. Design Science research procedure (Source: - Adapted from Hevner et al, 2004)

According to the adoption of Hevner et al, (2004) design science research process model, the study used the procedures strictly.

Understanding of the business process of AALHRIA

In the first phase, the researcher collected data which is relevant to understand the AALHRIA's business environment and land registration and information management business process. This phase provides a detail explanation of the business organization that helps to design an artifact which has high utility to solve the problem.

Identification of Problems

In the second phase, the researcher identified individual and organizational challenges that obstruct KM activities to facilitate tacit knowledge sharing culture through knowledge management system (KMS) in AALHRIA. In this stage, literature research and expert interviews are the most common tools that were used to understand the problems thoroughly.

Proposing KMS Design solution

In the third phase, the researcher developed goals of the new KMS design as a solution to the problems identified in phase two. Here, the researcher also proposed the KM implementation model. The goals are attainable to address the current KM problems and user requirements.

Design an Artifact

In the fourth phase, KMS framework design prototype was proposed as an artifact to solve the identified problems in phase two. Relevant KMS design options for AALHRIA were also identified based on the KMS design goals.

Evaluation

According to Peffers et al, (2012), without evaluation, we only have an unsubstantiated design theory or hypothesis that some developed artifact will be useful for solving some problem or making some improvement.

This study aims at developing a framework. So as to evaluate the design artifact of the framework, the researcher followed Peffers et al, (2012) evaluation methods. These evaluation methods are Logical Argument, Expert evaluation, technical experiment, Subject based experiment, action research, framework, case study and illustrative scenario.

According to Peffers et al, (2012) distribution of evaluation methods, the researcher selected the illustrative mechanism because it is a framework type evaluation method. Illustrative mechanisms are an application of an artifact to a synthetic or real-world situation aimed at illustrating suitability (Peffers et al, 2012) or utility of the artifact.

The reason behind for selecting an illustrative Scenario is that Peffers et al, (2012) recommended this evaluation method for a framework type artifact. According to Peffers et al, (2012), most researchers who designed a framework type have used the illustrative scenario design science evaluation method.

The researcher developed an evaluation checklist (attached in appendix II) to evaluate the proposed KMS design framework. The respondents were selected from two departments that represent IT professionals and domain experts. The expert feedback is used as an input to check the framework of the proposed KMS design to solve tacit knowledge sharing problems in AALHRIA.

CHAPTER FOUR

Data Presentation and Discussions

This chapter explained the existing tacit knowledge sharing activities of employees to share knowledge with one another in the Addis Ababa Land Holding registration and information agency. The study collected data through interviews, observation and document analysis which was organized into categories and themes in order to answer the research questions described in chapter One. It also addressed investigation of Tacit Knowledge Management practice, factors influencing that hurdle Knowledge management and tacit knowledge sharing and existing Knowledge management System framework with stating their findings respectively.

4.1. Investigation of Knowledge Sharing practice

One of the objectives of this study is to investigate the knowledge sharing practice of Addis Ababa Land Holding registration and information agency. This research use Nonaka's SECI model to assess knowledge sharing practice. It identifies personification and codification as a main knowledge sharing methods.

Personification is a knowledge sharing activities that is used to share knowledge through personal interactions. It is mainly used to share tacit knowledge that is resided on the knower brain and hard to articulate through one way communication channels. On the other hand, codification is used to promote knowledge sharing through knowledge repository such as documents and knowledge bases. Codification is mainly used to share explicit type of knowledge.

4.1.1. Personification

Temtem Assefa (2013) defined that personification is knowledge sharing process through one to one personal interaction. Knowledge sharing activities that are used to share knowledge requested by the knowledge seekers are through informal methods. Personification uses informal social networks. Planned knowledge sharing activities that are designed to deliver pre defined body of knowledge in specific time and place are known as formal methods.

4.1.1.1. Informal methods of knowledge sharing

Informal knowledge sharing activities can be achieved through direct face to face interaction or telephone conversation.

Direct face to face interaction

AALHRIA's office layout is convenient for direct face to face interaction. Knowledge sharing through informal methods is undertaken among employees who are colleagues. It helps knowledge seekers to get specific knowledge relevant to the problem. The Data Center and Hardware maintenance expert explained that:-

Here in our office, we are friends. It is simple to discuss any issues face to face. Without any rules and regulations, we can share knowledge freely. If there is a problem in my duty, I will ask one of my colleagues who have the better exposure for the problem.

The senior System developer on the other hand responded about the attitudes of the employees on tacit knowledge sharing:-

The knowledge sharing attitudes of the employees within AALHRIA is very low. Because most of the employees do not have appropriate awareness on knowledge sharing. This kind of problem comes through knowledge gap. But employees share their experience in a friendship manner.

Most employees of the AALHRIA preferred face to face interaction. Cyber security analyst added:-

When I came here, I did not read any documents like manuals, procedures or proclamations. I just ask the seniors about my task and they already briefed me in a simple and understandable way. If I were reading documents, I would have more difficulties to understand the objectives of the organization with in short period of time. So personal contact makes it easy to understand my task.

The system administrator assured that personal interaction is better than formal trainings. This is because:-

When I am assigned as a system administrator, I had no ample knowledge about Addis Ababa Cadastral Information System (AACADIS). What I did was ask those who have had an experience on AACADIS. Instead of reading the AACADIS system requirement, discussions with persons was valuable. Even I took training; I did not understand the main concept of AACADIS. But through personal interaction, I have got the entire concept of AACADIS in a simple way.

The findings from the respondents show that direct face to face interaction has a great benefit to share the knowledge simply. It is a natural way of sharing experiences and giving solution for problems.

Telephone Conversation

Telephone conversation is a standard communication medium used for personal interaction in the office. AALHRIA does not have IT based system that facilitates personal interaction for knowledge sharing. Without such services, telephone is used to solve distance barriers for knowledge sharing. Sub city employees also use telephones for personal interaction with the head office. When branch sub city

employees face some frequent problems, they call to their colleagues for support. The Data base and System case team stated:

Most used mechanism for communication is telephone call. While you serve your customers, you may have a problem. You pick a telephone and call to head quarter to get the information quickly and solve the problems.

The Agency has ten sub-city branch offices in the Addis Ababa city. When there is a need for personal interaction with other offices, telephone is the most frequently used communication tools. One of the Information system case team leaders of branch office also added a similar view saying:

Our branch offices are not closer to the head quarter except Arada sub city and Gulele sub city. The rest of eight sub cities are dispersed in the city. If we use letter for communication, it takes time. So to get a quick solution, we use telephone call.

Another Information system case team leader of sub city branch office added:

We discuss through telephone with other branches to tackle problems. We do our tasks and make a solution through informal communication when the problems occurred. This kind of telephone communication gives us more benefits.

The interviewees described that most senior knowledgeable experts are found in the head quarter of the agency. When employees in sub-city faced the problems, they call to experts in the head office to get support for their problems. They also indicated that telephone is the main communication channel that is used for informal knowledge sharing when there is a distance barrier. In short, most knowledge in the AALHRIA is shared through personal interactions than other methods.

4.1.1.2. Formal Methods of Knowledge Sharing

Land service is now the burning issue in our country. AALHRIA is committed to foster public land services. It motivates employees to use existing knowledge from proclamations, manuals, standards and procedures. The Agency organizes different knowledge sharing mechanisms that encourage employees to share knowledge through personal interaction. These formal knowledge sharing methods are used to share standard land service knowledge and personal experiences which are necessary for the task.

- **Training**

AALHRIA is a public organization established in 2012 which tries to modernize the existing land services. The agency started its task by giving training for its employees. Because it is established to foster the existing land management and development service. Respondents clarified that training is organized to provide basic knowledge which cannot be filled by other methods of knowledge sharing. As the Senior System Administrator explained:

Training has a paramount role to feed the basic knowledge about the organization to employees. Like the school lesson, training should be prepared in a formal way. It helps us to get basic knowledge. When you try to apply your training knowledge, you may face skill gap. So to tackle that gap, you will start discussions.

The System analysis and development case team leader also added:

Having no basic knowledge, you ask for formal training. Even after you get training, the problems may occur those will be solved by discussions. So, you should take discussions to solve the problems with your colleagues. Then you will be equipped enough for the basic tasks of the organization.

Training is a formal knowledge sharing method that it used to gain basic and deep knowledge which cannot be gathered through brainstorming sessions. The Agency organized trainings which contains both theoretical and on job training. This kind of training is useful to share both explicit and tacit knowledge.

The Senior System Analyst also indicated about the importance of training:

Mostly, Agency trainings contain both theoretical and practical activities because land services need tacit and explicit knowledge. For example, when we took GIS application training, we have to take practically base training on the procedures of the land policy. When you come back to office, you can directly apply the knowledge. Knowing manuals and technical usage of application is a mandatory.

Training is normally organized to share basic knowledge that gives a general idea on the task. It is mostly used to share explicit knowledge. Most of the knowledge required for the task is tacit knowledge that requires close mentorship by senior employees.

- **Mentoring**

One of the knowledge sharing method is mentoring. It is applied through demonstration and supervision on the task. Informants described that mentoring is used to acquire knowledge from senior experts. It is effectively shared when an employee observes the process from the start to the end while the senior employee does the task. Mentoring is sharing tacit knowledge from senior knowledgeable experts to knowledge seekers.

Sub city Information System case team leader indicated that:

The new employees will be assigned to the senior staff to observe and learn the task. Then the employees can work independently and effectively.

Right registration case team leader also confirmed that:

The new employees are assigned with the senior experts. They try to work independently. But if they faced the problems, the senior experts show them how to tackle the problem. Through times, the new employees will gain an adequate knowledge to process the tasks.

It means that mentoring is a tacit knowledge sharing mechanism to assist junior employees to acquire new knowledge and skills. Seniors experts developed their knowledge from experience how the problem is solved. The researcher observed that junior and senior employees sit side by side. This kind of seating arrangement creates an opportunity for junior employees to observe seniors how they are doing the task.

- **Meeting**

Meeting is a process of knowledge sharing method by assessing previous success and failures in order to make improvements for future actions. Formal meetings are the common practices in the Agency that promote knowledge sharing through story telling. AALHRIA undertakes weekly, monthly and quarterly meetings at different levels.

As the Sub city Information System case team leader explained:

We have scheduled meetings. In these meetings, each sub city branch office delivers its performances. And we look at our strengths and weaknesses. If we have got good experiences, we will take them as best practices. The meeting discussions will also be recorded and documented as a report. The report is then disseminated to all sub city branches for future use.

All sub city branch offices are expected to provide the service in a predefined standard. This can be achieved by the regular meetings.

The senior System Administrator added that:

As you know that this agency is the public organization. So the services are expected to be provided equally for all Addis Ababa city land holders. Regularly, there are meetings with all sub city branches. These meetings can serve us as a knowledge sharing medium. Because every sub city branches will share the best practices from which branch performed its tasks effectively.

Meeting is used to explicit the tacit knowledge which resided in the experts through two way dialog in meetings. It is also used to create a shared understanding among employees who work in different branches.

4.1.2. Codification

AALHRIA has a practice to codify its experiential knowledge in the form of procedure manual so that new employees can learn its practices by reading those procedure manuals. It contains best practice knowledge that is captured as effective knowledge to solve similar problems. The Agency is providing the land service which is the burning issues in a country. Every employee should strictly follow the procedure manual to avoid any mistake or corruptions in the task. Respondents mentioned that they read documents to collect new knowledge they need for their task.

As a Right registration case team leader explained:

First we have to check the availability of proclamations and manuals. If they are easily accessible, we are expected to read them. If there is misunderstanding or misconception, we ask our seniors for detail clarification.

Reading proclamations and manuals provide a basic understanding about Land services for new employees. Others also indicated that when they come to this agency, they were given proclamations, manuals and other land related documents to read and understand the land sector.

Senior System Analyst described that:

Before beginning my work, I just look at previously studied requirement analysis documents done by Hansa Luftbild Company. Through reading I have got the understanding of the AACADIS.

AALHRIA has practiced the codification practice in its right registration directorate which focused on legal issues. This directorate review and codify the land law proclamations, manuals and standards. Information System development and management directorate also codify a manuals and procedures that are gathered from all sub city branches requirements in order to make a customization on AACADIS system.

4.2. Factors influencing KM and tacit knowledge Sharing

There are organizational, individual, social, task and technological factors which influenced knowledge sharing activities. Knowledge sharing is a set of activities which are exposed to different threats. Respondents explained that organizational and individual factors are the main motivational factors to promote knowledge sharing in AALHRIA.

4.2.1. Organizational factors

Organizational factors refer to organizational variables that affect employees' knowledge sharing behavior. These are organization core values and organization support. Organization support creates a facilitating condition for knowledge sharing activities.

4.2.1.1. Organization Support

Organization support creates conducive environment and a smooth relationship among employees in order to facilitate knowledge sharing activities.

The organization should arrange training programs, incentives, create innovative and collaborative culture, and establish good office layout in order to improve the knowledge sharing activities.

- **Incentives**

Organizational support with regard to incentives is very relevant to any organization. Therefore, incentives can motivate employees to perform their task including knowledge sharing effectively. Any type of incentive has a motivational factor to encourage employees to engage in extra organizational activities.

The Senior System Administrator explained about the relevance of incentives as:

For any achievement of the organization, there should be incentives to which they have done the best performance. If your works are not considered, you will be lazy enough. So incentives can enhance employees' motivation.

As the Data center and hardware maintenance case team leader described:

The organization should create conducive environment and incentive mechanisms. It is because of that if the person is encourage for the specific participation, others employees can be encouraged.

Incentives are like energy. The top management of AALHRIA should design an appropriate reward system and adopt a fair implementation mechanism.

- **Organizational culture**

Unless the organization supports to create the best organizational culture, there will never be innovative or collaborative culture. If both things are unavailable, no change will happen in ones organization.

According to Damanpour & Evan, (1984), organizational innovativeness refers to the adoption of practices or technology that is new to the organization. The AALHRIA's organizational culture is not good enough according to the respondent's response.

As a Cyber Security Analyst explained:

As of my understanding, there is a loose organization culture which is not yet fully applied. Because the top management has no any initiations to create either innovative or collaborative culture. Almost our organizational culture status is very low.

The Senior System Developer added that:

The organization culture is very low. I do not know the problem. This organization was established as a new way of IT based land registration organization. But its implementation is very poor because top managements have no adequate knowledge on the objectives of the organization.

The System Administrator also described that:

Our organization culture is not in a good way. There is no rewarding system to encourage employees who really create a new idea or business rule. The minimum requirement of this organization is only attendance.

Organizational innovativeness and collaborativeness is associated with acquisition of new knowledge by the organization. AALHRIA must acquire new knowledge through its employees. Organizational cultures forces employees to create and learn new knowledge through mutual interaction which is relevant to the agency.

4.2.2. Individual Factors

Tacit knowledge sharing activities can be influenced by the attributes of individual factors which engage the attitude of employees. The three attributes of individual factors are work experience, personal interest and background education.

- **Work Experience**

Experience is the exposure of an employee for the particular task for a long time. Through experience, an individual employee can retain the knowledge how to do the single task.

Data center and maintenance expert explained that:

The huge knowledge resides in the experience. When we come out from the university, our knowledge is limited. Because we have no adequate experiences. Working on the same task for years, it leads you to know it very much. Knowing very much is an experience. Therefore, experience enables the seniors to know very well and/or to share your tacit knowledge to the new comers.

Senior System Administrator added that:

A junior develops practical knowledge from senior experts. The knowledge that is relevant to do the task is a practical knowledge. This knowledge is achieved from experience. So experience has the motivational factor to share the tacit knowledge to those who have no experience.

According to the responses of the informants, seniors have rich knowledge which they acquire by working on the task for a long period of time. Employees first acquire knowledge before they start to execute the task.

Personal Interest/Commitment

Effective knowledge sharing activities can be achieved through personal interest. Personal interest is defined as employee's intention to acquire new knowledge for self development and giving support for others to develop themselves.

As a Senior System Analyst explained:

If we have no interest to share for and from others, we can get nothing. Life is exchanging something. You give what you have and receive what you do not have. Therefore, personal interest is a decisive factor to knowledge sharing.

Data center and maintenance case team leader added:

Our attitude to share knowledge is not good enough. Anybody is running for personal benefit. Our personal interest limited us to share the knowledge among ourselves. Sharing attitude is the intention behind our actions. Therefore, personal interest for knowledge sharing activity is an important thing to acquire the knowledge.

Sub city Information system case team leader also stated that:

Our attitudes rose from our culture. Our culture is not open. So our attitudes also closed enough. We have no good attitude to share for and from others.

Negative attitude or lack of personal interest is mentioned as the main limitation that influences the current knowledge sharing practice of the AALHRIA. The agency is expected to do awareness creation on the importance of tacit knowledge sharing activities.

- **Background Education**

To effectively perform a task, education is a basic background for knowledge. One of the formal knowledge acquisition methods is education.

As the Right Registration case team leader asserted:

Formal education gives you general knowledge how to do the task. It is a theoretical knowledge that anyone should exercise practically.

The System Administrator explained that:

I am an IT professional by qualification but I was assigned to work as Real property registration system (RPRS) editor. It was a challenge for me.

An individual factor is seeking knowledge from other colleague for tacit knowledge sharing activities. Individual level knowledge sharing needs tight social interactions. Knowledge is intangible resources which cannot be monitored once it is shared to other person.

In general, individual factors (Experience, personal interest and background education) have the great role to facilitate knowledge sharing.

4.3. Existing Knowledge Management System Framework

IT based knowledge management service is any ICT infrastructure and software that promotes knowledge sharing. These IT based KM sharing tools include Internet, Intranet/portal, websites, e-mail and so on. The deployment of IT based knowledge management tools in the organization increases efficiency and promotes knowledge sharing activities.

According to the respondents, AALHRIA has no integrated common IT based knowledge management service that facilitate knowledge sharing activities. Moreover, Employees also have a minimum trend of IT use to share knowledge between them. IT based knowledge management framework must be useful to the purpose and easy to use to facilitate knowledge sharing activities of employees.

The benefit of using IT based knowledge management tools is to improve the quality of work. Most respondents mentioned that IT based knowledge management system has a great benefit to facilitate the process of tacit knowledge sharing activities.

As Database and System case team leader explained:

I have prepared sharing folder for all sub cities branch to facilitate knowledge sharing in respect of system and database case team. But there is no common sharing system for all departments within the organization. However, our sharing folder is used to exchange problems and its solutions. Therefore, its usefulness is very high.

Almost all respondents described that the benefit of Internet access is to help them to browse a variety of knowledge sources. Internet also helps them to overcome distance barrier.

As a Senior Database Administrator mentioned:

We use IT as a tool for knowledge sharing like e-mail, social Medias like LinkedIn, core mail and so on. But without Internet, we cannot do anything. We get the information from Internet. For instance, we access information about debugging systematical problems like database crush or server downs and so on.

If employees cannot get solutions to their problems by themselves or checking manuals in the agency, they use to access Internet as the last option.

As the Senior Cyber Security Analyst asserted:

First you should try to get support from your friends or seniors. When your seniors or friends do not know the answer of your question, you automatically go to check on Internet.

Thus, it can be concluded that IT based knowledge management system can overcome both distance and social barriers to access knowledge sources and promote knowledge sharing activities. This kind of IT based framework can be considered as one of the necessary tools that motivate employees to engage in knowledge sharing activities. But AALHRIA has no a common IT based knowledge management system.

IT based knowledge management system must be intuitive and interactive. It means that IT tools can reduce efforts of knowledge sharing activities.

As the Information Security and auditing analyst described:

Look the internet; it is very easy to access the varieties of knowledge. You can retrieve by simple key word. If you do not write miss-spelled word, mostly you can access whatever you want.

AALHRIA has no centralized knowledge base. Therefore, the agency is not liable for the availabilities of the knowledge. Paper based manuals, procedure and proclamations are not easily accessible by everyone and convenient to use.

Unavailability of knowledge source leads to trust few key employees. Most respondents proved that without centralized organizational memory, sustainable performance and growth cannot be achieved.

The System analysis and development case team stated:

We have no common knowledge sharing system. It is not good for the organization because if the key employees left the organization, it starts from the scratch. The knowledge management system can serve as a knowledge source for all employees. This system should be open for all employees to post whatever they know about the organization .If we have an integrated KMS, everything will be easy.

The Senior System Administrator added:

When I read manuals or proclamations in hard copy, I will take long times. But if there is IT based knowledge management system, it is too easy to find what I need.

Indeed, AALHRIA has no a common IT based knowledge sharing tool. But most respondents asserted that centralized Knowledge sharing portal is very significant for the organization. IT based knowledge management system has many advantages for knowledge sharing by providing the varieties of organizational knowledge for all employees equally.

There are also the unique types of knowledge that cannot be codified easily in to the document. This kind of knowledge can be shared by the intranet based knowledge management system simply through either individual or group chatting.

The Land holding registration and information agency did not have well organized knowledge management system. However, there is an attempt of knowledge sharing through the use of IT from database and system case team within the organization.

CHAPTER FIVE

Designing A Knowledge Management System Framework

This research designed the knowledge management system framework based on the knowledge management implementation model in order to facilitate the tacit knowledge of employees. The researcher tried to address the basic design requirements that have been gathered from the interviews with in AALHRIA. This study mainly focused on the design of Knowledge Management System framework that can retain and ideas gathered from literature, tacit knowledge of each employee in the AALHRIA's organizational memory, reduce the turn-over effects improve sharing of the tacit knowledge among all employees within the organization and increase the entire performance of the agency.

The researcher designed the KMS framework based on the requirements gathered from interviews and the theories from literature.

5.1. Needs for the Knowledge management system design

The needs raised from the respondents are discussed as follows:-

- Recommendations of basic functions which must be incorporated in the proposed knowledge management IT solution for the AALHRIA.
- Challenges to design knowledge management system framework.

5.1.1. Recommendations of basic functions for the KMS design

Any system should consider the needs of the users. Without fitting the user requirements, a system cannot benefit the organization. Therefore, user requirements must be incorporated within the system.

Respondents recommended different functional and non-functional requirements for the new KMS design. All informant employees forwarded their points of view on the new KMS design which must be considered and fulfilled.

As Data Center and Hardware maintenance expert explained:

The proposed system should have a rewarding system to show who participated more and display the top three employees every week.

A Senior System Developer also mentioned that:

The system must incorporate the following points:- Team viewer, Video conferencing, chatting, knowledge base, discussion forums, blogs, individual and group chatting rooms, upload and download spaces, and organizational resources (proclamations, manuals, procedures, standards and so on).

A Senior Cyber Security Analyst described that:

There should be an upload space to put the knowledge of the employees. Every department should have a space for organizing and presenting its own resource for knowledge sharing.

A System and Database Case Team leader also added that:

There should be a blog, question and answer box, discussion forums. If these are available, the knowledge sharing activities will be simple and all employees can improve themselves.

The knowledge management system should facilitate tacit knowledge sharing. The proposed system can simulate the real world of one to one interaction (tacit to tacit) and group discussions through individual chatting and group chatting application.

But some respondents mentioned that the proposed system design should incorporate cryptography technology that prevents the restricted knowledge that may harm the organizational AACADIS system by unauthorized access.

The Senior Cyber Security Analyst assured that:

There should be a dividend security privilege for users, middle level managers and top level managers. This is why the top management should see the low level task problems and its solutions. There are secured knowledge which must be kept secretly. For example, passwords, configuration codes and solved solutions in respect of system security. The system should use cryptography technology for the top management privilege.

Senior Information Security and auditing analyst also added similar view:

The KMS should be secured. Every employee should have a user account to access the system. The user account can help the knowledge expert to know “who post what?”

The respondent reasoned out that any employees should take responsibilities and be accountable for their own posts. This kind of preemptive actions help the organization to protect the abnormal use of the KMS.

In short, most respondents agreed that the proposed system design should contain the knowledge base, discussion forums, blogs, individual and group chatting rooms, upload and download spaces, reward system (that can identify and display who participate more every week) and different organizational resources such as, proclamations, manuals, standards and procedures. Some respondent also recommended that a system design should have modern security system like cryptography technology to prevent sensitive knowledge such as configuration codes, passwords and system security problems and its solutions.

5.1.2. Challenges of the new Knowledge Management System Framework

According to the respondents, many challenges are expected which may hinder the designing process and implementation of the system even if it is completed successfully. Most respondents indicated that unacceptability of the KMS is also a great challenge. The top management should be aware on the significance and functionalities of the proposed KMS.

As a Data Center and Maintenance case team leader explained:

The new KMS might face unacceptability by the top management. Therefore, awareness creation must be undertaken about the main intent of the KM.

Sub city branch office Information system case team leader also explained that:

Resistance may happen from top management and employees themselves. Willingness of usage might be the challenge of the proposed KMS.

As a system design, the challenges are cost, time and skill gap. Any research or project will face challenges. Respondents explained those cost, time and skill gaps are the expected challenges.

As Senior System Developer mentioned that:

Knowledge gap, cost, time, miss-implementation, resistance to change, top management misunderstanding and so on are the big challenges of the proposed KMS system.

A Senior Cyber security analyst also added similar view:

The challenges might be shortage of professional knowledge, cost, time, negative attitude, security, top management refusal and employees resistance.

Another Senior System Developer assured the above comments:

I think the challenges are: - Top management may not accept the KMS design, professional knowledge gap and the system may incur cost.

Some respondents underlined that the negative attitude of top management and employees are the great challenge of the new KMS system. Because mostly employees resist accepting the change. It needs detail awareness creation before the implementation of KMS takes place. The respondents also said that our culture is not open and inconvenient to accept new things.

As a Senior Database Administrator explained:

The challenge may be the user resistance. Almost all employees have given up on life. Another challenge might be the top management negative attitude.

A Data Center and Maintenance expert added similar view:

The challenge of the KMS might be lack of awareness of usage. Most employees might not use the system because of they are resist to accept changes.

Negative attitudes should be replaced by positive attitudes. Negative attitude can be changed through deep awakening knowledge. Therefore, AALHRIA is responsible for creating an attitudinal change awareness to implement the proposed KMS system effectively.

5.2. Model for Knowledge Management System

The main objective of this research is to design a knowledge management system framework that can facilitate the tacit knowledge sharing of the employees of AALHRIA. To fulfill the needs of AALHRIA, the researcher selected the knowledge management implementation model from Jones and Leonard (2009) that is closely related with the context of this study.

According to Jones and Leonard (2009), the knowledge management implementation model includes both organizational and initiative characteristics. There are two organizational characteristics included: innovative and collaborative culture. Within the initiative characteristics there are four factors included: top management support, formal KM staff, incentives based on quality (not quantity), and communication about KM to employees. These characteristics can affect each of the steps in the KM process differently (See Fig. 3).

5.2.1. Organizational Characteristics

Characteristics of organizations can differ greatly. As such, it is important to consider these characteristics when trying to implement a technology that was not specifically created for the organization. Organizational characteristics can support or impede an implementation attempt. More specifically, whether or not an organization is innovative and has a collaborative culture can affect the implementation of KM.

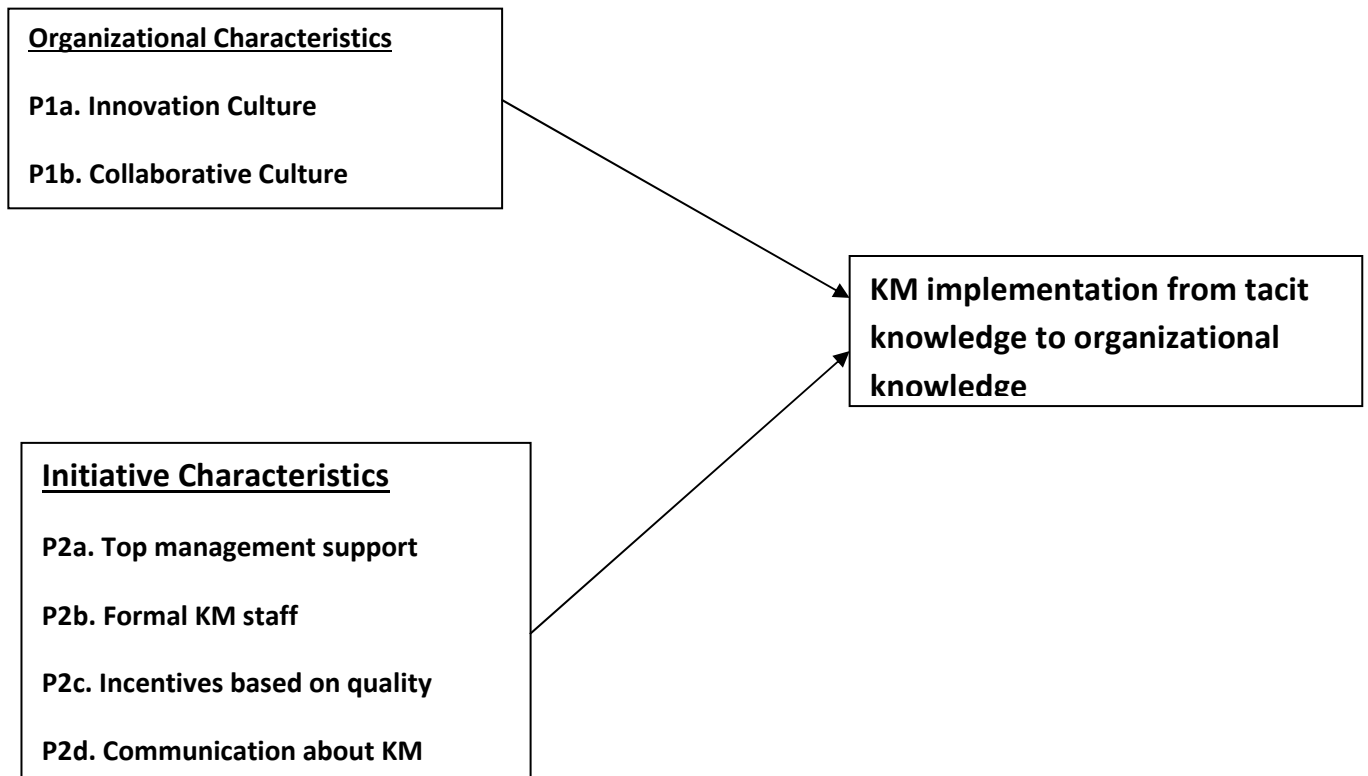


Fig. 3. The knowledge management implementation model by Kiku Jones and Lori N. K. Leonard (2009)

- **Innovative and Collaborative Culture**

Innovation cultures are open to new innovations and are willing to give their full attention to helping the implementation succeed. Employees are encouraged and rewarded for creativity. An organization's culture in terms of collaboration can severely affect the KM implementation from tacit knowledge to organizational knowledge (TK to OK). The whole premise of moving from Tacit Knowledge to Organizational Knowledge is the sharing of knowledge. If an organization has not set that as the culture, it will have difficulty in implementing this move. Communication can create, maintain and change culture (Johnson, 1993).

5.2.2. Initiative Characteristics

It is not enough to have the organizational characteristics. There are certain characteristics of the KM initiative that are also needed for a successful KM implementation from Tacit Knowledge to Organizational Knowledge. Not considering these may lead an organization to make mistakes. More specifically, top management support, a formal KM staff, incentives based on quality not quantity, and adequate communication to the employees about KM are necessary for success.

5.3. Proposed Model for AALHRIA Knowledge Management System Framework

According to the knowledge management implementation model of Jones and Leonard (2009), the researcher has adapted the model for this study.

The proposed model consisted both organizational and initiative characteristics. There are two organizational characteristics included: innovative and collaborative culture. Within the initiative

characteristics there are four factors included: top management support, formal KM staff, incentives based on quality (not quantity), and communication about KM to employees.

Fig. 4. Shows the proposed knowledge management model for Addis Ababa Land holding registration and information agency.

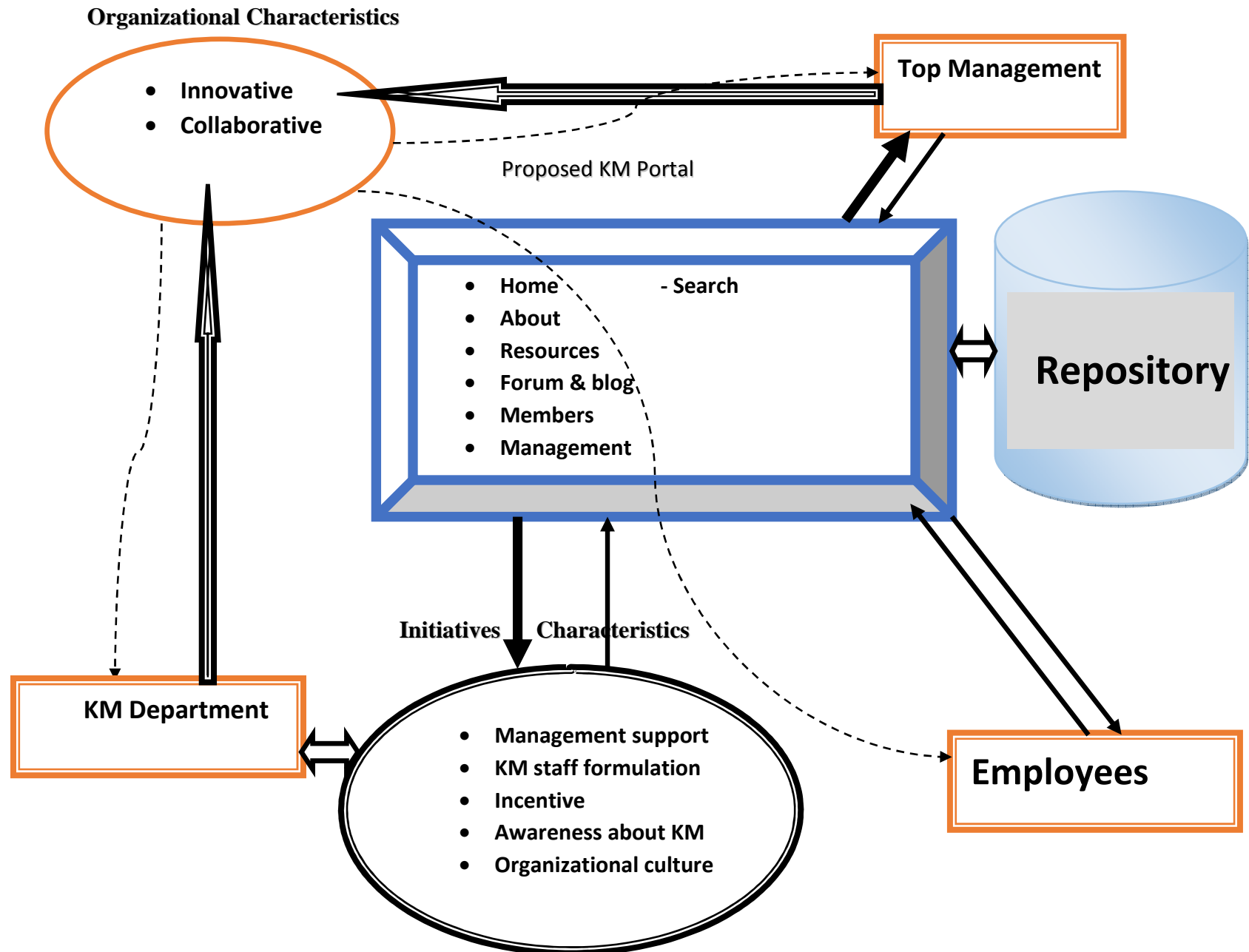


Fig. 4. The proposed KM implementation model for AALHRIA

5.3.1. Discussions of the proposed model

The KM department in collaboration with the top management and organizational initiatives should accomplish the following objectives:

- Uncover strengths and weaknesses within the actual corporate management of knowledge assets and business processes.
 - Analyze circumstances, barriers and enablers of KM as corporate culture, leadership, human resources management (HRM), information technology (IT), process organization and control.
 - Increase awareness of KM within the organization
 - Collect measurable data from reward system for quality based incentive and control purposes
 - KM Benefit Assessment – focus on potential effects of KM initiatives as a base for planning, action, and monitoring of KM implementation.
 - Evaluate and analyze the knowledge that is being stored from the repository.
-
- The main objective of the award system in the management page is to motivate those employees who are participating and sharing their ideas in order to enhance the collaborative culture of the organization. Award system, similar to other decision support systems, aims to investigate the sharing status at a particular concept or idea with the specified time frame. It focuses on a submitted and discussed knowledge which are available and used for further needs, knowledge flows and sharing among employees. It considers how knowledge usage in business processes for adding value of the organization, as well as proposes the top contributors to KM staff or Knowledge managers.

- Forum system components that facilitate knowledge flow within the KM system that include:
 - Information mapping: links and maps the flow of information that might later be converted to knowledge across the organization.
 - Information and knowledge exchange: tools and non technological facilitators that enable exchange of information between people.
- The top management and KM department or Knowledge managers should have a big role to develop organizational culture suitable for knowledge management.
 - The motivation and incentives should be based on building those collaboration and innovative cultures.

5.4. Prototype of the Proposed KMS

The prototype is developed based on the requirements gathered from in depth interview and the contents which should be incorporated in to a KMS system as suggested by employees.

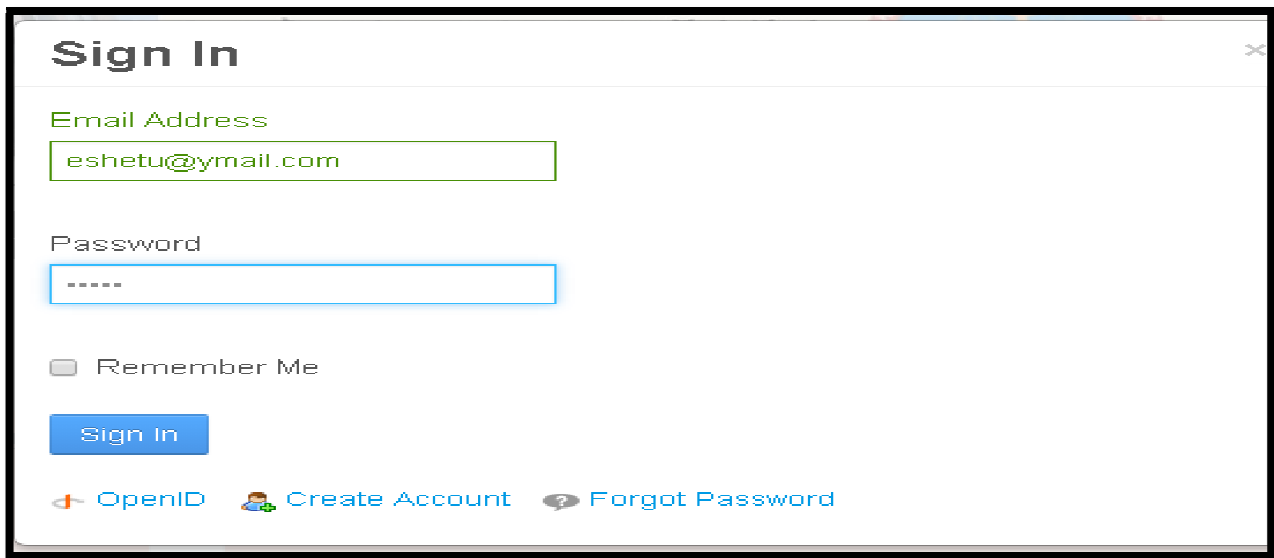
The researcher used Liferay (version 6.2) and MySQL database to develop a web based knowledge management system prototype. The reason to select Liferay software tool is that it can fit the purpose of the study. Liferay is very convenient for web 2.0 intranet based systems. Because it has group and individual chat space and portal platforms. The goal of designing this knowledge management system is to facilitate the knowledge sharing activities of the employees and increase efficiency and effectiveness of the employees within AALHRIA.

The designed prototypes contained Home page, About Page, Forum & Blog page, Resources Page, Staff Page, Management Page and Members Page. Each page and its descriptions are discussed here forth:-

5.4.1. Login Page

The login page authenticates the authorized employee who has an account for the knowledge management system of AALHRIA. This page requires e-mail address and password.

Fig.5. depicted the layout of the sign in page.



The screenshot shows a web browser window titled "Sign In". It features two input fields: "Email Address" containing "eshetu@ymail.com" and "Password" with masked characters "*****". Below the password field is a checkbox labeled "Remember Me". A blue "Sign In" button is positioned below the checkbox. At the bottom, there are three links: "OpenID" with a plus icon, "Create Account" with a person icon, and "Forgot Password" with a question mark icon.

Fig. 5. Login page

5.4.2. Home page

The Home page is the first page of AALHRIA Knowledge Management System. Home page (see fig 6) contains links to all relevant pages and describes about the organization main tasks. This page also contained all pages such as: forum & blog, resources, management and members pages.



Fig.6. Home Page or overall layout of knowledge management system.

5.4.3. About page

About page consists the mission, vision and values of the AALHRIA. Any new employee can understand the mission, vision and values of the agency from this page (see fig. 7).



Fig. 7. About Page

5.4.4. Forum and blog page

The forum and Blog page is responsible for giving a space for employees’ post in order to write any issues of the organization for sharing knowledge and open discussions. The blog is a series of posts about the issue of AALHRIA tasks. The employees also can discuss through this forum. Any employee can put his/her comment under any posts (See fig.8.)

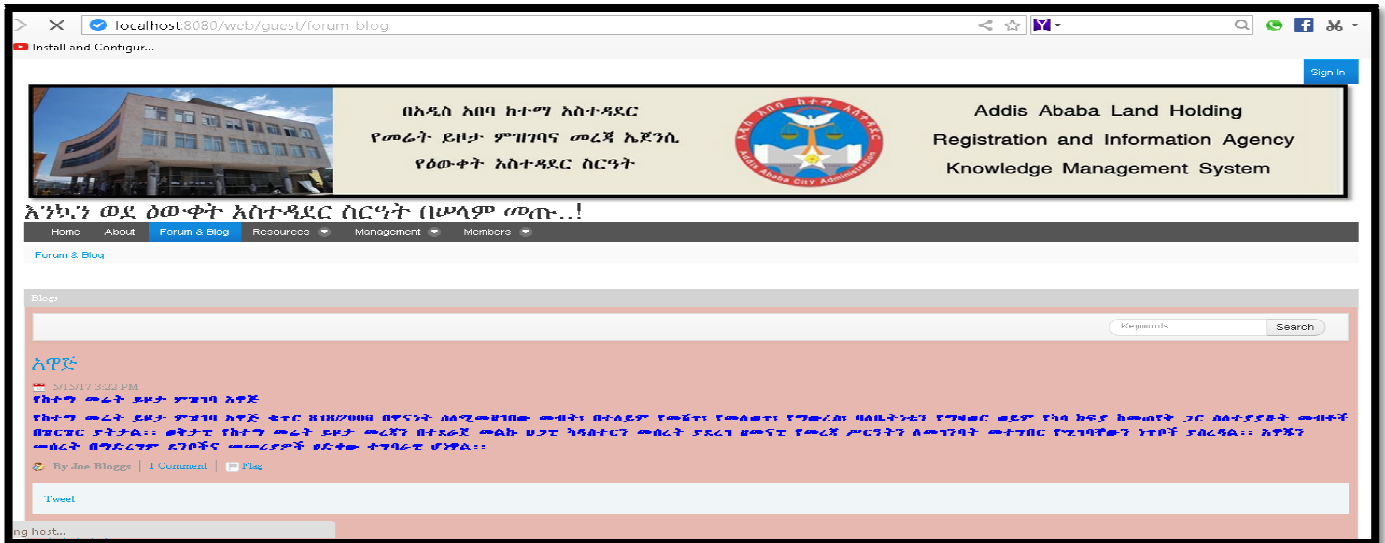


Fig.8. Forum & Blog page

5.4.5. Resources page

This page consisted documents and media. The important documents and videos are available here to view by the employees who are interested to know about AALHRIA. Fig. 9. Shows the layout of the resource page.

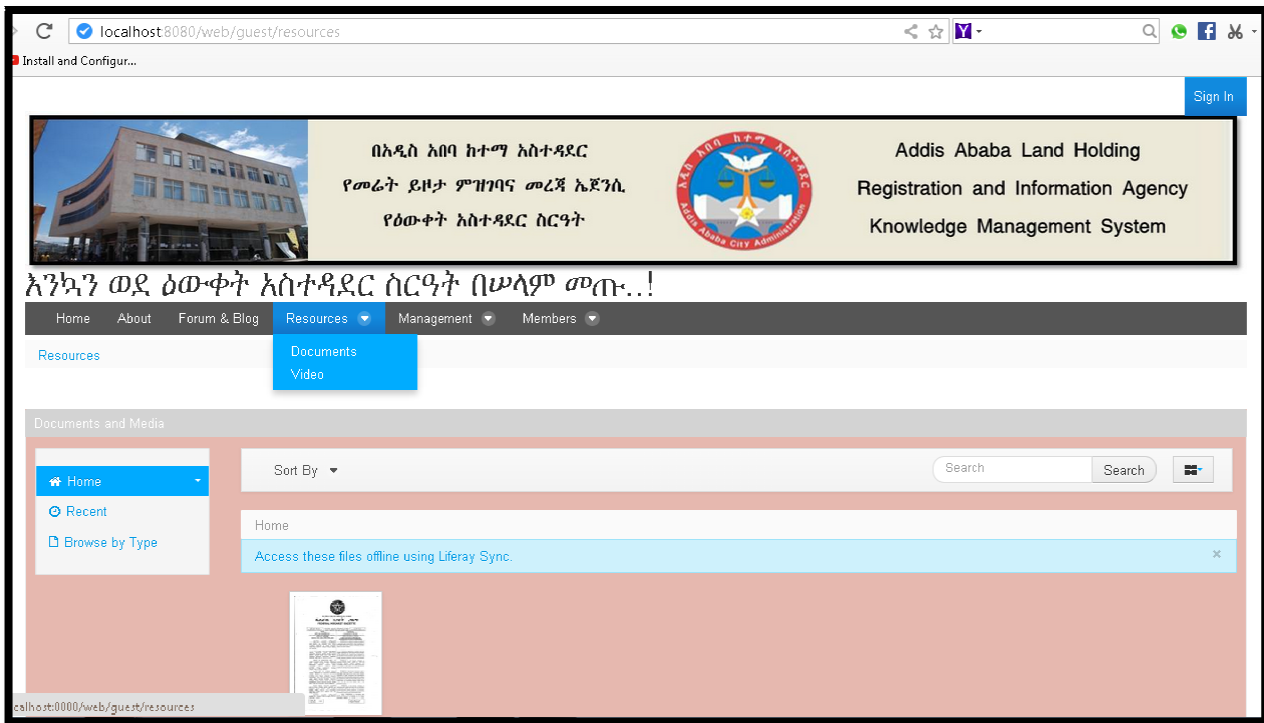


Fig.9. Resources page

5.4.6. Management Page

The management page is accessed by the responsible person who is assigned by the top management for the controlling and monitoring of the knowledge management system. This page contains four child pages: reward system page, restricted files page, black list user page and the week's top three user page. The reward system page works on incentives by counting the user's quality of the knowledge that have high participation per week. The restricted files page also contains confidential information like password, configuration codes and so on which should be protected from unauthorized access.

The black list user page registers the users who are using the knowledge management system inappropriately and out of the organization's mission. The last page "Top three users" page registers and displays the users who have participated in knowledge sharing activities highly.

Fig. 10. Depicted the management page layout.

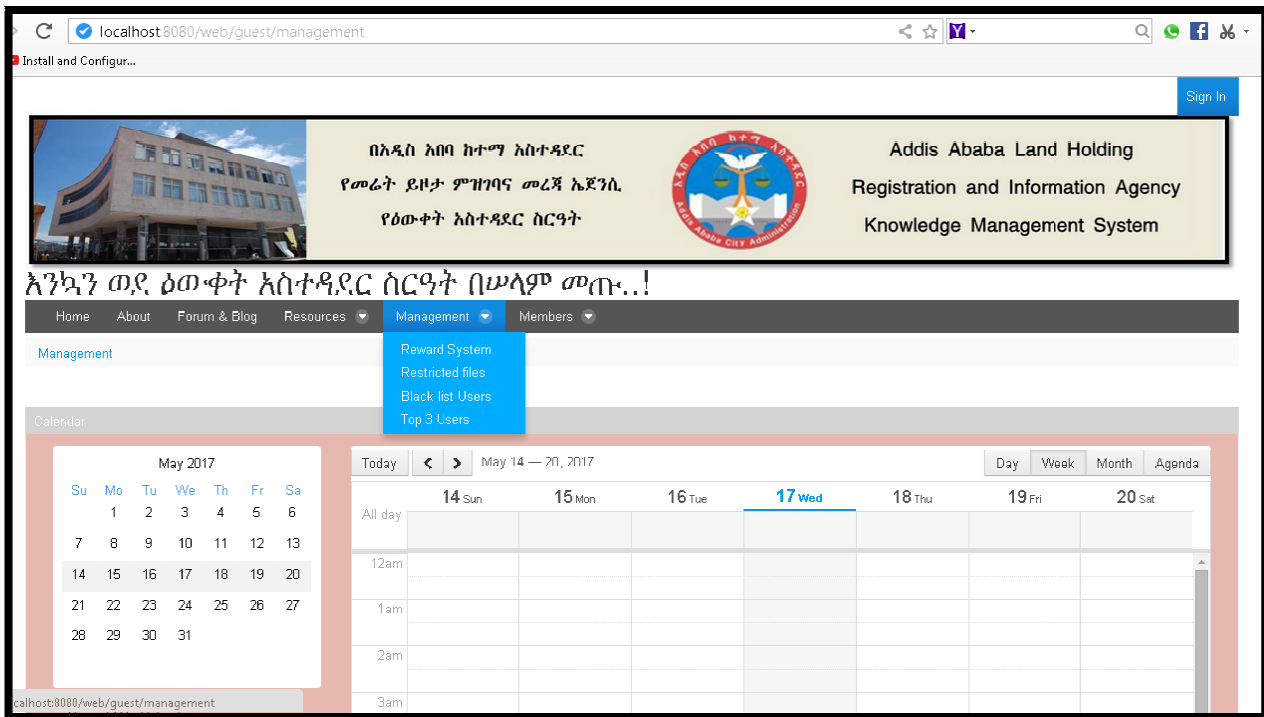


Fig.10. the layout of Management page

5.4.7. Members Page

The member page consist the “chat” child page. All employees can communicate with each other through the use of chat application. This chat page simulated as face to face discussions. The member page also displays the on-line users who are using the knowledge management system. Fig. 11. depicts the layout of member page.

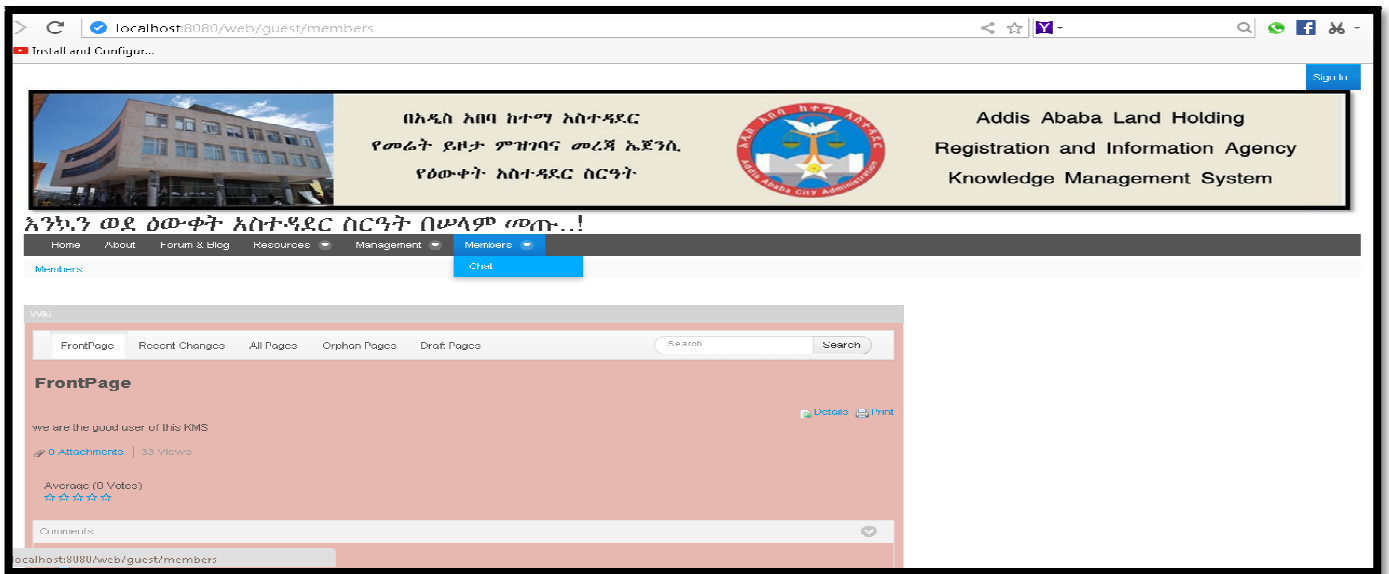


Fig.11. Member Page

5.5. KMS Design Evaluation

Hevner et al, (2004) stated that Evaluation is an essential activity in knowledge management system design, development and implementation. Artifact evaluation should be seen as important part of the development process to make certain that the developed artifact can bring observed improvement and works in the real environment.

The researcher selected the illustrative scenario from design science evaluation methods. It is because those illustrative scenarios are used for the framework type artifacts (K. Peffers et al, 2012). Illustrative scenario applies the artifact in a synthetic or real world situation to demonstrate its utility.

The researcher explained the detailed functionality and benefits of the knowledge management system. The researcher used illustrative scenario to evaluate the efficiency of the knowledge management system framework. The evaluation data was collected using interviews with AALHRIA representatives. The responses from the evaluation questions in relation to benefits and ease of access is explained below.

5.5.1. Benefits of the proposed KMS system for AALHRIA

The proposed KMS system has multiple benefits. Most respondents mentioned that the proposed system have a strategic benefit for AALHRIA. They explained that the proposed KMS design have the great benefits for AALHRIA. According to their response, AALHRIA can increase its organizational performance through the effective implementation and use of the KMS system.

A Senior System Developer explained that:

The benefit of KMS is to share knowledge freely and simply. When we make cost-benefit analysis, the system has more benefit than its costs.

Another System Developer also stated that:

The proposed KMS helps the AACADIS system by giving an input for system improvement knowledge. The employee can upload his/her knowledge freely on KMS. The entire performance of the organization will be increased.

A senior Database Administrator added:

The KMS have an advantage for the AACADIS as an input. This system can hold different new cases (problems & solutions) and organize these cases to improve the AALHRIA services in order to increase the entire performance of the organization.

A Database and System Case team leader clarified that:

This KMS can give an input for AACADIS. There are daily system errors that are incurred. So these errors can be uploaded in the KMS's knowledge base. The knowledge developer analyzes these errors with accordance to theirs solutions. So system improvement can be done on

AACADIS. Then the system can handle different cases. So this can increase the satisfactions of the public.

As Senior Cyber and Security Analyst asserted that:

The basic advantage of the KMS is retaining the knowledge of the employees. So the organization never worried about the turnovers.

A Senior System Developer also mentioned the similar view:

The basic benefit of the KMS is to give a sustainable and permanent knowledge for the organization. So the organization does not worry about the turnovers.

Another Senior Cyber and Security added that:

The advantage of the proposed KMS will be preserving any cases of the problem and its solution. If anyone of the employee needs to share some cases of the problem, he/she only expected to browse the KMS. And the top management should never worry about turnover. Because the knowledge of the employees' will be deposited in the organizational memory.

The respondents evaluated that the benefits of the proposed KMS system is multiple. Specifically, the proposed KMS system improves the functionalities of AACADIS. Because there are so many cases rose from sub cities which need urgent solutions. Therefore, these cases will automatically register in the proposed KMS system. Any employee who faces the similar case, he/she expected only browse the KMS system. Moreover, the organization can secure its knowledge permanently.

5.5.2. Easiness of the KMS System

The simplicity of KMS system encourages employees to facilitate knowledge sharing activities. The respondents agreed that the proposed system is very intuitive and easy to use.

As the Senior System Developer described:

This system is really simple to use. The interfaces are user friendly and intuitive. Any employee who need reflect his/her ideas based on the specific organizational issue, this system is very convenient.

And the Senior System analyst also assured that:

The proposed system prototype is really interested. Honestly speaking, it looks easy and attractive. It seems like the social media facebook and twitter..

The System Analysis and Development case team added a similar view:

The proposed system prototype has the capability of knowledge sharing activities. It is because of that the system is very simple and intuitive enough.

According to the respondents, the KMS prototype looks easy to use and encourage employees to participate for knowledge sharing activities.

CHAPTER SIX

Conclusion and Recommendations

Knowledge is a broad and abstract notion that has defined epistemological debate in western philosophy since the classical Greek era. Consistent with the interest in organizational knowledge and knowledge management (KM), IS researchers have been promoting a class of information systems, referred to as knowledge management systems (KMS). The objective of KMS is to support creation, transfer, and application of knowledge in organizations. Knowledge and knowledge management are complex and multi-faceted concepts. Thus, effective design, development and implementation of KMS require a foundation in user requirements from the respective organization.

6.1. Conclusion

The research investigated the practice of tacit knowledge sharing among employees of the Addis Ababa Land Holding Registration and Information Agency. It is the new way of established public land organization with all sub city branches for giving land related services with modern cadastral information system in the Addis Ababa city administration.

The general objective of this study was mainly to design a knowledge management system framework in order to capture and process all employees' tacit knowledge sharing among themselves and transfer individual knowledge to organizational knowledge for the Addis Ababa Land Holding Registration and Information agency.

The research used both qualitative case study and design science research methods. The case study research method is used to explore the existing knowledge sharing practice among the employees of AALHRIA. Whereas, the design science research method is used to design a knowledge management system framework prototype that promotes tacit knowledge sharing. The research also identified

organizational factors and individual factors which influences the tacit knowledge sharing activities. Individual factors (Experience, personal interest and background education) have a paramount role to facilitate tacit knowledge sharing.

This research also found that direct face to face interaction (Informal knowledge sharing) has a great benefit to share tacit knowledge successfully rather than the formal knowledge sharing. Because it is a natural way of sharing experiences and finding solution to problems. Good organizational supports like incentives, trainings and organizational cultures have the positive influence to motivate employees to share their tacit knowledge among themselves.

The research found that the benefits of the proposed KMS system are many. There are so many cases raised from sub cities' branch office which needs urgent solutions. Therefore, these cases can be registered in the proposed KMS system. Any employee who face similar problem should only browse the KMS system to get the solution. Moreover, the organization can secure its knowledge permanently.

The researcher has adopted the knowledge management implementation model of Jones and Leonard (2009) because the model contained both organizational and initiative characteristics. Without innovative and collaborative culture, the tacit knowledge sharing activities cannot be processed effectively. Within the availability and interactions of initiative characteristics (top management support, formal KM staff, incentives based on quality and communication), the proposed KMS system have an immediate benefit for the AALHRIA. This is the reason that all employees can highly participate and collaborate among themselves within a good organizational culture and reward system. Therefore, AALHRIA needs to implement the knowledge implementation model via the design of KMS system proposed by the researcher.

6.2. Recommendation

According to the findings of the research, the following recommendations are forwarded for the employees and top managers of AALHRIA.

I. Employees

Each employees working in the AALHRIA should:

- Engage in knowledge sharing with all available means (orally, document sharing through the use of KMS)
- Employees should change the negative attitude of knowledge sharing in to positive attitude.

II. AALHRIA Top Managers

As an immediate governing body of the AALHRIA, the top management is advised to engage in actions like:

- Complete implementation and usage of proposed KMS system for knowledge sharing activities.
- Equipping the agency with up-to-date ICT infrastructures suitable for KMS system.
- Providing training to all employees so that they will be motivated to use KMS.
- Creating awareness on knowledge sharing attitude and usage of the KMS system for all staff.
- Developing and applying rule and regulation on KMS usage.
- Formulating formal KM staff.
- Creating good organizational cultures (innovative and collaborative culture)
- Setting up a reward system in order to motivate employees who are sharing knowledge regularly.

- Supporting employees and monitoring the interactions of KMS system.

6.3. Challenges of the Study

The main challenge of the qualitative research is the generalizability of findings problem. The research findings are not generalizable to other contexts.

The interview was conducted in Amharic language which is the official language of the country and the working language in the office. The researcher translated the Amharic interview discussion into English language. The interview appointments are also very difficult to keep by the interviewees. So, interview time management and discussions were very challenging task.

Since the study is undertaken on a single organization, respondents may exaggerate or undermine some organizational events due to their personal bias they have on the agency. The researcher tried to minimize such kind of biases by asking multiple respondents when he recognized some exaggeration in the response. Therefore, it cannot be fully claimed that this research is free from respondents' bias.

6.4. Future Research

This research used case study research method to explore the existing practice of employees' assumptions that may affect tacit knowledge sharing in the AALHRIA. It is also used the design science research methodology to design an artifact that can solve the tacit knowledge sharing problem in AALHRIA. Indeed, this research answered the research problems stated in Chapter one. However, there are also other issues that need to be further studied by another researchers.

The findings of this research cannot be generalizable for other public land institutions. Other researchers can do similar research using instruments and models developed in this research and they should make further study on tacit knowledge sharing in public organization. The field of tacit knowledge sharing and management study with respect of IT solution is not yet surveyed adequately

in Ethiopia. The government of Ethiopia must also encourage researchers who are interested to study in this area.

This study proposed a design of KMS framework for AALHRIA. This framework requires further development and implementation work by other researchers.

In short, the researcher recommends for other researchers to further study in the area of tacit knowledge sharing and management on other public institutions.

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Appendix I.

Interview Questions

Organization of Interviews

This interview questions are organized to gather the relevant information in order to explore the existing knowledge management and tacit knowledge sharing practice. The interview questions will also find out the factors and barriers that can hurdle knowledge management practice with in the Addis Ababa Land Holding registration and information agency. Therefore, you are kindly requested to provide accurate and recent information as possible as.

Background Information

Your cooperation on the interview would be highly appreciated!

- 1) Would you explain your educational background, your position in the agency and your work experience?

a. Investigation of Knowledge Management practice

1. Have you heard about tacit knowledge sharing? How tacit knowledge is being managed/shared among departments in your agency?
2. What do you think of Knowledge Management (KM)?
3. What are the attitudes of the employees' with respect to tacit knowledge management in your organization?
4. What are the methods for tacit knowledge management?
5. What is the current status of Knowledge Management in your organization?
6. Do you think your organization acquire tacit knowledge from employees? Please explain?
7. Does your organization recognize tacit knowledge as a part of your asset base?

b. Factors influencing about Knowledge management and tacit knowledge sharing

- 1) What are the problems related to tacit knowledge sharing among employees?
- 2) Is there any existing policies and procedures for practicing knowledge management in your organization?
- 3) How do you describe your organizational culture?
- 4) What is the biggest hurdle in effective implementation of KM in your organization?
- 5) What do you think are the factors influencing tacit Knowledge sharing in your organization?

c. Knowledge management System Framework

- 1) Is there any use of IT to manage the tacit knowledge of employees?
- 2) What kind of knowledge sharing systems your organization uses to share knowledge?
- 3) Would you explain your organizational experience in using, accessing and the availability of existing ICT tools to share knowledge among employees of branch sub city offices?

d. Requirements for the proposed Knowledge management system design

1. What will be your recommendations of the knowledge management IT solution for your organization?
2. What are the challenges to design knowledge management system framework in your agency?
3. What do you think the basic functions which must be incorporated in the new knowledge management system design?

Appendix II.

Evaluation checklist for the Knowledge Management System

1. What are the benefits do your agency get from this knowledge management system framework?
2. Does the knowledge management system framework create easy access?
3. Is the knowledge management system framework intuitive and user friendly?

Appendix III.

Observation Checklist

1. The common knowledge sharing methods used among employees within the agency?
2. Are employees of all branch sub-cities freely exchange knowledge in formal way?
3. Are employees managed their files properly?
4. What are the technological means to facilitate knowledge sharing among employees?
5. Is there a means to promote best practices in the agency?