University of Nairobi

School of Computing and Informatics

Master of Science Information Systems

Research Project

PROJECT TITLE

A FRAMEWORK FOR APPLYING KNOWLEDGE MANAGEMENT IN ORGANIZATIONS IN KENYA

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P56 / 70402 / 2007

DATE: 7TH September 2010

Presented as a partial fulfillment for the award of the degree of Master of Science in Information Systems

Declaration

*I, **Charles James Katua** do declare that this research project as presented in this report is my original work and has not been presented for any other University award.*

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This research project has been submitted as part fulfillment of the requirements for the Master of Science in Information Systems of the University of Nairobi with my approval as the University Supervisor.

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ACKNOWLEDGEMENTS

I would like to express my sincere thanks to my academic supervisors Mr. Dan Orwa, for his continual guidance, support and encouragement throughout the duration of this project. I consider it a privilege to have had the opportunity to work with him and share his valuable knowledge and expertise.

During this study, I have collaborated with many colleagues and industry experts for whom I have great regard. I wish to extend my warmest thanks to all those who have helped and supported me. My thanks go to the staffs at Mumias Sugar, G4S and KCB Bankgroup, who have been very supportive of this project. I also wish to acknowledge all my classmates with whom we brainstormed and worked towards the successful accomplishment of this task. I would like to especially thank Shem Angolo, Nixon Amuomo and Patrick Kinoti for their help and guidance. I would also like to thank all those who participated in the case study and interviews and shared their valuable knowledge and experiences without forgetting to mention my friends. Last but not the least; I owe my loving thanks to my family, for their continual encouragement and support.

Charles James Katua

ABSTRACT

Knowledge Management (KM) has been discussed as being a critical component in an organization's ability to sustain a long-term competitive advantage. This study analyses the existing knowledge management frameworks. This study uses existing KM models as a framework to assess the components necessary to develop and sustain an effective KM in organizations in organizations.

This study aims to develop a framework for applying knowledge management in organizations by determining the knowledge processes used at the organization, it also determines the techniques and tools that comprise of the KM processes for the organization. The study looks at some of the existing frameworks in details and outlines the problems of each of the discussed frameworks. This research identifies and combines the main issues addressed in the above frameworks in order to develop a framework for implementing KM in organizations. The framework developed as part of this research project combines aspects of these three frameworks which are- people and organizational culture, information and communications technology and knowledge management processes and builds on them. This study explores this impact based on an empirical survey of three Kenyan organizations. A factor analysis supports the importance of these three factors -- people and organizational culture, information and communications technology and knowledge management processes - as contributing significantly to KM. The primary aim of this research project is to develop a KM framework and methodology that will have the ability to apply KM in an organization and aid an organization in achieving its stated goals.

ABBREVIATIONS

KM- Knowledge Management t

KMS-Knowledge Management Systems

ICT-Information and Communication Technologies

IT- Information Technology

TP-Top Management

KP-Knowledge Process

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INTRODUCTION

Increasingly, organizations are becoming aware of the problem of ineffective utilization of the knowledge that they have or once had. In many organizations, knowledge sometimes is lost when an employee leaves the organization through resignations, death, retirements etc. Sometimes, existing knowledge is not utilized owing to communication breakdown or knowledge hoarding. Other times, the knowledge is lying is some report buried in the organization's archive. This lack of knowledge management exists in many organizations irrespective of industry or size.

In the present information and knowledge era, knowledge has become a key resource for gaining and sustaining competitive advantage. Applying knowledge resources effectively and efficiently is vital in order to gain a competitive advantage and to ensure the sustainable development for societies, as well as for the organizations (Nonaka, 1998; Davenport and Prusak, 1998; Storey and Barnett, 2000). Faced with competition and increasingly dynamic environments, organizations are beginning to realize that there is a vast and largely untapped asset diffused around in the organization – knowledge (Gupta, Iyer & Aronson, 2000). The role of knowledge in achieving competitive advantage becomes an important management issue in all sectors (Davenport T. and Prusak, L., 1998) As a result many organizations are exploring the emerging field of KM. KM is the process of gathering, managing and sharing employees' knowledge capital throughout the organization.

Organizational success comes from consistently creating, disseminating and creating new knowledge. By managing its knowledge assets, an organization can improve its competitiveness and adaptability and increase its chances of success. Organizations need to capture, distribute, apply and create knowledge in order to stay ahead of their competition.

The transition from an industrial era to an information and knowledge era is significant and the relevance of acquiring and managing knowledge is becoming increasingly critical. To remain competitive, organizations need to continuosly develop new knowledge by implementing KM initiatives.

1.1 Problem statement

Knowledge is held tacitly by individuals and becomes very much difficult to share it. Each individual has their own knowledge and expertise areas, however, they are very protective of such knowledge because there are no clear mechanisms on how to motivate and encourage people from this industry to share and reuse knowledge, as well as generate new knowledge that belongs to the organization.

It has been suggested that organizations often waste their resources and lose a significant amount of money by repeating the same mistakes, duplicating projects and being unaware of each others' knowledge due to the lack of knowledge transfer and sharing throughout the organization (Robertson, 2002).

Delong (2004) noted that in far too many companies, knowledge is in the danger of vanishing with the employees who acquired it and even though companies may not be able to reduce the deluge of downsizing, resignations and retirements, they still need to do something to "keep knowledge on board."

This study aims to develop a framework for applying knowledge management in organizations by determining the knowledge processes used at the organization, it also determines the techniques and tools that comprise of the KM processes for the organization. Finally a framework for applying knowledge management in organizations is also developed.

1.2 Project Objectives

1) To determine how organizations go about capturing, creating, disseminating and applying knowledge.
2) To determine the activities, tools and techniques that comprise of the knowledge management process for the organization.
3) To develop a framework for improving the application of knowledge management in organizations.

1.3 Significance of the study

This study should be able to provide the organizations with some indication on the working the organization as to whether it supports the application of KM. the framework developed will assist organizations in the implementation of KM at their respective organizations since it lays the foundation of what needs to be put in place for a KM program to be successful and enable the organization to reap the benefits of managing knowledge.

LITERATURE REVIEW

2.1 Overview of the chapter

The following is a summary of the literature reviewed which provides background and conceptual information on Knowledge Management (KM).

It is widely agreed that the success of knowledge management systems relies on technology combined with social interaction and organizational culture to encourage knowledge acquisition and capture, application, creation and transfer between individuals (Birkinshaw, 2001; Coles, 1999; Dawson, 2000; Manchester, 1999; Min & Yoon, 2002; O'Dell & Grayson, 1998; Robertson & Hammersley, 2000).

A practical approach towards KM requires that both the social and technical aspects of KM are fully addressed since KM deals with both social and technical aspects for any KM initiative to succeed. A number of KM models have been developed but these models are based on the western developed countries and cannot be applied in our Kenyan Context. An overview of the models is presented in the literature below.

2.2 Data, information and knowledge

According to Bellinger (2000):

- Data can be described as unstructured pieces of fact. They are facts with no context and are without a meaningful relationship to anything else.
- Information can be described as pieces of fact that have a structure. It relates to description, definition or perspective.
- Knowledge can be described as usable pieces of information in a defined context. It comprises strategy, practice, method or approach.

2.3 What is Knowledge?

The term "knowledge" is defined in the Oxford Dictionary and Thesaurus as: "awareness or familiarity gained by experience (of a person, fact, or thing)".

Knowledge as suggested by Thomas Davenport and Laurence Prusak. "Knowledge is a fluid mix of framed experience, values, contextual information, expert insight and grounded intuition that provides an environment and framework for evaluating and incorporating new experiences and

information. It originates and is applied in the minds of knowers. In organizations, it often becomes embedded not only in documents or repositories but also in organizational routines, processes, practices and norms".

Knowledge is an understanding one gains knowledge through experience, reasoning, intuition and learning. Individuals expand their knowledge when others share their knowledge, and one's knowledge is combined with the knowledge of others to create new knowledge.

2.4 What is Organizational Knowledge?

There are several media in which knowledge can reside within an organization, including documents, computers and the human mind. Organizational knowledge consists of both tacit knowledge and explicit knowledge. It is vital to note that organizational knowledge is dispersed and scattered throughout the organization. It is found in different locations. In people's minds, in organizational processes, in corporate culture; embedded into different artifacts and procedures and stored into different mediums such as print, disks and optical media. (Bhatt, 2001)

2.5 Knowledge management

A simple definition is that KM is a process that helps organizations identify, select, organize, disseminate, and transfer knowledge and expertise that are part of the organization's memory and that typically reside within the organization in an unstructured manner.

KM can also be defined as leveraging information and knowledge embedded in people, documents, processes and organizational practices to achieve better, faster and more innovative products and services.

Bhatt (2001) defines KM as "a process of knowledge creation, validation, presentation, distribution and application"

A more formal definition of KM is given by The American Productivity & Quality Centre as "the strategies and processes of identifying, capturing and leveraging knowledge"

2.6 Classification of knowledge

An organization's knowledge can be classified and categorized in a number of ways. This is important in the identification of knowledge sources for the capture and distribution of knowledge that will benefit the organization as a whole.

Human knowledge is both explicit and tacit, it is what individuals know (e.g. cognitively) or know how to do (e.g. procedurally). Social knowledge exists in relationships between individuals and groups, it is largely tacit, and is the result of working and learning together. Structured knowledge is embedded in the processes and infrastructure of a social system.

2.6.1 Tacit and explicit knowledge

Knowledge is divided into two types, tacit and explicit knowledge.

Turban and Aronson (2001) describe explicit knowledge as knowledge that has been codified (documented) in a form that can be distributed to others without requiring interpersonal interaction or has been transformed into a process or strategy. Examples are the policies, procedural guides, white papers, reports, designs, products, strategies, goals, missions and core competencies of the enterprise and the IT infrastructure. Explicit knowledge can be explained and is easily shared. It has the properties of being codified, structured and accessible to others.

Tacit knowledge is highly personal. It is hard to formalize and therefore difficult to communicate to others and is therefore difficult to codify and share with others such as the kind of informal, hard-to-pin-down skills captured by the term know-how (Nonaka and Takeuchi, 1995).

Tacit knowledge is the "cumulative store of the experiences, mental maps, insights, acumen, expertise, know-how, trade secrets, skills set, understanding and learning that an organization has", as well as the organizational culture that has embedded it in the past and present experiences of its people, processes and values (Turban and Aronson, 2001).

2.7 Knowledge Management Processes

The main important character of KM is KM Process. Delong (1997) classified the processes into capturing, transferring and using knowledge. Leonard-Barton (1995) on other hand, distinguished between acquisition, collaboration, integration and experiment. Grant (1996)

indicated the effectiveness KM process should be conducted frequently, consistently and flexibly. The KM processes include:

i. Knowledge Capturing and Acquisition
ii. Knowledge Sharing
iii. Knowledge Application
iv. Knowledge Creation

2.7.1 Knowledge Capturing and Acquisition

Knowledge capturing and acquisition refers to the mechanisms that an organization uses to import external knowledge into the organization. Knowledge acquisition deals with the processes of creating, generating, developing, building and constructing knowledge internally. These terms refer to the process of deriving new and useful insights and ideas. Organizations have an option to acquire knowledge from external sources such as by hiring or employing individuals with the required knowledge or by purchasing knowledge assets such as patents, research documents or other intelligence.

Organizations often suffer permanent loss of valuable experts through dismissals, redundancies, retirement and death (Probst, Raub & Romhardt 2000, p.226). The reason for this is that much knowledge is stored in the heads of the people and it is often lost if not captured elsewhere. To avoid knowledge loss organizations need to identify the expertise and the skills of their staff and capture it. Organizations need to develop ways of capturing its internal knowledge, devise systems to identify people's expertise and develop ways of sharing it.

2.7.2 Knowledge Sharing

Knowledge sharing refers to the activities that diffuse and share knowledge. It includes the exchange of tacit and explicit knowledge, among individuals, groups, and units at the same and different organizational levels.

Expertise exists in people, and much of this kind of knowledge is tacit rather than explicit, which makes it difficult to be shared. At its most basic, knowledge sharing is simply about transferring knowledge of employees to other employees within the organization. Knowledge sharing is based on the experiences gained internally and externally in the organization. Making this know-

how available to other organizational members will eliminate or reduce duplication of efforts and form the basis for problem solving and decision-making.

Probst, Raub & Romhardt (2000) have pointed out that it is vital that knowledge should be shared and distributed within an organization, so that isolated information or experience can be used by the whole company. Knowledge sharing also includes exchange of knowledge externally with other individuals, groups, and organizations. Knowledge transfer can occur explicitly, when an individual or a unit communicates with another individual or another unit, or implicitly, through norms and routines.

2.7.3 Knowledge Application

Knowledge application describes the methods and mechanisms that an organization adopts to use available knowledge to improve its processes, products and services, and organizational performance. Knowledge application also refers to any broadly available thought in the organization that can be generalized and applied, at least in part, to new situations (Tiwana, 2000). As stated by Bhatt, applying and sharing knowledge means making it "more active and relevant for the organization in creating values".

2.7.4 Knowledge Creation

Knowledge creation refers to internal activities an organization undertakes to encourage the development of new ideas that can help improve processes and products. Knowledge creation is typically the outcome of an interactive process that will involve a number of individuals who are brought together in a project team or some other collaborative arrangement.

Only where there is interaction and communication can be a comparison of each person's ideas and experiences with those of others. Knowledge creation is a particularly important process of knowledge management. It focuses on the development of new skills, new products, better ideas and more efficient processes (Probst, Raub & Romhardt, 2000). In addition, knowledge creation refers to the ability to originate novel and useful ideas and solutions (Bhatt, 2001).

Employees can become part of the knowledge creation process through participating in the trainings, seminars, conferences, advanced studies and research activities of the organization.

2.8 Models and frameworks used by previous research

2.8.1 The SECI Model

Nonaka's SECI model is the most widely discussed model in KM literature. Nonaka and Takeuchi present a case for knowledge management practices by detailing how Japanese companies apply their organizational knowledge for competitive advantage. Nonaka proposed four different modes of knowledge conversion from:

- Tacit knowledge to tacit knowledge;
- Explicit knowledge to explicit knowledge;
- Tacit knowledge to explicit knowledge; and
- Explicit knowledge to tacit knowledge.

Tacit knowledge to tacit knowledge (socialization): socialization which involves capturing tacit knowledge through physical proximity and disseminating it among colleagues .e.g. shared mental models and technical skills.

Tacit knowledge to explicit knowledge (Externalization): it is the translation of tacit knowledge in comprehensible forms that can be understood by others and also translation of highly professional knowledge to explicit knowledge. These conceptual knowledge usually happens through: symbolic representation of the tacit knowledge (through metaphors, analogies, models, concepts, hypotheses by using the figurative language), oral reports and films, part description of the tacit knowledge through spreadsheets, texts, images, rules, scripts, design history, lesson learned, etc.

Explicit knowledge to explicit knowledge (Combination): conversion processes of some type of explicit individual knowledge, generated for add up to organization explicit knowledge (e.g. individual's knowledge exchange and combination through documents, meetings, chats, etc.).

Explicit knowledge to tacit knowledge (Internalization): this is when explicit knowledge is embodied in action and practice and in this way it actualizes concepts or methods about strategy, tactics, innovation or improvement.

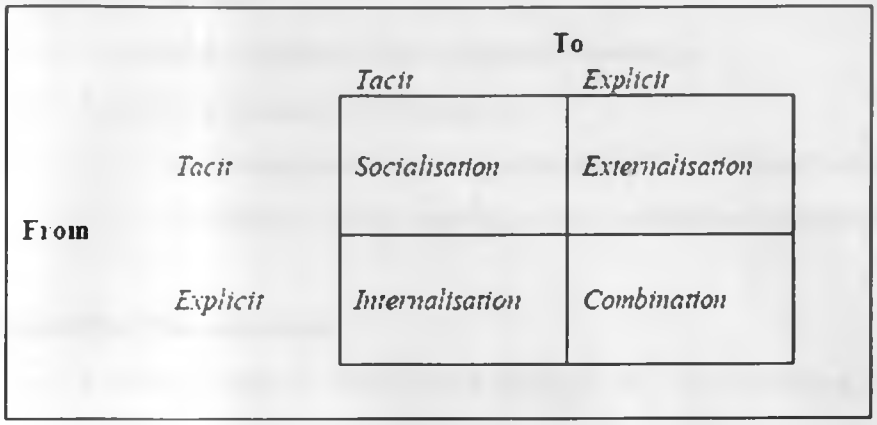


Figure 2.1 Nonaka & Takeuchi's Knowledge Management Model (1995)

Creating knowledge is a broad concept that could mean *inventing* in the sense of exploring and discovering new knowledge, or *forming* in the sense of configuring and shaping existing knowledge. Although Nonaka (1991) specifies *creating* 'new' knowledge in his definition, he actually implies both aspects of knowledge creation: the generation of new knowledge as well as making existing knowledge available to others.

The concept *knowledge dissemination* means spreading around or circulating knowledge. According to Nonaka (1991), *dissemination* is conducted through making knowledge available to others. This is achieved on the tacit as well as the explicit levels: *sharing* and *communicating* tacit knowledge through 'socialization', and *sharing* and *communicating* explicit knowledge through 'combination' (Nonaka, 1991; Nonaka & Takeuchi, 1995). The concept *embody knowledge* entails the personification of knowledge. According to Nonaka (1991) *embodying knowledge* happens when knowledge is *transformed* from explicit to implicit through the act of 'internalization'.

The following is a preliminary classification of categories and sub-categories according to Nonaka (1991), and Nonaka and Takeuchi (1995):

Knowledge Creation:

- Knowledge invention: discovering new knowledge
- Knowledge formation/configuration:
  - converting tacit knowledge into explicit knowledge (conversion/ externalization)
  - combining explicit knowledge into a new whole (combination)

Knowledge Dissemination:

- Knowledge transfer: discussing (dialogue) and communicating (socialization) knowledge (involves learning and articulating).
- Knowledge sharing: making knowledge available to others.

Knowledge Embodiment:

- Knowledge enrichment: understanding and transforming explicit knowledge into tacit knowledge (internalization).
- Knowledge testing: assessing existing knowledge.

Bottlenecks in the SECI Model

The SECI Model focuses mainly on the social interactions among organizational members more so on the capturing of tacit knowledge through three phases namely socialization, externalization and combination. Nonaka and Takeuchi focus their work on how organizations can create knowledge at the individual, group and organizational level. The SECI model is more of a human oriented style of knowledge management whereby emphasis is on acquiring and sharing tacit knowledge and interpersonal experience. The main criticism of this model is that it focuses on creating knowledge, which is only a portion of what constitutes KM. It also focuses on capturing tacit knowledge only. The framework does not place proper emphasis on human aspects in KM and the importance of IT. An approach where both implicit and explicit knowledge are captured, stored and managed is suggested in the proposed framework.

2.8.2 Karl Wiig (1997, 1999)

Wiig [1997] divided knowledge management processes into creation, capture, use, and transfer. Creation and capture is related to how it is created and captured in people's minds as well as in procedures, culture and even technology. Use is concerned with how it is used in making decisions and other knowledge-related work by individuals and businesses. Transfer means how we can exchange knowledge and learn from one another.

Wiig (1997) breaks down these processes to monitoring and facilitation; creation and maintenance; renewing, organizing, and transforming; and leveraging or using knowledge.

The concepts discussed by Karl Wiig appear to be more inline with Nonaka's categories. The following is a restructured classification of Nonaka's categories and sub-categories accordingly:

Knowledge Creation:

- Knowledge exploration: discovering and inventing new knowledge
- Knowledge exploitation:
  - Knowledge conversion: converting/transforming tacit knowledge into explicit knowledge.
  - Knowledge capturing: combining, and organizing explicit knowledge into a new whole.

Knowledge Dissemination:

- Knowledge transfer: discussing (dialogue) and communicating (socialization) knowledge (involves learning and articulating).
- Knowledge sharing: making knowledge available to others.
- Knowledge distribution: sending knowledge to points of action.

Knowledge Utilization:

- Knowledge embodiment: understanding and transforming explicit knowledge into tacit knowledge (internalization).
- Knowledge testing: assessing existing knowledge.

- Knowledge renewing and maintenance.

Bottlenecks in Karl Wiig's Framework

Wiig's KM framework rests on three pillars, which represent the major functions needed to manage knowledge. The three pillars of KM discussed by Wiig are: knowledge creation, knowledge dissemination and knowledge utilization. The model captures the KM processes that are practical in KM and at the same time fails to include other important factors that are useful for a KM initiative to succeed. There is lack of emphasis on the importance of people and their contribution towards the knowledge management. The framework puts emphasis on the KM processes and activities. Emphasis is on acquiring and sharing explicit knowledge thus making it a system oriented framework rather than a dynamic framework comprising of both explicit and tacit methods.

2.8.3 Thomas Davenport and Laurence Prusak (1998)

Despite the lack of an explicit definition for KM in Davenport & Prusak's book "Working Knowledge" (1998), they provide a more pragmatic approach to describing processes in a KMS. They categorize KM concepts into knowledge *generation*, *codification and coordination*, and *transfer*.

The concept of *knowledge generation* is used along the same meaning of knowledge *creation* to indicate both knowledge exploration and exploitation. They further explain that acquired knowledge is knowledge that is new to the organization, whether it is newly invented, purchased, or rented. Accordingly, another concept of knowledge exploration emerges in their chapter on knowledge generation: *knowledge acquisition*.

Another concept that emerges in Davenport & Prusak's (1998) book is *knowledge codification* and *coordination*. They explain that through *codification* and *coordination* knowledge is turned into an organized, explicit, portable, and easy to understand form. *Knowledge codification* is used along the same meaning of *knowledge conversion:* to "convert knowledge into accessible and applicable formats". However, Davenport & Prusak (1998) argue that some kinds of knowledge, such as tacit knowledge, are almost impossible to codify.

The concept of *knowledge transfer* means the relocation of knowledge. According to Davenport & Prusak (1998), the best way to transfer knowledge within organizations is through communication. They argue that knowledge is usually transferred between employees whether the organization manage the process or not. A better term used by Davenport & Prusak (1998) for knowledge transfer within the organization is *knowledge fusion.*

Davenport & Prusak (1998) categorize activities in a KMS into knowledge *generation*, *codification and coordination*, and *transfer*. These concepts are inline with the previously stated categories by Nonaka as shown below.

Knowledge Creation:

- Knowledge exploration:
  - Knowledge invention: discovering new knowledge
  - Knowledge acquisition: buying or renting new knowledge
- Knowledge exploitation:
  - Knowledge conversion: transform knowledge into accessible and applicable formats (i.e. tacit knowledge into explicit knowledge)
  - Knowledge capturing: combining, and organizing explicit knowledge into a new whole
  - Knowledge mapping: a map that points to knowledge but does not contain it.

Knowledge Dissemination

- Knowledge fusion: transferring knowledge through discussing (dialogue) and communicating (socialization) knowledge (involves learning and articulating).
- Knowledge sharing: making knowledge available to others
- Knowledge distribution: sending knowledge to points of action

Knowledge Utilization:

- Knowledge embodiment: understanding and transforming explicit knowledge into tacit knowledge (internalization)

- Knowledge testing: assessing existing knowledge
- Knowledge renewing and maintenance

Bottlenecks in Thomas Davenport and Laurence Prusak Framework (1998)

Davenport and Prusak trace the development of knowledge management and link it to business strategy, work processes, culture, and behavior. Thomas Davenport and Laurence Prusak framework is more concerned with how the knowledge is to be codified in a form that other employees can access. The framework uses the system-oriented style of KM which places more emphasis on codifying and reusing knowledge and fails to capture much of the implicit knowledge embedded in people's minds. The framework emphasizes on Knowledge cycle processes and fails to address the human aspects of training and rewards.

The table below depicts the diverse perspectives on knowledge management activities as applied in the frameworks discussed above. The frameworks have different variables with them though the underlying concepts are the same as discussed earlier. Four common phases spanning the knowledge management lifecycle can be identified: (1) Socialization / acquisition / creation / generation, (2) externalization / retention / codification and coordination / capture, (3) combination / share / transfer / disseminate / distribute and (4) internalization / application / utilization / use; or more succinctly, Creation, Retention, Transfer and Application.

Reference	**Knowledge Management Phases**			
Davenport & Prusak (1998)	Generation	Codification & Coordination	Transfer	
Nonaka & Takeuchi (1995)	Socialization	Externalization	Combination	Internalization
Wiig (1997)	Creation	Capture	Transfer	Use

Table 2.1: Knowledge Management Phases

Looking at each of the above discussed frameworks, each places an emphasis on different factors. The frameworks have successful implementation in industrial western economies and cannot be replicated in the Kenyan context. The above frameworks lack consensus and common

ground about the necessary elements that would be covered in a KM framework. ICT and human and organizational factors have been neglected in the above frameworks. Some frameworks mention this issue, while others emphasis one particular element and neglect the other. In this research we are to identify and combine the main issues addressed in the above frameworks in order to develop a framework for implementing KM in organizations. The framework developed as part of this research project combines aspects of these three frameworks and builds on them. The proposed framework differs from the above discussed frameworks in that it takes a people driven approach and a technology driven approach towards KM.

RESEARCH METHODOLOGY

3.1 Overview of the chapter

The study employed the descriptive research design utilizing a multiple case study approach. A descriptive research design was selected for the research as its main objective was to reveal the application of management practices within the organizations, thus establishing the learning model for applying knowledge management for the case study organizations. Potential participants for the study comprised of all employees from all departments within the company. The study used questionnaires collect data. The questionnaire included 33 questions on KM. To be able to gather the necessary data, the researcher utilized the descriptive method, using the quantitative approach. Herein, the chosen respondents were randomly selected from various departments within the organization. A questionnaire was used as the main research instrument for the data-gathering. Data analysis was performed in SPSS, version 11.5. Data collection was conducted between June 2009 and September 2009. A total of 310 questionnaires were distributed to various departments within the company, and 222 (71.6%) questionnaires were duly filled and returned. Total samples were derived from the sample size table developed by Krejcie & Morgan (1970) and Cohen (1969).

Most of the questions were of nominal and ordinal scale characteristics. Descriptive statistics, such as frequency and percentages were used in the analyzing stage. Other statistical methods such as factor analysis, correlation analysis, multiple regression analysis, t-tests were also applied.

The credibility of findings and conclusions extensively depend on the quality of the research design, data collection and data analysis. This chapter will be dedicated to the description of the methods and procedures done in order to obtain the data, how they will be analysed, interpreted, and how the conclusion will be met.

3.2 Research Model

A number of models for KM are found in the literature. Most of these frameworks contain processes that are cyclic in nature; that is, they convert tacit knowledge to explicit knowledge and through the creation of new knowledge create more tacit knowledge.

The review of KM frameworks clearly showed that they were predominantly similar in their main building blocks (acquire/create, codify/organize, share/distribute, and apply) that is they contain similar attributes, many of which are captured within the research model discussed here. Almost any of the KM strategy frameworks could serve as a reference preliminary theoretical base for KM studies.

However, the KM frameworks showed slight differences in some elements, where some aspects were emphasized at the expense of others, yet KM requires interplay between the people and organizational culture, technology and KM processes.

Based on the literature review from previous studies we construct a research model which addresses the shortcomings of the current models. The research model consists of five main interlinked components: Knowledge Application, Knowledge Creation, Knowledge Acquisition and Capture, Knowledge Sharing and Organizational Life (KM of People and KM of Organization).

The research model shows how the organization goes about to make knowledge available within the organization. In this study we have four factors that are influential in the KM cycle, they are: Knowledge Capture, Knowledge Sharing, Knowledge Application and Knowledge Creation.

At the center of the research model is the organizational life which includes both the KM of the people and KM of the organization which are of utmost importance for a knowledge management strategy to succeed. The aspect of organizational life relates to the way the organization as a whole tries to achieve KM by applying the knowledge that is within it.

Finally, the knowledge management processes of the organization cannot be neglected when implementing knowledge management. The knowledge management processes are outlined as follows knowledge acquisition and capture, knowledge sharing, knowledge application and knowledge creation. The research model is illustrated in Figure 3.1:

The table below presents the KM processes and a list of some possible mediums used for applying KM.

Table 2.1 Knowledge management processes

Knowledge Management Processes	Meanings	Mediums used
Knowledge Acquisition and Capture	Integration of external Knowledge.	Circulars and procedures, internet, training and on job duties, conferences and seminars, feedbacks and central database.
Knowledge Sharing	Diffuse knowledge among all employees to increase its value.	Chatting, apprenticeship, meetings or professional groups, advanced studies, internet, reflections and readings.
Knowledge Application	Make knowledge actionable Integrate knowledge into daily tasks & processes	Manage cultural changes Involve Mentoring, organizational collaboration, professional groups and apprenticeship. Use the experience of former projects as starting point for new projects.
Knowledge Creation	Generate new knowledge from previous ones	Master key of conversion of Knowledge, benchmarking, readings, organizational collaboration, advanced studies, brain storming, internet, trainings and seminars.
Organizational Life	Knowledge within the organization that is knowledge of the people and the organization.	KM strategy and organizational strategy/ business strategy, people and organizational culture.

Proposed Research Model

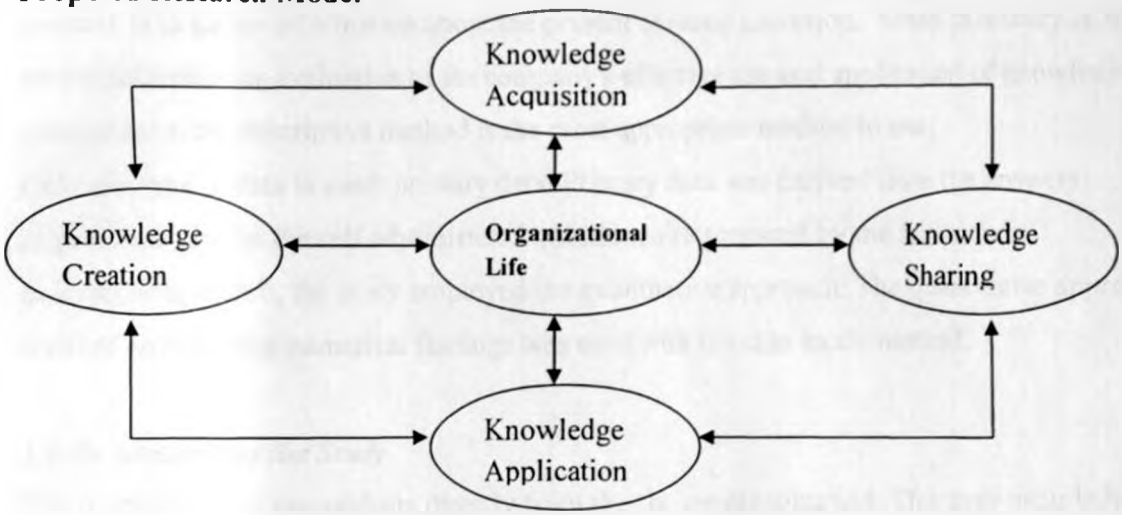


Figure 3.1: Adapted from Nonaka & Takeuchi, 1995; Davenport & Prusak, 1998; & Wiig, 1999.

3.3 Research Methods

This study utilized the descriptive method of research. As widely accepted, the descriptive method of research is a fact-finding study that involves adequate and accurate interpretation of findings. Descriptive research describes a certain present condition. Relatively, the method is appropriate to this study since it aims to explore the media, most feasible methods and related information, thus establishing the learning model for applying knowledge management for the case study organization. The technique that was used under descriptive method is the normative case study approach and evaluation, which is commonly used to explore opinions according to respondents that can represent a whole population. The case study is appropriate in this study because it enables the researcher in formulation of generalizations. The questionnaire case study respondents were given ample time to explore how knowledge is managed in their respective organizations. Their own experiences of how knowledge is managed within the company are necessary in identifying its strengths and limitations.

The purpose of employing the descriptive method is to describe the nature of a condition, as it takes place during the time of the study and to explore the cause or causes of a particular condition. The researcher opted to use this kind of research considering the desire to acquire first

hand data from the respondents so as to formulate rational and sound conclusions and recommendations for the study. According to Creswell (1994), the descriptive method of research is to gather information about the present existing condition. Since this study is focused on the perception or evaluation of the company's effective use and application of knowledge management, the descriptive method is the most appropriate method to use.

Only one type of data is used: primary data. Primary data was derived from the answers respondents gave in the self-administered questionnaire prepared by the researcher.

In terms of approach, the study employed the quantitative approach. The quantitative approach focused on obtaining numerical findings was used with the case study method.

3.4 Respondents of the Study

The study will have respondents directly from the chosen organisation. This may include head of departments, managers, accountants and other knowledgeable employees. All of these participants were selected through random sampling. This sampling method is conducted where each member of a population has an equal opportunity to become part of the sample. As all members of the population have an equal chance of becoming a research participant, this is said to be the most efficient sampling procedure. In order to conduct this sampling strategy, the researcher defined the population first, listed down all the members of the population, and then selected members to make the sample. For this purpose, a self-administered questionnaire in Likert format was given to the respondents to answer.

Herein, there were *310 participants* for the questionnaire. After collecting the questionnaires, the responses will be tallied, computed, analysed, and recorded.

3.5 Research Instrument

In gathering information pertaining to the above study, a questionnaire was used as the main research instrument for data collection. The reason for selecting questionnaires as a tool was because it can reach many respondents in relatively short time. The set of questionnaire consisted of several sections. Each question in each section required respondents to either tick one appropriate response.

To ensure full coverage of potential respondents, a current list of divisions and the numbers of manpower in the all divisions were obtained from the Human Resource Department. It was then used as a guide when distributing the questionnaires. This is to ensure that the correct numbers of respondents in the organization are covered in the study. A total of 310 questionnaires were distributed to various departments, and 222 (71.6%) questionnaires were duly filled and returned. The instrument used for data collection was adopted from Filius et al (2000) and comprised four sections representing the four KM dimensions: Knowledge Acquisition and Capture, Knowledge Sharing, Knowledge Application and Knowledge Creation. Responses were measured on a 5 point Likert-type scale, ranging from strongly agree (0) to strongly disagree (4). Data was analyzed using SPSS 11.5. The questionnaire was divided into two sections. The overall questionnaire was designed as follows:

The first part of the questionnaire was designed to focus on the demographic information of the respondents including current employer, department, work experience at the company, education level and total experience. The second part included questions about the respondents perception on the knowledge management practices and processes used in the company in generating, acquiring, applying and disseminating knowledge. The items in the second part were divided into 4 sections including knowledge acquisition, knowledge application, knowledge creation and knowledge sharing. Each section consisted of about 9 to 10 items.

3.6 Questionnaire Piloting

Pre-test interviews were conducted to assess and enhance the semantic content validity of the items by assessing the correspondence between candidate items and the definitions of the constructs they are intended to measure. The assessment resulted in re-organization of the test items into different domain constructs. Some test items were re-framed for clarity.

The resulting items were piloted on a representative sample in order to assess the reliability and factorial validity of the test items. 100 questionnaires were prepared and used to collect information from respondents who were picked at random in within the company. Responses from 80 respondents were received. Out of the 80 received, 11 were invalid due to incomplete filling. The total valid responses were 69, giving a response rate of 69%.

3.6.1 Reliability Test

Reliability test is an assessment of the degree of consistency between multiple measurements of a variable. The Cronbach alpha coefficient was used to estimate the internal consistency and reliability. A generally agreed lower limit of the Cronbach's alpha coefficient is 0.7, and the table below presents all the alpha coefficients that were above the required level of 0.7 as suggested by Hair et al.

R E L I A B I L I T Y A N A L Y S I S - S C A L E (A L P H A)

Item-total Statistics

	Scale Mean if Item Deleted	Scale Variance if Item Deleted	Corrected Item-Total Correlation	Alpha if Item Deleted
KAPROCDR	86.2029	271.2818	.5915	.9361
KANET	86.0870	266.6688	.5447	.9363
KATRAIN	86.1159	273.1040	.4260	.9374
KAGRPS	86.4928	267.1948	.5645	.9361
KASEMINR	86.3478	270.6714	.5231	.9365
KAFEEDBK	86.5797	273.0119	.3863	.9378
KADBASE	86.6232	271.1795	.4300	.9374
KSCHAT	86.6232	274.2089	.3753	.9378
KSAPPRNT	86.5797	275.8061	.3083	.9384
KSMENTR	86.7101	268.1206	.6088	.9357
KSMEETNS	86.3043	270.6854	.5119	.9366
KSMULTMD	86.7536	269.5119	.4657	.9371
KSINTNET	86.0290	274.0580	.4688	.9370
KSREFLCT	86.9855	260.8380	.6804	.9348
KSRPTS	87.0000	263.1471	.6409	.9352
KACOPTRN	86.4928	267.9595	.5378	.9364
KAMNGE	86.8116	260.9493	.6670	.9349
KATEAMS	86.6377	270.2639	.4517	.9372
KACREATV	86.4493	274.4275	.4639	.9371
KAPROMTE	86.3333	267.9020	.5567	.9362

KCRFLCTN	86.7391	264.9604	.6701	.9350
KCREADNS	86.4203	266.5413	.6040	.9357
KCCOLLBT	86.5507	267.6922	.5721	.9360
KCTRANSF	86.4928	267.5477	.5634	.9361
KCINCTVE	87.0000	256.3824	.6741	.9349
KCDISCNS	86.4348	269.0729	.6026	.9358
KCMEETNS	86.3623	268.2639	.5583	.9362
KCGROUPS	86.6957	267.3031	.6116	.9357
KCSELFST	86.6377	270.2639	.4347	.9375
KCSTUDY	86.6812	263.1616	.6581	.9351
KCTRAING	86.5942	266.3623	.6018	.9357
KCBRAINS	86.3333	268.4608	.5606	.9361
KCNET	86.3188	262.8968	.6133	.9356

Reliability Coefficients

N of Cases = 69.0 N of Items = 33

Alpha = .9381

Table 3.2: Cronbach's Alpha on Pilot Data

3.6.2 Factorial Validity

Validity refers to whether a given survey question actually taps into the true underlying concept it attempts to measure. In other words, how well does the measure correlate with some unknown underlying 'reality'? Factor analysis is one way for researchers to test the validity of certain constructs. By clustering related items together in scales or indices, for example, researchers can examine how well those related items 'hold together' in a statistical sense (this 'scale reliability' is most commonly measured using Cronbach's Alpha or measured using factor loadings derived from factor analyses).

From the results of the Cronbach's alpha performed, some items needed to be reviewed, that is items that had a correlation of less than 0.3, and this resulted in editing of the final questionnaire which is to be used for the final study.

Factor Analysis was done on the 45 factors that are believed to influence and promote knowledge management. These factors were selected after doing an extensive literature review.

Exploratory factor analysis was conducted and the initial results of tests of sampling adequacy showed the following results.

Table 3.3: KMO and Barlett's test

Kaiser-Meyer-Olkin Measure of Sampling Adequacy.		.170
Bartlett's Test of Sphericity	Approx. Chi-Square	3365.941
	df	99
	Sig.	.000

A KMO score of 0.6 is an acceptable score and therefore factors with low KMO statistic values were dropped till the overall KMO rose to near about 0.6. Factors with correlations that were less than 0.3 were dropped. Twelve factors were dropped and factor analysis was done on the remaining 33 factors.

Table 3.3: KMO and Barlett's test

Kaiser-Meyer-Olkin Measure of Sampling Adequacy.		.711
Bartlett's Test of Sphericity	Approx. Chi-Square	2022.313
	df	528
	Sig.	.000

Further dropping of factors with correlations less than 0.3 improved the overall KMO statistic significantly. Thus these 33 factors were considered for the analysis using the software SPSS. The method of Principal Component Analysis was used and the following results were obtained.

Table 3.5: Communalities Table on Pilot Data

	Initial	Extraction
knowledge acquisition through circulars and procedures	1.000	.633
knowledge acquisition through internet	1.000	.854
knowledge acquisition through trainings	1.000	.831
knowledge acquisition through professional groups	1.000	.806
knowledge acquisition through conferences and seminars	1.000	.798
knowledge acquisition through feedbacks	1.000	.753
knowledge acquisition through central database	1.000	.628
knowledge sharing through chatting with other staff	1.000	.711

knowledge sharing through learning with other staff within department	1.000	.813
share knowledge and experience through mentoring	1.000	.843
share knowledge and experience with staff through groups	1.000	.696
share knowledge through multimedia presentations	1.000	.763
share knowledge using the internet	1.000	.796
share knowledge and experience with others through journals, diaries etc	1.000	.777
share knowledge and experience with other staff though special topic reports	1.000	.807
apply knowledge to foster organizational cooperation	1.000	.813
apply knowledge to manage professional groups	1.000	.862
apply knowledge through combining specialisms in teams	1.000	.734
apply knowledge in a creative manner for new application	1.000	.639
employees promote new knowledge internally	1.000	.747
create knowledge by reflecting on failures	1.000	.736
create knowledge through reflecting on readings and reports	1.000	.786
create knowledge through organizational cooperation and collaboration	1.000	.848
create and innovate new knowledge through technical transfer	1.000	.705
create knowledge by providing proper incentives	1.000	.806
create knowledge by conducting discussions	1.000	.828
create knowledge by conducting meetings	1.000	.703
create knowledge through learning groups	1.000	.795
create knowledge from self study	1.000	.846
create new knowledge though advanced studies	1.000	.854
create new knowledge from trainings	1.000	.764
create new ideas though brain storming	1.000	.737
create knowledge from information obtained from the internet	1.000	.834

Extraction Method: Principal Component Analysis.

Table 3.4: Total Variance Explained on pilot data

Component	Initial Eigenvalues			Extraction Sums of Squared Loadings		
	Total	% of Variance	Cumulative %	Total	% of Variance	Cumulative %
1	11.331	34.338	34.338	11.331	34.338	34.338
2	3.698	11.206	45.544	3.698	11.206	45.544
3	2.568	7.782	53.326	2.568	7.782	53.326
4	2.138	6.480	59.806	2.138	6.480	59.806
5	1.918	5.812	65.617	1.918	5.812	65.617
6	1.531	4.639	70.256	1.531	4.639	70.256
7	1.233	3.737	73.993	1.233	3.737	73.993
8	1.130	3.423	77.416	1.130	3.423	77.416
9	.948	2.871	80.288			
10	.858	2.601	82.889			
11	.753	2.282	85.171			
12	.673	2.040	87.211			
13	.603	1.827	89.038			
14	.475	1.438	90.476			
15	.426	1.292	91.768			
16	.384	1.162	92.930			
17	.322	.977	93.907			
18	.295	.893	94.801			
19	.243	.736	95.537			
20	.233	.707	96.244			
21	.211	.639	96.883			
22	.180	.546	97.429			
23	.157	.475	97.904			
24	.142	.431	98.334			
25	.120	.363	98.697			
26	.107	.326	99.023			
27	.086	.261	99.284			
28	.066	.200	99.484			
29	.049	.149	99.633			
30	.039	.118	99.751			
31	.032	.096	99.847			
32	.028	.086	99.933			
33	.022	.067	100.000			

Extraction Method: Principal Component Analysis.

DATA ANALYSIS

4.1 Overview of the chapter

This chapter discusses the result of the questionnaire responded by the participants. In gathering information pertaining to the above study, a questionnaire was used as the main instrument for data collection. Data collection was carried out between June 2009 and September 2009 where printed questionnaires were distributed to the respondents randomly at the case study organizations.

We used the statistical package for social sciences (SPSS) version 11.5 to generate basic descriptive and inferential statistics. Cronbach's alpha coefficient was used to assess the reliability of the internal consistency of scales. Table 4.1 shows that all knowledge management practice dimensions of the study are reliable showing an alpha coefficient higher than 0.70 as recommended by Hair (1998).

4.2 Reliability Analysis

Reliability tests were carried out before doing further analysis. Table 4.1 portrays values of Cronbach's Alpha for the knowledge management practices of the respondents. The results suggest that the instrument used in the study was highly reliable as the reliability statistics of the KM components category fell well above 0.7 (Hair et al 1998).

R E L I A B I L I T Y A N A L Y S I S - S C A L E (A L P H A)

Item-total Statistics

	Scale Mean if Item Deleted	Scale Variance if Item Deleted	Corrected Item-Total Correlation	Alpha if Item Deleted
KAPROCDR	88.6171	228.7803	.3834	.9281
KANET	88.5631	225.0616	.3805	.9285
KATRAIN	88.4820	228.5766	.3375	.9286
KAGRPS	88.9910	222.2986	.5492	.9264
KASEMINR	88.7387	225.7323	.4606	.9274
KAFEEDBK	88.9865	222.7283	.4820	.9272
KADBASE	89.1171	222.6469	.4520	.9276
KSCHAT	89.0000	225.2670	.4158	.9279
KSAPPRNT	89.0225	225.1533	.3889	.9283
KSMENTR	89.1306	220.4851	.5980	.9258
KSMEETNS	88.7072	222.7148	.5379	.9265
KSMULTMD	89.2252	218.8540	.5556	.9263
KSINTNET	88.6532	227.5398	.3363	.9287
KSREFLCT	89.2297	217.7886	.6325	.9253
KSRPTS	89.3288	218.9095	.6497	.9252

KACOPTRN	88.8604	222.0845	.5590	.9263
KAMNGE	89.1667	218.0400	.6418	.9252
KATEAMS	88.9459	221.2550	.5782	.9261
KACREATV	88.9099	227.9466	.3814	.9281
KAPROMTE	88.8649	221.3391	.5765	.9261
KCRFLCTN	89.0856	221.3094	.5762	.9261
KCREADNS	88.9595	224.5640	.4174	.9279
KCCOLLBT	88.9730	220.5966	.5911	.9259
KCTRANSF	88.9234	219.0484	.6454	.9252
KCINCTVE	89.2432	213.5062	.6750	.9246
KCDISCNS	88.8919	222.1512	.5816	.9261
KCMEETNS	88.7387	225.1170	.4480	.9275
KCGROUPS	89.1396	218.3379	.6431	.9252
KCSELFST	88.8739	226.7623	.3764	.9283
KCSTUDY	88.9775	219.5515	.6374	.9254
KCTRAING	88.7973	223.9361	.4777	.9272
KCBRAINS	88.7928	225.2872	.4290	.9277
KCNET	88.6937	223.0913	.4674	.9274

Reliability Coefficients
N of Cases = 222.0 N of Items = 33
Alpha = .9289

Table 4.1 Cronbach's Alpha on Field Data

4.3 Factor Analysis

Factor Analysis was done on the 33 factors that are believed to influence and promote knowledge management. These factors were selected after doing an extensive literature review. Exploratory factor analysis was conducted and the initial results of tests of sampling adequacy showed the following results. The 33 factors that promote KM were subjected to principal components analysis (PCA) using SPSS. An inspection of the correlation matrix revealed the presence of many coefficients of 0.3 and above. The Kaiser Meyer-Oklin (KMO) value was 0.796, which is great and a significant value of 0.000.

The Factor Analysis using Principal Component Analysis (PCA) method with varimax rotation through Kaiser Variation was used to generate factors. Factor analysis for the instrument explaining the percentage variance and Eigen values is given in Table 4.4. The required number of factors has been forced and only factor loadings above 0.6 were considered. The percentage variance extracted by the given number of factors is 93.30%. Thus, with a reasonable degree of confidence, it could be concluded that the instruments used have measured what they were expected to measure.

Table 4.2: KMO and Bartlett's Test

Kaiser-Meyer-Olkin Measure of Sampling Adequacy.		.796
Bartlett's Test of Sphericity	Approx. Chi-Square	4537.521
	df	528
	Sig.	.000

Table 4.3: Communalities Table

	Initial	Extraction
knowledge acquisition through circulars and procedures	1.000	.525
knowledge acquisition through internet	1.000	.776
knowledge acquisition through trainings	1.000	.765
knowledge acquisition through professional groups	1.000	.713
knowledge acquisition through conferences and seminars	1.000	.825
knowledge acquisition through feedbacks	1.000	.735
knowledge acquisition through central database	1.000	.827
knowledge sharing through chatting with other staff	1.000	.736
knowledge sharing through learning with other staff within department	1.000	.762
share knowledge and experience through mentoring	1.000	.806
share knowledge and experience with staff through groups	1.000	.669
share knowledge through multimedia presentations	1.000	.809
share knowledge using the internet	1.000	.824
share knowledge and experience with others through journals, diaries etc	1.000	.737
share knowledge and experience with other staff though special topic reports	1.000	.795
apply knowledge to foster organizational cooperation	1.000	.727
apply knowledge to manage professional groups	1.000	.797
apply knowledge through combining specialisms in teams	1.000	.717
apply knowledge in a creative manner for new application	1.000	.752
employees promote new knowledge internally	1.000	.609
create knowledge by reflecting on failures	1.000	.674
create knowledge through reflecting on readings and reports	1.000	.663
create knowledge through organizational cooperation and collaboration	1.000	.757
create and innovate new knowledge through technical transfer	1.000	.645
create knowledge by providing proper incentives	1.000	.792

create knowledge by conducting discussions	1.000	.751
create knowledge by conducting meetings	1.000	.801
create knowledge through learning groups	1.000	.688
create knowledge from self study	1.000	.808
create new knowledge though advanced studies	1.000	.828
Create new knowledge from trainings	1.000	.670
create new ideas though brain storming	1.000	.793
create knowledge from information obtained from the internet	1.000	.767

Extraction Method: Principal Component Analysis.

Table 4.4: Total Variance Explained

	Initial Eigenvalues			Extraction Sums of Squared Loadings		
Component	Total	% of Variance	Cumulative %	Total	% of Variance	Cumulative %
1	10.328	31.297	31.297	10.328	31.297	31.297
2	2.426	7.353	38.650	2.426	7.353	38.650
3	2.190	6.637	45.287	2.190	6.637	45.287
4	1.934	5.860	51.147	1.934	5.860	51.147
5	1.602	4.854	56.001	1.602	4.854	56.001
6	1.473	4.463	60.464	1.473	4.463	60.464
7	1.279	3.875	64.340	1.279	3.875	64.340
8	1.177	3.567	67.907	1.177	3.567	67.907
9	1.071	3.245	71.151	1.071	3.245	71.151
10	1.062	3.218	74.370	1.062	3.218	74.370
11	.854	2.587	76.957			
12	.793	2.404	79.361			
13	.667	2.023	81.384			
14	.631	1.911	83.295			
15	.563	1.706	85.000			
16	.526	1.593	86.593			
17	.518	1.570	88.164			
18	.467	1.414	89.578			
19	.452	1.371	90.949			
20	.401	1.217	92.165			
21	.377	1.143	93.309			
22	.308	.935	94.243			
23	.267	.808	95.051			
24	.253	.767	95.818			

25	.235	.713	96.531			
26	.194	.589	97.120			
27	.178	.539	97.659			
28	.172	.521	98.180			
29	.147	.447	98.626			
30	.135	.410	99.037			
31	.129	.390	99.426			
32	.117	.354	99.780			
33	.073	.220	100.000			

Table 4.5: Final Factors

	Component									
	1	2	3	4	5	6	7	8	9	10
knowledge acquisition through circulars and procedures										
knowledge acquisition through internet										
knowledge acquisition through trainings										
knowledge acquisition through professional groups										
knowledge acquisition through conferences and seminars										
knowledge acquisition through feedbacks										
knowledge acquisition through central database										
knowledge sharing through chatting with other staff										
knowledge sharing through learning with other staff within depertment										
share knowledge and experience through mentoring	.639									

share knowledge and experience with staff through groups										
share knowledge through multimedia presentations										
share knowledge using the internet										
share knowledge and experience with others through journals, diaries etc	.670									
share knowledge and experience with other staff though special topic reports	.687									
apply knowledge to foster organizational cooperation	.606									
apply knowledge to manage professional groups	.685									
apply knowledge through combining specialisms in teams	.624									
apply knowledge in a creative manner for new application										
employees promote new knowledge internally	.625									
create knowledge by reflecting on failures	.612									
create knowledge through reflecting on readings and reports										
create knowledge through organizational cooperation and collaboration	.641									

create and innovate new knowledge through technical transfer	.693									
create knowledge by providing proper incentives	.717									
create knowledge by conducting discussions	.618									
create knowledge by conducting meetings										
create knowledge through learning groups	.691									
create knowledge from self study		.606								
create new knowledge though advanced studies	.673									
createnew knowledge from trainings										
create new ideas though brain storming										
create knowledge from information obtained from the internet										

4.4 Descriptive Analysis

Descriptive analysis is the transformation of raw data into a form that will make them easy to understand and interpret. The analysis usually includes a statistical summary that succinctly characterize the observations and variables. In this study the analysis was used to describe the demographic profile of the respondents in terms of distributions and percentages. Also, it was used to determine the respondent's KM practices.

4.4.1 Demographic profile of the respondents

The first section of the questionnaire is dedicated to obtain the demographics profile of the respondents and the departments that they are attached to as shown in table 4.5. This section also

includes the number of years of employment, the education level and the number of years worked at the company.

Table 4.6: Shows number of respondents from various departments

Department

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	agriculture	61	27.5	27.5	27.5
	audit	14	6.3	6.3	33.8
	factory	32	14.4	14.4	48.2
	finance	27	12.2	12.2	60.4
	hr	38	17.1	17.1	77.5
	ict	24	10.8	10.8	88.3
	s and m	26	11.7	11.7	100.0
	Total	222	100.0	100.0	

Table 4.5: Education Level

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Masters Degree	12	5.4	5.4	5.4
	First degree/equivalent	87	39.2	39.2	44.6
	diploma	88	39.6	39.6	84.2
	others	35	15.8	15.8	100.0

Work Experience

Table 4.7 below, categories the respondents into number of years worked and 58.6% of the respondents have more than 10 years of working experience followed by 16.2% of those who have been working for 5 – 10 years and 11.3% have a working experience of 1– 3 years. The items in this section are very crucial because experienced workers are usually considered to be very knowledgeable and this will certainly have impact on how they work and solve work problems etc.

Table 4.6: Work experience

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	less than 1 year	11	5.0	5.0	5.0
	1 - 3 years	25	11.3	11.3	16.2
	3 - 5 years	20	9.0	9.0	25.2
	5 - 10 years	36	16.2	16.2	41.4
	more than 10 years	130	58.6	58.6	100.0

Years of Service at Current Employer

Table 4.8 below, categories the respondents into number of years of services and 53.6% of the respondents have more than 10 years of working experience at the company, followed by 16.2% of those who have been working for 1 – 3 years and 14% have a working experience of 5– 10 years. The items in this section are very crucial because experienced workers are usually considered to be very knowledgeable and this will certainly have impact on how they work and solve work problems etc.

Table 4.7: Shows the number of respondent's categories into years of service.

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	less than 1 year	12	5.4	5.4	5.4
	1 - 3 years	36	16.2	16.2	21.6
	3 - 5 years	24	10.8	10.8	32.4
	5 - 10 years	31	14.0	14.0	46.4
	more than 10 years	119	53.6	53.6	100.0

4.4.2 Knowledge Management Practices

Four components were grouped as knowledge management practices, namely; knowledge acquisition, knowledge sharing, knowledge application and knowledge creation. The score of responses from respondents were calculated based on relevant items in the questionnaire. The items were measured in a 5-point Likert scale, ranging from 0= Strongly Disagree, 1 = Disagree, 2 = Neutral, 3 = Agree, and 4 = Strongly Agree. To explore KM practice, descriptive statistics were calculated for the four dimensions of KM. the results, which include the means and standard deviations for each of the questions are presented in the tables below.

4.4.2.1 Knowledge Acquisition

Knowledge Acquisition appears to be the most practiced KM process in the company (having a mean = 2.92) as can be seen from Table 4.9, the employees of the organization think that the most important dimension of knowledge management is "Knowledge Acquisition and Capture" Only three items in this dimension had averages above 3 which is the mid-point of the scale. The most important item of this dimension is found as "knowledge acquisition through trainings" (having an average of 3.23). This average makes it the most important item of KM as well.

82% of the respondents strongly agreed or agreed that they used the internet to acquire and capture knowledge (mean= 3.14). 90.1% of the respondents strongly agreed or agreed that they used circulars and procedures to acquire and capture knowledge(mean = 3.09) giving an impression that most of their knowledge is codified or documented on paper and stored in cabinets as can be seen in table 4.8.

66.3% of the respondents acquired knowledge from professional groups (having a mean of 2.72). 81.5% of the respondents strongly agreed or agreed that they acquired and captured knowledge through conferences and seminars (mean = 2.97). 64.9% of the respondents strongly agreed or agreed that they acquired and captured knowledge through feedbacks from colleagues and superiors (mean = 2.72).

Finally, more than 50% of the respondents agreed that the company had no central database for knowledge capturing and acquisition (mean = 2.59), thus no organizational knowledge and personal knowledge has been captured electronically.

Table 4.8 Knowledge Capture and Acquisition

Contents (Average= 2.92)	Mean	Std. Deviation
knowledge acquisition through central database	2.59	.941
knowledge acquisition through professional groups	2.72	.810
knowledge acquisition through feedbacks	2.72	.884
knowledge acquisition through conferences and seminars	2.97	.721
knowledge acquisition through circulars and procedures	3.09	.610
knowledge acquisition through internet	3.14	.906
knowledge acquisition through trainings	3.23	.701

From the above findings one can perceive that both tangible as well as intangible assets are given equal importance, with a slight lean towards the intangible ones.

4.4.2.1.1 Descriptive Statistics for Knowledge Acquisition

Several interesting results have emerged out of the analysis of data through the use of frequencies, such as the following:

Knowledge acquisition through circulars and procedures

The majority of respondents (68.9 %) supported that their organization acquired knowledge through the use of circulars and procedures aim of their organizations KM Strategy is to make knowledge accessible in the organizations. In the following table and bar chart we can see the frequencies related to how knowledge is acquired through procedures and circulars in their organization.

Table 4.9: Knowledge acquisition through circulars and procedures

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	D	5	2.3	2.3	2.3
	N	17	7.7	7.7	9.9
	A	153	68.9	68.9	78.8
	SA	47	21.2	21.2	100.0

Knowledge acquisition through internet

Majority of the respondents (72%) either agreed or strongly agreed that the internet was the most used knowledge acquisition tool at their organization. The following table presents their percentages of acquisition through the internet

Table 4.10: Knowledge acquisition through internet

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	SD	7	3.2	3.2	3.2
	D	1	.5	.5	3.6
	N	32	14.4	14.4	18.0
	A	95	42.8	42.8	60.8
	SA	87	39.2	39.2	100.0

Knowledge acquisition through trainings

Majority of the respondents (88.7 %) acquired new knowledge through trainings as can be noted from the frequency table below.

Table 4.11: Knowledge acquisition through trainings

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	D	5	2.3	2.3	2.3
	N	20	9.0	9.0	11.3
	A	117	52.7	52.7	64.0
	SA	80	36.0	36.0	100.0

Knowledge acquisition through professional groups

More than 50% of the respondents agreed that they acquire knowledge through professional discussion where, they conduct forums and discuss the performance of individuals, departments and the organization as a whole.

Table 4.12: Knowledge acquisition through professional groups

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	SD	4	1.8	1.8	1.8
	D	9	4.1	4.1	5.9
	N	62	27.9	27.9	33.8
	A	118	53.2	53.2	86.9
	SA	29	13.1	13.1	100.0

Knowledge acquisition through conferences and seminars

Conferences and seminars are also widely used at the organization as a medium for acquiring knowledge. 80.5% of the respondents agreed that seminars and conferences are used within their organization to acquire knowledge. The table below depicts their percentages.

Table 4.13: Knowledge acquisition through conferences and seminars

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	D	10	4.5	4.5	4.5
	N	31	14.0	14.0	18.5
	A	137	61.7	61.7	80.2
	SA	44	19.8	19.8	100.0

Knowledge acquisition through feedbacks

Majority of the respondents acquire knowledge from feedbacks from their colleagues in areas that they are not familiar in. This can be seen in the table below which shows that 54.9 % of the respondents agree or strongly agree that they use feedbacks in acquiring new knowledge.

Table 4.14 Knowledge acquisition through feedbacks

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	SD	2	.9	.9	.9
	D	19	8.6	8.6	9.5
	N	57	25.7	25.7	35.1
	A	105	47.3	47.3	82.4
	SA	39	17.6	17.6	100.0

Knowledge acquisition through central database

Most respondents (45.9 %) noted that the company did not have an idea whether a central database repository existed where organizational knowledge is stored giving an implication that both tacit knowledge and explicit knowledge within the organization are not codified in a manner that another employ can access.

Table 4.15: Knowledge acquisition through central database

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	SD	4	1.8	1.8	1.8
	D	12	5.4	5.4	7.2
	N	102	45.9	45.9	53.2
	A	57	25.7	25.7	78.8
	SA	47	21.2	21.2	100.0

4.4.2.2 Knowledge Sharing

Knowledge Sharing is the least important dimension of KM (having a mean of 2.67). The internet (mean = 3.05) and staff groups (mean = 3.00) seemed to be the mechanisms/techniques used most often to transfer and share knowledge internally (Table 4). 78.8% of the respondents strongly agreed or agreed that they share knowledge using the internet while 79.3% of the respondents strongly agreed or agreed that they share knowledge through groups.

67.2% of the respondents strongly agreed or agreed that they share knowledge through chatting with other staff (mean= 2.71). 67.2% of the respondents strongly agreed or agreed that they share knowledge through learning with other staff within departments (mean = 2.68).

59.5% of the respondents strongly agreed or agreed that they share knowledge through mentoring (mean = 2.58). 47.8% % of the respondents strongly agreed or agreed that they share knowledge multimedia presentations (mean = 2.48) 50% of the respondents strongly agreed or agreed that they share knowledge through journals, diaries (mean = 2.48).

Knowledge sharing being the least important KM dimension applied at the company had the item with the least score of all the 33 items. This item "share knowledge and experience with other staff though special topic reports (having a mean of 2.38)" More than 50% of the respondents agreed that knowledge was not shared through special topic reports (mean = 2.38) giving an

indication that there are no informal communication channels, to transfer and share knowledge where knowledge is documented or codified for other employees to use.

Table 4.16: Knowledge Sharing

Contents (Average= 2.67)	Mean	Std. Deviation
share knowledge and experience with other staff though special topic reports	2.38	.862
share knowledge and experience with others through journals, diaries etc	2.48	.940
share knowledge through multimedia presentations	2.48	.996
share knowledge and experience through mentoring	2.58	.846
knowledge sharing through learning with other staff within department	2.68	.882
knowledge sharing through chatting with other staff	2.71	.824
share knowledge and experience with staff through groups	3.00	.802
share knowledge using the internet	3.05	.794

From the above findings, one can observe that everybody seems to agree and believe in sharing and application of knowledge. In conclusion it can be said that emphasis is being given on the internal intangible resources of the company. The ambience within the organization is that of willingness to share one's own experience and learn from other's experience but there are no clear methods on own experiences of all the employees can be shared whereby the experiences could be codified electronically to make it accessible by all employees from anywhere within the company.

4.4.2.2.1 Descriptive Statistics for Knowledge Sharing

Knowledge sharing through chatting with other staff

Most of the respondents agreed that they share knowledge with their colleagues through chatting with each other (face to face interactions). The table below shows their percentages in terms of how the groups agreed to or disagreed to the statement that "Our organization shares knowledge through chatting with other staff".

Table 4.17: Knowledge sharing through chatting with other staff

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	SD	2	.9	.9	.9
	D	17	7.7	7.7	8.6
	N	54	24.3	24.3	32.9
	A	120	54.1	54.1	86.9
	SA	29	13.1	13.1	100.0

Knowledge sharing through learning with other staff within department

Most of the respondents (53.2 %) agreed to the statement "Our organization shares knowledge through learning with other staff within the department". The table below shows their percentages.

Table 4.18 : Knowledge sharing through learning with other staff within department

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	SD	3	1.4	1.4	1.4
	D	22	9.9	9.9	11.3
	N	48	21.6	21.6	32.9
	A	118	53.2	53.2	86.0
	SA	31	14.0	14.0	100.0

Share knowledge and experience through mentoring

Majority of the Respondents (59.5 %) agreed that there are mentoring places within the company which assist them to share knowledge and learn from each other.

Table 4.19 : Knowledge sharing through mentoring

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	SD	6	2.7	2.7	2.7
	D	13	5.9	5.9	8.6
	N	71	32.0	32.0	40.5
	A	111	50.0	50.0	90.5
	SA	21	9.5	9.5	100.0

Share knowledge and experience with staff through groups

Majority of the respondents (79.3%) agreed or strongly agreed that their organization used groups to share knowledge from each other. The table below shows their frequencies and percentages.

Table 4.20 : Knowledge sharing through groups

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	SD	1	.5	.5	.5
	D	10	4.5	4.5	5.0
	N	35	15.8	15.8	20.7
	A	118	53.2	53.2	73.9
	SA	58	26.1	26.1	100.0

Share knowledge through multimedia presentations

No multimedia presentations were used to share and learn new knowledge from each other. 37 % of the respondents were not aware that such a program was in existence at the company to assist them in sharing knowledge. The table below shows their frequency distributions.

Table 4.21 : Knowledge sharing through multimedia presentations

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	SD	5	2.3	2.3	2.3
	D	28	12.6	12.6	14.9
	N	83	37.4	37.4	52.3
	A	67	30.2	30.2	82.4
	SA	39	17.6	17.6	100.0

Share knowledge using the internet

The internet was the most used medium for knowledge sharing accounting for 78.8 %

Table 4.22 : Knowledge sharing through the internet

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	SD	1	.5	.5	5
	D	6	2.7	2.7	3.2
	N	40	18.0	18.0	21.2
	A	108	48.6	48.6	69.8
	SA	67	30.2	30.2	100.0

Share knowledge and experience with others through journals, diaries etc

Knowledge sharing through journals and diaries was not used as a medium for knowledge sharing at the organization. These can be depicted from the results in the table and bar chart below.

Table 4.23 : Knowledge sharing through journals, diaries etc

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	SD	5	2.3	2.3	2.3
	D	25	11.3	11.3	13.5
	N	81	36.5	36.5	50.0
	A	81	36.5	36.5	86.5
	SA	30	13.5	13.5	100.0

Share knowledge and experience with other staff though special topic reports

Respondents mildly agreed to the statement "our company shares knowledge and experience with other staff through special topic reports". This can be seen from the results in the table that follows. This is a clear indication that no documentation of work processes and practices is done at the organization.

Table 4.24 : Knowledge sharing through special topic reports

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	SD	8	3.6	3.6	3.6
	D	20	9.0	9.0	12 6
	N	86	38.7	38.7	51.4
	A	96	43.2	43.2	94 6
	SA	12	5.4	5.4	100.0

4.4.2.3 Knowledge Application

KAP appears to be the second most practiced KM process in the company (mean = 2.758). 79.8% of the respondents applied knowledge to foster organizational cooperation (having a mean of 2.85)As shown in Table 4.11, employees promotion of new knowledge within the company is perceived by many of the respondents to be the second most practiced mechanism for knowledge

application (mean = 2.84). Because of the highly perceived recognition for new ideas, individuals are eager to share their ideas and see them implemented.

In addition, approximately 73.9% of the respondents agreed that their company used existing knowledge and skills creatively to generate new ideas (mean = 2.80). That is they applied knowledge in a creative manner for new application.

77.5% of the respondents applied knowledge through combining specialisms in teams (mean= 2.76).

Finally, successful use of professional seemed to be the least-practiced method for applying knowledge. Only 53.6% of the respondents agreed that professional groups (mean = 2.54) had been successful in applying diverse knowledge.

Table 4.25 : Knowledge Application

Contents (Average= 2.758)	Mean	Std. Deviation
apply knowledge to manage professional groups	2.54	.915
apply knowledge through combining specialisms in teams	2.76	.830
apply knowledge in a creative manner for new application	2.80	.679
employees promote new knowledge internally	2.84	.828
apply knowledge to foster organizational cooperation	2.85	.809

From the findings above knowledge application seems to be applied at an organizational level, employees apply there experiences to solve problems, they also use their past experiences in dealing with new situations.

4.4.2.3.1 Descriptive Statistics for Knowledge Application

Apply knowledge to foster organizational cooperation

Most respondents (64.9 %) agreed that they applied knowledge to foster organizational cooperation; this can be seen in the table below.

Table 4.26 : Application of knowledge to foster organizational cooperation

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	SD	3	1.4	1.4	1.4
	D	16	7.2	7.2	8.6
	N	26	11.7	11.7	20.3
	A	144	64.9	64.9	85.1
	SA	33	14.9	14.9	100.0

Apply knowledge to manage professional groups

The most of the respondents (40.5 %) supported that they applied knowledge in their organizations to manage professional groups.

Table 4.27 : Application of knowledge to manage professional groups

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	SD	8	3.6	3.6	3.6
	D	12	5.4	5.4	9.0
	N	83	37.4	37.4	46.4
	A	90	40.5	40.5	86.9
	SA	29	13.1	13.1	100.0

Apply knowledge through combining specialisms in teams

Majority of the respondents agreed (67.1 %) that teams are used in the organizations to apply knowledge, thus it is evident that teams with employees in their specialization are encouraged so as other employees can share and apply whatever they have learnt.

Table 4.28 : Application of knowledge through combining teams

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	SD	7	3.2	3.2	3.2
	D	12	5.4	5.4	8.6
	N	31	14.0	14.0	22.5
	A	149	67.1	67.1	89.6
	SA	23	10.4	10.4	100.0

Apply knowledge in a creative manner for new application

The most of the respondents supported that they "Agree" to the following statement: "There organization applies knowledge in a creative manner for new application". The table below depicts the results from the respondents.

Table 4.29 : Application of knowledge in a creative manner for new application

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	D	10	4.5	4.5	4.5
	N	48	21.6	21.6	26.1
	A	141	63.5	63.5	89.6
	SA	23	10.4	10.4	100.0

Employees promote new knowledge internally

A majority of the respondents (56.3 %) who answered the questionnaires supported that their organizations applies knowledge management whereby employees promote new knowledge internally.

Table 4.30 : Application of knowledge to promote knowledge internally

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	SD	3	1.4	1.4	1.4
	D	12	5.4	5.4	6.8
	N	42	18.9	18.9	25.7
	A	125	56.3	56.3	82.0
	SA	40	18.0	18.0	100.0

4.4.2.4 Knowledge Creation

Knowledge Creation refers to internal activities the company undertakes to encourage the development of new ideas that can help improve processes and products. The statistical results show that the effects of knowledge creation methods vary among the respondents as shown in Table 4.33. That is, employees seem to create knowledge differently.

The results in Table 4.33 show that Knowledge Creation is moderately practiced in the company (mean = 2.776). Most of the respondents indicated that they create knowledge from information

obtained from the internet which seemed to be the most practiced method for knowledge creation (mean = 3.01) in the company.

With the agreement of most of the respondents, creation of knowledge by conducting meetings (mean = 2.97) was considered to be the second-most-practiced knowledge creation method.

Table 4.31 : Knowledge Creation

Contents (Average= 2.776)	Mean	Std. Deviation
create knowledge by providing proper incentives	2.46	1.091
create knowledge through learning groups	2.57	.899
create knowledge by reflecting on failures	2.62	.830
create new knowledge though advanced studies	2.73	.845
create knowledge through organizational cooperation and collaboration	2.73	.849
create knowledge through reflecting on readings and reports	2.75	.872
create and innovate new knowledge through technical transfer	2.78	.860
create knowledge by conducting discussions	2.82	.777
create knowledge from self study	2.83	.781
create new knowledge from trainings	2.91	.813
create new ideas though brain storming	2.91	.800
create knowledge by conducting meetings	2.97	.781
create knowledge from information obtained from the internet	3.01	.885

From the findings, one can conclude that most of the knowledge that is created is tacit knowledge, there lacks a formal procedure where these knowledge can be made explicit and be accessed by all employees or stakeholders of the company.

4.4.2.4.1 Descriptive Statistics for Knowledge Creation

Create knowledge by reflecting on failures

When respondents were asked if they create knowledge by reflecting on failures, 64.5% agreed or strongly agreed with the statement. A total of 25.2% percent of all respondents were not sure if they created knowledge by reflecting on their failures, and 10.4 percent disagreed that the company did not create knowledge by reflecting on their failures. (Table 4.34).

Table 4.32 : Creation of knowledge by reflecting on failures

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	SD	3	1.4	1.4	1.4
	D	20	9.0	9.0	10.4
	N	56	25.2	25.2	35.6
	A	122	55.0	55.0	90.5
	SA	21	9.5	9.5	100.0

Create knowledge through reflecting on readings and reports

From the table below it is evident that the majority of respondents (62.6%) agreed to the statement that their organization creates knowledge through reflecting on readings and reports. The table below shows the responses given.

Table 4.33 : Creation of knowledge through reflecting n readings and reports

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	SD	9	4.1	4.1	4.1
	D	9	4.1	4.1	8.1
	N	38	17.1	17.1	25.2
	A	139	62.6	62.6	87.8
	SA	27	12.2	12.2	100.0

Create knowledge through organizational cooperation and collaboration

Most respondents agreed that knowledge was created through organizational cooperation and collaboration. 45 percent of the respondents were not sure whether their organization created knowledge through organizational cooperation and collaboration.

Table 4.34 : Creation of knowledge through organizational cooperation and collaboration

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	SD	8	3.6	3.6	3.6
	D	8	3.6	3.6	7.2
	N	45	20.3	20.3	27.5
	A	135	60.8	60.8	88.3
	SA	26	11.7	11.7	100.0

Create and innovate new knowledge through technical transfer

When respondents were asked if they create and innovate new knowledge through technical transfer, 70.2% agreed or strongly agreed with the statement. A total of 18.9% percent of all respondents were not sure of the statement as to whether the company creates new knowledge through technical transfer. The table below gives a snapshot of the results.

Table 4.35 : Creation of knowledge through technical transfer

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	SD	1	.5	.5	5
	D	21	9.5	9.5	9.9
	N	42	18.9	18 9	28 8
	A	119	53 6	53 6	82 4
	SA	39	17.6	17 6	100 0

Create knowledge by providing proper incentives

58.1 % of the respondents agreed that the organization creates knowledge by providing proper incentives. This is a clear indication that the management supports and rewards employees in a bid to support KM within the organization.

Table 4.36 : Creation of knowledge by providing proper incentives

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	SD	10	4.5	4 5	4 5
	D	40	18.0	18.0	22 5
	N	43	19 4	19 4	41 9
	A	95	42.8	42 8	84 7
	SA	34	15.3	15 3	100.0

Create knowledge by conducting discussions

76.2 percent of the respondents agreed that they used discussions to create new knowledge at the same time learn from each other. The table below gives a preview of the results.

Table 4.37 : Creation of knowledge by conducting discussions

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	D	19	8 6	8 6	8 6
	N	34	15.3	15 3	23 9
	A	138	62 2	62 2	86 0
	SA	31	14 0	14 0	100 0

Create knowledge by conducting meetings

A majority of the respondents (85.2%) create knowledge by conducting meetings: this can be depicted from the table below.

Table 4.38 : Creation of knowledge by conducting meetings

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	D	19	8.6	8.6	8.6
	N	14	6.3	6.3	14.9
	A	144	64.9	64.9	79.7
	SA	45	20.3	20.3	100.0

Create knowledge through learning groups

56.3 % of the respondents agreed that the organization creates new knowledge though learning groups.

Table 4.39 : Creation of knowledge through learning groups

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	SD	5	2.3	2.3	2.3
	D	18	8.1	8.1	10.4
	N	74	33.3	33.3	43.7
	A	96	43.2	43.2	86.9
	SA	29	13.1	13.1	100.0

Create knowledge from self study

Majority of the respondents agreed with the statement that their company creates knowledge from self study.

Table 4.40 : Creation of knowledge from self study

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	SD	2	.9	.9	.9
	D	15	6.8	6.8	7.7
	N	32	14.4	14.4	22.1
	A	142	64.0	64.0	86.0
	SA	31	14.0	14.0	100.0

Create new knowledge through advanced studies

66.2 % of the respondents agreed that the organization creates new knowledge though advanced studies.

Table 4.41 : Creation of knowledge through advanced studies

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	D	21	9 5	9.5	9.5
	N	54	24 3	24 3	33 8
	A	111	50 0	50 0	83 8
	SA	36	16 2	16 2	100 0

Create new knowledge from trainings

83.3 % of the respondents agreed that the organization creates new knowledge from trainings.

Table 4.42 : Creation of knowledge from trainings

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	SD	1	.5	.5	.5
	D	21	9 5	9.5	9 9
	N	15	6 8	6 8	16 7
	A	145	65 3	65 3	82 0
	SA	40	18 0	18.0	100.0

Create new ideas though brain storming

80.5 % of the respondents agreed that the organization creates new ideas through brainstorming.

Table 4.43 : Creation of knowledge through brainstorming

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	D	20	9.0	9.0	9.0
	N	21	9 5	9 5	18 5
	A	139	62 6	62.6	81.1
	SA	42	18.9	18.9	100.0

Create knowledge from information obtained from the internet

82.3 % of the respondents agreed that the organization creates new knowledge form information obtained from the internet. This gives an implication that the internet is the most used media for

creating knowledge, whereby they create new knowledge from both internal and external sources.

Table 4.44 : Creation of knowledge from information obtained from the internet

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	SD	4	1.8	1.8	1.8
	D	14	6.3	6.3	8.1
	N	19	8.6	8.6	16.7
	A	123	55.4	55.4	72.1
	SA	62	27.9	27.9	100.0

4.5 The Extent of the Application of the Knowledge Management Practices

In order to determine the extent to which the dimensions of knowledge management are implemented in the case study organization, we ran one sample t-test. Considering that a five-point Likert scale was used, the t-tests were run with a test value of 2.779. The tables below report the obtained results showing that four dimensions of knowledge management – knowledge capture and acquisition, knowledge sharing, knowledge application and knowledge creation - have mean values that are insignificantly lower than the test value of 2.779 except for knowledge acquisition and capture. This indicates that these dimensions are not widely implemented in the company. This implies that KM is minimally practiced at the organization thus their need be a framework to assist these organizations in applying KM.

Knowledge acquisition and knowledge creation have the highest means. This indicates that these two dimensions are the most widely used knowledge management dimensions in the company. The least practiced KM process being knowledge sharing.

Table 4.45 : Knowledge Acquisition and Capture

	Test Value = 2.779					
	t	df	Sig. (2-tailed)	Mean Difference	Mean	
knowledge acquisition through circulars and procedures	2.201	221	.029	.09		
knowledge acquisition through internet	2.371	221	.019	.14		
knowledge acquisition through trainings	4.784	221	.000	.23		
knowledge acquisition through professional groups	-5.218	221	.000	-.28		
knowledge acquisition through conferences and seminars	-.652	221	.515	-.03		
knowledge acquisition through feedbacks	-4.707	221	.000	-.28		
knowledge acquisition through central database	-6.490	221	.000	-.41		

Table 4.46 : Knowledge Sharing

	Test Value = 2.779					
					95% Confidence Interval of the Difference	
	t	df	Sig. (2-tailed)	Mean Difference	Lower	Upper
knowledge sharing through chatting with other staff	-5.296	221	.000	-.29	-.40	-.18
knowledge sharing through learning with other staff within department	-5.327	221	.000	-.32	-.43	-.20
share knowledge and experience through mentoring	-7.457	221	.000	-.42	-.54	-.31
share knowledge and experience with staff through groups	.000	221	1.000	.00	-.11	.11
share knowledge through multimedia presentations	-7.746	221	.000	-.52	-.65	-.39
share knowledge using the internet	1.014	221	.312	.05	-.05	.16
share knowledge and experience with others through journals, diaries etc	-8.280	221	.000	-.52	-.65	-.40
share knowledge and experience with other staff though special topic reports	-10.745	221	.000	-.62	-.74	-.51

Table 4.47 : Knowledge Application

	Test Value = 2.779					
					95% Confidence Interval of the Difference	
	t	df	Sig. (2-tailed)	Mean Difference	Lower	Upper
apply knowledge to foster organizational cooperation	-2.819	221	.005	-.15	-.26	-.05
apply knowledge to manage professional groups	-7.480	221	.000	-.46	-.58	-.34
apply knowledge through combining specialisms in teams	-4.284	221	.000	-.24	-.35	-.13
apply knowledge in a creative manner for new application	-4.448	221	.000	-.20	-.29	-.11
employees promote new knowledge internally	-2.837	221	.005	-.16	-.27	-.05

Table 4.48 : Knowledge Creation

	Test Value = 2.779					
					95% Confidence Interval of the Difference	
	t	df	Sig. (2-tailed)	Mean Difference	Lower	Upper
create knowledge by reflecting on failures	-6.793	221	.000	-.38	-.49	-.27
create knowledge through reflecting on readings and reports	-4.312	221	.000	-.25	-.37	-.14
create knowledge through organizational cooperation and collaboration	-4.664	221	.000	-.27	-.38	-.15
create and innovate new knowledge through technical transfer	-3.744	221	.000	-.22	-.33	-.10
create knowledge by providing proper incentives	-7.318	221	.000	-.54	-.68	-.39
create knowledge by conducting discussions	-3.541	221	.000	-.18	-.29	-.08
create knowledge by conducting meetings	-.602	221	.548	-.03	-.13	.07
create knowledge through learning groups	-7.169	221	.000	-.43	-.55	-.31
create knowledge from self study	-3.179	221	.002	-.17	-.27	-.06
create new knowledge though advanced studies	-4.766	221	.000	-.27	-.38	-.16
create new knowledge from trainings	-1.650	221	.100	-.09	-.20	.02
create new ideas though brain storming	-1.594	221	.112	-.09	-.19	.02
create knowledge from information obtained from the internet	.228	221	.820	.01	-.10	.13

4.6 Spearman Correlation Analysis

Spearman rank correlation is a non parametric test that is used to measure the degree of association between the two variables. Spearman rank correlation test does not assume any assumptions about the distribution meaning that the above data has a non normal distribution. We used Spearman's Correlation analysis to determine the relationships between the various

knowledge management practices, which are identified as knowledge acquisition, knowledge sharing, knowledge application and knowledge creation. The table below shows their relationships.

Table 4.49 : Knowledge Acquisition

		KA1	KA2	KA3	KA4	KA5	KA6	KA7
Spearman's rho	KA1	1.000	.254(**)	.196(**)	.176(**)	.223(**)	.309(**)	.287(**)
	KA2	.254(**)	1 000	.062	.324(**)	.337(**)	.187(**)	.257(**)
	KA3	.196(**)	062	1.000	.369(**)	.566(**)	.164(*)	.072
	KA4	.176(**)	.324(**)	.369(**)	1.000	.518(**)	.292(**)	.403(**)
	KA5	.223(**)	.337(**)	.566(**)	.518(**)	1.000	.291(**)	.216(**)
	KA6	.309(**)	187(**)	.164(*)	.292(**)	.291(**)	1 000	.520(**)
	KA7	.287(**)	.257(**)	.072	.403(**)	.216(**)	.520(**)	1.000

** Correlation is significant at the 0.01 level (2-tailed).
* Correlation is significant at the 0.05 level (2-tailed).

Table 4.50 : Knowledge Sharing

		KS1	KS2	KS3	KS4	KS5	KS6	KS7	KS8
Spearman's rho	KS1	1 000	.358(**)	.464(**)	.321(**)	.372(**)	.254(**)	.498(**)	.416(**)
	KS2	.358(**)	1.000	.653(**)	.276(**)	.208(**)	111	.249(**)	.345(**)
	KS3	.464(**)	.653(**)	1.000	446(**)	.313(**)	134(*)	.398(**)	.531(**)
	KS4	.321(**)	.276(**)	.446(**)	1.000	.327(**)	.052	.302(**)	.432(**)
	KS5	.372(**)	.208(**)	.313(**)	.327(**)	1.000	.484(**)	.416(**)	.378(**)
	KS6	.254(**)	111	.134(*)	.052	.484(**)	1.000	.367(**)	.305(**)
	KS7	.498(**)	.249(**)	.398(**)	.302(**)	.416(**)	367(**)	1.000	.729(**)
	KS8	.416(**)	.345(**)	.531(**)	.432(**)	.378(**)	.305(**)	.729(**)	1.000

** Correlation is significant at the 0.01 level (2-tailed).
* Correlation is significant at the 0.05 level (2-tailed).

Table 4.51 : Knowledge Application

		KAPP1	KAPP2	KAPP3	KAPP4	KAPP5
Spearman's rho	KAPP1	1.000	610(**)	464(**)	357(**)	382(**)
	KAPP2	610(**)	1.000	403(**)	390(**)	419(**)
	KAPP3	464(**)	403(**)	1 000	521(**)	391(**)
	KAPP4	357(**)	390(**)	521(**)	1.000	465(**)
	KAPP5	382(**)	419(**)	391(**)	465(**)	1 000

** Correlation is significant at the 0.01 level (2-tailed).

Table 4.52 : Knowledge Creation

	KC1	KC2	KC3	KC4	KC5	KC6	KC7	KC8	KC9	KC10	KC11	KC12	KC13
KC1	1.000	.386(**)	.479(**)	.506(**)	.424(**)	.383(**)	.320(**)	.238(**)	.335(**)	.361(**)	.372(**)	.313(**)	.261(**)
KC2	.386(**)	1.000	.411(**)	.422(**)	.306(**)	.473(**)	.201(**)	.194(**)	.166(*)	.288(**)	.240(**)	.308(**)	.302(**)
KC3	.479(**)	.411(**)	1.000	.556(**)	.554(**)	.369(**)	.306(**)	.346(**)	.213(**)	.476(**)	.301(**)	.239(**)	.334(**)
KC4	.506(**)	.422(**)	.556(**)	1.000	.546(**)	.506(**)	.236(**)	.504(**)	.230(**)	.553(**)	.397(**)	.359(**)	.262(**)
KC5	.424(**)	.306(**)	.554(**)	.546(**)	1.000	.395(**)	.307(**)	.536(**)	.492(**)	.689(**)	.456(**)	.297(**)	.355(**)
KC6	.383(**)	.473(**)	.369(**)	.506(**)	.395(**)	1.000	.556(**)	.517(**)	.320(**)	.394(**)	.326(**)	.516(**)	.201(**)
KC7	.320(**)	.201(**)	.306(**)	.236(**)	.307(**)	.556(**)	1.000	.331(**)	.293(**)	.313(**)	.087	.350(**)	.287(**)
KC8	.238(**)	.194(**)	.346(**)	.504(**)	.536(**)	.517(**)	.331(**)	1.000	.291(**)	.526(**)	.291(**)	.420(**)	.236(**)
KC9	.335(**)	.166(*)	.213(**)	.230(**)	.492(**)	.320(**)	.293(**)	.291(**)	1.000	.637(**)	.369(**)	.247(**)	.327(**)
KC10	.361(**)	.288(**)	.476(**)	.553(**)	.689(**)	.394(**)	.313(**)	.526(**)	.637(**)	1.000	.416(**)	.308(**)	.372(**)
KC11	.372(**)	.240(**)	.301(**)	.397(**)	.456(**)	.326(**)	.087	.291(**)	.369(**)	.416(**)	1.000	.280(**)	.332(**)
KC12	.313(**)	.308(**)	.239(**)	.359(**)	.297(**)	.516(**)	.350(**)	.420(**)	.247(**)	.308(**)	.280(**)	1.000	.273(**)
KC13	.261(**)	.302(**)	.334(**)	.262(**)	.355(**)	.201(**)	.287(**)	.236(**)	.327(**)	.372(**)	.332(**)	.273(**)	1.000

** Correlation is significant at the 0.01 level (2-tailed).

* Correlation is significant at the 0.05 level (2-tailed).

4.6.5 Overall Construct Correlation

The table below shows the findings of correlation analysis which indicates that knowledge acquisition is significantly correlated to knowledge sharing (0.6606). Knowledge Acquisition is also correlated to knowledge application (0.4703) and knowledge creation (0.5668). The results also show that knowledge sharing is significantly correlated to both Knowledge application and knowledge creation with a coefficient of 0.6316 and 0.6049 respectively. There is also a significant correlation between knowledge application and knowledge creation (0.6275). The overall findings of correlation analysis shows that the components are interlinked which implies that change in any component will affect others as well as KM practice. The correlations between the test items were significant with all having a value of above 0.3.

Correlation Matrix

	KAC	KS	KAP	KC
KAC	1.0000			
KS	.6606	1.0000		
KAP	.4703	.6316	1.0000	
KC	.5668	.6049	.6275	1.0000

N of Cases = 222.0

Table 4.6.5: Overall Correlations between the Components

Table 4.53 : Spearman's Correlation Analysis between the Overall Components

		KAC	KS	KAP	KC
Spearman's rho	KAC	1 000	650(**)	467(**)	545(**)
	KS	.650(**)	1.000	629(**)	637(**)
	KAP	.467(**)	629(**)	1 000	590(**)
	KC	545(**)	.637(**)	590(**)	1.000

** Correlation is significant at the 0.01 level (2-tailed)

The above table indicates that all the knowledge management practices are significantly correlated to each other.

4.7 Pearson correlation analysis

Pearson correlation is used to determine the relationships between the items factors in each knowledge management practice. The knowledge management practices include knowledge capture and acquisition, knowledge sharing, knowledge application and knowledge creation. As presented in the tables below, the results of Pearson product-moment correlations show significant positive correlations between all different KM practices, namely knowledge acquisition, knowledge sharing, knowledge application and knowledge creation.

4.7.1 Knowledge Capture and Acquisition

Results in Table 4.56 show that the item factors of knowledge capture and acquisition are significantly correlated with the other item factors.

On average most of the item factors are correlated. Knowledge acquisition through the internet does not correlate to knowledge acquisition through trainings and feedbacks but it does correlate with the other item factors. The same way knowledge acquisition through trainings does not correlate with knowledge acquisition through the internet and knowledge acquisition through a central database. Knowledge acquisition through feedbacks does not correlate with knowledge acquisition though the internet.

Knowledge acquisition through central database does not correlate with knowledge acquisition through training. But as earlier mentioned the other items correlate with each other significantly at Po0.05 level.

Table 4.54 : Knowledge Capture and Acquisition

	KA1	KA2	KA3	KA4	KA5	KA6	KA7
KA1	1	.238(**)	.153(*)	.180(**)	.192(**)	.307(**)	.293(**)
KA2	.238(**)	1	.027	.321(**)	.298(**)	.118	.192(**)
KA3	.153(*)	.027	1	.400(**)	.596(**)	.160(*)	.093
KA4	.180(**)	.321(**)	.400(**)	1	.504(**)	.281(**)	.381(**)
KA5	.192(**)	.298(**)	.596(**)	.504(**)	1	.284(**)	.214(**)
KA6	.307(**)	.118	.160(*)	.281(**)	.284(**)	1	.547(**)
KA7	.293(**)	.192(**)	.093	.381(**)	.214(**)	.547(**)	1

** Correlation is significant at the 0.01 level (2-tailed).

* Correlation is significant at the 0.05 level (2-tailed).

4.7.2 Knowledge Sharing

Results in Table 4.57 show that the item factors of knowledge sharing are significantly correlated with the other item factors.

On average most of the item factors are correlated. Knowledge sharing through learning with other staff within departments does not correlate with sharing knowledge using the internet. Knowledge sharing through mentoring does not correlate with knowledge sharing using internet, knowledge sharing through groups does not correlate with knowledge sharing using internet and vice versa, that is knowledge sharing using internet does not correlate with knowledge sharing through learning with other staff within departments, mentoring and groups.

Table 4.55 : Knowledge Sharing

	KS1	KS2	KS3	KS4	KS5	KS6	KS7	KS8
KS1	1	.346(**)	.445(**)	.308(**)	.355(**)	.259(**)	.456(**)	.367(**)
KS2	.346(**)	1	.639(**)	.269(**)	.174(**)	.037	.215(**)	.295(**)
KS3	.445(**)	.639(**)	1	.487(**)	.334(**)	.108	.369(**)	.543(**)
KS4	.308(**)	.269(**)	.487(**)	1	.346(**)	.050	.342(**)	.498(**)
KS5	.355(**)	.174(**)	.334(**)	.346(**)	1	.430(**)	.396(**)	.324(**)
KS6	.259(**)	.037	.108	.050	.430(**)	1	.286(**)	.234(**)
KS7	.456(**)	.215(**)	.369(**)	.342(**)	.396(**)	.286(**)	1	.731(**)
KS8	.367(**)	.295(**)	.543(**)	.498(**)	.324(**)	.234(**)	.731(**)	1

** Correlation is significant at the 0.01 level (2-tailed).

4.7.3 Knowledge Application

Results in Table 4.58 show that the item factors of knowledge application are significantly correlated with the other item factors. On average most of the item factors are correlated with most of them above 0.3.

Table 4.56 : Knowledge Application

	KAPP1	KAPP2	KAPP3	KAPP4	KAPP5
KAPP1	1	.686(**)	.477(**)	.338(**)	.436(**)
KAPP2	.686(**)	1	.403(**)	.374(**)	.489(**)
KAPP3	.477(**)	.403(**)	1	.484(**)	.419(**)
KAPP4	.338(**)	.374(**)	.484(**)	1	.442(**)
KAPP5	.436(**)	.489(**)	.419(**)	.442(**)	1

** Correlation is significant at the 0.01 level (2-tailed).

4.7.4 Knowledge Creation

Results in Table 4.59 show that most of the item factors of knowledge creation are correlated with the other item factors. Knowledge creation by conducting meetings does not correlate with knowledge creation through trainings and vice versa is the case. The other item factors are correlated significantly.

Table 4.57 : Knowledge Creation

	KC1	KC2	KC3	KC4	KC5	KC6	KC7	KC8	KC9	KC10	KC11	KC12	KC13
KC1	1	.312(**)	.358(**)	.487(**)	.454(**)	.396(**)	.352(**)	.216(**)	.307(**)	.331(**)	.378(**)	.305(**)	.383(**)
KC2	.312(**)	1	.527(**)	.440(**)	.366(**)	.499(**)	.221(**)	.276(**)	.217(**)	.319(**)	.172(*)	.326(**)	.280(**)
KC3	.358(**)	.527(**)	1	.528(**)	.510(**)	.337(**)	.233(**)	.448(**)	.206(**)	.436(**)	.253(**)	.206(**)	.348(**)
KC4	.487(**)	.440(**)	.528(**)	1	.551(**)	.488(**)	.273(**)	.551(**)	.249(**)	.535(**)	.379(**)	.335(**)	.248(**)
KC5	.454(**)	366(**)	.510(**)	.551(**)	1	.422(**)	.315(**)	.515(**)	.532(**)	.652(**)	.399(**)	.269(**)	.350(**)
KC6	.396(**)	.499(**)	.337(**)	.488(**)	.422(**)	1	.557(**)	.501(**)	.374(**)	.434(**)	.310(**)	.528(**)	.241(**)
KC7	.352(**)	.221(**)	.233(**)	.273(**)	.315(**)	.557(**)	1	.329(**)	.362(**)	.371(**)	.131	.329(**)	.315(**)

KC8s	.216(**)	.276(**)	.448(**)	.551(**)	.515(**)	.501(**)	.329(**)	1	.245(**)	.495(**)	.281(**)	.427(**)	.218(**)
KC9	.307(**)	.217(**)	.206(**)	.249(**)	.532(**)	.374(**)	.362(**)	.245(**)	1	.686(**)	.340(**)	.281(**)	.252(**)
KC10	.331(**)	.319(**)	.436(**)	.535(**)	.652(**)	.434(**)	.371(**)	.495(**)	.686(**)	1	.419(**)	.294(**)	.350(**)
KC11	.378(**)	.172(*)	.253(**)	.379(**)	.399(**)	.310(**)	.131	.281(**)	.340(**)	.419(**)	1	.287(**)	.297(**)
KC12	.305(**)	.326(**)	.206(**)	.335(**)	.269(**)	.528(**)	.329(**)	.427(**)	.281(**)	.294(**)	.287(**)	1	.225(**)
KC13	.383(**)	.280(**)	.348(**)	.248(**)	.350(**)	.241(**)	.315(**)	.218(**)	.252(**)	.350(**)	.297(**)	.225(**)	1

** Correlation is significant at the 0.01 level (2-tailed).

* Correlation is significant at the 0.05 level (2-tailed).

THE PROPOSED FRAMEWORK FOR APPLYING KNOWLEDGE MANAGEMENT

Based on the literature review and the findings of the research, we construct a framework which addresses the shortcomings of the current models. The proposed framework consists of three main components: people and organizational culture, process, and technology. The organization needs to achieve a balance between these three subsystems in order to achieve a successful knowledge management effort. Two main independent variables were identified- people and organizational culture and ICT, and these were tested against the knowledge management processes which are: knowledge capture, knowledge sharing, knowledge application and knowledge creation.

The focus should be on the importance of the employees of the organization, and their contribution towards a successful knowledge management effort. There should also be a concerted effort to make people feel part of the change when implementing knowledge management. The organization should also encourage individual learning, and innovative thinking with employees, and reward those that do produce such results.

Finally, the technology and knowledge management processes of the organization cannot be neglected when implementing knowledge management. The knowledge management processes are defined as follows knowledge capture and acquisition, knowledge sharing, knowledge application and knowledge creation.

Our proposed framework for applying KM in organizations considers three aspects which are people and organizational culture, KM processes and ICT, based on what we found out in our study and existing literatures. The proposed model considers each knowledge management process and provides adequate enablers to support each of these.

The framework is illustrated in Figure 5.0:

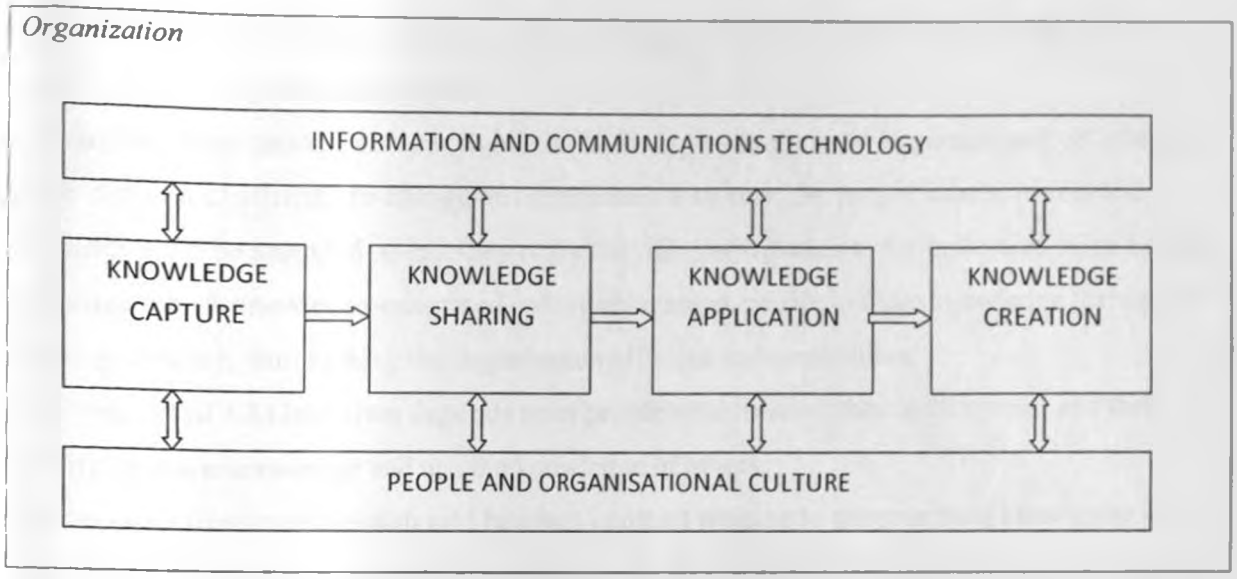


Figure 5.0: Proposed Framework for Applying Knowledge Management in Organizations

5.1 Description of the Framework

People and organization culture, KM processes, and ICT are the three key components for a KM strategy to succeed. KM focuses on people and organizational culture to stimulate and nurture the sharing and use of knowledge; on processes or methods to locate, create, capture and share knowledge; and on technology to store and make knowledge accessible and to allow people to work together without being together.

5.1.1 People & Organizational Culture

In organizational culture and people, there are five variables suggested which are top management support, motivation, reward and incentives, training and education and finally policies and strategies. These variables are together with Organizational Culture and People to determine there importance towards applying KM in organizations.

These are the foundation of every KM initiative, no matter the size of the organization. An organizational culture that promotes the creating and sharing of knowledge, and one that rewards its employees, is a prerequisite to effective KM. At the same time people are the most important component, because managing knowledge depends upon people's willingness to share and reuse knowledge. People can understand knowledge and generate new knowledge, and without a

proper culture that promotes sharing, this knowledge they have cannot be disseminated to be used within an organizational setting.

Getting an organization's culture 'right' for KM is typically the most important and yet often the most difficult challenge. To change an organization's culture, the people values, norms and attitudes must be amended so that they make the right contribution to the collective culture of the organization. A knowledge-orientated culture encourages people to share knowledge throughout the organization, thus making the organization efficient and competitive.

The success of KM initiatives depends upon people's motivation, their willingness, and their ability to share knowledge and use the knowledge of others.

At the same time employees should be given constant training to improve their knowledge and capabilities. Knowledge gained by employees through learning or training enables employees to translate their knowledge into organizations' routine, competencies, job descriptions and business processes, plans, strategies and cultures thereby applying knowledge within the organization and at the long run KM is being achieved at the organizational level.

Policies and strategies provide an organization with the foundation of how it can deploy its capabilities and resources to achieve KM goals. The KM strategy must be in agreement with the business strategy for the KM initiative to succeed.

Training and education is another important consideration for successful KM. employees need to be aware of the needs to manage knowledge and to recognize it as a key organizational resource. Through training employees understand the importance of KM and appreciate its benefits to the organization as a whole.

5.1.2 KM Processes

The KM processes are drawn from existing literature, the framework proposes to address the processes for managing knowledge; the following are the KM processes:

5.1.2.1 Knowledge Capture and Acquisition

It is the ability to seek and obtain entirely new knowledge or create new knowledge out of existing knowledge mainly through collaboration. Employees attempt to obtain needed knowledge from both inside and outside sources and to formalize and document the obtained knowledge.

5.1.2.2 Knowledge Sharing

Employees classify and retrieve knowledge from organizational memory, and make it available for the other knowledge users.

5.1.2.3 Knowledge Application

The ability to apply, exploit and use knowledge. Employees utilize the knowledge in performing the tasks such as solving problems, making decisions, researching ideas, and learning.

5.1.2.4 Knowledge Creation

The knowledge comes primarily from the experiences and skills of the employees. New knowledge is created through a variety of media such as internet, advanced studies, readings, brainstorming and organizational collaboration.

5.1.3 Information and Communication

Two variables are included in the study, KM and ICT tools and technologies, and ICT infrastructure.

ICT infrastructure helps employees create, share and transfer knowledge in organizations. ICT tools play important role in knowledge management. ICT tools exist in organizations can help and facilitate employees to share knowledge.

Technology is a key enabler in implementing a successful KM program and strategy. Although technology is an enabler to KM, it is still considered as the most effective means of capturing, storing, transforming and sharing knowledge.

It should be noted that technology alone will not result in a successful KM initiative or culture. To achieve any successful KM initiative IT should be used minimally whereby there should be a balance between all the other factors being KM processes and people and organizational culture.

5.2 *Descriptive Analysis*

User responses were analyzed using SPSS 11.5. variuos analyses authenticated the instruments reliability and validity, and produced a descriptive analysis of the respondents' demographics, their organization's profiles, industry sector and their work experience.

5.2.2 Demographic Analysis

This section providesa demographic profile of the participants and their organizations.

5.2.2.1 Demographic profile of the respondents

Gender:

63% percent of the respondents were male and 37% were female. Only 37% of the respondents were feamle, an indication of low female representation in the studied companies.

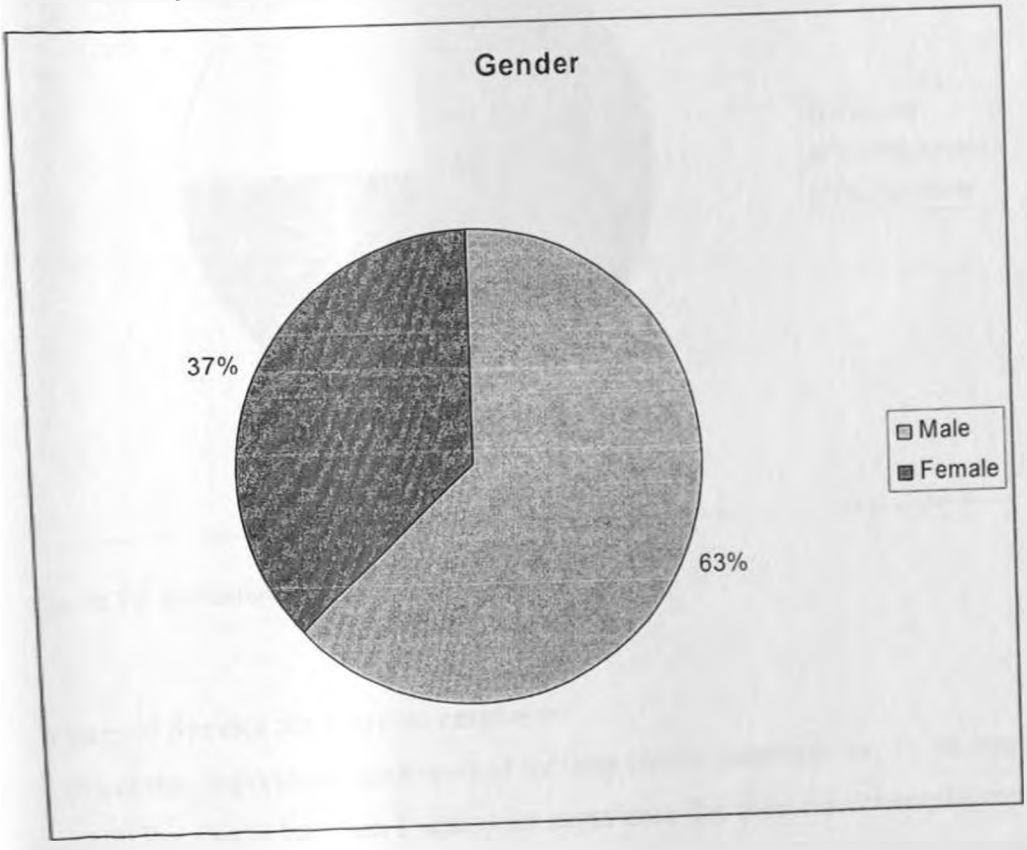


Figure 5.2 Gender of the respondents

Level of Education:

In terms of education level, most of the respondents have a bachelor's degree. The respondents are well educated with 75% holding at least a first degree and most of the respondents occupying management positions.

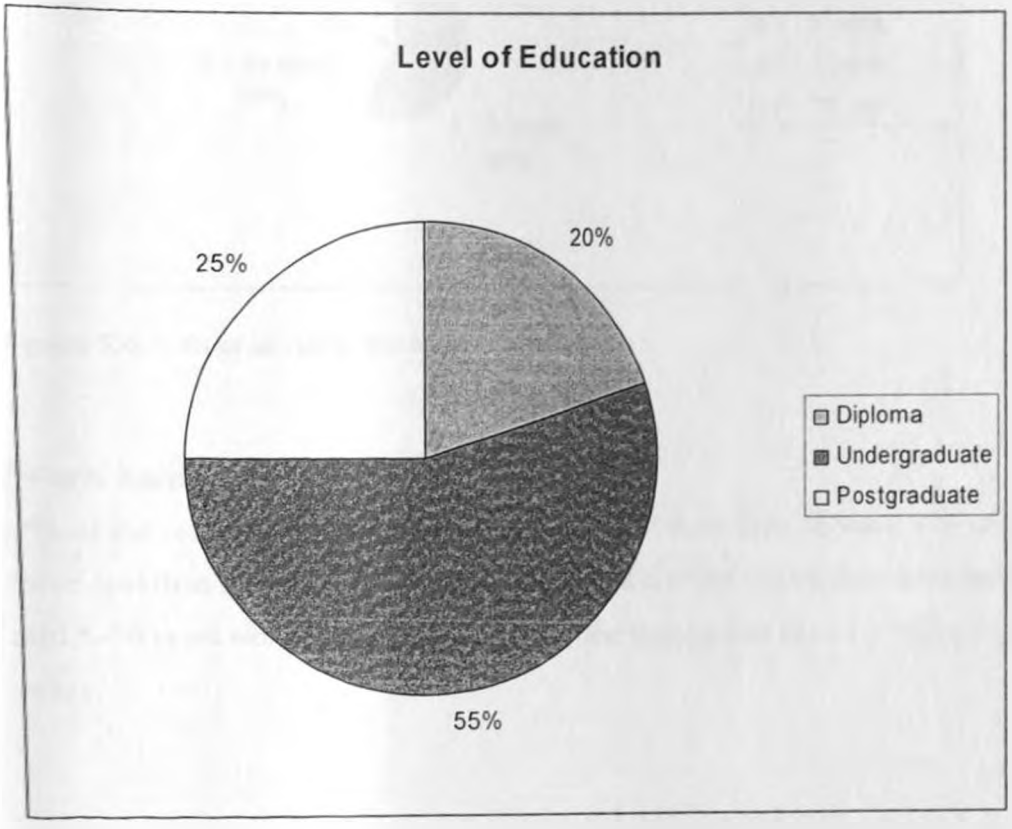


Figure 5.3 Education level of the respondents

Years of Service for Current employer:

18% of the respondents have worked for their current employer for 5 - 10 years, 20 % of the respondents have less than 1 year work experience for their current employer and a cumulative of 62% of the respondents have between 1-3 years and 3-5 years of working experience for the current employer. This implies that most of the respondents have been at there employers work places for a while and know whether KM programs/initiatives have been implemented.

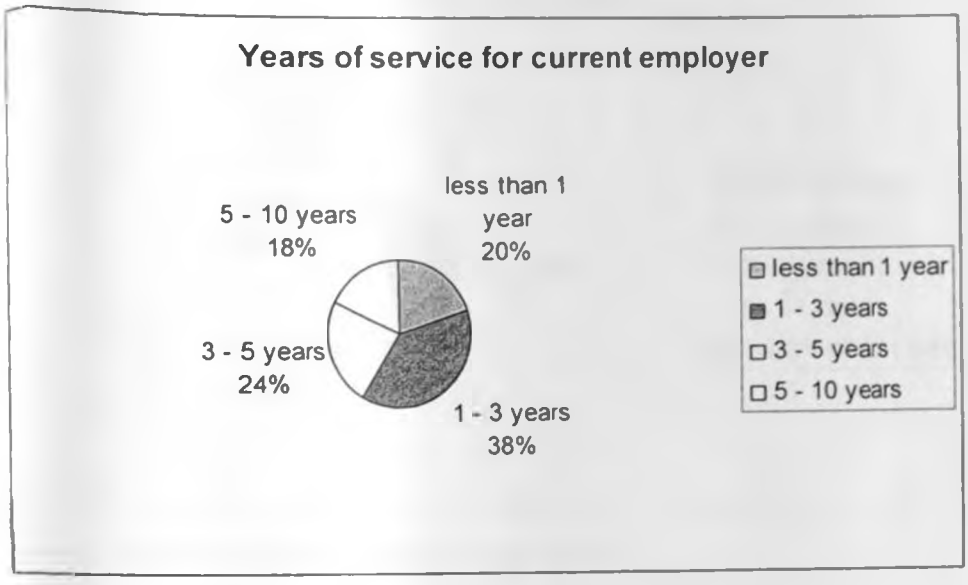


Figure 5.4: Years of service for the current employer

Work Exeprience:

6% of the respondents have working experience of more than 10 years, 8 % of the respondents have less than 1 year working experience and 48% of the respondents have between 3-5 years and 5-10 years working experience. 38% of the respondents have a working experience of 1-3 years.

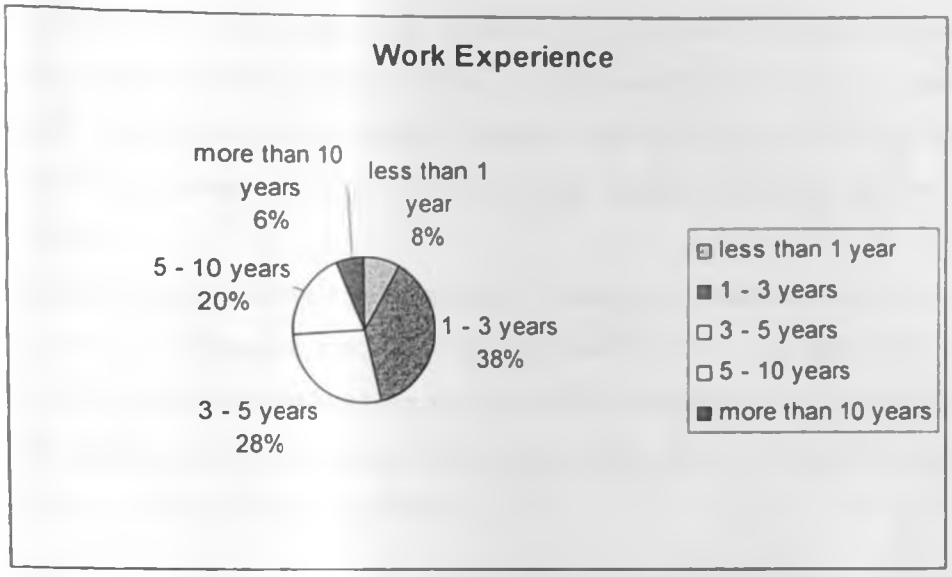


Figure 5.5: Total work experience of the respondents

5.2.2.2 Knowledge Management Practices

Four components were grouped as knowledge management practices, namely; knowledge capture and acquisition, knowledge sharing, knowledge application and knowledge creation. The score of responses from respondents were calculated based on relevant items in the questionnaire. The items were measured in a 5-point Likert scale, ranging from 1 = Strongly Agree, 2 = Agree, 3 = Neutral, 4 = Disagree, and 5 = Strongly Disagree.

The respondents often developed new ideas or generated new knowledge through discussions with peers and experts, observation, by experimentation, etc. The findings are consistent with other literatures on knowledge management process that members of an organization develop knowledge through learning, problem solving, innovation, creativity, and importation from outside sources and generation of new knowledge through tacit and explicit knowledge (Nonaka and Takeuchi, 1991). Six items were used to measure personal knowledge acquisition practice. From the responses, most of the respondents generally acquired information through research, the Internet and Intranet, seminars and workshops, periodicals, bulletins, and notices. The respondents often contribute or disseminate their knowledge through publications, seminar, conferences, workshops, dialogues, forums, informal discussions, teaching and training, and consultancy.

The table below shows the mean scores for the practices of knowledge management by individual companies. From the table, it can be seen that G4S a private security company has the lowest mean scores as compared to the other two companies studied for the practices of knowledge capture and acquisition, knowledge sharing, knowledge application and knowledge creation.

Mumias Sugar has developed a number of strategies to make knowledge available within the company. For instance, since the main objective of KM is to acquire. share, apply and create knowledge, an intranet has been set up in most of the organizations studied. It also shows information about employees and their areas of expertise, meeting dates and memorandum. training programs and post profiles.

Table 3: Level of involvement in knowledge management practice (individual) by companies

Name of your organization	KCAPTURE	KSHARING	KAPPLY	KCREATE
MUMIAS SUGAR	4.3200	4.1714	4.4500	4.2000
KCB	3.7111	3.6190	3.7222	3.5741
G4S	3.2000	3.2041	3.2143	2.9524
Average	3.7829	3.6939	3.8286	3.6286

Level of Management and Knowledge Management Practice

In this study, info-structure is regarded as one of the important perspective and initiative from organization's top management to instill knowledge management culture and change management program. The elements included in this study were as follows: perception on comprehensive ICT infrastructure policy; top management shows support through actively demonstrating their commitment to knowledge-based activities; ensuring that information system meets the organizational needs; the ICT policy facilitates knowledge sharing among staffs, etc. These elements have mean ratings ranging from 3.00 to 4.12. Generally, the respondents perceived that for any knowledge management initiative to progress or succeed there should be support from the top management as it can be seen from the table below.

Table 2: Level of involvement in knowledge management practice (individual) by Management

Level of management	KCAPTURE	KSHARING	KAPPLY	KCREATE
Head of Department/ Executive Mgt	4.0500	4.0714	4.1250	4.0417
Middle Level Mgt	3.8700	3.6571	3.8750	3.6833
Junior Mgt	3.2286	3.3673	3.3571	3.0000
Average	3.7829	3.6939	3.8286	3.6286

Gender and Knowledge Management Practice

The table below present information relating to personal attributes of the respondents. Only 37% of the respondents were female, an indication of low female representation in the two sectors studied. Looking at the results it can be noted that the females participated in the knowledge practices more than there male counterparts.

Table 3: Level of involvement in knowledge management practice by gender

Gender		KCAPTURE	KSHARING	KAPPLY	KCREATE
Male	63%	3.7000	3.6234	3.7500	3.4848
Female	37%	3.9231	3.8132	3.9615	3.8718
Average		3.7829	3.6939	3.8286	3.6286

Education Level and Knowledge Management Practice

Table 4, presents information relating to personal attributes of the respondents. The respondents are well educated with holding at least a first degree and most of the respondents occupying management positions.

Level of Education		KCAPTURE	KSHARING	KAPPLY	KCREATE
Diploma	20%	3.5429	3.6122	3.5714	3.5714
Undergraduate	55%	3.7895	3.6541	3.8684	3.5965
Postgraduate	25%	3.9556	3.8413	3.9444	3.7407
Average		3.7829	3.6939	3.8286	3.6286

Information Technology Components

Infrastructure consists of technical components such as hardware and software as well as systems and organizational knowledge repository. Most of the companies have KMS put in place such as intranet, and contains aspects such as training programs, internal communication, career development etc.The table below shows the mean scores of individual companies for the ICT components. The table indicates that Mumias Sugar has the highest mean in relation to the ICT tools used for attaining KM.

Name of your organization	KMMEAN	OPMEAN	ITMEAN
MUMIAS SUGAR	4.2687	4.3917	4.4167
KCB	3.6528	3.4583	3.8704
G4S	3.1429	2.9048	3.2143
Average	3.7268	3.6143	3.8952

5.2.2.3 Results for Individual Companies

People and Organization Culture components in individual companies

The Table below shows that G4S had the lowest score for each of people and organizational culture components. These indicators, which act as a predictor to the current level of knowledge management application, could be used by company to take appropriate actions to increase the level of KM application. Therefore, people and organizational culture components are very important in determining the success of KM application in the organization.

Name of your organization	recording of information is a routine	employees are encouraged to share knowledge	culture of organization promotes knowledge sharing	organization is recognized and rewarded	employees are cooperative	knowledge sharing is promoted	there is good internal communication	there is regular refresher training	there is a program to enhance competence	coaching and mentoring approaches are used to support knowledge sharing	management support for knowledge sharing	motivation to share knowledge
MUMIAS SUGAR	4.00	4.60	4.50	4.60	4.60	4.40	4.30	4.20	4.40	4.50	4.10	4.50
KCB	3.50	3.61	3.28	2.94	3.50	3.28	3.39	3.89	3.56	3.39	3.56	3.61
G4S	2.29	3.43	3.00	2.14	3.29	3.14	3.29	2.43	3.00	3.00	3.00	2.86
Average	3.40	3.86	3.57	3.26	3.77	3.57	3.63	3.69	3.69	3.63	3.60	3.71

ICT Components in Individual companies

Mumias Sugar has the highest scores for each ICT component, this indicates that there are "knowledge management tools" that assist in finding, creating, applying and sharing knowledge assets in an organization.

Name of your organization	use of technology to enhance service	company uses systems that make knowledge available	it is easy to find information	a task is well documented	right systems are used to capture and share ideas	employees use systems that can easily find information
MUMIAS SUGAR	4.30	4.20	4.40	4.60	4.60	4.40
KCB	4.11	3.83	4.00	3.83	3.72	3.72
G4S	3.71	3.86	2.71	2.86	3.29	2.86
Average	4.09	3.94	3.86	3.86	3.89	3.74

Knowledge Management Processes in Individual companies

The table below shows the mean scores for each KM Process component by individual companies. From the table, it can be seen that G4S has the lowest mean scores as compared to the other two companies for the practices of knowledge generation, acquisition, creation and dissemination. Only Mumias Sugar has an average score that is way above the required.

Name of your organization	the company has a written knowledge management policy	company has a culture to promote knowledge sharing	company has policies to improve worker retention	company uses partnerships to acquire knowledge	our company has work teams	activities are documented	procedures and related documentation are updated	effective techniques are used to capture critical knowledge	data is retained to facilitate search and retrieval	there are processes for transfer and utilization of knowledge	interdepartmental communication between employees is common	regular meetings are held to disseminate information	every employee has access to the corporate network	databases are used to store and organize important information	there are mentoring places where it is possible to engage in professional discussions	there are archives where reports can be retrieved
MUMIAS SUGAR	4.20	4.20	4.40	4.20	3.90	4.30	4.60	4.20	4.30	4.00	4.10	4.30	4.40	4.60	4.20	4 40
KCB	3.83	3.72	3.67	3.33	3.50	3.67	3.78	3.83	3.67	3.61	3.33	3.61	3.89	3.89	3.28	3.83
G4S	3.57	2.71	2.86	3.29	3.71	3.29	3.14	2.43	3.71	3.43	3.43	3.14	2.29	3.86	1.86	3.57
Average	3.89	3.66	3.71	3.57	3.66	3.77	3.89	3.66	3.86	3.69	3.57	3.71	3.71	4.09	3.26	3.94

5.3 Reliability of the Instument

The reliability of the research instrument is concerned with consistency. This research used cronbach's Alphha value in order to assess the internal consistency of the results across items within a test. The Cronbach alpha value was 0.958 which is above the recommended value of 0.7 as suggested in the literature (Hair et al.)

Table 4.61: Cronbach Alpha test

R E L I A B I L I T Y A N A L Y S I S - S C A L E (A L P H A)

Item-total Statistics

	Scale Mean if Item Deleted	Scale Variance if Item Deleted	Corrected Item-Total Correlation	Alpha if Item Deleted
KMPOLICY	122.7200	419.2261	.5234	.9574
KMCULTUR	122.7200	414.3690	.5973	.9569
KMPROGRM	122.8200	405.7424	.7545	.9558
KMPARTNS	122.9600	416.9780	.5881	.9570
KMTEAMS	122.8200	425.2118	.3767	.9582
KMDOCMNT	122.7600	415.1249	.5464	.9573
KMPROCDR	122.6800	409.0792	.6702	.9564
KMTECHNQ	122.8200	415.9465	.5546	.9572
KMINFORM	122.6000	415.5918	.6449	.9566
KMPROCES	122.8200	409.3751	.7091	.9561
KMCOMMN	122.8400	417.5657	.5110	.9575
KMMEETNG	122.7600	419.2065	.5164	.9574
KMNETWK	122.9000	417.0714	.4767	.9579
KMDATABS	122.4800	423.1118	.4673	.9577
KMMENTOR	123.1600	402.6678	.7327	.9560
KMARCHVE	122.5600	421.2310	.4411	.9580

PRECORD	123.0000	410.8571	.7232	.9561
PSHARE	122.6600	417.3310	.5460	.9573
PCULTURE	122.8600	412.5718	.7228	.9561
PREWARD	123.2000	405.3061	.7262	.9560
PHELP	122.6800	411.8139	.7071	.9562
PPROMOTE	122.9200	408.8098	.6987	.9562
PCOMMUNC	122.8000	418.8980	.6041	.9569
PTRAININ	122.9200	410.7690	.6502	.9566
PPROGRAM	122.9200	410.0751	.6673	.9564
PCOACH	122.8600	407.7963	.6744	.9564
PMANGMNT	122.9200	419.5853	.6074	.9569
PMOTIVTE	122.8200	412.6404	.7073	.9562
ITECHNLG	122.3200	424.5486	.4920	.9576
ISYSTEMS	122.4800	427.1118	.4483	.9578
IACCESS	122.6200	409.3424	.6919	.9563
IDOCMNTD	122.6400	405.6229	.8318	.9553
ICAPTURE	122.6800	408.3037	.7848	.9557
IUSAGE	122.7800	410.9098	.6612	.9565

R E L I A B I L I T Y A N A L Y S I S - S C A L E (A L P H A)

Reliability Coefficients

N of Cases = 50.0 N of Items = 34

Alpha = .9580

5.4 Inferential Analysis

This section illustrates the results of the testing of the statistical significance regression models. Simple linear regression was used aa the main tool in the inferential analysis.

5.4.1 The Analysis of Regression data

At this stage, in order to determine the rate of impact of independent variables on dependent variables, a test of "multiple regression analysis" by the method of step-by step has been carried out. The dependent variables Knowledge Management Processes has sub variables within it, which are: knowledge capture, knowledge sharing, knowledge application and knowledge creation. The results are as follows:

Knowledge Capture:

To determine the rate of impact of independent variables on the dependent variable of knowledge capture and acquisition, through enter method, all the variables were considered and entered in the model.

Model Summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.794(a)	.631	.578	.62917

a Predictors: (Constant), ICTAVER, PAVER

Coefficients(a)

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	.291	.705		.413	.686
	PAVER	-.129	.391	-.106	-.330	.746
	ICTAVER	.977	.355	.884	2.751	.016

a Dependent Variable: KCAPTURE

Knowledge Sharing:

To determine the rate of impact of independent variables on the dependent variable of knowledge sharing, through enter method, all the variables were considered and entered in the model.

Model Summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.917(a)	.841	.818	.31288

a Predictors: (Constant), ICTAVER, PAVER

Coefficients(a)

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	.624	.351		1.779	.097
	PAVER	.622	.195	.674	3.197	.006
	ICTAVER	.226	.177	.270	1.282	.221

a Dependent Variable: KSHARING

Knowledge Application:

To determine the rate of impact of independent variables on the dependent variable of knowledge application, through enter method, all the variables were considered and entered in the model.

Model Summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.855(a)	.731	.692	.39301

a Predictors: (Constant), ICTAVER, PAVER

Coefficients(a)

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	1.205	.441		2.736	.016
	PAVER	.126	.244	.141	.514	.615
	ICTAVER	.590	.222	.730	2.662	.019

a Dependent Variable: KAPPLY

Knowledge Creation:

To determine the rate of impact of independent variables on the dependent variable of knowledge creation, through enter method, all the variables were considered and entered in the model.

Model Summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.870(a)	.757	.723	.53533

a Predictors: (Constant), ICTAVER, PAVER

Coefficients(a)

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	-.506	.600		-.843	.413
	PAVER	1.107	.333	.866	3.326	.005
	ICTAVER	.005	.302	.005	.018	.986

a Dependent Variable: KCREATE

5.4.2 Framework Validation using Multiple Regression Analysis

Multiple Regressions Analysis (MRA): The MRA is a statistical technique for finding the best relationship between a dependent variable and selected independent variables. Regression analysis informs how strongly related a pair of variables is, via a measure of correlation. It also measures the extent of the effect that a change in the independent variable has on the dependent variable.

Regression analysis is used in this research to establish statistical model fit of the developed framework. To achieve this, the variables obtained for KM, people and organization culture and finally IT were subjected to further variable relationship analysis. Models are run separately for each of the dependent variables Knowledge Management, IT, people and organization culture. First, regression analysis was performed to ascertain if any relationships exist between KM Processes, People and Organizational Culture, and IT.

Second, regression analysis was employed to ascertain if there is a relationship between people and organizational culture, IT and KM Processes. In this instance the dependent variable, People and Organizational Culture, is assessed against the independent variables, and IT and KM Processes.

Table 5.2 presents the findings of statistical investigation to establish a relationship between KM processes, people and organizational Culture and IT.

The result of this multiple regression analysis indicates a highly significant relationship between the dependent variable (Knowledge Management) and independent variables (people and organizational climate, and IT). Model fit supports the hypothesis that there is a positive relationship between KM processes and IT and People and Organizational Culture. This means that changes in people and organizational culture and/or changes in IT will have a direct effect on Knowledge Management.

The results of the regression analysis are reported in Table 5.2. This regression analysis reports that a highly significant relationship exists between the dependent variable and the independent variable ($r = 0.951$). We may also interpret this to mean that a linear trend might exist between these three variables.

90.5 % variation in KM is explained by the independent variables people and Organizational Culture and IT, which shows that KM processes in the organizations surveyed mainly depend on

the IT infrastructure put in place by the organizations for KM and the overall people and organizational culture which promotes the sharing and use of knowledge. This implies that IT is used in a greater way to support KM in the organizations.

Model Summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.951(a)	.905	.891	.22512

a Predictors: (Constant), ICTAVER, PAVER

Table 5.2. Regression analysis: model summary

The result of the T-test is also an indicator of relationship. This test checks the hypothesis that β_1 (the coefficient for knowledge management) is equal to. If there was no relationship between IT, People and Organizational Culture and KM variables, β1 would be equal to 0. Using a one – tailed test, the calculated value of t from our coefficient table (Table 5.3) is equal to t= 3.208 and t =2.832. Given our sample size (N) being 100, the degrees of freedom are 99 (N-1). There are n-1 degrees of freedom (d.f.) in each sample, so d.f =99. If we look for the critical value of in a t-table we find that $t_{\alpha,99} = 1.66255$. Since both the calculated values are larger than the critical value (3.208> 1.66255) and (2.832 >1.66255), we can reject that $\beta_1 = 0$. This test reinforces the relationship tendency between IT, People and Organizational Culture and KM variables.

Coefficients (a)

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	.699	.252		2.770	.015
	PAVER	.449	.140	.523	3.208	.006
	ICTAVER	.360	.127	.462	2.832	.013

a Dependent Variable: KMAV

Table 5.3. Regression analysis coefficients

The results from the second multiple regression analysis performed, conducted using People and Organizational Culture as the dependent variable, and ICT as the independent variables are shown in Table 5.4. The correlation coefficient R obtained was equal to 0.863 (Table 5.) that indicates again that there exists a significant relationship between the dependent variable and the independent variable.

Model Summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.863(a)	.744	.727	.45743

a Predictors: (Constant), ICTAVER

Table 5.4. Regression analysis: model summary

There is a significant positive relationship between ICT and people and organizational culture due to the fact that the level of there significance was below 0.05, this is shown in the Table 5.5.

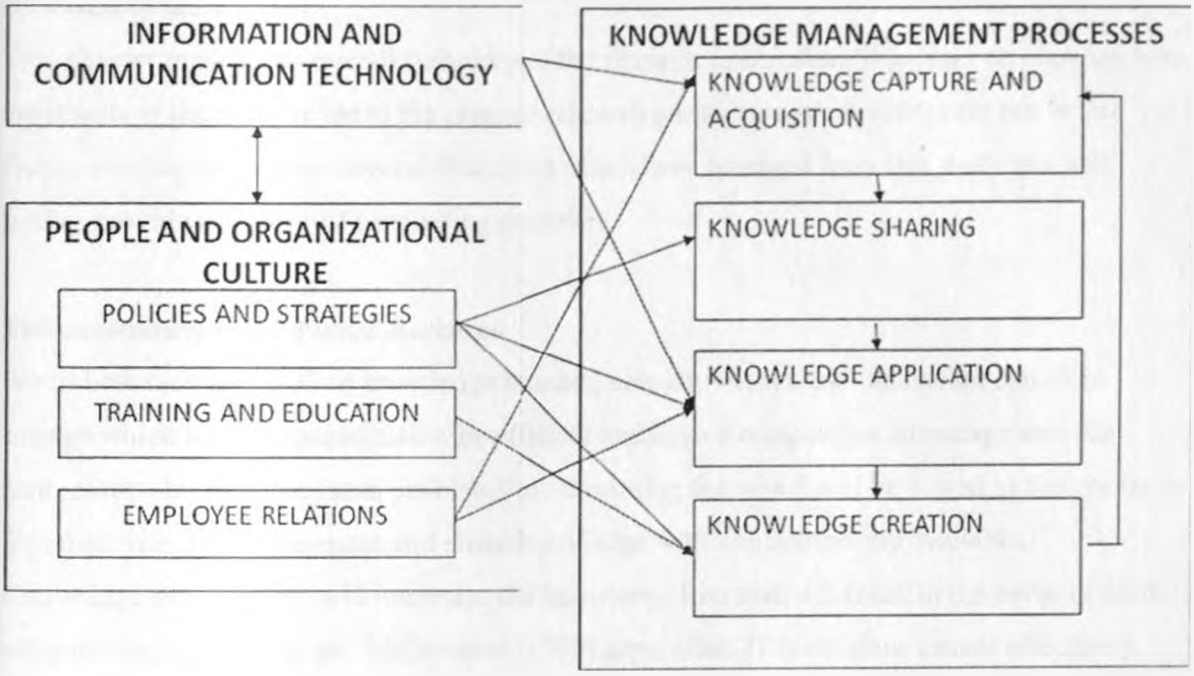
Coefficients(a)

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	.416	.453		.919	.373
	ICTAVER	.783	.119	.863	6.608	.000

a Dependent Variable: PAVER

Table 5.5: Regression analysis coefficients

Developed Framework for Applying Knowledge Management in Organizations



In order to capture, organize and transfer or share knowledge, organizations need to take advantage of ICTs. KM is an effort to make knowledge of an organization available to those who need it, where they need it and when they need it. KM involves both social and technical subsystems for an organization to fully benefit from a KM initiative, in that they compliment each other, the technological systems and social systems.

ICT alone cannot create effective KM within the organization; a change in organizational culture and people is needed in order to promote sharing within the organization. ICT is not seen as an absolute answer to KM, it is only a tool. ICT will not get anything out of one's head, there has to be an organizational culture that favors knowledge sharing, giving an implication that ICTs enhance the effectiveness of KM.

The results from the research study are supported by the other authors who note that only humans can take the central role in KM, not computer systems even with the most powerful information processing capabilities. (Stewart; 1991; 1993: 1995; Nonaka 1991; Nonaka & Takeuchi, 1995 ;)

CONCLUSION AND RECOMMENDATIONS

Overview of the Chapter

This chapter presents an overall summary of the research undertaken. It focuses on showing how the results of the study relate to the original research questions and objectives set out in this thesis, the chapter outlines several directions which have emerged from this study and will further provide a number of concluding remarks.

Recommendations for Future Research

When both tacit and explicit knowledge interact, new knowledge and innovation can often emerge which helps an organization be efficient and have a competitive advantage over her competitors, by these we mean problems of reinventing the wheel will be solved in that mediums for employees to communicate and share knowledge with one another are available.

Knowledge management will minimize the knowledge loss that will result in the event of death, resignations, retirements etc. McDermott (1999) argues that IT tools alone cannot effectively perform knowledge conversion, unless certain other conditions such as trust, face-to-face contact, time to interact between participants and creation of a common language are in place.

The framework discussed above shows the critical success factors for any KM initiative. In order to bring knowledge management to its next lap, organizations need to look into their work procedures and incorporate the knowledge management processes in the work procedures.

In addition, organizations also need to be able to identify the media or techniques that comprise of the knowledge management process for the organization. For organizations to implement a successful KM initiative, investment on education, training, infrastructure and knowledge related processes need to be leveraged or aligned.

The above study needs to be replicated in different industries to see their responses and determine their level of application of KM. Future research should also try to access a single organization in a longitudinal case study to determine their level of application of KM.

In a broader view, other KM enablers such as organizational structure, leadership and business strategy could be taken into consideration to provide a more comprehensive picture of the interrelationships among these factors.

To further validate our findings, a case study in a company should be performed. This would give us deeper understanding of the relationship of the constructs proposed in our model and would serve to further test its applicability and usefulness from the practical point of view.

Conclusion

The objectives of the study was to find out how the organization went about capturing, disseminating, applying and creating knowledge, four KM processes are used in this research. They are: knowledge creation and acquisition, knowledge capture/codification; knowledge organization; knowledge distribution/ sharing; and knowledge application (Nonaka, 1994) Secondly; this study determines the activities and techniques that comprise of the knowledge management process for the organization and finally to develop a framework for applying KM in organizations.

A review of all 10 cases is used to offer insight into the value of consolidating and centralizing knowledge resources. A comparison of the organizations provides evidence to show that corporations of different sizes and across industries can become a learning organization by maximizing opportunities to apply knowledge resources, thereby creating more efficiency within their companies. While each company followed different paths to get to their end, each share the strategy of consolidating company data and resources.

From the results obtained through the statistical analysis it is evident that KM is being practiced at a minimal level. A general conclusion based on the findings obtained indicated that the level of KM in organizations was very low. To help organizations benefit from KM initiatives a framework is developed to assist organizations in applying knowledge management in their respective organizations; the framework developed is to be applied in several case studies with the aim to test it and develop it further.

Further implementation of the framework should result in improved application of knowledge management in the organizations. It is important to ensure that organizational culture and people, knowledge management process and information technology are aligned towards the goals of knowledge management, and that best practice approaches are used in the knowledge management initiatives deployed in the organizations.

The study also reveals a number of relationships between knowledge assets and organizational elements being KM processes, people and culture and ICT.

From out findings ICT plays an important role in developing and sharing knowledge, but without the attention to the people and organizational culture of their respective organizations in which people are encouraged to share their knowledge, technology may not be able to stimulate the flow of knowledge. ICT is a key enabler for implementing KM. It enables rapid search, access and retrieval of information, and supports communication of employees. Technologies are only knowledge enablers and technology implementation cannot in itself provide a solution to KM. The success of a KM program depends on the support and participation of employees to generate, capture, share, apply and create knowledge. Technology can facilitate KM processes but if employees do not buy-in and contribute to them, its implementation will not enable the organization to fully utilize its intellectual assets.

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