Addis Ababa University
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KNOWLEDGE MANAGEMENT FRAMEWORK FOR THE MINISTRY OF DEFENSE (MOD) OF THE FEDERAL DEMOCRATIC REPUBLIC OF ETHIOPIA (FDRE)

Mesfin Legese Debele

June 2018
Addis Ababa

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A Thesis submitted to the School of Graduates Studies of Addis Ababa University in Partial Fulfillment of the Requirements for the Degree of Master of Science in Information Science

By
Mesfin Legese Debele
Addis Ababa University

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Name and Signature of Members of the Examining Board

Name	**Title**	**Signature**	**Date**
1. _____	Chairperson	_____	_____
2. Dr. Wondwossen Mulugeta	Advisor	_____	_____
3. Dr. Rahel Bekele _____	Examiner	_____	_____
4. _____	Examiner	_____	_____

ABSTRACT

Knowledge Management is becoming a critical factor to all sectors, be it educational, service provider, production/manufacturing, and even the public and nonprofit sectors. It also plays an important role in military organizations for the effective accomplishment of their mission. As any military organization, the Ethiopian Ministry of Defense needs real-time knowledge deeply embedded in the context of the operational area so that it can make good decisions and implement it faster than the enemy. However, the effective management of knowledge resources always remains challenging.

The general objective of this research is to propose a knowledge Management framework that the Ministry of Defense can utilize to ensure that it is making the best use of its knowledge resources. In order to meet this objective, the research adopted a Design Science Research as a research approach and design with mixed methodology for data collection and analysis. Therefore, review of literature on knowledge, knowledge management, and previously designed knowledge management frameworks is undertaken with the aim to develop conceptual framework and identify commonalities and shortcomings in the available knowledge management frameworks. Primary data is gathered through survey questionnaire, key informant interviews, and Focus Group Discussions to establish organizational context and domain specific knowledge management requirements. These two efforts are combined to design a comprehensive Knowledge Management framework appropriate for the Ministry of Defense specific context, as the selected research approach dictates.

The main goal of the framework is to provide the organization with the possible areas for consideration in knowledge management efforts and help to approach knowledge management methodologically and consciously. The proposed framework has all the three components of a typical comprehensive framework, and additional four components are added and interconnected to fit the requirements of the Ministry of Defense. The proposed framework has been evaluated by key experts in the field of knowledge and information management by means of a Delphi-like methodology. Lastly, to ensure effective KM in the MoD using the proposed KMF, the establishment of knowledge management section, the expansion of knowledge management technology and infrastructure, the formulation of knowledge management policy and Strategy, and the provision of continuous training on knowledge and KM are recommended.

Keywords: Knowledge, Knowledge Management, Framework, Design Science, Military Knowledge Management

DECLARATION

I declare that this thesis, "Knowledge Management Framework for the Ministry of Defense (MoD) of The Federal Democratic Republic of Ethiopia (FDRE)", is my original work and has not been presented for a degree in any other university. All sources materials used for the thesis have been accordingly acknowledged.

Mesfin Legese Debele

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04, June 2018

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

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04, June 2018

ACKNOWLEDGEMENT

I would like to express my deepest gratitude and heartfelt thanks to my thesis advisor, Dr. Wondwossen Mulugeta, for his scholarly and kindly assistance in reading and correcting this thesis. His critical remarks and comments from the preparation of the proposal to the completion of this thesis were constructive and helpful.

My thanks go to Ato Tesfamariam Tesfahunegn and Major Ayana Getnet for giving me valuable information, material support, and for assisting me in identifying well informed informants for the interview.

I am also greatly indebted to all informants, who were enthusiastic to share their exceptional knowledge and experience in the conduct of this research. I would like to extend my acknowledgment to all leaders and experts of the Communication and Information Technology (CIT) Department, Intelligence Department, Policy and Strategy Main Directorate, and Logistics Main Department, who took part in the interview and focus group discussion. My special thanks also go to Col Belay Abebe, without his exclusive contribution my work would have not been complete.

My heart-felt and deepest gratitude also goes to my beloved wife Tsige Gamie, and my three daughters Tihitina, Bethelhem, and Yeabsera for their consistent patience and moral encouragement during the course and throughout the research work.

Above all, however, these all is nothing without the will and help of the almighty God. He is the one who makes this all. Praise to the Lord.

Mesfin Legese

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ACRONYMS

AAR	After Action Review
ADP	Army Doctrine Publication
ADRP	Army Doctrine Reference Publication
ATP	Army Technical Publication
CIT	Communication and Information Technology (department)
COA	Course of Action
CS	Combat Support
CSS	Combat Service Support
DCSC	Defense Command and Staff College
DSR	Design Science Research
ERP	Enterprise resource planning
FDRE	Federal Democratic Republic of Ethiopia
FGD	Focus group Discussion
FM	Field Manual
GDP	Gross Domestic product
GKMF	Global Knowledge management Framework
ICT	Information and Communication Technology
IT	Information Technology
KM	Knowledge Management
KMF	Knowledge Management Framework
KMFs	Knowledge Management Frameworks
KMS	Knowledge management Systems
MDMP	Military Decision Making Process
MoD	Ministry of Defense
NCO	Non-Commissioned Officer
SECI	Socialization, Externalization, Combination and Internalization

CHAPTER ONE
INTRODUCTION

1.1 BACKGROUND

The world is experiencing a new economic era characterized by a rapid rate of change, globalization and knowledge-based products in which knowledge has become the primary source or wealth (Savage, 1996). Organizations no longer compete solely on the basis of financial capital and strength, rather knowledge is the new competitive advantage in business. In fact the Gross Domestic Product (GDP) growth rate is now determined, amongst other factors, by the quantum and quality of knowledge stock harnessed and applied in the production process in sectors of the economy (Omotayo, 2015). Therefore, today's competitive advantage is very much dependent on how organizations effectively and efficiently manage their knowledge.

Knowledge Management (KM) is becoming a critical factor to all sectors, be it educational, banking, telecommunications, production/manufacturing, and even the public and nonprofit sectors. It is stated by Teng and Song (2011) that the importance of KM is no longer restricted to knowledge intensive firms in the high-tech industries but to all sectors of the economy. Zack (2003) also further says that even companies in the traditional industries can benefit greatly from KM.

Similarly, the imperative of managing knowledge in an efficient and effective way is extended far beyond business organizations. Managing knowledge and information as well as organizational learning are considered as the prerequisites in military organizations (Lis, 2014). Though there are some differences, as it is observed by McIntyre et. al., (2003), Knowledge Management (KM) in military organizations is based on the same assumptions as corporate knowledge management. The major difference is in the context, content, and pace.

As any military organization, the management of knowledge is promoted as an important and necessary factor for organizational survival and maintenance of competitive strength in the Ministry of Defense (MoD) of the Federal democratic Republic of Ethiopia (FDRE). KM in the MoD can play valuable role in leveraging existing knowledge and converting new knowledge into action through the KM cycle. According to the Strategic Plan 2016-2020 (MoD, 2015) of the MoD, the organization pays more attention to knowledge management issues, perhaps, much greater than other business organizations. Though, the MoD acknowledges that managing and

utilizing knowledge effectively is vital for the organization to take full advantage of the value of knowledge, the effective management of its knowledge resources remain challenging.

Therefore, the rationale behind this research is to propose institutionalized Knowledge Management solutions for the MoD, which enables the organization to manage and transfer its knowledge effectively.

1.2 PROBLEM STATEMENT

Current challenges faced by the military on the era of globalization and the advance of Information and Communication Technology (ICT) has been shifted and identified as more complex. As a result, defense organizations and military operations now needs thinking soldiers who are innovative and creative to fight digital warfare, which present and future wars will be all about. A balanced and credible force guided by sound operational strategies and concepts, equipped with high-tech weapons and manned by competent professionals will be the direction of almost all today's military organizations in developing their defense forces.

Members of the military organizations often operate in high-risk and high-stake situations in dangerous environments. In combat, which is an extreme case, soldiers risk their lives fighting directly with enemies. They bear the responsibility for the accomplishment of operational aims and objectives as well as for their subordinates and colleagues. They often encounter extreme terrain and climate conditions. They are expected to operate and make the best possible decisions in highly uncertain situations. Therefore, soldiers need knowledge which is deeply embedded in the context of the operation area. They need knowledge which can be practically applied to solve the problems they encounter. They need knowledge and expertise to be available immediately when needed in order to respond properly to emerging threats and challenges.

This means military organizations, according to Lis (2014, p. 59), require knowledge processes that are robust and reliable within operational contexts; knowledge content and intellectual assets that are focused, precise, and reliable with suitable recall levels; and knowledge creation and conversion processes that match the pace of operations. Routine trainings and education alone do not cover all the good experiences and encounters of elite military personnel. KM in the military will play a valuable role in leveraging existing knowledge and converting new knowledge into action through the KM cycle, which is essential to help leaders make better decisions and conduct more effective operations. On the other hand, military operations often

times give no time to think and analyze options to make a decision. Thus, many decisions are made intuitively in the battlefield, in a time constrained and stressful environment. Intuition requires knowledge, specifically tacit knowledge gained through study, experience, practice, and human interaction.

Literatures show that the applications of KM in military context is seen extensively applied in the military of major countries, like the United States of America, Britain, Canada, Australia and several countries such as Japan, Korea, and Singapore to name a few. In the MoD, as any organization, most of the organizations' extensive and critical knowledge gained through study, experience, practice, and human interaction is imbedded within its soldiers. This knowledge must be identified, captured, shared, and used. Unlike other business organizations, knowledge in the MoD is also tends to be sensitive in regard to security. Not all knowledge will be shared to everyone. There are different knowledge management efforts that are being undertaken within the various units of the organization. However, organizational records and the preliminary assessment carried out by the researcher revealed that these efforts are very limited and none of these efforts are integrated and directed towards the achievement of the overall objectives of the organization. Even most of the activities are conducted as a daily routine activity and do not consider the basic ideas and concepts of KM. Despite the critical importance of knowledge and knowledge management in the organization, there is no structure with KM responsibility, and the general understanding and perception of knowledge and knowledge management in the organization is at its infancy stage. Moreover, there is no framework, guiding principles and policies and strategies that govern KM in the organization.

Effectiveness of KM in the MoD depends on how KM processes are aligned with the organization's infrastructure and processes, in a manner that supports the achievement of its goals. To understand and represent these relationships a simple list of elements and processes is inadequate. Therefore, the MoD needs a holistic framework where all KM resources, activities, tools and technologies are integrated into a dynamic coherent whole.

Frameworks, or blueprints, according to Stankosky (2005), help ensure organization's KM programs include these elements. Knowledge management frameworks (KMFs) provide the organization with the central areas for consideration in KM efforts (Earl, 2001). Frameworks can help organizations to think about KM methodically and consciously (Okunoye, 2004). Furthermore, they can help to identify a specific approach to KM, to define goals and strategies,

to understand the various KM initiatives, and then to choose the best ones in the particular circumstances (Earl, 2001). Frameworks define the relevant objects and their coherences as well as providing a scaffold for aspects that have to be considered during the design and implementation process. By that, frameworks are a proper solution to map the different contextual aspects, influence factors as well as results. Frameworks also describe concepts, aspects, such as processes or systems as well as their relations of a certain domain or problem to create a better understanding or to support specific purposes. Therefore, it is inevitably important for the MoD to embark on knowledge-based organization through KM and KM frameworks.

As the KM field grows, like any other field, researchers and practitioners have developed theories, models and frameworks that explain KM phenomena. As a result several, perhaps hundreds of KMFs have been proposed. Among the most influential pioneers of the field who have developed KMFs include Wiig (1993), Alavi and Leidner (2001), Lai and Chu (2000), the European Committee for Standardization (CEN) (2003), Heisig (2009), Dalkir (2011), and Evans *et al.* (2015). According to Karemente, et al., (2011) these KMFs have served as foundations for planning and developing KMS in the corporate world. However, not all organizations can manage knowledge in the same manner. Each has at least different standards, operation procedures, and organizational structures. Since the military and the corporate world differ in many aspects, those frameworks developed for the corporate world do not fit to the military context as they are. Moreover, there are no frameworks found from the military perspective for public release that can be adopted to the MoD.

Similarly, KM research in the practice of KM in the MoD is almost nonexistent. There are only two research works that have been made so far on the practice of KM in the MoD. One conducted by Kebede Mikael (2016), which deals with KM in the peacekeeping context, and the other is a master's thesis by Hager (2017), Defense Command and Staff College (DCSC). None of them have in depth assessment on the current KM practices, tools and techniques used, and challenges that are impeding the practice of KM.

Therefore this research aims to propose a KM framework for the MoD, that provides a clear and unambiguous knowledge base which can serve as a platform for the development of an effective knowledge management strategy, and consequently contribute a bit to fill the research gap in KM in the Military.

1.3 BASIC RESEARCH QUESTIONS

In view of the aforementioned problem statement, the research aims to answer the following questions:

1. What is the current status of KM practice in the MoD?
2. What are the factors that have critical impact on the practices of Knowledge Management in the MoD?
3. What KM framework can be best utilized by the MoD to ensure that it is making the best use of its intellectual capital?

1.4 OBJECTIVES OF THE RESEARCH

1.4.1. General Objective

The general objective of this research is to propose a Knowledge Management Framework for the Ethiopian MoD to ensure the proper usage of its knowledge resources.

1.4.2. Specific Objectives

1) Assess the current practices of KM in the MoD,
2) Identify major factors that impact on the practices of Knowledge Management in the MoD,
3) Review available KM frameworks that can be used as a basis to build a KM framework for the purpose of the MoD,
4) Propose a KM framework that best fits with the MoD's specific context,
5) Evaluate the applicability of the proposed KM framework.

1.5 SCOPE

The scope of the research is confined to the organization of the Ethiopian MoD. However, due to the limitation of time and resources, data collection is conducted from the Defense Headquarters and different departments in Addis Ababa and a few selected field units. The research process comprises an assessment of the current KM practices and approaches in the MoD; which include the identification of knowledge resources of the organization, knowledge management tools, methods, and processes used to manage these resources. The current level of understanding and perception of employees towards knowledge and KM, and major factors that impact on the practices of Knowledge Management have also been assessed. Finally, different

KM frameworks are examined from the business and military context and a KM framework is tailored and proposed that can best fit to the MoD context.

1.6 APPLICATION OF THE RESEARCH

KM is highly dependent on the context and cannot be validated separately from practical implementations. It is one of the main objectives of KM research to develop solutions which achieve practical impact and benefits as the main goal. Therefore, the proposed framework can assist the management of the MoD to understand the true nature of the relationships that exists between an organization and knowledge management processes, and to exploit them for an organization's success. The framework can also be used to realize a common understanding within different stakeholders in the MoD on the different issues in the KM domain, to assess and evaluate KM practices in the organization, and to structure KM approaches and practices. Most importantly, the framework would be the basis on which KM policies and strategies to be developed for the organization.

1.7 ORGANIZATION OF THE THESIS

The research document is organized into six chapters. The first chapter is an introduction chapter in which the overview and background of the study, statement of the problem, objective of the study, research questions that the research is intended to answer, as well as significance and the scope of the study are discussed. The second chapter provides an overview of the most important concepts in the field of knowledge and KM in the research literature to develop the basic theoretical and conceptual understanding on the subject matter. In this chapter different KM frameworks have been reviewed as empirical study based on the criteria that has been identified from the theoretical framework. The third chapter dealt with the research design and methodology. As the research adopted Design Science approach and design with mixed research methodology, the chapter describes the research model which adopted the Design Science cycle, the procedures followed for sampling, data collection methods and method of data analysis and interpretations. The fourth chapter is focused on the data presentation and analysis. Here both qualitative and quantitative data is presented and analyzed and triangulated with literature. The fifth chapter is where the Knowledge Management Framework (KMF) is designed based on the requirements identified in chapter four and conceptual and empirical results in chapter two. The last chapter presented conclusion and recommendations.

CHAPTER TWO

THEORETICAL FRAMEWORK AND REVIEW OF RELATED LITERATURE

THEORETICAL FRAMEWORK

This chapter provides an overview of the most important concepts in the field of knowledge and KM in the research literature. This will lay down basic theoretical and conceptual understanding of what knowledge and KM as well as their associated concepts are. Therefore, starting with history, definition, and importance of knowledge and KM, types of knowledge, components, processes, systems, as well as factors affecting KM practices have been discussed from different perspectives. Lastly different KM frameworks have been reviewed as an empirical study based on the criteria that have been identified from the theoretical framework.

2.1 THE HISTORY OF KNOWLEDGE AND KM

Historical perspective of knowledge and KM indicates that these concepts are old quests. Although the term KM may seem new, the concept of categorizing and defining the parts of knowledge dates back to thousand years. Throughout history, brilliant minds such as Aristotle, Plato, and Socrates, have philosophized over the fascinating notion of knowledge. Mertins et al., (2003)**,** stated that the philosopher Socrates dealt with the question of the limit of knowledge, as early as 5th century BC. According to Fin (2013), Aristotle is also accredited as the first KM pioneers with his groundbreaking works more than 2,000 years ago.

In the early 17th century, Sir Francis Bacon, who is attributed with saying "Knowledge is power," studied knowledge and published his views in The Advancement of Learning. Despite this seminal work, interest in epistemology or the study of knowledge declined until post World War II (Girard & Girard, 2009)**.** However the history and development of KM, as we know it today, is not clear and linear since it has evolved from so many different disciplines and domains. A number of management theorists have contributed to the evolution of KM as it stands today. Among them, Peter Drucker, Paul Strassmann, and Peter Senge are few of them (Geisler & Wickramasinghe, 2009)**.** Drucker was the first to coin the term knowledge worker in the early 1960s (Drucker, 1964).

As the recent history of KM is concerned, the term knowledge management came into being in the popular press in 1991, when Tom Stewart published "Brainpower" in Fortune Magazine. Perhaps the most widely read work to date is Ikujiro Nonaka and Hirotaka Takeuchi's "The

Knowledge-Creating Company: How Japanese Companies Create the Dynamics of Innovation" (1995). At the same time by the mid-1990s, thanks in part to the Internet, KM initiatives were flourishing, (Geisler & Wickramasinghe, 2009).

Today, knowledge and its management have been receiving more interest than ever before. As we move into the twenty-first century, the business world is increasingly becoming competitive and the demand for rapid access to relevant knowledge also becomes critical (Geisler & Wickramasinghe, 2009). According to Dalkir (2005), globalization of business, learning organizations, corporate amnesia, and technological advances have been considered the major business drivers behind today's increased interest in the development and application of KM. With the advent of the information or computer age, KM has come to mean the systematic, deliberate leveraging of knowledge assets.

2.2 WHAT IS KNOWLEDGE?

The fundamental issue in many KM literatures available today is to actually define what knowledge is. The question of defining knowledge has occupied the minds of philosophers since the classical Greek era and has led to many epistemological debates. Like many words, according to Gamble and Blackwell (2001), the word Knowledge caries a depth of meaning that goes beyond simple dictionary definitions. Therefore, forming some simple definition for knowledge seems nearly impossible. Nevertheless, Merriam-Webster dictionary defines knowledge as "the fact or condition of knowing something with familiarity gained through experience or association".

Zeleny (1989), stated that knowledge is a purposeful coordination of human actions; the whole set of insights, experiences, and procedures which are considered to be subjectively reasonable and feasible. Therefore, it guides the thoughts, behavior and communication of people. Knowledge, according to Lambe (2011), is a complex cognitive process that involves a unique blend of communication and learning, which are affected by an individual's perception and experiences. It is "personalized information related to facts, procedures, concepts, interpretations, ideas, observations, and judgments which is possessed in the mind of individuals" (Alavi & Leidner, 2001, p. 109). Schubert et al. (1998), also described knowledge as a state or fact of knowing or a condition of understanding gained through experience or study; and, the sum or range of what has been perceived, discovered, or learned.

Davenport and Prusak (2000, p. 5), indicated that knowledge is "a fluid mix of framed experience, values, contextual information and expert insight and grounded intuition that provides an environment and framework for evaluating and incorporating new experiences and information". They also added that knowledge originates and is applied in the minds of people who own it. However, since knowledge is a complex concept and epistemologists spend their lives trying to understand what knowledge is, Davenport and Prusak (2000), acknowledged that this definition is just a pragmatic description to help communicate what they mean by knowledge.

Due to this, different typologies have been developed to help define knowledge but, according to Omotayo (2015), the only consensus is the notion that knowledge is more than just mere data and information. Therefore, many knowledge and KM literatures often prefer to define knowledge in terms of data and information.

2.3 DATA, INFORMATION, AND KNOWLEDGE

Several cognitive theories exist that take into account the relationship between data, information, and knowledge in a pyramid called knowledge pyramid. Knowledge is usually shown as the top layer of the hierarchy based on data and information (Davenport & Prusak, 2000). However, some research suggests that the hierarchy should extend beyond these three basic building blocks. For example, the Department of Defense (2014), suggests the hierarchy should include understanding as a fourth component. According to Downes (2014), Russell Ackoff (1994) has also extended the U.S. Defense's pyramid in to five by adding Wisdom.

As it is depicted on figure 2.1, data become information when meaning, understanding, relevance, and purpose is added on it. Similarly, information is transformed to knowledge through personal application, values, and beliefs. Despite identical names for many of the components, there is no consensus on their exact meaning. As is often the case when academia and the business world merge, a variety of definitions exist for data, information, and knowledge (Girard & Girard, 2009)**.**

2.3.1 Data

The definition of data is almost certainly the least contentious, as it is relatively straightforward and intuitive. According to Davenport and Prusak (2000), data is the raw material comprising simple, discrete, objective facts measured, or recorded observations which are not in context and bear no relationship with other facts. From the military point of view, data consists of

unprocessed signals communicated between any nodes in an information system, or sensing from the environment detected by a collector of any kind - human, mechanical, or electronic (Department of the Army (2), 2012). Wiig also mentioned that "data is a sequences of numbers and letters; spoken words; pictures; even physical objects presented without a context" (1992, p. 70). "In an organizational context, data is most usefully described as structured records of transactions" (Davenport & Prusak, 2000, p. 2).

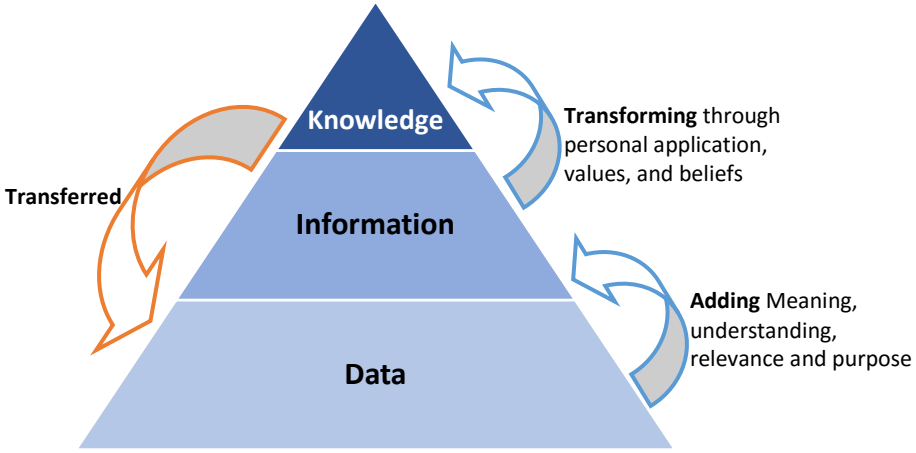


Figure 2.1: The pyramid of data, information, and knowledge.
(Source: Bender & Fish, 2000, p. 126)

2.3.2 Information

Information is data that has been analyzed and processed by collecting, classifying and linking elements of data into a format that is meaningful and has value when taking actions or making decisions. It consists of "facts and data that are organized to describe a particular situation or condition" (Wiig M. , 1992, p. 66). Information also provides answers to 'who', 'what', 'where' and 'when' questions (Ackoff 1989, in Garg, Pandey, & Vashisht, 2017, p. 103).

2.3.3 Knowledge in relation to data and information

Looking at knowledge from data and information perspective, it is clear that data, information, and knowledge are interrelated in a hierarchical structure as best described by Davenport and Prusak (1998, p. 5 in Nkwenti, 2009, p. 4) as "the value-added processes" where data supports the generation of information, which is in turn used to generate knowledge (Nkwenti, 2009, p. 4). Similarly the Department of the Army (2012), stated that knowledge is information that has been analyzed to provide meaning or value or evaluated as to implications for the military operation. Though data and information can provide the building blocks of knowledge, the transformation process is not an automatic one. It rather involves the interaction and the cognitive abilities of

people to analyze data and information then transform them into knowledge (Nkwenti, 2009). Knowledge can be applied in evaluating and incorporating new information and experiences, providing the capacity for effective action and answering 'how' questions (Davenport & Prusak, 2000).

2.4 IMPORTANCE OF KNOWLEDGE

Knowledge is an essential part of KM. Without having knowledge to manage, there would be no KM. It is the fundamental resource that allows people function intelligently (Omotayo, 2015) and is increasingly recognized to underlie the success of all enterprises. It is the agent that generates visions, the ingredient that drives people's reasoning, and the capability that leads to intelligent-acting behavior. Knowledge is also "the factor that creates value for the organization and it is judged to be the most valuable asset that an organization has" (Wiig M. , 1992, p. 1). Because, organization's decision-makers, problem-solvers and innovators rely on knowledge gained from insight and experience. Knowledge is gained through study, experience, practice, and human interaction and is the basis for expertise and skilled judgment and provides meaning or value for the operation (Department of the Army (2), 2015). Many organizations are becoming increasingly concerned with organizational knowledge and their use of knowledge to create and make quality products, deliver quality services, and to maximize the efficiency of their internal operations (Wiig M. , 1992, p. 4). In order to effectively manage organizational knowledge as a strategic asset, different scholars developed different conceptualization and partitioning or classification of knowledge.

2.5 CLASSIFICATIONS OF KNOWLEDGE

Most KM theorists recognize knowledge as having several forms or shapes, with the most popular perspective being the dichotomy of Polanyi's (1958) tacit vs. explicit knowledge and Blackler's (1995) categorization of knowledge in to five types as embrained, embodied, encultured, embodied, embedded, and encoded. According to Alavi and Leidner (2001, p. 112), some scholars such as Zack (1998) refer to knowledge as declarative (know-about or knowledge by acquaintance), procedural (know-how), causal (know-why), conditional (know-when), and relational (know-with).

2.5.1 Tacit vs. explicit knowledge

According to Robertson (2007, p. 27), Polanyi was among the first modern philosophers to distinguish knowledge as tacit and explicit. However, Laurence Prusak, another early KM

practitioner, argues that the ancient Greek philosopher Aristotle was the one who distinguished knowledge as tacit and explicit (Prusak, 2001, p. 1005). The distinction between tacit and explicit knowledge led other researchers including Nonaka and Takeuchi to investigate the relationship between these two types of knowledge. In addition to this, Koenig (2015)**,** extended this classification by adding implicit knowledge as the third classification and (Choo, 1995), classified organizational knowledge as tacit, rule-based, and background knowledge.

2.5.1.1 Tacit knowledge

All individuals have a unique personal store of knowledge gained from life experiences, training, and formal and informal networks of friends and professional acquaintances, which is referred as tacit knowledge. Intuition, mental agility, effective responses to crises, and the ability to adapt are forms of tacit knowledge (Department of Defense (2), 2014, pp. 3-2). Tacit knowledge is the expertise and experience that resides in the minds of individuals and has not been formally documented. It is influenced by personal commitment, ideals, values and emotions, and it is hard to formalize and includes subjective insight, intuition and hunches (Downes, 2014). It is also the difficult type of knowledge to codify and articulate (Davenport & Prusak, 2000). It is this tacit knowledge that can only be shared from one party to another through socialization, and created (stored) by the other party through experience and practice (Nonaka, 1994; Tsoukas, 2001 in Bordeianu, 2015). Leaders use tacit knowledge to solve complex problems and make decisions (Department of Defense (2), 2014, pp. 3-2).

As described by Hislop (2013, p. 19) this knowledge is characterized as "inexpressible in a codifiable form". Sayer (1992 in Hislop, 2013, p. 18) says that "tacit knowledge is informal, and highly subjective, being embedded within cultural values and assumptions of those who possess and use it."

2.5.1.2 Explicit knowledge

Explicit knowledge is that which has been documented and can be shared with others (Polani, 1958). Explicit knowledge can be readily captured, codified and communicated to others thus becoming universal knowledge (Downes, 2014). It consists of written or otherwise documented information that can be organized, applied, and transferred using digital or non-digital means and lends itself to rules, limits, and precise meanings (Department of Defense (2), 2014, pp. 3-2). Examples of codified and articulated forms include doctrines, manuals, fact sheets, pictures, charts and diagrams.

Table 2.1: Comparison of properties of tacit versus explicit knowledge (Dalkir, 2005:8)

Properties of tacit knowledge	Properties of explicit knowledge
• Ability to adapt, to deal with new and exceptional situations	• Ability to disseminate, to reproduce, to access and re-apply throughout the organization
• Expertise, know-how, know-why, and care-why	• Ability to teach, to train
• Ability to collaborate, to share a vision, to transmit a culture	• Ability to organize, to systematize, to translate a vision into a mission statement, into operational guidelines
• Coaching and mentoring to transfer experiential knowledge on a one-to-one, face-to-face basis	• Transfer knowledge via products, services, and documented processes

These two forms of knowledge are interdependent and Tsoukas (2005b, in Evans, Dalkir, & Bidian, 2014, p. 53) refers to tacit and explicit knowledge as "two sides of the same coin". Essentially, codified and encapsulated knowledge provide the grounding of meaning and the basis for the interpretation to a tacit activity. Un-codified knowledge provides background context and warrants for assessing the codified knowledge (Duguid, 2005). Most of the knowledge assets of organizations reside within tacit or un-codified form. According to FM 6-0 (2014, pp. 3-2), 80% and 20% of the organizations knowledge is tacit and explicit respectively. According to Hislop et al., (2018, p. 34) a number of writers including Brown and Duguid (2001) and Tsoukas (2003), criticized the notion of Polanyi's classification of knowledge as tacit and explicit. They suggest that there is no such thing as pure tacit and explicit knowledge, as all knowledge contains elements of both and they are inseparable.

2.5.2 Individual, Group and Organizational knowledge

Depending on the type of knowledge that exists in an organization, knowledge can also be classified as individual, group and organizational knowledge. Knowledge is not merely considered as know-how that exists with individuals mind, instead it also exists at group and organizational levels (Nonaka & Konno, 1998).

Individual knowledge is a knowledge embedded in the mind of an individual and it is an explicit knowledge private to individuals themselves. The knowledge of individual members needs to be shared and legitimized through integrating interactions and Information Technology (IT) before it becomes group knowledge. According to Nonaka and Takeuchi (1995), organizational knowledge is created through continuous dialogue between tacit and explicit knowledge. Organizational knowledge is a knowledge that scattered throughout the organization members. It

enables firms to attain deeper levels of understanding and perception that lead to business intelligence and insight.

2.5.3 Personal, shared expertise and public knowledge

Wiig also classified knowledge in similar way as Nonaka & Konno (1998) in to three; personal knowledge, shared expertise, and public knowledge (Wiig M. , 1992, pp. 132-33). Public Knowledge is the most accessible knowledge which is predominantly explicit, taught and shared routinely, and generally available in the public domain. Shared Expertise, on the other hand, is the proprietary knowledge asset which is an exclusive knowledge held either by knowledge workers and shared in their work, or embedded in technology and other proprietary manifestations. Wiig (1992) referred personal knowledge as the least accessible and most complete knowledge which exists tacitly in people's minds and is used no-consciously in work, play, and daily life.

2.6 FORMS (DIMENSIONS) OF KNOWLEDGE

In addition to the types of knowledge discussed above, (Blackler, 1995) defines knowledge as taking five distinct forms: embodied, embedded, embrained, encultured, and encoded.

- **Embodied** knowledge is action oriented and likely to be only partly explicit and it depends on people's physical presence (Wilkinson, et al., 2015, p. 230). It is gained through training of the body to perform a specific task, (Hislop, 2013); and is impossible to totally disembody this knowledge from people (Omotayo, 2015).
- **Embedded** knowledge is a "knowledge that resides in systematic routines and procedures" (Blackler, 1995, p. 1026). Organizational common tasks, routines or the common ways people go about their jobs, can hold embedded knowledge, as the routines facilitate learning amongst the employees that go beyond their job tasks. Hislop (2013) corroborates this fact by stating that knowledge is embedded, and inseparable from, practice. That is, knowledge that is embedded in work practices is simultaneously embodied by the workers who carry out these practices (Omotayo, 2015).
- **Embrained** knowledge is abstract knowledge dependent on conceptual and cognitive skills and often equated with scientific knowledge (Blackler, 1995). People can possess embrained knowledge over time and they may reflect one's perceptions, opinions, values and morals but has difficulty expressing in words or sharing with other. It is also a type of

knowledge that one cannot easily write down, talk about with others, or represent with pictures or other tools. It is gained through experience.

- **Encultured** knowledge is related to the creation of shared understanding and embedded in cultural systems (Wilkinson, Townsend, & Suder, 2015). Therefore, it is a set of knowledge that is shared among groups of people who share a similar environment or culture, such as what is accepted, what actions and opinions are considered normal, and what behaviors are expected of people.
- **Encoded** knowledge is 'recorded in signs and symbols and requires interpretation' (Blackler, 1995, p. 1026). Procedure manuals, guidelines, process diagram, flowcharts, recipes and instructions are all examples of encoded knowledge, because they are encoded in a physical form that is understandable by a lot of people (Omotayo, 2015).

Therefore, it can be said that organizational knowledge is embodied and embrained in the staff, embedded in routines/common tasks, encultured among the staff, and encoded in manuals, guidelines and procedures. Davenport and Prusak (2000) stated that in organizations, knowledge becomes embedded not only in documents or repositories, but also in organizational routines, processes, practices, norms and cultures. Organizational knowledge is therefore the sum of the critical intellectual capital residing within an organization (Badaracco, 1991 in Omotayo, 2015)

2.7 KNOWLEDGE MANAGEMENT

"If knowledge is viewed as a resource that is critical to an organization's survival and success in the global market, then like any other resource it demands good management" (Holsapple & Joshi, 2002, p. 47). As knowledge is not a simple construct to define, it should come as no surprise that the concept of KM is equally difficult to pin down (Geisler & Wickramasinghe, 2009), due to the wide range of strategies that have been advocated and adopted for managing Knowledge in organizations (Hislop, 2013).

KM has been defined in different ways by different scholars. Some defined KM as a methodology, tools and techniques. Others define it as a field, discipline, and even as a science. KM has been described by Davenport & Prusak (2000), as the methodology, tools and techniques required to gather, integrate and disseminate knowledge within an organization**.** It is an umbrella term which refers to any deliberate efforts to manage the knowledge of an organization's workforce, which can be achieved via a wide range of methods including

directly through the use of particular types of ICT, or more indirectly through the management of social processes, the structuring of organizations in particular ways or via the use of particular culture and people management practices (Finn, 2013).

Amidon and Skyrme (1997, p. 32) also defined KM as the "explicit and systematic management of vital knowledge and its associated processes of creating, gathering, organizing, diffusion, use and exploitation" which requires "turning personal knowledge into corporate knowledge" to be shared and put to use across an organization. Duhon (1998, 12) in his part mentioned that KM can be described as a "discipline that promotes an integrated approach to identifying, capturing, evaluating, retrieving, and sharing all of an enterprise's information assets". Dalkir even described KM as "a science of complexity, because it could be seen as a response to the challenge of trying to manage our complex and information-overloaded work environment" (2005, p. 18). It is a formal process that engages an organization's people, processes, and technology in a solution that captures knowledge and delivers it to the right people at the right time. Arthur Andersen in (Geisler & Wickramasinghe, 2009) defined KM as the discipline of enabling individuals in an organization to collectively acquire, share, and leverage knowledge to achieve business objectives..

From the military perspective, the US Army Regulation AR 25-1 (2013) defined KM as a discipline that promotes an integrated approach to identify, retrieve, evaluate, and share an enterprise's knowledge assets to meet mission objectives. The military understands KM in a short phrase as "Know, Show, Grow!". "Know" refers to tacit knowledge (Department of the Army, 2012, p. iv). "Show" stands for knowledge that is explicit to be shared with others. "Grow" denotes collaboration toward innovation which sparks new knowledge (Lis, 2014). KM is thus much more than just managing information, i.e. getting the right information to the right people at the right time, since its very essence is social, and keeping its social context in future might be crucial (Dalkir K. , 2005, p. 319).

2.7.1 Why KM is important?

Several researchers have stated that the purpose of KM is to increase an organizational performance to gain a competitive advantage. Several benefits including better decision making, better customer handling, faster response to key business issues, improved employee skills, and increased profits (KMPG Consulting, 2000). It also helps to create shared understanding through the alignment of people, processes, and tools within the organizational structure and culture in

order to increase collaboration and interaction between leaders and subordinates (Department of the Army, 2014, pp. 3-1).

According to Geisler & Wickramasinghe (2009), KM will help organizations to gain insight and understanding from their own experience. The purpose of KM according to Wiig (1997, p. 1) is, in general "to maximize the enterprise's knowledge-related effectiveness and returns from its knowledge assets and to renew them constantly". Similarly Department of the Army (2013) articulated that the objective of KM is to connect those who know with those who need to know by leveraging knowledge transfers from one-to-many across the defense organization. This transfer or flow of knowledge also enhances shared understanding, learning, and decision-making (Department of the Army (2), 2012). Therefore, KM is the management of the organization's knowledge towards the continuous renewal of the organizational knowledge base. (Geisler & Wickramasinghe, 2009).

2.7.2 Components of KM

Based on actual experiences of the leading global KM case studies, Bhojaraju (2005) argues that the components for KM can be broadly categorized into three classes - People, Processes, and Technology.

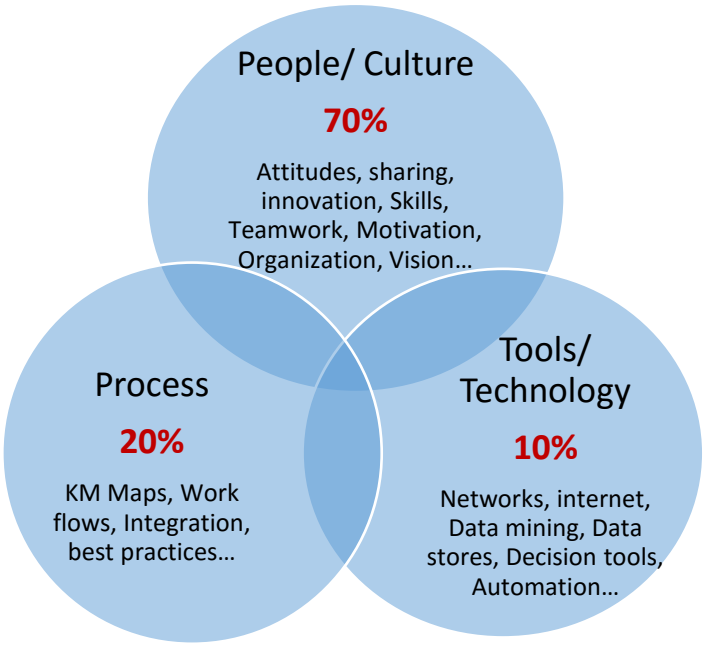


Fig 2.2: Components of KM
(Source: Bhatt 2000, in Shannak, Masa'deh, & Akour, 2015, p. 154)

While all three are critical to build a learning organization and get business results from KM. Most of the organizations worldwide which implement KM have found it relatively easier to put technology and processes in place, whereas the "people" component has posed greater challenges (Bhojaraju, 2005). According to Bhatt (2000, in Shannak, et al., 2015, p. 154) 90% of KM is the people/culture and process components. Technology which is the remaining 10% enables processes of KM to a large extent. As acquisition of knowledge is accordingly made easier, knowledge is accessed quickly and from any location and combination of various knowledge is enabled in order to create new knowledge (Masic, et al., 2017, p. 133).

However the American Army Field Manual FM 6-0 (2014), adds ‘organization’ as the fourth component. Organization, in this context, is the matrix in which people, processes, and tools or technology function to integrate individual and organizational learning strategies.

2.7.3 Knowledge Assets (Resources)

The processes of KM involve knowledge acquisition, creation, refinement, storage, transfer, sharing, and utilization of organizational knowledge or knowledge related assets or often referred as intellectual assets (King, 2009). Organizational knowledge assets are defined as ‘stocks of knowledge’ through which a variety of value added services flow. Knowledge or intellectual assets are also referred in general as what is known by the organization and its employees. In theory, these assets could have a long lasting, open-ended value since there is a nonlinear relationship between the effort used in creating them and the value they yield for the organization (Boisot, 1998, in Evans, et al., 2014, p. 86)**.**

Knowledge-related assets include the knowledge possessed by the organization and its workforce in the form of information, ideas, learning, understanding, memory, insights, cognitive and technical skills, and capabilities. Organization’s workforce, databases, documents, guidelines, policies and procedures, software, and patents are repositories of the organization’s knowledge assets. Knowledge assets are held not only by an organization but reside within its customers, suppliers, and partners as well (King, 2009). Nonaka et al. (2005, p. 36) regard the knowledge assets as the basis of knowledge-creating process and define them as “firm-specific resources that are indispensable to create values for the firm”.

In general, according to Geisler (2009, p. 11) intellectual and knowledge-based assets fall into one of the two categories: explicit or tacit. On the other hand, Nonaka and Tekeuchi identify four categories of knowledge assets as experiential, conceptual, routine, and systemic Knowledge

Assets (1995). Experiential Knowledge Assets are **t**acit knowledge gained through common experiences, which include skills and know-how of individuals. Explicit knowledge which is articulated trough images, symbols, and language such as product concepts, design, and brand equity are identified as Conceptual Knowledge Assets. Routine Knowledge Assets **a**re tacit knowledge routinized and embedded in actions and practices which include Know-how in daily operations, organizational routines, and organizational culture. Similarly, systemized and packaged explicit knowledge, including documents, specifications, manuals, databases, and patents and licenses are classified as Systemic Knowledge Assets (Nonaka & Takeuchi, 1995)**.**

On the other hand, many scholars including Luthy (1988), Stewart (1997), Holsapple and Joshi (2002), and Okunoye (2004) defined intellectual capital as the sum of everything everybody in a company knows that gives it a competitive edge. They also classified it in to three categories summarized as Human capital, which is the intangible value of a business covering its people, Relational capital, which is the value inherent in its relationships, and Structural capital, everything that is left when the employees go home, of which Intellectual property is one component. Having identified the generic types of knowledge resources an organization possesses, organizations formulate a set of generic types of manipulation activities they undertakes in working with those resources (Holsapple & Joshi, 2002, p. 55).

2.7.4 KM Processes

KM is viewed as "distinct but interdependent processes, where many activities are formed to carry out key elements of an organization's KM strategy and operations" (Omotayo, 2015, p. 8). KM processes include activities gearing towards creating and sharing knowledge and harvesting knowledge from either employees or external sources. There have been numerous KM processes cycle models that describe the relationships of the key processes of KM, ranging from Davenport and Prusak's (2000) 3-stage model, which is perhaps the smallest, to Ward and Aurum's (2004) 7-stage model (King, 2009). For example Nagendra and Morappakkam (2016) propose Knowledge Acquisition, Knowledge Creation, Knowledge Storage, and Knowledge Sharing as the four major processes of KM. On the other hand Alavi and Leidner (2001), argue that KM process should be alienated into Knowledge Creation, Storage and Retrieval, Transfer, and Applications. However, according to Schubert et al., (1998), slight discrepancies in the delineation of the processes appear in the literature in terms of the number and labeling of processes, rather than the disparities in the underlying concepts. At a minimum, four basic

processes of creating, storing/retrieving, transferring, and applying knowledge appear consistently (Alavi & Leidner, 2001).

Knowledge Acquisition and creation involves developing new knowledge or replacing existing knowledge with new content (Nonaka & Takeuchi, 1995). The focus of this is usually on knowledge creation inside the boundary of the firm or in conjunction with partners. The knowledge creation phase deals with combining new sources of knowledge (Karadsheh, et al., 2009, p. 70). Nonaka and Takeuchi (1995) suggested that knowledge can be created by the interaction between tacit and explicit knowledge through Socialization, Externalization, Combination and Internalization (SECI). Knowledge creation process allows firms to amplify knowledge embedded internally and transfer knowledge into operational activities to improve efficiency and create business value (Bordeianu, 2015).

In contrast to knowledge creation, knowledge acquisition involves the search for, recognition of, and assimilation of potentially valuable knowledge, often from outside the organization Huber, (1991, in King, 2009).

Knowledge storage and retrieval is the process used to support organization's memory and individuals to access knowledge. Knowledge storage provides coding and indexing of knowledge for later recovery. Organizational memory includes knowledge stored in the minds of organizational participants, that held in electronic repositories, that which has been acquired and retained by groups or teams and that which is embedded in the business's processes, products or services and its relationships with customers, partners and suppliers (Cross & Baird, 2000).

Transfer and sharing may be conceptualized as two ends of a continuum. Transfer involves the focused and purposeful communication of knowledge from a sender to a known receiver. Sharing is less-focused dissemination, such as through a repository, to people who are often unknown to the contributor. Knowledge transfer provides communication channels and faster access to knowledge sources (King, 2009).

The last step of the process is **knowledge application** which assists in applying knowledge in different sites through workflow automation. (Karadsheh, et al., 2009, p. 70)

2.7.5 Knowledge Management Systems

Knowledge management Systems (KMS) refer to a class of information systems applied to managing organizational knowledge (Alavi & Leidner, 2001). In essence, KM tools and

technologies are the systems that integrate various legacy systems, databases, Enterprise Resource Planning (ERP) systems, and data warehouses (Geisler & Wickramasinghe, 2009). While not all KM initiatives involve the implementation of IT, and "admonitions against an emphasis on IT at the expense of the social and cultural facets of KM are not uncommon" (Alavi & Leidner, 2001, p. 114).

Information Technology can be used for KMS development and KMS can be supported by nearly all the known IT. Sometimes specific IT is only used for one development phase or just to visualize results (Natek & Zwilling, 2016, p. 1124). An organization, according to Natek and Zwilling (2016) can build a content management type of KMS with File Management System and Office tools. On the other hand, data mining technology can be used for knowledge discovery in rare data patterns or customer behavior. A majority of KM authors try to clarify the role of IT in KMS and classify the available IT in relation to KM processes (Natek & Zwilling, 2016).

Information technology is an important component of the KMS. (Sedighi & Zand, 2012) . It holds a pivotal position both as a domain for knowledge possession and creation and as a possible contributor to the knowledge proliferation and management processes. Modern technology may also ease the integration of dispersed knowledge, speed up the replication of best practices across time and place and facilitate leveraging across uses and users to achieve economies of scale and scope (Metaxiotis, et al., 2005, p. 12).

Davenport and Prusak (2000), on his part argue that, despite its importance, IT is only the pipeline and storage system for knowledge exchange. It does not create knowledge and cannot guarantee or even promote knowledge generation or knowledge sharing in a corporate culture that doesn't favor those activities. Davenport and Prusak stated that "the proverbial phrase 'if we build it, they will come' does not apply to information technology" (2000, p. 14). But it doesn't mean that technology should be undermined in KM even though it is an enabler and not a driver of KM (Alavi & Leidner, 2001, p. 121).

2.7.6 Factors affecting KM

The conduct of KM in an organization is influenced by a variety of factors. KM literatures have identified a broad range of factors that can influence KM in organizations. Many KM enablers and barriers, or some consider critical factors, have been suggested by various writers.

The four critical enablers and barriers of KM that have been identified by Nagendra and Morappakkam (2016) are (1) the role of leadership, (2) guidelines, processes and Standard Operating Procedures (SOPs), (3) organizational structure and (4) technological infrastructure. Holsapple and Joshi (2002, p. 58) also identified three classes of factors: resource influences, managerial influences, and environmental influences. In addition, technological advancements, unstable business environment, growing awareness of the importance of KM processes and newly created knowledge are all assumed to have certain effects on KM (Masic, et al., 2017, p. 135).

As it is shown in table 2.2, Nagendra and Morappakkam (2016) identify KM critical factors which play an important role in management of knowledge from two perspectives, as external or environmental factors and internal or organizational factors. External factors effect on internal factors, which can act as enablers or barriers for fostering KM.

Table 2.2: Knowledge Management Critical Success Factors (Source: Sedighi & Zand, 2012, p. 2)

Aspects	Factors	Sub-Factors
Internal (Organizational Factors)	Corporate Culture	Sharing knowledge, conformity/Individualism
	KM Processes	KM measurement, processes and activities
	Strategy and leadership	KM strategy, management support, commitment..
	Technology and Infrastructure	IT, connectivity, security, repository
	Human and Financial resources	HRM, teamwork skill, empowerment, finance
	Structure and procedures	Structure, incentive, coordination, size..
External (Environmental factors)	Meso factors	Partnership and alliance, benchmarking
	Macro factors	Legal, economic, political, social, educational, technological, globalization

2.8 KNOWLEDGE MANAGEMENT FRAMEWORK (KMF)

As Knowledge Management has evolved over time, the need for Knowledge Management Framework (KMF) has become apparent. Wig stated the importance of a framework as follows:

> *'The lack of a framework for managing knowledge on a broad and relevant basis has been a problem for managers as they have not had ways of "thinking about thinking" with practical directions for how to deal with all the required knowledge-related aspects and supported by practical methods' (Wiig, 1993: 11).*

Unless we have a framework that allows us to understand the present state of knowledge related affairs, to helps us envision what is possible, and places in context of methods and approaches, our attempts to manage will at best be arbitrary (Wiig M. , 1992, p. 378).

2.8.1 Definition of KMF

According to Weber et al., (2002), a framework is a holistic and concise description of the major elements, concepts, and principles of a domain. The fundamental purpose of a framework is "to explain the domain and define a standardized schema of its core content as a reference for future design implementations" (Metaxiotis, et al., 2005, p. 11). Weber, et al., (2002, p. 5) also added that "…KM framework explains the world of KM by naming the major KM elements, their relationships and the principles of how these elements interact. It provides the reference for decisions about the implementation and application of KM".

2.8.2 Why KMF is Important?

KM Frameworks are one of the key strategic components that are required for key KM processes in managing knowledge effectively within an organization. Frameworks, or blueprints, according to Stankosky (2005), help ensure organization's KM programs include these elements. KM Frameworks help people understand what KM is, what knowledge activities are involved and how the knowledge activities affect organizational effectiveness. Most of the confusion about KM results from the lack of a comprehensive framework. Framework is important for the practical and theoretical structure it can provide. Framework facilitates communication and it is also extremely useful to have a common and understood vocabulary.

Mostly based on lack of clarity with respect to the definition and domain of KM, much confusion exists surrounding the notion of KM. A KMF is needed that defines the boundary of KM as well as its components, resources, actors and influences involved in the process. (Holsapple & Joshi, 2002).

2.8.3 Components of a KMF

KM frameworks explain the essentials of the KM domain and offer a plan to build and implement KM programs (Metaxiotis et al., 2005). Due to the broadness of the field of KM and the lack of KM standards, existing KM models vary in scope and focus. Reviewing literature on KMFs shows that researchers suggest three major components for KMFs (Marshall, 2007).

The first of these provides a taxonomy that identifies the kinds of **knowledge resources** that an organization can have and manage. According to Davenport et al., (1998), the knowledge resources include: human capital (e.g. employee staff, customer and suppliers), knowledge

capital (quantity and quality of knowledge possessed by the firm) and intellectual property (the product of knowledge creation that generates value).

The second component identifies basic **types of activities or processes** that can be used to manipulate an organization's knowledge resources. KM processes involve activities related to knowledge flow in the organization (Alavi & Leidner, 2001).

The third component of a framework characterizes **classes of influences** that shape the conduct of KM in an organization (Holsapple & Joshi, 2002). These factors include cultural, structural and technological aspects such as trust culture, structure and IT support. (Oufkir, et al., 2017)

2.8.4 Types of KMFs

A number of individuals and organizations have developed frameworks for KM. According to Rubenstein-Montano et al. (2001), KM frameworks are divided into three classes, based on their typology: these are prescriptive, descriptive, and hybrid.

a) **Prescriptive frameworks** provide direction on the types of KM procedures without providing specific details of how those procedures can/should be accomplished. In essence, they prescribe different ways to engage in KM activities i.e., suggest a KM methodology.

b) **Descriptive frameworks** characterize or describe knowledge management. These frameworks identify attributes of KM important for their influence on the success or failure of KM initiatives (Rubenstein-Montano, et al., 2001, p. 7).

c) **Hybrid frameworks** are the combination of the two.

As a result of the analysis of 160 frameworks, Heisig (2009) found that half of the frameworks exhibit a hybrid character. However, (Rubenstein-Montano, et al., 2001) argue that of the 26 frameworks he has investigated, the majority of frameworks presented in the literature to date are prescriptive. Weber et al. (2002), advocate for a prescriptive KM framework which suggests how things shall be done in a practical manner. Since they have the combination of the prescriptive and descriptive character a hybrid frameworks will be more advantageous.

REVIEW OF RELATED LITERATURE

Researchers and practitioners in the field of KM have developed several, perhaps hundreds of KMFs that explain KM phenomena. Although all of these frameworks focus on how organizations manage their knowledge, they are still different in some aspects. Many of the frameworks do not fully address KM comprehensively. Each of them addresses specific aspects of KM. Some of them are process oriented, some focus on influence aspects, and some of them deal with implementation issues only.

For example, when KM components are concerned, Alavi and Leidner's (2001) framework has four KM processes, but Lai and Chu's (2000) framework has seven. The terminology used in these frameworks is confusing too. The use of synonyms to define some KM processes makes it difficult to understand the processes. Dalkir (2011, p. 32) concurs with this notion, and states that "the terms used differ, but there does appear to be some overlap with regard to different types of KM processes involved in a KM cycle" (Shongwe, 2016, p. 143).

Different scholars have reviewed different KM frameworks to capture some commonalities and differences. For example, Holsapple and Joshi (1999), has reviewed 10 frameworks, Lai and Chu (2000), have reviewed 16 frameworks, Heisig (2009), has reviewed 160, (Karemente et al., 2011), have reviewed 21 framewroks, and Shongwe (2016) has reviewed 20 frameworks. All of them have identified common elements that a KMF should include as a minimum. Resulting from their analysis, some of them, including Heisig (2009), Dalkir (2011), and Evans *et al.* (2015), also attempted to develop a unified or integrated framework. Among the hundreds of frameworks integrated ones are very few and no framework from the military perspective has been found for review.

2.9 INTEGRATED KM FRAMEWORKS

In this research five comprehensive framework have been reviewed as an empirical study. These are selected because they are among the very few comprehensive frameworks available with relatively complete and detailed information for review, and are mostly cited frameworks when a unified or integrated framework is concerned. These KMFs are assessed based on the three aspects that have been identified by Lai and Chu (2000). According to Lai and Chu (2000) KMF, at a minimum, consists of knowledge resources, knowledge management activities, and knowledge influences.

2.9.1 Heisig's (2009) The GPO-WMw-Framework

Based on the results from his study, other empirical data, several KM case studies and KM projects with industrial companies and public administration, the author has developed and refined a three layered KM Framework, called the GPO-WMw-Framework. This Framework aims to embed KM into organizational practices with supporting actions in six critical enablers.

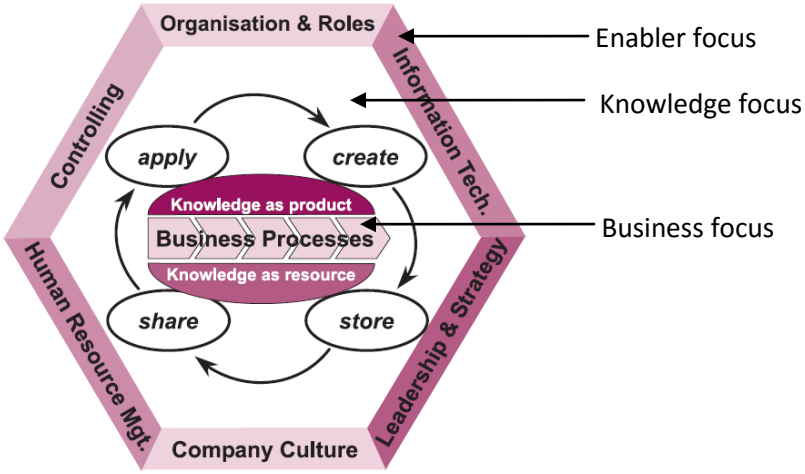


Fig 2.3: Heisig's The GPO-WMw-Framework (Heisig, 2009, p. 15)

The framework has identified the following three layers (Figure 2.3):

- Business focus. The business process is the context of application and generation of specific domain knowledge and its tasks are the central object for analysis and design. KM has to demonstrate its benefits for the key processes of an organization not only from the management perspective but also from the perspective of the ''knowledge workers'' performing theses tasks on a daily basis.
- Knowledge focus. The systematic handling of knowledge could be described with (at least) four core activities: ''create'', ''store'', ''share'' and ''apply''. These KM activities form an interlinked process. Knowledge is understood as a resource applied in the business process and by-product generated within the business process. This product could be reused by the same or another business process inside or outside the organization. Knowledge itself could appear in different forms. The organization has to determine which forms contribute most to their strategic and business objectives.
- Enabler focus. Successful and sustainable KM is influenced by the following key enablers: Culture, Organization and roles, Strategy and leadership, Skills and motivation, ''Controlling and measurement and Information technology. Practical experiences showed that a proper

KM assessment related to these six design areas should be carried out at the start of any KM initiative. Successful implementation generally requires adequate measures within each of these areas.

2.9.2 The CEN framework (CEN, 2004)

This European KM Framework, designed to promote a common European understanding of KM, show the value of the emerging KM approach and help organizations towards its successful implementation. The Framework is based on empirical research and practical experience in the field from all over Europe and the rest of the world. The Framework addresses the most relevant elements of a KM approach and aims to serve as a point of inspiration and as a reference basis for all types of organizations aiming to improve their performance through dealing with knowledge in a better way. The Framework is considered as a starting point for developing, if appropriate, an organization-specific framework that serves best the needs of a particular organization's KM approach.

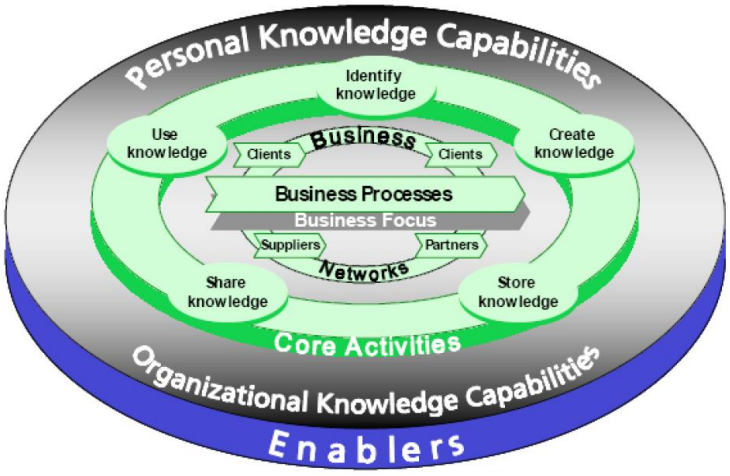


Fig 2.4: Knowledge Management Framework: A European Perspective (CEN, 2004, p. 7)

According to Pawlowski and Bick (2012) the CEN framework shows a clear process orientation, aiming at describing core business processes as well as knowledge-related processes. It extends those processes by enablers: knowledge capabilities on an organizational (e.g., vision, strategy) and individual level (such as skills, competences, methods, tools). This framework has created a common terminology and structure as well as guidelines around those.

CEN (2004) is the framework created in the European standardization community and it is one of the major frameworks currently used in practice. It provides a common terminology and frame of reference for organizations involved in knowledge management.

2.9.3 Lai and Chu's (2000) KM Framework

Lai and Chu (2000) divided KM into a comprehensive theoretical framework that consists of seven steps: initiation, generation, modeling, repository, distributing and transfer, use, and retrospect. Initiation stage is concerned with understanding requirements for knowledge and or the recognition of strategic capabilities and knowledge domain. As depicted on fig 2.5, generation is concerned to identify what knowledge exists in the organization, who owns it, and what is needed to gather and import knowledge from outside or learning from existing knowledge. Modeling phase is concerned with justifying the generated knowledge. Repository stage is necessary in order to maintain the explicit knowledge and facilitate further sharing.

According to Lai and Chu (2000), it is important to have a repository for maintaining all critical knowledge. Distributing and transferring phase is concerned with how to distribute knowledge to other people. The next phase is the use of the knowledge that describes how to develop knowledge in order to produce commercial value. Finally, retrospection stage includes examination of the process, performance of KM and detecting if new knowledge was created in order to keep pace with knowledge creation and management in a changing environment.

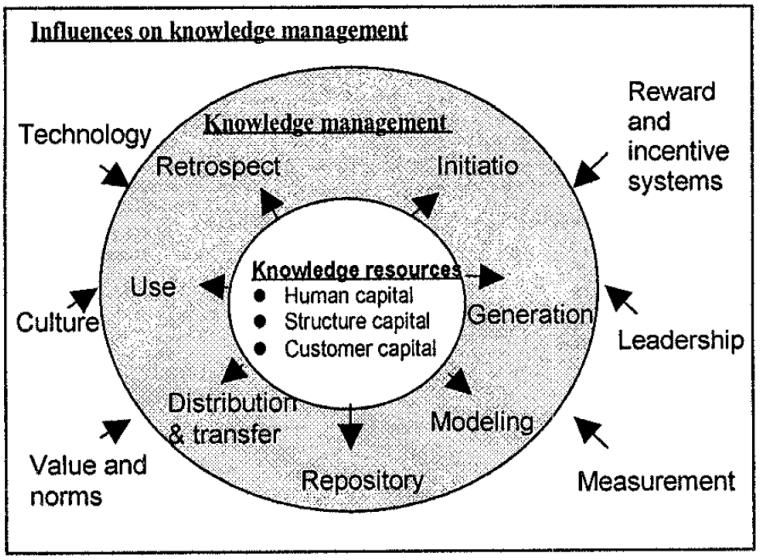


Fig 2.5: Lai and Chu's KMF (Lai & Chu, 2000, p. 5)

2.9.4 Karemente et al., (2011) Comprehensive KMF

Karemente et al., (2011) have constructed a comprehensive framework for IT-based Organizations, which addresses the shortcomings of the existing ones. The proposed framework, based on the literature survey and analysis, consists of two main distinguishing aspects or elements.

The first one is the integrated KM Influences Aspects encompassing environmental, information technology and organizational factors as shown in Figure 2.6. Environmental Influences are in the outer circle of the KMF model to represent governmental, economic, political, social, and educational factors. Technology, especially Information Technology, has been instrumental in enhancing communication and the interaction of individual, group, organizational, and inter-organizational knowledge. Therefore it has been identified as internal as well as external influential aspect. Organizational influences include corporate culture, leadership, corporate infrastructure, knowledge structure, vision, continuous learning, knowledge worker, measurement, reward and incentives, among others. However according to Karamente's (2011, p. 48), it has been observed that particular attention be paid to organizational influences without which the success of KM becomes doubtable.

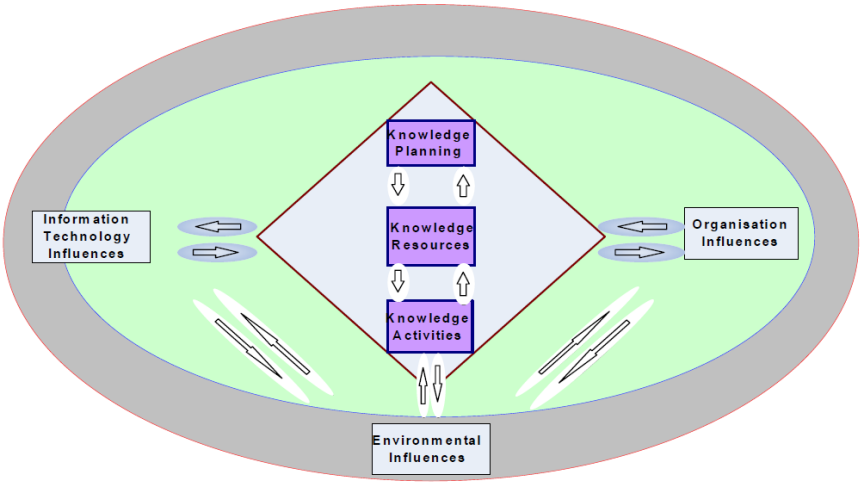


Fig 2.6: Comprehensive Knowledge management Framework.
Source: (Karemente et al., 2011, p. 46)

The other aspect is Knowledge Development that consists of KM planning, resources and activities. These aspects interact with each other and within each aspect. The influential aspects shape the other key knowledge development aspects of the framework that include knowledge planning, knowledge resources and knowledge activities or processes (Karemente et al., 2011). Knowledge activities include knowledge acquisition, creation, repository, sharing, use and evaluation.

Karemente et al., (2011, p. 51), has also classified knowledge resources to be fitted into his proposed comprehensive knowledge management framework as a major pillar. These are Human capital, Structure capital, Customer capital, and collaborative technological capital.

2.9.5 Pawlowski and Bick's (2012) Global KMF

The main goal of the Global KMF (GKMF) is to identify and relate global influence factors for distributed knowledge management projects in global settings. It also aims at providing a base for research (as an analysis tool) and practice (as a guideline for development). The GKMF framework development is based on a combination of frameworks, including CEN (2004) and Heisig's GPO-WMw-Frameworks, and an analysis of influence factors, barriers and challenges in global settings from different literatures.

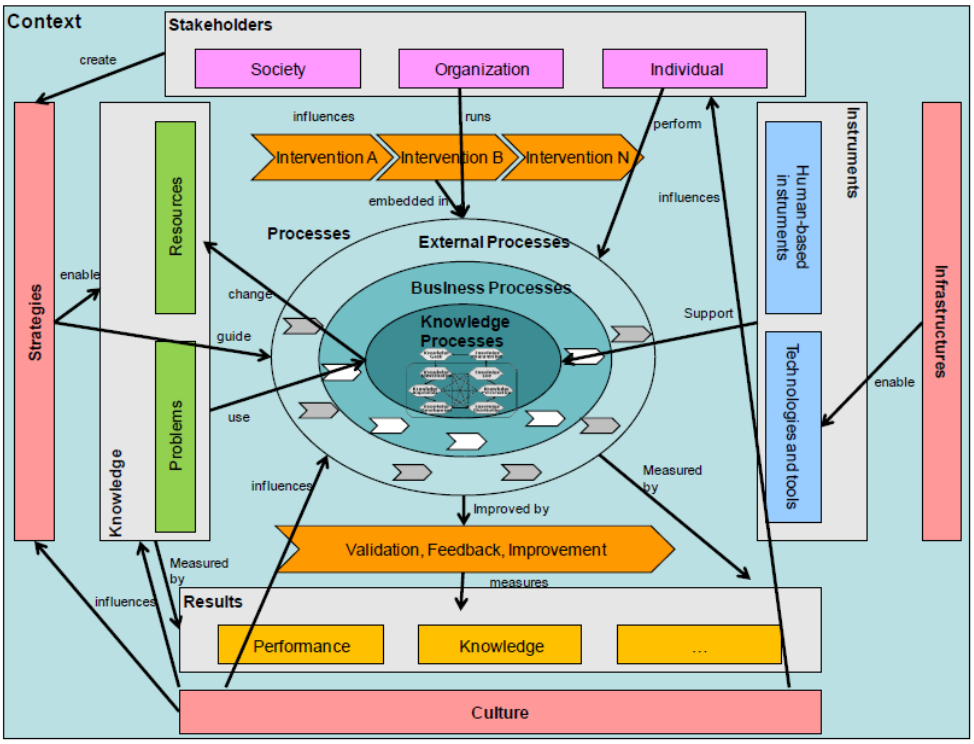


Figure 2.7: Global Knowledge Management Framework (GKMF).
Source: (Pawlowski and Bick, 2012)

The core of the framework is described by processes on three levels: knowledge, business and external processes (Fig 2.7). Business processes denote the core processes of an organization. The core business processes are supported by embedded knowledge processes which enable knowledge management within and outside the organization. In the global context, those processes are highly related to external processes with stakeholders who are distributed across the globe. These processes are also accompanied by interventions and supporting processes.

The category 'stakeholders' describe characteristics of participating stakeholders. This can be related to individuals, organizations or societies. The sub-category 'context' describes the context or environment in which knowledge management takes place. In most cases, it relates to

organizations or society as well. The 'knowledge', and 'instrument' component describe and characterizes knowledge aspects and elements which are shared or required in the organization, and methods and activities to realize the knowledge processes respectively. The main categories of instrument are human-oriented and technological instruments. Finally, 'results' in the GKMF describe the key outcomes of the knowledge processes using some form of assessment and metrics. Comparing to other frameworks, the GKMF is complex in its design with many components in it.

2.9.6 Summary

All the five comprehensive frameworks, though their approach may differ, identify knowledge resources, KM processes, and influencing factors in their framework. Pawlowski and Bick's (2012) GKMF incorporates many components since it attempts to address global influence factors as a primary concern. Three of the five frameworks, Heisig's (2009), CEN 2004, and Global KMF, also incorporate business process as a central focus for KM in an organization.

Table 2.3: Summary of key elements from the reviewed KMFs

s/n	KMF elements	KM Process	Knowledge Resources	Enablers/Factors
1	**Heisig (2009)** The GPO-WMw-Framework	Create, Store, Share, and Apply	The organization has to determine which forms contribute most to their strategic and business objectives	Human-oriented (culture, people, leadership), Organization (process and structure),Technology (infrastructure and applications), and Management process (strategy, goals and measurement)
2	The CEN framework (CEN, 2004)	knowledge acquisition, creation, repository, sharing, use, and evaluation	Human, Structural, and Customer, and Collaborative technological Capital	Organizational, Environmental, and IT influences
3	Karemente (2011) KMF	Initiation, generation, Modeling, Repository, Distribution and transfer, Use, and Retrospect	Human, Structural, and Customer Capital	Couture, leadership' measurement, Education, Reward and Motivation, Values and Norms, and technology
4	Lai and Chu (2000) Comprehensive KMF	Identify, create, Store, Share, and Use	Employee (Human), shared knowledge assets (Structural), and stockholder (Customer) Capital	Knowledge capabilities on an organizational (e.g., vision, strategy) and individual level (such as skills, competences, methods, tools).
5	Pawlowski and Bick's (2012) Global KMF	Knowledge identification, acquisition, development, distribution or	Human, structural, customer	Culture, infrastructure, strategy, stakeholders (including, Lack of time, Fear about job security, Lack of awareness for KM, Use of

		sharing, preservation, and use		strong hierarchy and position-based status , Poor communication and interpersonal skills, gender, cultural differences, Lack of networking skills, Lack of trust)

2.10 CONCLUSION

KM has been described as the methodology, tools and techniques required to gather, integrate and disseminate knowledge within an organization. Efficient use of knowledge through KM enhances an organization's competitive advantage, where the effective use of the organization's knowledge assets and resources supports vital operational and innovative activities in response to the demands of the fast changing environment. KM has emerged as a discipline, drawing on established disciplines such as philosophy, psychology, sociology, management, economics, information systems, human resources and quality management. However, there is no universally accepted concise definition of Knowledge, nor is there a generally accepted standard KM framework that specifies the scope, boundaries and activities associated with KM.

From the different frameworks, it is clear that various aspects of knowledge management played an important role in the development of KM frameworks. Intellectual assets, customers, processes, development, people or the human focus, competitors, business values, networks and infrastructure all played an integral part in the development of these frameworks. In developing a new framework for knowledge management, all these aspects must be taken into account (Kok, 2004).

CHAPTER THREE

RESEARCH DESIGN AND METHODOLOGY

This chapter deals with the research design, methodologies and tool adopted to conduct this research together with explanation and justification as to why such methods and techniques were used to produce the research findings that follow.

3.1 RESEARCH APPROACH AND DESIGN

The general objective of this research is to propose a KMF that the MoD can utilize to ensure that it is making the best use of its intellectual capital. In order to meet this objective, the research adopted research design and methodology that best fit with the following research questions the researcher endeavors to answer:

1. What is the current status of KM practice in the MoD?
2. What are the factors that have critical impact on the practices of Knowledge Management in the MoD?
3. What KM framework can be best utilized by the MoD to ensure that it is making the best use of its intellectual capital?

3.1.1 Research approach

Two paradigms characterize much of the research in the Information Science discipline: behavioral science and design science. The behavioral science paradigm according to Hevner et al., (2004) seeks to develop and verify theories that explain or predict human or organizational behavior. Design science, as conceptualized by Simon (1996), supports a pragmatic research paradigm and it seeks to extend the boundaries of human and organizational capabilities by creating new and innovative artifacts to solve real-world problems. It means knowledge and understanding of a problem domain and its solution is achieved in the building and application of the designed artifact. Such artifacts may include constructs, models, methods, and instantiations (Hevner, March, Park, & Ram, 2004). They might also include social innovations (Van Aken, 2004) or new properties of technical, social, and/or informational resources (Järvinen, 2007).

Knowledge generated via design can take several forms including constructs, models, methods, and instantiations (March & Smith, 1995). Design research projects are often performed in a specific application context and the resulting designs and design research contributions may be

clearly influenced by the opportunities and constraints of the application domain (Hevner & Chatterjee, 2010).

Designing a KM framework, on one side, involves studying the current practice of KM within the organization to which the KM framework is to be developed, and to gather organization specific requirements that will be addressed in the framework. On the other side, existing knowledge bases such as theories and concepts on knowledge and KM have to be assessed to develop a conceptual framework for the entire discussion, and existing KMFs have to be reviewed as empirical study. These two are combined to develop a new framework, or to propose the one which is existed with some adjustment or as it is depending on the requirements of the organization. Therefore, for this study, Design Science Research (DSR) has been adopted as the philosophical approach for discovering and identifying problems and opportunities relevant to the management of knowledge in the MoD and directly developing or adopting new or improved KMF to address those problems and thus to establish a link to the theoretical explanation at the end of the process.

3.1.2 Research design

In design research three research cycles are distinguished as shown in Figure 3.1: the relevance cycle, the design cycle and the rigor cycle. Havner and Chatterjee (2010, p. 16) stated that the DSR Cycles is developed from the IS research framework found in Hevner et al., (2004, p. 80) and overlays a focus on three inherent research cycles. In the relevance cycle the research problem or the need for the research and the research environment is explained. It bridges the contextual environment of the research project with the design science activities.

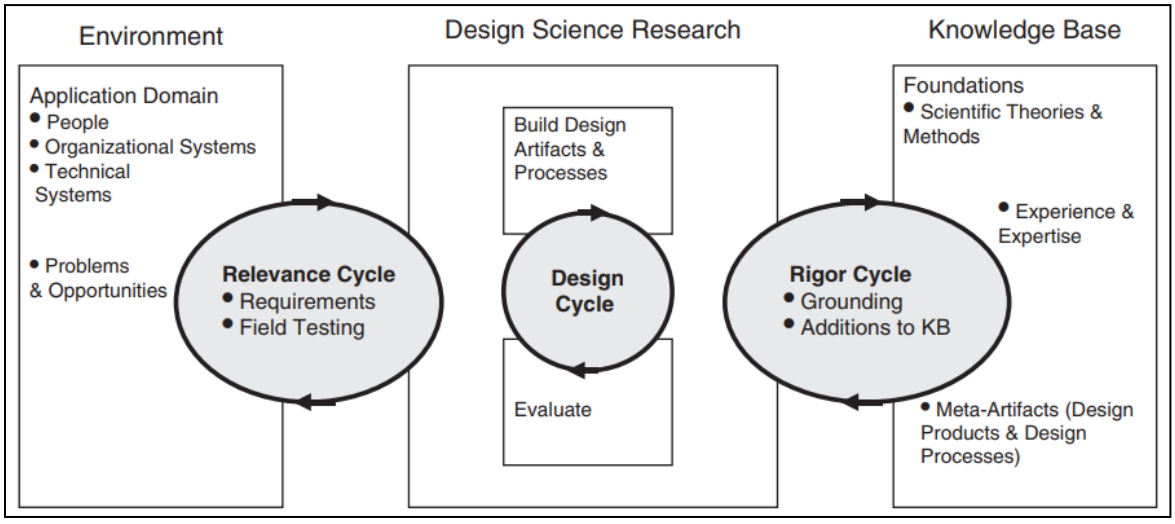


Fig 3.1: Design Science Research Cycles (Hevner & Chatterjee, 2010, p. 16)

The rigour cycle uses existing knowledge bases such as theories, methods, design products, design processes, artifacts, experiments and expertise to provide a basis for rigorous design research. The central Design Cycle iterates between the core activities of building and evaluating the design artifacts, in this case the KMF, and processes of the research. Thorough evaluation or testing is done where requirements or problem statements are revisited and improved.

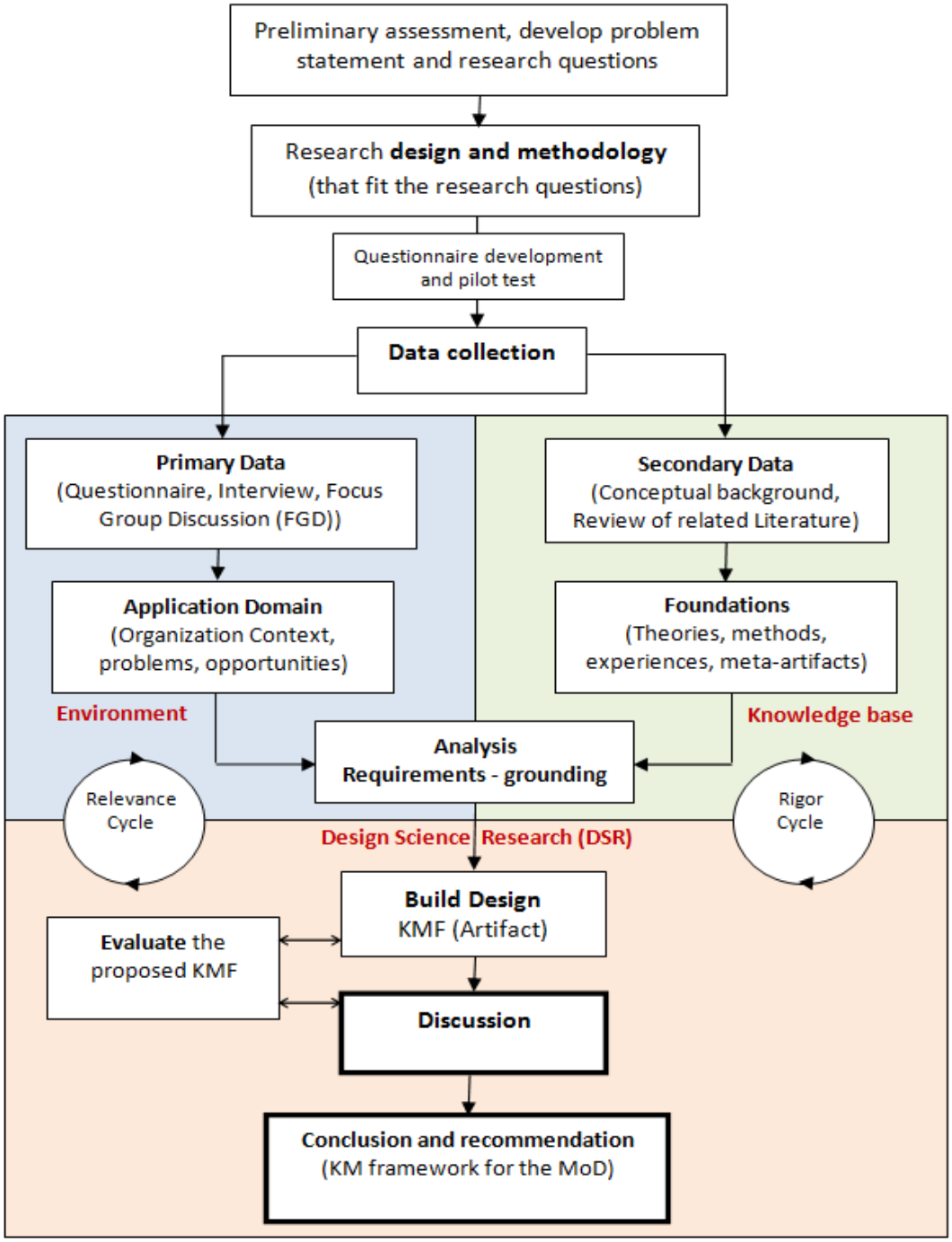


Figure 3.2: Research Design based on Design Science Research Cycles (Source: researcher)

Total redo may be required to ensure that the artifact meets requirements and expectations (Hevner & Chatterjee, 2010). Therefore the research follows the above research design (fig 3.2) that is developed by the researcher based on the Design Science Research Cycle.

3.2 RESEARCH METHODOLOGY

Since the nature of the research questions require both qualitative and quantitative methods, the researcher examined both methods together with a contemplation of a pluralistic approach, whereby a combination of both methods could be used. According to Finn (2013), combining quantitative and qualitative research (mixed methods) has become unexceptional and unremarkable in recent years.

3.3 STUDY AREA

Unlike civilian organizations, militaries have almost similar structure throughout the world. Their organization is hierarchical. They are structured from the smallest team/squad with 4-10 soldiers to Armies of tens and hundreds thousand. Every unit is subordinate to its immediate higher unit, and every unit is under the command and control of a single officer.

The Armed forces of the FDRE, constitutes the Ground, Air, Special, and Reserve forces under the constitution of the FDRE. Each force has its own units, and headquarters to carryout administrative and operational functions, that are subordinate to the Armed forces headquarters. These units are formed from different specialties to make a balanced combined combat force. Units only differ in their ability to apply different scales of force to achieve different strategic, operational and tactical goals and mission objectives. Otherwise, they have the same structure, composition of personnel, weapons, and equipment. For example, an infantry unit, whether it is a team, squad, or a brigade, is the same throughout.

In general, all these units fall in to the categories of combat arms, Combat Support (CS), or Combat Service Support (CSS). Actual combat units are collectively referred to as combat arms units. CS refers to units that provide fire support and operational assistance to combat elements. CS units provide specialized support functions to combat units including chemical warfare, combat engineering, intelligence, security, and communications. CSS units are primarily responsible for the provision of logistical support by providing supply, maintenance, transportation, health, and other services required by the soldiers of combat units to sustain their missions in combat.

A typical unit, either combat, CS, or CSS, is a homogeneous military organization that includes service personnel predominantly from a single arm of service, or a branch of service, and its administrative and command functions are self-contained. Except combat units, CS and CSS units have both military and civilian personnel with various disciplines. Therefore, primary data collection is aimed to balance responses from each of the three groups to have a complete picture of the MoD to meet the research objectives.

3.4 POPULATION SIZE AND SAMPLING

3.4.1 Target population

The entire MoD permanent as well as contract civilian employees and military personnel in the defense headquarters and field units throughout the country are considered target population for this study. Describing the population in numeric figures was inappropriate as per to the information security act of the MoD.

3.4.2 Sampling technique

Though, the study population is comprised of all the entire MoD, due to financial and time constraints the study is conducted mainly in the selected Defense Head Quarters and field units around Addis Ababa and Adama, selected using convenient random sampling. The researcher aims to generate a sample that is representative and that also provides meaningful information that will address the research questions. Therefore, both probability and non-probability sampling techniques are used in this study.

For the purpose of survey, stratified sampling is found to be ideal for this research. Populations are often stratified according to several characteristics. In this technique, the population is stratified into a number of non-overlapping subpopulations or strata and sample items are selected from each stratum (Creswell, 2014). The entire population of the MoD is divided into three sub-populations, based on the previously classified functional areas that are more homogeneous than the total population, and then field units and staff groups have been selected from each stratum to constitute a sample. The advantages of this approach are that representation is made between each stratum and that an equal proportion of responses and data were made (Saunders, Lewis, & Thornhill, 2012). Un-proportional quota sampling is used to select a sample of equal number (60 is estimated to be manageable) respondents from each stratum.

Therefore, to have 180 valid responses, a total of 200 questionnaires (adding about 10% or coningncy) were distributed, out of which 188 (94%) were filled and returned. Out of these,

sixteen questions were found to be incomplete or inconsistent, therefore removed during data preparation and clearance. Four questions, three from combat and one from CSS, have been randomly removed to make equal number of responses from each sub-population. Sixty valid questions have been collected from respondents from each of the three major functional areas and four levels of hierarchy (responsibility), to get a balanced response from individuals representing each level of hierarchy and functional areas (table 3.1.).

Table 3.2: Questionnaire distribution

s/n	Major areas (categories)	Total no. of questionnaire	No. of participants in each level of hierarchy				Remark
			Higher officers	Line officers	NCO	Civilians	
1	Combat Units	60	20	20	20	0	
2	Combat Support Units	60	18	18	16	8	
3	Combat Service Support Units	60	20	14	10	16	
	Total	180	58	52	46	24	

Purposive sampling technique is employed for key informant interviews and focus group discussions to select the most relevant respondents who have the knowledge and practices as well as major challenges of KM in the organization. The main goal of the purposive sampling is to focus on particular characteristics of a population that are of interest, which will best enable the researcher to answer the research questions.

3.5 METHODS OF DATA COLLECTION

3.5.1 Primary Data Collection

a) Questionnaire

Survey questionnaire are used to collect information on organizational knowledge assets, KM processes and tools being used, employee's perception towards knowledge and KM, and challenges/factors that affect knowledge management in the MoD. The questions are generated from the literature, "An Evaluation of Knowledge Management Practices in Nonprofit Community Services Organizations in Australia", (Downes, 2014) and has been modified to meet the research questions and the MoD specific context. Most of the questions use five point likert-scale rating which is divided into ten parts, each addressing a particular facet of KM. The questionnaire include items that require responding to reestablished or predetermined categories of responses and open-ended space that allow respondents to add responses not included in the

predetermined items (see Annex 1). Once the questionnaire design was complete it was piloted by 15 respondents, five from each of the three strata (Combat, CS, and CSS).

b) Key Informant Interview

In order to get primary data regarding the KM processes, tools, technologies, challenges, and requirements in-depth interviews are conducted with selected key informants using semi structured questions. Interviews with suitable and accessible participants in the context of the research topic is one of the most fundamentals of qualitative methods, and the method chosen for this research as the most appropriate in producing the desired results and outcome (Finn, 2013). Key informants who are well versed with information and KM related activities of the MoD are identified and selected through purposive sampling technique. Participants including knowledgeable leaders and experts who are frequently participating or have experiences in the information and KM activities are carefully selected. Similarly, fair balance of interviewees has also been maintained from each of the three functional categories as well as the different levels of hierarchy. Therefore, a total of seven key informants have been interviewed to have their views in respect to the practices and challenges of KM in the MoD.

All interviewees are supplied with interview schedule and possible areas of discussion prior to the interview. This allowed the participants to focus on the specific areas and therefore assisted greatly during the interview to reduce the overall time, but also to improve the quality of the data being gathered. Transcripts are not used as it was considered time consuming, therefore detailed notes were taken throughout the discussion.

c) Focus Group Discussion (FGD)

Focus group discussions are conducted with forums of individuals with good organizational knowledge related to the management of knowledge in the MoD, to discuss ideas and to clarify each others' impressions and opinions, in an open and fairly unrestricted environment. A total of six focus group discussions, two from each of the three major areas of the MoD, are made with 6-8 individuals each (table 3.2.).

From the two FGDs in each major area, one is composed of team of experts and the other is made up of leaders and managers representing different sections. This is because of the fact that making a discussion among individuals (more than two) is believed to provoke individuals mind to generate more ideas and to make an exhaustive argumentation among each other. In this

regards, the study utilizes this instrument to obtain reliable information through discussions as well as it helps to triangulate and reach on consensus on conflicting individual opinions and views.

Table 3.1: Focus Group discussion

s/n	Major areas (categories)	No. of FGDs	No. of participants in each group		Remark
			Group 1	Group 2	
1	Combat Units	2	6	6	
2	Combat Support Units	2	7	8	
3	Combat Service Support Units	2	6	8	

3.5.2 Secondary Sources of Data

To build conceptual and theoretical background of the research and support the discussion in the preceding parts of the research, books, journals-articles, and other internet resources related with Knowledge, KM, and KM frameworks in the business in general and in the military context in particular, are reviewed. Some of the seminal works that have been reviewed include the works of Wiig, Alavi and Leidner, Davenport and Prusak, Dalkir, Pawlowski and Bick, Holsapple and Joshi, are just a few to mention.

In addition to this, organizational documents, including the five years strategic plan of the MoD (2016-2020), Information Communication Technology development Policy and Strategy, Information security policy, Regulation for the security classification of information resources, and annual plans and reports of the Communication and Information technology Main department are reviewed.

In the domain of KM, frameworks are widely used to describe components, design aspects or technical architectures and their interdependencies, to achieve a common understanding of the domain and to structure approaches and practices as well as to identify research gaps. Thus it is necessary to analyze available frameworks as a basis in building a framework for the purpose of the MoD. Therefore the following frameworks are reviewed as an empirical study. Heisig's (2009) The GPO-WMw-Framework, the CEN framework (CEN, 2004), Lai and Chu's (2000) KM Framework, Karemente et al., (2011) Comprehensive KMF, and Pawlowski and Bick's, (2012) Global KMF.

3.6 DATA ANALYSIS AND INTERPRETATION

Mixed method data analysis involves qualitative and quantitative data analysis that are combined, connected, or integrated. In view of this, the data analysis began after organizing the data collected through primary data collection methods, where exerting maximum effort to keep the originality of the research. Both qualitative and quantitative data have been analyzed independently and then connected and integrated in a way to provide information to answer the research questions. The data gathered through key informant interviews and focus group discussions are analyzed and interpreted thematically based on the objective of the research.

Quantitative data mostly collected through survey questionnaire is analyzed using descriptive statistics techniques. The analysis is done using Statistical Package for the Social Sciences (SPSS) version 20. Frequency, average and percentage values are used for discussion of the data collected from the survey. This data has been triangulated with the secondary data to maximize the reliability and validity of the findings. The draft findings of this research have also been returned back to the management of the MoD and key informants mostly participated in the primary data collection for validation. The process facilitated for further discussions to clarify issues that may have been missed or misunderstood.

3.7 LIMITATIONS OF THE RESEARCH

The issue of security and confidentiality, as a military organization, has limited the freedom of the researcher to asses and evaluate some knowledge resources and practices exhaustively. Therefore, discussions on some aspects are brief, with no detail discussion and explanation.

3.8 ETHICAL CONSIDERATIONS

This relates to moral standards that the researcher should consider in all research methods in all stages of the research design. In the context of research, “ethics refer to standards of behavior that guide the researcher’s conduct in relation to the rights of those who become the subject of the work, or are affected by it” (Saunders et al., 2012, p. 226). All interviews have been made with the due consent and knowledge of each and every informant. The utmost effort is exerted to maintain the interviewee’s right and privacy. Therefore, the researcher sticks to the ethical protocols of qualitative research in order to hold the truth that the research participants put up on him in the highest regard. Hence, the researcher respects the rights, needs, values, and desires of informants. Specially, when the participants wish to remain anonymous for any information, it

has been respected. In addition, all data collected has been referred to the MoD data clearance procedure for possible security issues before data is released for public.

3.9 VALIDITY AND RELIABILITY

The researcher has conducted internal consistency reliability of the instruments by Cronbach's alpha reliability in the form of split half methods by dividing the instrument in the form of even and odds. To test the instrument the researcher has taken a total of 15 responses, five from each functional area. The result is o.8. This result indicated that the questionnaire is reliable to collect the data. However, some minor modifications have been done based on the validity and reliability test. Ethics and triangulation are also employed for maintaining validity and reliability of the research findings in this study as a general procedure. This research also uses a variety of methods, sources of data and varieties of theories in order to check the findings and supplement the results. It involves checking information that will be collected from different sources or methods for consistency across sources of the data.

CHAPTER FOUR
DATA PRESENTATION AND ANALYSIS

4.1 INTRODUCTION

In this chapter, both quantitative and qualitative data that is obtained from survey, interview, and FGD is presented and analyzed. The major aim of this chapter is to establish an organizational context to which the KMF is to be developed and identify organization specific requirements for the development of KMF for the MoD. Quantitative data collected from the respondents using structured questionnaire were organized in to tables and figures. Qualitative data obtained from interview and FGD is presented and analyzed with each respective quantitative responses. To verify or support the validity of the responses, qualitative and quantitative data has been also triangulated with its corresponding conceptual and empirical data.

To make the data presentation and analysis clear and easy those responses with 'agree' and 'strongly agree' are considered as agreement, and 'disagree' and 'strongly disagree' are merged as disagreement. As a matter of fact, as shown in each table, there are no or very few responses in the 'strongly agree' and 'strongly disagree' category.

4.1.1 Characteristics of Respondents

This section attempts to provide general characteristics of the respondents in the survey. The variables include gender, education level, title/rank, age, work experience and area of work (expertise).

4.1.2 Distribution of respondents by gender, area of work, and title

In this research, None Commissioned Officers (NCO) includes all soldiers with non-officer ranks, from private to Master Sergeant. Line officers are those officers from Second Lieutenant to Captain rank, and higher officers include all ranks from Lieutenant Colonel and above. Civilians are all non-soldiers working in the MoD.

As shown on the table 4.1., the data collection attempted to maintain a balanced representation from each area of specialization and title. In general, the highest number of respondents is male, with 72%. However, it differs from one specialization to the other due to the nature of the work. For example, in the CSS area of specialization equal number of responses are collected from both female and male respondents. In general, 60 responses have been collected from each area of work to maintain a balance response from the three categories.

Table 4.1: Distribution of respondents by area of work (Specialization), gender, and title

Area of Work (Specialization)	Title/ Rank									
	NCO		Line Officers		Higher Officers		Civilians		Total	
	F	M	F	M	F	M	F	M	F	M
Field Units	0	20	6	14	2	18	0	0	8	52
Combat Support	0	16	10	8	0	18	2	6	12	48
Combat service support	8	2	8	6	6	14	8	8	30	30
Total	8	38	24	28	8	50	10	14	50	130

4.1.3 **Distribution of respondents by education and work experience**

With regard to the level of education and work experience of the respondents, table 4.2 shows that the majority of the respondents, 116 (64.4%), are first degree graduates and 46 or 1/4th have Masters Degree. It shows that more than 90% of the respondents have educational background of either first degree or above. About 9% (16) and only 1% (2) have college diploma and above Masters Degree qualification respectively.

When work experience is concerned, 92 (51%) of the respondents have 10-20 years of experience in the MoD. In addition, 46 or 1/4th of the respondents serve in the MoD for more than 20 years. Due to the complex nature of Knowledge and KM, respondents are selected with a minimum of college diploma and more than 5 years of work experience for reliable data collection.

Table 4.2: Distribution of respondents by education and experience

Level of Education	Work Experience in the MoD										
	Less than 5 years		From 5-10 years		From 10-20 years		More than 20 years		Total		
	F	M	F	M	F	M	F	M	F	M	T
College Diploma	0	0	4	6	4	0	0	2	8	8	16
First Degree	0	0	12	16	8	56	2	22	22	94	116
Masters Degree	0	0	0	4	10	14	10	8	20	26	46
Above Masters degree	0	0	0	0	0	0	0	2	0	2	2
Total	**0**	**0**	**16**	**26**	**22**	**70**	**12**	**34**	**50**	**130**	**180**

4.1.4 **Distribution of respondents by age group**

In terms of age, respondents are placed in the four groups of age category. Figure 4.1 shows that more than half of the respondent, 98 (54%), are within the age category of 36-45, which is followed by the age group of 26-35, with 58 respondents or 32% of the total respondents.

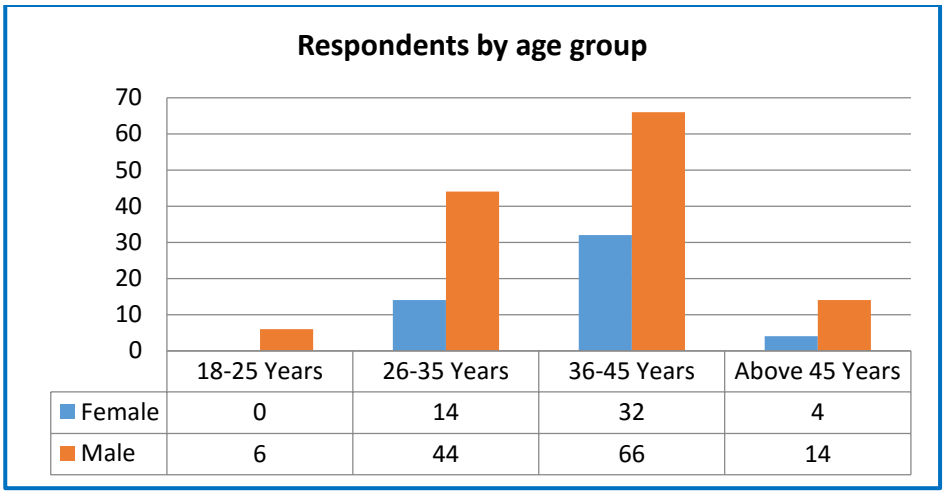


Figure 4.1: Distribution of respondents by age group

4.2 THE WAY THE MOD ENGAGED IN KM ACTIVITIES

As indicated on figure 4.2., two opposite responses are recorded from the same number of respondents regarding the way MoD engaged in KM activities. That is, 20 (11%) of the respondents said that the organization has a formal KM policy in place to carryout KM activities, whereas another 20 (11%) replied that the organization do not have a knowledge management policy and has not engaged in any KM activities.

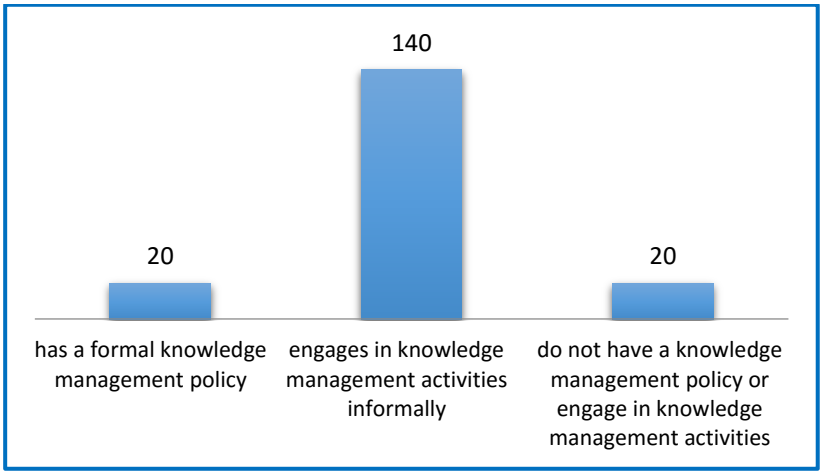


Figure 4.2: The way the MoD engaged in KM activities

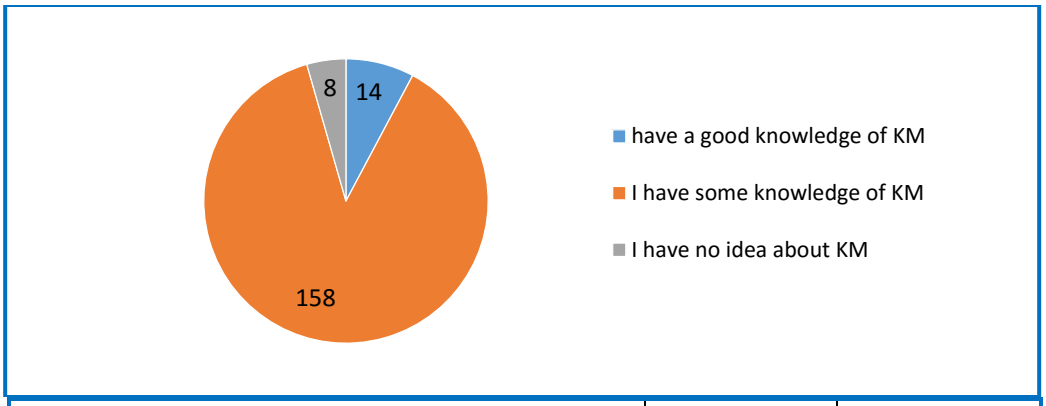
However, the majority of the respondents, which is 140 or near to 80%, have answered to the same question by saying that the MoD engaged in KM activities without having a formal written KM policy in place. This is because, according to the information collected from interview and FGD, since the concept of KM is relatively new the word information is commonly used for both information and knowledge related issues. The organization has policies and procedures

that govern the management of information within the organization. But they are not explicitly labeled as knowledge policies and procedures. Therefore, since the MoD cannot survive without knowledge and KM, it engages itself in different aspects of KM without having a policy. By its nature, people acquire and develop their knowledge, share it with others, and use it in the day to day activities without even knowing they are doing so.

One officer from the Military Intelligence department mentioned that the MoD, as any military organization, has dedicated units to collect, analyze, store and disseminate timely and relevant information to decision makers at all levels throughout the organizational structure. These units acquire information through different mechanisms including reconnaissance, surveillance, patrols, human intelligence, and electronic warfare systems. Similarly he stated that 'the MoD has special units that are dedicated for sharing real-time and secured information as well. Despite the fact that these activities are not clearly labeled, the organization is actually engaged in extensive KM activities.'

4.3 LEVEL OF UNDERSTANDING AND PERCEPTION TO KNOWLEDGE AND KM IN THE ORGANIZATION

When respondents are asked to describe their level of understanding regarding Knowledge and KM, 158 or 87.7%, have replied that they have some kind of awareness towards knowledge and KM. Only 7.7% said that they have a good knowledge of it, whereas 4.6% have no idea at all. In general figure 4.3 shows that 95% of the respondents have at least some level of awareness in knowledge and KM. it can be said that in general, the organization is knowledge aware. Similar responses have been collected through both interviews and FGDs. Respondents have acknowledged that knowledge and KM seem simple to many people, however it is a complex phenomenon. Most people consider knowledge as information or education, and therefore they use these words interchangeably.



I have good knowledge of KM	14	7.8%
I have some knowledge of KM	158	87.8%
I have no idea about KM	8	4.4%

Figure 4.3: Level of Understanding on KM

Similarly 158 (87%), of the respondents believed that KM plays an important role for the effective accomplishment of the mission of the organization. For 10% of the respondents, KM is more than that; it is a matter of survival for the organization. The remaining 2% still believe that KM is important, however, it is not that much significant for them. Most of the interviewees strongly asserted that knowledge can be critically important for any organization; but for the military it is more than that. If you don't have knowledge, you would die.

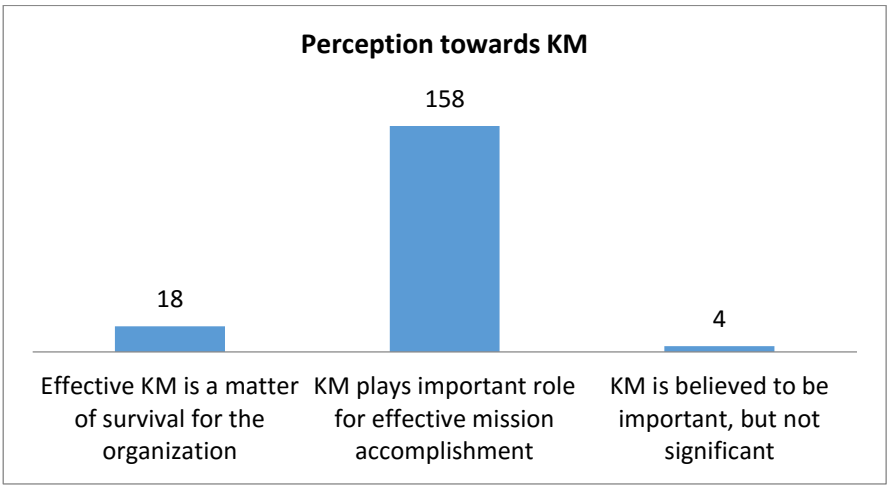


Figure 4.4: Perception towards KM

One officer, quoting from the words of Sun Tzu, a Chinese strategist who wrote a book entitled 'The Art of War', 2500 years ago said that:

> *"Sun Tzu said, if you know the enemy and know yourself, you need not fear the results of a hundred battles. If you know yourself but not the enemy, for every victory gained you will also suffer a defeat. If you know neither the enemy nor*

yourself, you will succumb in every battle. Therefore knowledge is a matter of survival for a military organization."

4.4 KNOWLEDGE MANAGEMENT PRACTICE IN THE MOD

The purpose of KM from the military perspective, as it is stated on FM 6-0 (2012), is to create a shared understanding through the alignment of people, processes, and tools within the organizational structure and culture. Effective KM practices increases collaboration and interaction between leaders and subordinates, and enhance better decisions and enables improved flexibility, adaptability, integration, and synchronization to achieve a position of relative advantage (Dumitru, 2015). The next 14 questions aim to gather information regarding the KM practices in the MoD to get an insight in to the specific context of the MoD in regard to KM. These KM practice questions are divided in to three categories as process, resource, and training related.

With regard to the process related questions, there is no agreement made among the respondents in their response to the questions that ask whether the organization has standard process for storing reference materials such as policies, procedures, manuals, guidelines, ideas or other practical information. Almost 50% say yes it has, and 50% disagree. However, the information collected through interview and FGD confirmed that the organization has standard way of collecting and storing reference materials to be used whenever needed. Therefore, it can be said that the organization has standard processes for the storage of these knowledge resources. It is assumed that, these key informants and expert groups could have more information than the respondents participated in the survey.

At least more than 70% of the responses collected through survey revealed that the organization has limitations in the following three aspects of KM. These are, having the proper mechanisms for converting tacit knowledge from individuals in to explicit form, storing knowledge in a form that is readily accessible to its employees, as well as in the proper utilization of modern technology to facilitate knowledge sharing. Similarly, when respondents are asked whether the information held in facilities such as databases, other information technology applications, manuals or resource centers, are updated regularly, 31% have no information to agree or disagree, whereas 60% mentioned that these resources are not updated regularly. Information collected through interview and FGD also coincides with this response.

Table 4.3: Knowledge management Practice

Questions	Strongly Agree	Agree	Not Sure	Disagree	Strongly Disagree
Process related practices					
The organization has standard process for storing reference materials such as policies, procedures, manuals, guidelines, ideas or other practical information	06	**84**	04	**84**	02
The organization utilizes modern technology to facilitate knowledge sharing	02	30	18	**126**	04
The organization store knowledge in a form that is readily accessible to employees	0	14	22	**128**	16
The organization has mechanisms for converting tacit knowledge from individuals in to explicit form	0	10	30	**122**	18
Information held in facilities such as databases, other information technology applications, manuals or resource centers, are updated regularly	0	14	**56**	**96**	14
Resource related Practices					
Key experts in the organization are readily identified and contacted	0	**134**	14	30	02
For each activity conducted by individuals and units, there is a regular after-action review from which lessons can be drawn	06	**144**	16	12	02
The organization utilizes written documents such as newsletters, pamphlets, or manuals to share best practices from one unit to the other	02	18	14	**134**	12
The organization has libraries, resource centers or other forums to disseminate information or expertise	02	44	08	**124**	02
The organization has a knowledge retention program to ensure experience and expertise is not lost when staff leave	02	08	28	**128**	14
Training related Practices					
The organization provides training in its knowledge management processes	0	06	26	**136**	12
The organization provides training in new ways of doing things and overcoming potential challenges	0	**142**	18	16	04
Knowledge sharing is incorporated in staff performance review discussions	04	**60**	14	**98**	04
The organization has regular symposiums, lectures, conferences, or training sessions to share knowledge and ideas	02	14	20	**138**	06

With regard to the resource related questions, three-fourth, (134), of the respondent have mentioned that the organization has readily identified and contacted key experts in the organization. Interviews and FGDs confirmed that these key experts provide expert advice and support in many activities upon request. Similarly, 83% of the respondents confirmed that for each activity conducted by individuals and units, there is a regular After Action Review (AAR) from which lessons can be drawn. AAR, according to the key leaders and experts interviewed in this research, are a powerful concept for creating and transferring organizational knowledge. For many respondents, the central essence of AAR is how one can learn from his mistakes to ensure

he do not repeat the same mistakes again. It is a well known and practiced concept throughout the MoD. AAR, which is a procedure originated in the U.S. Army in the 1970s, is a verbal, professional discussion of a unit's actions that typically occurs immediately after a training event, combat operation, or other mission that determines what should have happened, what actually happened, what worked, what did not work and why, and the key procedures that must be sustained or improved (Lis, 2014).

When the respondents are asked if the organization utilizes written documents such as newsletters, pamphlets, or manuals to share best practices from one unit to the other, as well as libraries, resource centers or other forums to disseminate information or expertise, the majority, which is 68%-78%, do not agree with this statement. The same is true for knowledge retention. According to the respondents, the organization has nearly no knowledge retention program to ensure that experience and expertise is not lost when staff leave. In this regard interviewees and participants of the FGDs do not agree to this degree. They argue that knowledge retention programs are currently implemented through succession planning, especially for those who live the organization through termination of contract and retirement. The system may not be effective enough, but it is in place. As it was mentioned in the question of standard procedures for knowledge storage, the researcher acknowledged that many employees may not have as much as detailed information leaders and experts have in this respect.

The third and the last group of question in the KM practices is related to training. Very few respondents (less than 4%) agree that the organization provides training on its KM processes, and symposiums, lectures, conferences, or training sessions are regularly used to share knowledge and ideas. On the other hand, 82% agree that the organization provides training in new ways of doing things and overcoming potential challenges. One of the interviewee from the Communication and Information Technology Department (CITD) said that:

> *"the organization has different mechanisms that are being used for the benefit of KM, however these mechanisms have not labeled explicitly as KM. For example, training is a day to day activity for the military. Most of our trainings are focused on the new ways of doing things, to conduct operations within short period of time and with the minimum cost as possible. But training related to KM and KM processes and the use of symposiums, lectures, conferences, or training programs specifically for the purpose of sharing knowledge and ideas are very limited."*

With regard to performance review, interviewees acknowledged that team work and knowledge sharing are incorporated in staff performance review discussions. This is by itself an incentive to encourage knowledge sharing among members of the organization.

4.4.1 Organizational Structure

KM depends to a considerable extent on the organization's structure. Organizational structure determines the manner and extent to which roles, power, and responsibilities are delegated, controlled, and coordinated, and how information flows between levels of management. If the organizational structure does not facilitate knowledge sharing, KM will fail. If individual members are not eager to share their experiences with their colleagues on the basis of mutual trust and respect, there will be no generation of social, collective knowledge within that organization (Dalkir K. , 2005, p. 51). The military is recognized by its traditional hierarchical structure. Such type of structure defines each individual's role within the organization and greatly affects with whom each individual mainly and frequently interacts, and share knowledge.

Responses for the questions related to organizational structure revealed that the organization has no designated manager and structure for administering KM. However, the existing structure, unlike many other military organizations, facilitates information flow in all direction within the organization (71%) and promotes team work to facilitate knowledge sharing (74%).

Table 4.4: Organizational Structure

Questions	Strongly Agree	Agree	Not Sure	Disagree	Strongly Disagree
The organization has a designated manager and structure for administering knowledge management	0	12	34	134	0
The organization knowledge management structure (if any) extends at all levels down the organizational hierarchy	0	10	26	142	02
Te organizational structure facilitates information flow in all direction within the organization (top down, bottom up, and vertical)	0	128	26	24	02
The organizational structure promotes team work to facilitate knowledge sharing rather than strict hierarchical structure (setup).	02	132	24	22	0

Information obtained from questionnaire and FGDs asserted that the organization's designated manager for CIT department handles all issues related to KM. One of the interviewees mentioned that this structure, being one of the coordinating staff at the defense headquarter, extends at all levels down the organizational hierarchy. Participants, however, acknowledged that the term KM hasn't been used yet to describe the activities that the organization is carrying

out. Tough, the MoD follows a traditional hierarchical structure, due to its unique organizational culture, the structure facilitates information flow in all direction within the organization and promotes team work to facilitate knowledge sharing. The hierarchy doesn't limit and affect the interaction of people in the process of sharing information.

4.4.2 Organizational Culture

Similar to structure, organizational culture and climate may either help or hinder knowledge sharing. An organizational culture that encourages discovery and innovation will help, whereas one that nurtures individual genius will hinder. An organization that rewards collective work will help create a climate of trust, whereas a culture that is based on social status will hinder knowledge sharing. Without a receptive knowledge-sharing culture in place, effective knowledge exchanges cannot occur. Significant organizational changes may need to take place before effective knowledge sharing can begin to take place (Dalkir K. , 2005, p. 133).

Table 4.5: Organizational Culture

Questions	Strongly Agree	Agree	Not Sure	Disagree	Strongly Disagree
Mistakes are accepted as opportunities to learn and develop	01	136	12	20	10
The benefits of knowledge sharing is acknowledged from the individual's as well as organization's perspective	08	100	14	56	02
The organization reward employees for sharing their knowledge	04	86	20	44	06
The organization rewards employees for new ideas	06	82	14	74	04
The organization encourages the exchange of ideas and knowledge between individuals and groups	10	160	02	06	02
Great attention is given to the role and importance of knowledge held by individuals	06	138	14	16	06

Therefore, knowing and understanding the culture of any organization will provide the perspective by which information, goals and motivations can be viewed, allowing rapport, facilitation of knowledge sharing, and accurate interpretation for further understanding and acquiring a broad view of a situation (FM 6-01.1). According to 80% of the respondents the MoD gives considerable attention to the role and importance of knowledge held by individuals (tacit knowledge), and therefore since the benefits of knowledge sharing is acknowledged (60%) from the individual's as well as organization's perspective, 94% of the respondents agree that the organization encourages the exchange of ideas and knowledge between individuals and groups.

This shows that there is a strong organizational culture that promotes knowledge sharing in the MoD. In relation to this, for 67% (137) of the respondents, accepting mistakes as opportunities to learn and develop has been one of the enabling characteristics of the organizational culture in the MoD. However, when the respondents are asked whether the organization rewards employees for new ideas and sharing their knowledge, half (50%) of them agreed and the other half do not. This shows that organizational efforts in regard to rewards for sharing of knowledge are not well appreciated by its employees.

4.4.3 KM Infrastructure

As it has been mentioned by Sedighi and Zand (2012), technology, especially information technology (IT), is an important component of KM. IT is the pipeline and storage system for knowledge exchange (Davenport & Prusak, 2000). The IT Infrastructure is the combination of data processing, storage, and communication technologies and systems and the processes that make it all work. However, responses against the questions related to technology infrastructure, show that the MoD has not yet fully embraced the necessary technological infrastructure for the benefit of KM.

Table 4.6: KM Infrastructure

Questions	Strongly Agree	Agree	Not Sure	Disagree	Strongly Disagree
The organization provides appropriate resources to facilitate knowledge sharing	02	32	22	122	02
The organization utilizes information communication technology to support knowledge sharing among its employees	02	36	18	120	04
Social networks are encouraged in the organization	02	10	24	136	08
Information and communication technologies meet the needs of individual users for knowledge sharing	02	10	28	140	0
The physical work environment and layout of work area encourage knowledge sharing	04	126	14	34	02
The organization has databases to store policies, manuals, procedures and other organizational resources	0	20	32	126	02
Does the organization utilize non-information technology supported knowledge management tools for knowledge sharing (white board, flipcharts, workflow diagrams…)?	0	134	18	28	0

As it is shown in table 4.6, only 19% of the respondents agree that the organization provides appropriate resources to facilitate knowledge sharing. Similarly, the majority of the respondents (68%) replied that the organization doesn't properly utilize ICT to support knowledge sharing among its employees. Even, according to 78% of them, the ICT infrastructure does not meet the

needs of individual users for knowledge sharing. When they are asked whether the organization has databases to store policies, manuals, procedures and other organizational resources, as well as whether social networks are encouraged in the organization, only 11% and 6.6% of the respondents agree respectively.

On the other hand, the physical work environment and layout of work area is found to be encouraging for knowledge sharing, according to 72% of the respondents as well as most of the responses from the interview. 74% of the respondents also acknowledged that the organization utilizes non-information technology supported knowledge management tools such as white board, flipcharts, and workflow diagrams for knowledge sharing. The researcher's personal observation also reveals the same fact.

4.4.4 Leadership

The organization's ability to be innovative is related to leadership. Leaders construct the social reality of the organization, shape values, and help both to create and attain the vision of the organization (Dalkir, 2005:209). They should create organizational environment and culture which supports and encourages organizational and team learning.

In view of this, as it is shown on table 4.8, more than three-fourth (74-82) of the respondents agree that leaders and managers are openly supportive of the knowledge sharing and learning opportunities among their staff. Leaders in the MoD regularly involve staff in decision-making (Planning) and empower their staff to develop their potential. The same number of respondents asserted that, rank, status, formality, and organizational hierarchy do not impede employees at all levels from sharing knowledge with anyone and leaders at all levels are easy to be contacted and are openly supportive. Reponses gained from interview and FGDs are found to be an augmentation to this response. Many attributed this leadership culture to the success of the defense forces in general.

When it comes to formality, however, only 15% of the respondents replied that the organization has formal knowledge management strategy that is aligned with its strategic vision. However, key informants argued that, as it has been mentioned earlier, the organization has information policy and strategy which is formulated in alignment with the MoD overall strategy. It addresses how information is generated, protected, shared, and used within the organization. The researcher has acknowledged that the organization has two documents that are officially signed and authorized to be used. These are the ICT policy and strategy, which is mainly deals with the

development of ICT infrastructure and system in the organization, and the information security policy developed in accordance with the International Standard Organization (ISO) 27001 standard. One officer mentioned that "the only thing, I think we missed is, identifying clearly what information and knowledge is and treat them accordingly." More than half (56%) of the respondents also believed that leaders are limitations in their commitment to developing effective knowledge sharing practices in the organization.

Table 4.7: Leadership

Questions	Strongly Agree	Agree	Not Sure	Disagree	Strongly Disagree
The organization has a formal knowledge management strategy that is aligned with its strategic vision	04	24	32	118	02
Managers are openly supportive of knowledge sharing and learning opportunities	02	134	10	28	06
Leaders are committed to developing effective knowledge sharing practices	02	56	20	100	02
Leaders regularly involve staff in decision-making (Planning)	02	144	08	16	0
Rank, status, formality, and organizational hierarchy do not impede employees at all levels from sharing knowledge with anyone	02	134	12	32	0
Leaders empower their staff to enable them develop their potential	04	138	12	26	0
Leaders at all levels are easy to be contacted and are openly supportive	10	148	14	08	0

4.4.5 Knowledge management techniques

The interview with the head of the Communication and Information technology Department revealed that the MoD uses different methods to manage and share knowledge. Some of the techniques are specific to the military domain and some are common in the business world.

One of the best methods used throughout the MoD is an After Action Review (AAR). The work of the military also demands team work by its nature and training and education are routine and continuous activities of the military force. Commanders have a regular period where they speak with their soldiers in an informal setting, called durbar or commander's time. In support of this, an average of 85% of the respondents agree that all the techniques of KM and knowledge sharing listed in table 4.8, except the two i.e., counseling, coaching or mentoring and lessons learned systems are widely used to manage and share knowledge in the MoD.

As Hasnani (2016) mentioned, knowledge sharing or transfer is an indispensible element of KM, and successful knowledge transfer demands a good medium between the knowledge actors.

According to the information collected from interviews, non-ICT tools are mostly used for knowledge sharing in the organization than the ICT based ones. According to one respondent:

> *"Though it is partly due to the limitation in the utilization of ICT in the organization for the purpose of KM, there are numerous tools used in the military for knowledge sharing that are absolutely non ICT. Whether it is ICT based or not, knowledge can be transferred through military training and education, military exercises, doctrine, AAR, and durbar or commanders time, to mention some. What is crucial for the military forces is the selection of an appropriate mechanism for the transfer of knowledge.*

Similarly, according to another officer, unlike the KM in the business world, the military also uses military specific units including intelligence and signal corps to share knowledge in the battlefield. He added that "…intelligence agencies and signal corps are the excellent vehicles of knowledge transfer. Therefore, the importance of these units is paramount in the warfare. Collect, collate and analysis of information are the prime duties of these units." In military the local field intelligent agents/units, work like the vehicles of knowledge transfer through the act of transmitting their collected information to their respective military units/formations during peace and war times. Such information helps the decision makes the planning and decision making process easy for the commanders (Hasnain, 2016).

It has also been understood from the interview and FGD that Signal Corps of the military is a knowledge transfer mechanism between the units/ commanders. As the medium of knowledge transfer, they ensure the transfer of knowledge to the knowledge-recipients as fast as possible so that they may take decision and act as per the demands of the situations. Military training schools and institutions are the excellent vehicles of knowledge transfer for all ranks in the defense forces. Militaries also learn through best practices from other militaries as well.

Table 4.8: Knowledge management tools

The Organization uses the following techniques to manage and share knowledge	Response in No.	Response in %.	Rank
After Action Reviews (AAR)	**174**	96.7%	**1**
Lesson Learned Systems	**42**	23.3%	**7**
Team work	**168**	93.3%	**2**
Training and education	**152**	84.4%	**3**
Commanders Time	**148**	82.2%	**4**
Formal and informal social networks	**142**	78.9%	**6**
Manuals, procedures and other reference materials	**144**	80.0%	**5**
Counseling, Coaching or mentoring	**34**	18.9%	**8**

4.4.6 Knowledge Storage and sharing

KM implementations require a wide range of quite diverse tools that come into play throughout the KM cycle. Technology is used to facilitate primarily communication, collaboration, and content management for better knowledge capture, sharing, dissemination, and application. KM tools include information systems and various software tools used to put knowledge products and services into organized frameworks (FM 6-01.1).

Among different tools that are commonly used for knowledge storage and sharing, intranet (24.4%), electronic library (22.2%), and corporate e-mail (18.9%) are the first three tools that have been used in some areas of the MoD. However for more than 75% of the respondents none of these tools are used for knowledge storage and sharing. Informants participated in the interview and FGD also acknowledged this response. This shows that the use of technology-based tools for knowledge sharing is limited to some areas in the organization. Though there are a wide array of digital tools available for knowledge capture and flow, meaningful knowledge management does not solely depend upon technological means to function. According to department of the Army (2015), the capture and flow of knowledge needed to gain shared understanding can often be best accomplished by human interaction not supported by digital means.

Table 4.9: Knowledge Storage and sharing

The Organization uses the following tools for storing and sharing of knowledge in the organization . . .	Response in No.	Response in %.	Rank
Electronic Document Management System (e.g. SharePoint)	**26**	14.4%	**5**
Electronic Library	**40**	22.2%	**2**
Intranet	**44**	24.4%	**1**
Corporate e-mail	**34**	18.9%	**3**
Simulators	**32**	17.8%	**4**
Groupware	06	3.3%	8
Decision Support Systems	**14**	7.8%	**7**
other collaboration tools	**20**	11.1%	**6**

4.4.7 Factors affecting KM

The conduct of KM in an organization is influenced by a variety of factors. KM literatures have identified a broad range of factors that can influence KM in organizations. A fundamental part of KM is to spread and make knowledge accessible and usable. Knowledge which is not shared and used or applied for a specific purpose is useless. The major factors that can impede effective knowledge sharing in the MoD that have been agreed upon by 75% of the respondents are lack

of system and policy that support knowledge sharing, limited level of awareness regarding KM, and technological limitations. In addition, an average of 66% respondents agree that high concern for information security and lack of reward and recognition are also among the factors that affect knowledge sharing within the MoD.

In addition to the factors listed in the survey questionnaire, a more expanded list of factors has been collected during the interview and FGD. Participants in the interview and FGD argued that factors must be seen as both having enabling as well as obstructing effect. Though it depends on the specific organizational context, some factors can be enablers, some are impeders. In view of this, leadership, culture, structure, time, skill, and expertise, as well as external factors including social, political, legal, and economic factors have been considered as enabling or obstructing factors in addition to those listed in the questionnaire.

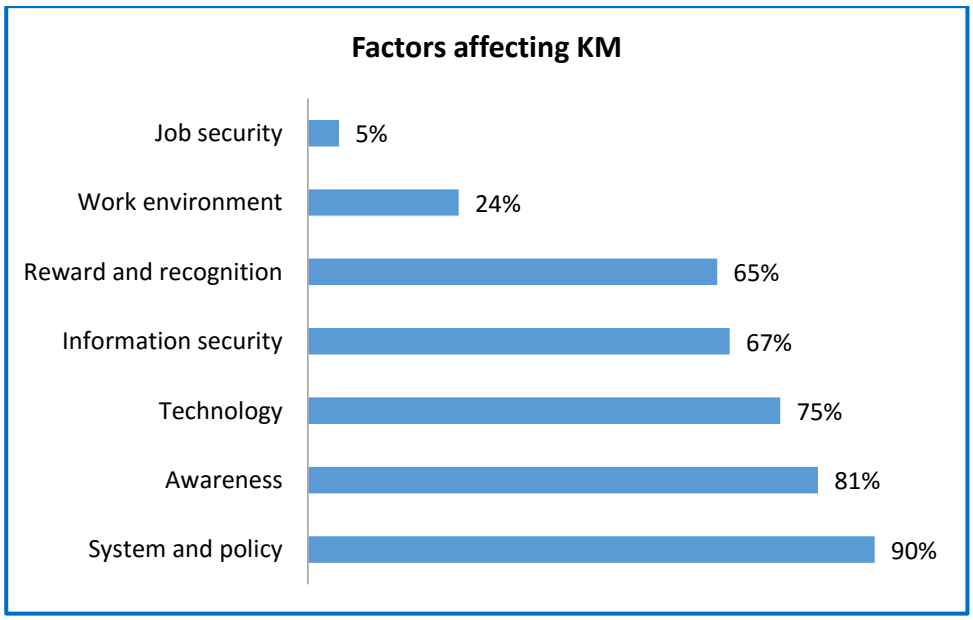


Figure 4.5: Factors affecting knowledge sharing

Similarly, informants also stressed that in any activity the organization plans and conducts, at most effort is often exerted to make sure that it is directed towards the achievement of the overall organization's mission, vision, and strategies. The organization's mission describes why the organization wants to be involved in certain activities, the vision makes explicit what the organization wants to be in the future, and the strategy explains how this should be accomplished. KM is no different. Without knowing why, what and how, it will be very difficult to link KM initiative to the business objectives.

Different studies including Holsapple and Joshi (2002), Heisig (2009), Sedighi and Zand (2012), and Karamente (2011) pointed out those factors that affect KM in their research. Heisig (2009) for example classified them in to four as human oriented, organizational, technological, and management, whereas Sedighi and Zand (2012), grouped them as internal or organizational factors and external or environmental factors. Apart from their level of influence in any way, all these factors could also affect KM in the military context as well.

On the other hand, participants also acknowledged that the working environment in general and as 95% of the survey respondents agree, job security hasn't been a problem for knowledge sharing in the MoD.

4.5 ORGANIZATIONAL CONTEXT

The MoD, as a military organization, is similar to other large public and private sector organization, but it also differs in many aspects. Key differences include its organizational culture, mission, governance, and its operational environment. Military organizations are expected to respond quickly and operate effectively, cohesively, and decisively across the entire spectrum of military operations - from full-scale major theater war to humanitarian relief operations and other peacetime engagements. The civilian control of the military, the influence of government entities, and the command-and-control structure of the military also make organization's governance issues and actions unique.

Moreover, members of the MoD often operate in high-risk and high-stake situations in dangerous environments. In combat, which is an extreme case, soldiers risk their lives fighting directly with enemies. They are expected to operate and make the best possible decisions in highly uncertain situations. Therefore they need real-time knowledge deeply embedded in the context of the operational area in order to allow them to make good decision and implement it faster than the enemy. On the other hand, similar to the civilian sector, the military environment includes the state of technology and the condition of social, economic, legal, and political influences. This will affect the way it operates and manages knowledge. Therefore, KM is a serious area of inquiry in the Military and it demands some requirements that are different from the business sector. Due to its complicated nature, there is always some uncertainty in the military environment. In order to overcome this uncertainty, military leaders at all levels must gain a good knowledge about their operation and operational environment. Decision makers can make accurate decisions only when they have timely and accurate information, because military

operations are highly dependent on information and information systems in the processes of integration, coordination and taking actions.

In the MoD, knowledge is usually codified in the military doctrine, field manuals, instructions and other publications, as well as electronically in the organization's memory. As any military organization, the explicit knowledge embedded in these documents is transferred to the troops through training and education. As Lis (2015), has demonstrated in his research on the knowledge creation and conversion in the Military organizations, knowledge gained through training and education, which is added to the tacit knowledge base of the individual, is applied in military operation. Therefore, operations are the contexts of paramount importance for military KM and learning. Lessons identified and learned from operations and exercises update the knowledge base of the organization. Reviewed and tested knowledge activates the development of new concepts. Simultaneously, military publications and organization memory are updated in order to keep pace with changes in the organization and the environment.

This process is basically facilitated by the staff in the MoD organizational setup. Staff in the military play critical role in KM. Usually staff at all levels is organized in to personnel, operations, intelligence, logistics, communication, planning, and other specializations depending on the level of the unit. As a section, KM is usually the prime responsibility of the communication section. However in many militaries activities related to knowledge are carried out by a designated knowledge section. Staffs in coordination with knowledge section perform KM and information management to find relevant information from large amounts of data and available information. They provide timely and relevant information and analysis to help commanders build and maintain situational understanding. Through analysis, staffs develop knowledge for commanders and recommendations to help commanders understand situations, make and implement decisions, control operations, and assess progress. Therefore KM activities in military organizations demand additional requirements due to the unique nature of the organization.

4.6 MILITARY SPECIFIC KM REQUIREMENTS

Interviews with key informants and FGD as well as review of literatures tell that there are many approaches to KM in the military each with its own set of tools, and methodologies. Military knowledge applications are often designed to support specific strategic, operational, or tactical decision making processes. Though many of the tools are adopted from the commercial sector

their application might be different in the military context and many others tools remain proprietary and classified. Because secrecy is the most important aspect in the military, knowledge is often labeled as unclassified, classified, secret, and top secret depending on its critical value and sensitivity. All information is not available to public and even to the soldiers at all levels. Similarly, if the knowledge that is required for decision-making delays even for seconds can change the entire situation of the operation. There is a very little scope for error in the military operations (Sriramesh, 2017). Therefore, KM processes within the context of military operational environment at least require emphasis on these additional requirements of security and time.

4.6.1 Security

One of the most critical knowledge military organizations seek to have is the knowledge about other militaries, often hostile or enemy forces, capabilities and vulnerabilities as well as the best way to neutralize capabilities and exploit vulnerabilities. In the same manner they exert their best effort to secure their own capabilities and vulnerabilities. Security involves actions taken to counter threats and vulnerabilities during all steps of the KM process. Security activities include encryption of data at rest, granting access to information on a need-to-share basis, and using secure, authorized processes to disseminate and display information. Security ensures the confidentiality, integrity, and availability of information traversing networks and residing on information systems from the time it is collected, processed, and stored until it is discovered, distributed, and used by the users, systems, and decision makers. Therefore security is one of the most critical requirements for the MoD, when knowledge and KM is concerned.

4.6.2 Time

Time is also critical for military operations. Militaries need knowledge and expertise to be available immediately when needed in order to respond properly to emerging threats and challenges. As the battlefield changes and the tempo of war increases, the pace of information creation and decision making also multiplies. Modern warfare relies on information from many sources that must be assessed and compiled for immediate use. Decisions are made in each and every minute in combat situations. When knowledge is timely available, it will enable the commander to develop an understanding of the situation, make good decision, and implement them faster than the enemy. Otherwise, slight delay could have a devastated effect that couldn’t

be reversed. Time is one of the distinctive characteristic of the military organization. Therefore, militaries require knowledge management processes that match the pace of operations.

4.7 SUMMARY

The MoD and its members believe that KM plays an important role for the effective accomplishment of the mission of the organization. It has been clear that the organization engages in multi dimensional KM activities, since it cannot survive without doing so. However, these efforts are carried out with the essence of information rather than knowledge. Most people consider knowledge as information or education, and therefore they use these words interchangeably. The organization has structure, policies, and procedures that govern the management of information within the organization. Despite this fact, the organization utilizes KM techniques such as After Action Review (AAR), teamwork, succession plans, durbar (commanders time), participatory decision-making, and staff empowerment among others.

As culture and structure is concerned, the MoD has a strong organizational culture and structure that promotes teamwork and knowledge sharing among its members. Leaders and managers in the organization are openly supportive of the knowledge sharing and learning opportunities among their staff and the physical work environment and layout is found to be encouraging for knowledge sharing. Unlike other military organizations rank, status, formality, and organizational hierarchy do not impede employees at all levels from sharing knowledge with colleagues. Many attributed this leadership culture with the success of the defense forces in general.

On the other hand, the organization has limitations in the utilization of modern technology to facilitate KM. The available ICT infrastructure does not meet the needs of individual users when it comes to knowledge sharing. Organizational efforts have also limitation in the development of formal and effective knowledge sharing practices.

As any organization, the MoD has similarities with other large public and private sector organization and it also differs in many aspects. Therefore militaries need real-time knowledge deeply embedded in the context of the operational area so that they can make good decisions and implement it faster than the enemy. Similar to the civilian sector, the military environment includes the state of technology and the condition of social, political, economic, and legal influences; therefore its KM activities are affected by the same factors that affect the business sector. Lack of system and policy that support knowledge sharing, limited level of awareness

regarding KM, technological limitations, high concern for information security and lack of reward and recognition are the major factors that affect knowledge sharing within the MoD. When KM tools and techniques are concerned, there are many approaches to KM in the military each with its own set of tools, and methodologies. The MoD uses military specific units, methods, and tools to acquire and share knowledge in the organization, and KM processes within the context of military operational environment require additional requirements of security and time among others. This all affect the way the organization operates and manages knowledge.

CHAPTER FIVE
FRAMEWORK DEVELOPMENT AND DISCUSSION

5.1 INTRODUCTION

This chapter is the design cycle of the design science approach where the relevance cycle and the rigor cycle meet. In the relevance cycle (chapter one and four) the problem or the need for the research, the research environment or context, and design requirements are discussed. The rigor cycle (chapter two) uses existing knowledge bases such as theories, methods, and design products to provide a basis for rigorous design research. In this process review of literature on knowledge, knowledge management and previously designed KMFs are undertaken with the aim to identify commonalities and shortcomings in the available KMFs. Primary data is gathered through survey questionnaire, interviews with key informant, and FGD to establish organizational context and KM requirements. In this chapter these two efforts are combined to design a comprehensive KMF appropriate for the MoD specific context, as the selected research approach dictates.

5.2 FRAMEWORK DEVELOPMENT

Militaries have their own knowledge requirements due to their specific operational environment and the nature or their mission. The KM frameworks that have been reviewed cannot be used for the MoD as they are. Because, most of them are not comprehensive and do not consider the military's knowledge requirements, specially the requirements of time and security. Moreover, there was no framework from the military domain that can be considered to the MoD. Therefore a KMF need to be developed on the basis of those available frameworks for the MoD specific requirements that have been identified in chapter four. The main goal of the framework that is to be developed is to provide the organization with the central areas for consideration in KM efforts and help the organization to approach KM methodically and consciously. The Framework helps people understand what KM is, what knowledge activities are involved and how the knowledge activities affect organizational effectiveness. It also facilitates communication and is extremely useful to have a common and understood vocabulary, and serves as a blueprint for the formulation KM policies and strategies.

As it has been mentioned by Metaxiotis et al., (2005), a KM framework should include and explain the major KM components, their relationships, and the principles that define the way in which these elements interact. Due to the broadness of KM field and the lack of KM standards,

existing KMFs vary in scope and focus. The review of the related literature on chapter two shows that in most comprehensive KMFs at least three major components are common. These are the knowledge resources that an organization has, basic types of activities or processes that can be used to manipulate these organizational knowledge resources, and classes of influences that shape the conduct of KM in an organization. Therefore, the proposed framework should contain at least these tree main distinguishing aspects or elements of a KMF.

Since the framework development follows a design science approach, some of the components of the framework are taken from existing frameworks in the business sector and modified to fit in to the MoD context. Additional components that are specific to the military context are also added based on the requirements identified in the data analysis.

5.3 COMPONENTS OF THE PROPOSED KMF

The proposed framework has all the three components of a typical comprehensive framework (knowledge resource, KM process, and KM influence aspects), and additional four components are added and arranged to fit the requirements of the MoD. Since this is the first framework developed for the MoD, much effort has been exerted to make it comprehensive, clear, and simple as possible. The following seven components are integrated in to the framework. Each of the components is discussed further in the discussion section (5.4). Here is a very brief description on why these are selected as a component in the framework.

1. **Business Process:** Every effort in an organization must be aligned with and in support of the organization's mission, vision, policies, and strategies. This is the starting point or the foundation for KM. Organization's mission, vision, policies, and strategies dictate the overall nature and characteristics of the KM. Therefore to emphasize this actuality the first component o the framework is set to be the business process.
2. **Knowledge resources:** On top of the business process are organization's knowledge resources. There is no KM if there is no knowledge resource to be managed. Different KM researches and frameworks have developed several resources dimensions which have been summarized into three types of intellectual capital namely Human capital, Structure capital, and Relational capital (Luthy (1988), Stewart (1997), Holsapple and Joshi (2002), and Okunoye (2004). Due to the fact that this classification appears in most KMFs the researcher adopted it in this framework.

3. **Knowledge management processes:** KM processes are a sequence of processes that operate on the knowledge resources in the conduct of KM. Different literature group KM activities in to three to nine categories. For the current level of KM in the MoD the four basic categories that are common to most KMFs are adopted for simplicity.

4. **KM methods and tools:** KM processes utilize different methods and tools that are common in the business world. Since there are additional methods and tools specific to the military and considering that the framework is proposed for the first time these methods and tools are incorporated within the respective KM processes, to build up common understanding among members of the MoD.

5. **Security:** Since security has been identified as a critical requirement for KM in the MoD, security has been included as a component in the framework. This shows that every KM process and associated methods and tools need to be security enabled from inside and outside the organization.

6. **Time:** Time is also identified as a critical requirement; therefore time (T) sign is added to each process to inform the each process has to be time sensitive.

7. **KM influence aspects:** Internal and external factors that affect the conduct of KM in an organization have been shown around the components of KMF to show that they can influence any of the components. These factors must be identified, so that they can be exploited or mitigated for the benefit of the organization. The Sedighi and Zand (2012) classification of influence aspects in to internal and external has been adopted for its popularity and simplicity as well as its recognition from responses in the primary data.

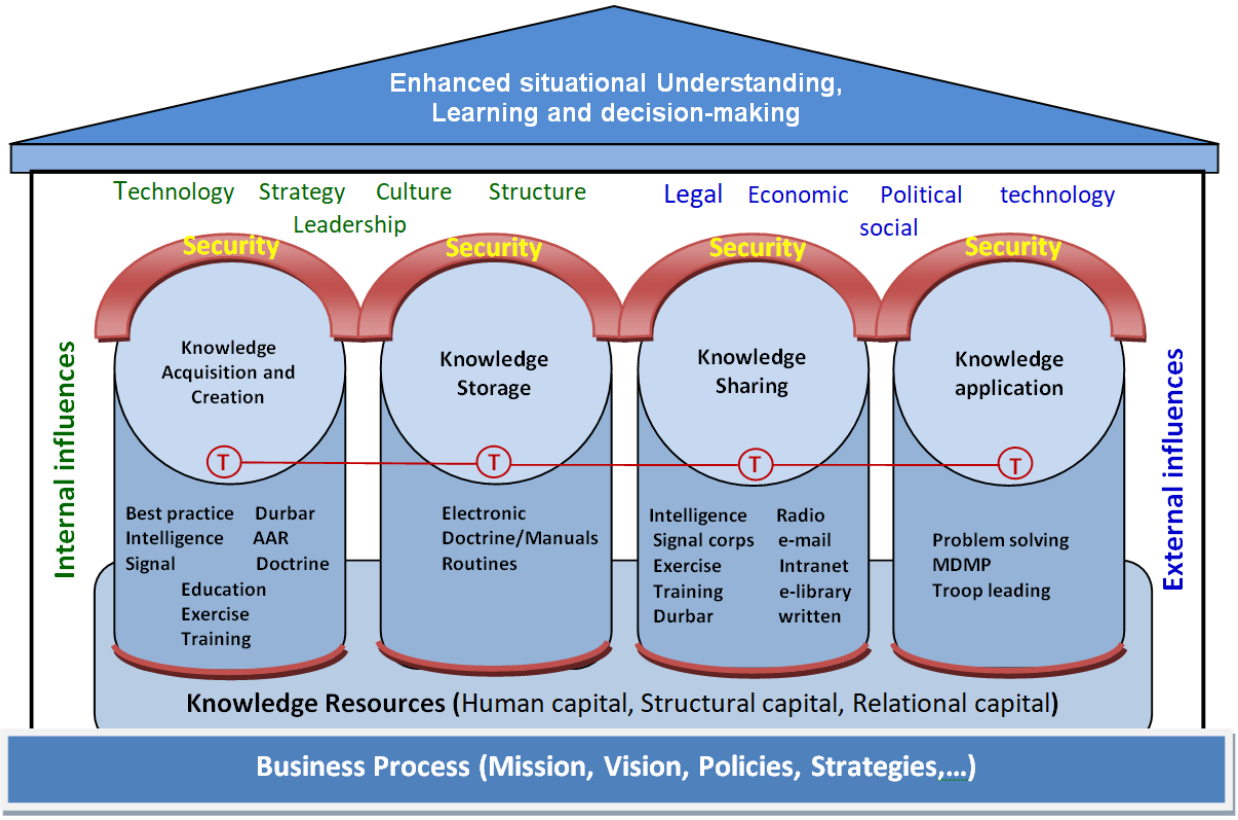


Figure 5.1: The proposed KMF for the MoD.

The overall objective or the end state of KM, is to bring enhanced situational understanding among the decision makers so that they can make good decision. The success of the KM is also measured against this objective.

5.4 DISCUSSION

In this section each of the components of the proposed KMF are discussed in details. The organization needs to realize logical balance between all these eight subsystems for effective KM in the organization.

5.4.1 Business Process

The KMF is developed to help the organization achieve its objectives. Therefore, organization's KM efforts and KMFs must be aligned with other organizational strategies in order to bring coordinated effect in the realization of organization's missions and objectives. Any kind of effort should start with the organizations broader mission and vision. In view of this the first element of the Framework is designed to be the organization, with its mission, vision, policies, and strategies as a foundation. It reminds the organization in all its endeavors in relation to KM, to consider and think of the organizational broader aspects and ensure KM efforts alignment

with it. One of the reasons to develop such a framework integrating all the seven components into a dynamic coherent whole is this relationship.

5.4.2 Knowledge assets of the organization

The critical advantage of KM is vested in the intellectual capital as a resource (Lai & Chu, 2000). Knowledge-related assets include the knowledge possessed by the organization and its workforce in the form of information, ideas, learning, understanding, memory, insights, cognitive and technical skills, and capabilities. Organization's workforce, databases, documents, guidelines, policies and procedures, software, and patents are repositories of the organization's knowledge assets. Knowledge assets are held not only by an organization but reside within its customers, suppliers, and partners as well (King, 2009). Nonaka et al. regard the knowledge assets as the basis of knowledge-creating process and define them as "firm-specific resources that are indispensable to create values for the firm" (2005, p. 36).

The benefit and strategic importance of knowledge management provides leverage to an organization to correctly identify which type of intellectual capital it can improve and apply to gain sustainable competitive advantage (Okunoye, 2004).

1. **Human capital** refers to the employee capability to solve problems and is the source of creativity. It is the knowledge, skills/competences, training and education, know-how, capabilities, and experience and value characteristics of the organization's workforce that is in the minds of individuals. This capital is the organization's constantly renewable source of creativity and innovativeness (and imparts it the ability to change) but is not reflected in its financial statements. Unlike structural capital, human capital is always owned by the individuals who have it, and can 'walk out the door' unless it is recorded in a tangible form, or is incorporated in the organization's procedures and structure.
2. **Structural capital** relates to the organizing capability of an organization in order to meet the objectives of the organization. The organizing capability refers to organizational structure, processes, information systems, databases, policies, intellectual property, culture, documented experience and knowledge, and the capability to utilize knowledge through sharing and transferring. Thus, the knowledge embedded in organizational structures and processes. In general it is the supportive non-physical infrastructure, processes and databases of the organization that enable human capital to function (Maddocks & Beaney, 2002)

3. **Relational capital** concerns the relationship between an organization and its stakeholders. This means all relations the organization entertains with external subjects, such as government, society, partners, and other stakeholders. The notion that relational capital is separate from human and structural capital indicates its central importance to the organization's worth (Skyrme, 1998).

5.4.3 KM processes

Knowledge management processes are the sequential steps of conducting knowledge management in an organization. A number of KMFs have been proposed and different literature group KM activities in to three to nine categories. In this framework the knowledge activities were re-classified and summarized into four activities basing on content of each activity as analyzed from previous frameworks. The new structure of activities is knowledge acquisition and creation, knowledge storage, knowledge sharing or transfer, and knowledge application. The researcher, in consultation with the CIT department and took and considered these as the key KM processes for the development of the comprehensive KMF appropriate for the MoD.

a) Knowledge Acquisition and Creation

Knowledge acquisition and creation involves developing new content or replacing existing content within the organization's tacit and explicit knowledge. Knowledge acquisition is the activity of accepting knowledge from the external environment and turning it into a commodity that can be used within the organization (Holsapple & Joshi, 2002). The process includes locating, accessing, capturing and collecting knowledge from knowledge sources. It is the stage at which knowledge is contextualized in order to be understood (Dalkir, 2005). Knowledge can be acquired from repositories, learning from others, and learning from experiences. Military organizations use different mechanisms and tools to acquire knowledge, including intelligence and signal units, and using reconnaissance, surveillance, different types of patrols, electronic warfare, human intelligence, and different sensors.

Knowledge creation is the process of developing new knowledge or combining, restructuring, or repurposing existing knowledge in response to identified knowledge gaps (FM 6-01.1, 2008, 1-1). What is important to know here is knowledge creation is primarily a human process; technology can facilitate knowledge creation but cannot replace people. Nonaka and Takeuchi (1995) stated that knowledge is created through the conversion of tacit and explicit knowledge in four modes: Socialization, Externalization, Combination and Internalization; which is

commonly referred as SECI model. Lis's (2015), analysis, in his research "Knowledge Creation and Conversion in Military Organizations: How the SECI Model is Applied within Armed Forces" proved that the SECI model is applicable to managing knowledge creation in the military organization. Therefore in the MoD SECI can be applied in this process. For example, knowledge can be socialized through face to face communication, counseling, and coaching; it is externalized through AAR and lesson learned; combined or codified in doctrines; and internalized through training and education.

b) Knowledge Storage

Knowledge storage refers to the identification and codification of existing knowledge and know-how into organizational memory (Dalkir, 2005). Organizational memory is the means by which knowledge from the past influences present organizational activities (Stein and Zwass, 1995). Knowledge storage is important because knowledge can be lost, especially if it is still tacit and held by knowers. When employees leave the organization, they leave with it, hence the importance to store it for future use. Knowledge is stored manually and electronically. Manually, knowledge can be stored in military doctrines, field manuals, minutes of meetings, operational plans and orders, maps, reports, policies and many other physical organizational documents. Electronically, it can be stored in organizational databases, portals and emails. According to Department of the Army (2012), 80% of organizational knowledge is stored and kept within individuals mind.

c) Knowledge transfer

Knowledge transfer is the conveyance of knowledge, including knowledge based on expertise or skilled judgment, from one person to another. It is the process in which knowledge is communicated to other people (individuals and groups), across and within departments and organizations through face-to-face interactions, or the use of technology (Likalu, et al., 2010). Since knowledge transfer is an important element of the KM process, successful knowledge transfer demands a good vehicle between the knowledge actors. Therefore the selection of appropriate transfer mechanism is crucial for the military forces.

Knowledge transfer has four elements: connection, collaboration, content, and context. All four are required for successful knowledge transfer. Connection provides people with a structure and networks, both technical and social, which facilitate communication. Collaboration is interaction among people at two or more locations who are developing knowledge for the same purpose.

Content is actual information or knowledge, and many means of storing and transferring content exist. These means are non-digital and digital media. Finally, context for military purposes is the operational environment within which the knowledge was created. Context identifies the applicable operational or mission variables and shows how they affect the outcome of applying the knowledge (FM 6-01.1, 2008, 1-1).

Experience and research suggest that successful knowledge sharing involves extended learning processes rather than simple communication processes. When knowledge is shared in the organization to achieve an organizational goal, the knowledge is distributed. Sharing of knowledge takes place in formal and informal ways and different methods and tools are used to transfer knowledge in the military. For obvious reasons, effective knowledge transfer is a crucial issue for the military. Knowing what to expect and what to do in military situations can be literally a life –or-death matter (Davenport & Prusak, 2000).

d) Knowledge application

Knowledge application refers to the utilization of knowledge that has been captured and stored in organizational memories or the knowledge in people's heads for a particular purpose. Knowledge utilization results in knowledge increase, by gaining expertise and insights. Knowledge is useless if it is not utilized. People do not just passively receive knowledge; rather they actively interpret it to fit with their own situation and perspective (Nonaka, 1998). It is the act of applying available knowledge to create new knowledge and produce an externalization of knowledge (Holsapple & Joshi, 2002, p. 57). As indicated by many writers, the available knowledge has to be applied to the processes of the organization. It could be in innovation, production, consulting, executive decision making, and many other tasks that require knowledge. Knowledge is applied to enhance situational understanding, learning, and decision-making (MDMP) within the three functional areas (Combat, CS, and CSS) of the MoD. Especially in a combat situation knowledge is applied by combat units in an operation, by CS units to support and enable the operation of the combat units, and by the CSS units to sustain the operation.

Commanders also use intuitive decision making when time is short and problems straightforward. Intuitive decision making is the act of reaching a conclusion that emphasizes pattern recognition based on knowledge, judgment, experience, education, intelligence, boldness, perception, and character (FM 6-0). Though intuitive decision making speeds up decision making significantly in a time constrained environment, it doesn't work well when the

situation includes inexperienced leaders, complex or unfamiliar situations, or competing Course of Actions (COA). Therefore leaders are often required to make on the spot decisions intuitively using their prior knowledge with their own judgment especially in troop leading.

5.4.4 KM methods and tools

Different KM methods and tools are utilized in the process of KM. The selection of KM methods and tools depends on the specific nature and context of the organization, including mission, availability, and determination of the simplest or most effective tool for the required purpose. Some methods and tools can appear in more than one process and some of them are associated with a specific process. The military uses military specific KM methods and tools in support of KM processes in conjunction with those used in the business.

KM methods and tools that support knowledge acquisition include best practices, intelligence units and signal units; and those that support knowledge creation are durbar, AAR, and doctrines. Education, exercise, and training support both knowledge acquisition and creation processes. Doctrines, manuals, routines and electronic memories are some of the KM methods and techniques that support knowledge storage. Intelligence units, signal corps, military exercises, training, and Durbar are some of the methods, whereas radio, e-mail, intranet, e-library, and written documents are some of the tools often used for knowledge sharing. Knowledge is applied in the military for decision making and problem solving in various operations.

5.4.5 Security

Since security has been identified as a critical requirement for KM in the MoD, every KM process and associated methods and tools have to be secured from inside and outside the organization. Security ensures the confidentiality, integrity, and availability of information traversing networks and residing on information systems from the time it is collected, processed, and stored until it is utilized, shared, and used by the users, systems, and decision makers. Therefore security has been incorporated as the fifth component of the framework.

5.4.6 Time

Time is a very critical and distinctive characteristic of the military organization. Given the life-threatening situations the military forces confront, timely knowledge is a matter of life and death. As the battlefield changes and the tempo of war increases, the pace of information creation and decision making also multiplies. Timely available knowledge enables the

commander to develop an understanding of the situation, make good decision, and implement them faster than the enemy. Therefore all the KM activities need to be time sensitive.

5.4.7 Influence factors

The conduct of KM in an organization is influenced by a variety of factors. The data analysis revealed that lack of system and policy that support knowledge sharing, limited level of awareness regarding knowledge management, technological limitations, high concern for information security and lack of reward and recognition are the major other factors that affect knowledge sharing within the MoD. KM literatures have also identified a broad range of factors that can influence (positively or negatively) KM in organizations. Despite the difference in degree and level of influence, KM efforts in an organization are affected by internal or organizational factors and external or environmental factors, as Nagendra and Morappakkam (2016) classified. Factors identified during data analysis can be categorized in to these two categories.

These two aspects interact with each other and within each aspect. The external or environmental factors relate to national infrastructure and culture in the surrounding environment while organizational factors concern organizational variables and information technology factors support the process of knowledge creation and its sustainability.

Success in military operations demands timely and effective decisions based on applying judgment to available information and knowledge. Throughout the conduct of operations, commanders supported by their staffs, subordinate commanders, and other partners seek to build and maintain situational understanding. Situational understanding is the product of applying knowledge to determine the relationships among the operational and mission variables to facilitate decision-making (ADP 5-0). Therefore, the objective of KM is to enable knowledge flow to enhance shared understanding, learning, and decision-making. This objective or end state has been depicted in the framework to inform KM efforts on what they should focus as an overall objective.

5.5 EVALUATION OF THE PROPOSED FRAMEWORK

Aside from the conceptual justification, the proposed framework has been evaluated by eight key experts in the field of knowledge and information management by means of a Delphi-like methodology. After the eight experts are identified, they are provided with the proposed KM framework and the evaluation matrix, and asked to comment on its accuracy,

comprehensiveness, clarity, and conciseness as criteria adopted from Holsapple and Joshi (2002). Their perceptions regarding the overall framework were also captured by asking how satisfied they are with the framework in general and the extent of the framework's success in providing a unified and comprehensive view of KM phenomena. The evaluation matrix is attached as Annex 3.

All the eight experts are unanimous in their perception that the framework is very important for the organization and they are very satisfied with the framework in general (table 5.1 and 5.3). Half of them (4 experts) rated the degree of the KMF's success in providing comprehensive view as successful and the other half (4 experts) very successful (table 5.2).

Table 5.1: Level of Importance of the proposed framework

Element of satisfaction	**Level of importance**						
	Not at all important	Slightly important	Somewhat important	Moderately important	Important	Very Important	Extremely important
Importance of a framework	-	-	-	-	-	8	-

Table 5.2: Level of success in providing a comprehensive view

Element of satisfaction	**Level of success**						
	Not at all successful	Slightly successful	Somewhat successful	Moderately successful	successful	Very successful	Extremely successful
Degree of success in providing a comprehensive view	-	-	-	-	4	4	-

Table 5.3: overall level of satisfaction

Element of satisfaction	**Level of satisfaction**						
	Not at all satisfied	Slightly satisfied	Somewhat satisfied	Moderately satisfied	satisfied	Very satisfied	Extremely satisfied
Overall Framework satisfaction	-	-	-	-	-	8	-

Responses to the accuracy, comprehensiveness, clarity, and conciseness of each of the seven components of the framework have been added and displayed from figure 5.2 to 5.8. The lowest rating was expected to be 8 (1 lowest mark x 8 experts = 8), the highest rating is expected to be 56 (7 highest mark x 8 experts = 8), and an average rating was expected to be 28.

For each of the seven components, all the responses regarding the framework are in the successful to very successful categories. On the whole, these results are supportive of the framework with high level of acceptability and validity as evaluated by the experts. However it is recommended that the framework has to be evaluated through practical application and more research to be conducted so that it can be modified and enhanced over time.

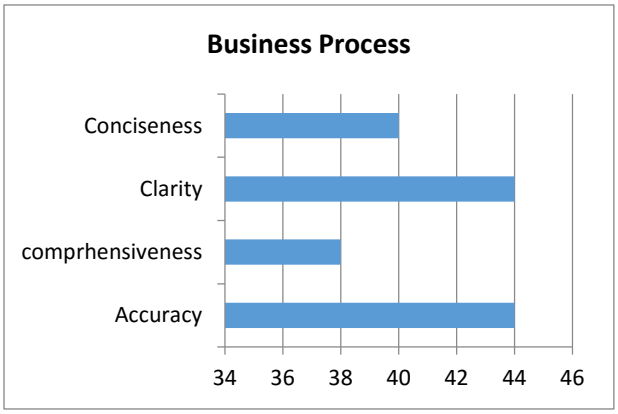


Figure 5.2: Business Process Component

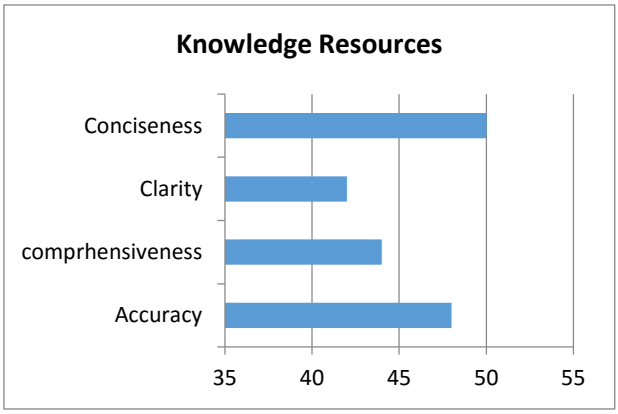


Figure 5.3: Knowledge Resource Component

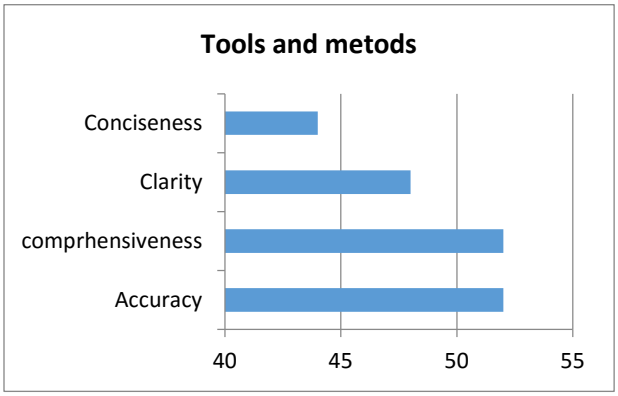


Figure 5.4: Tools and Methods Component

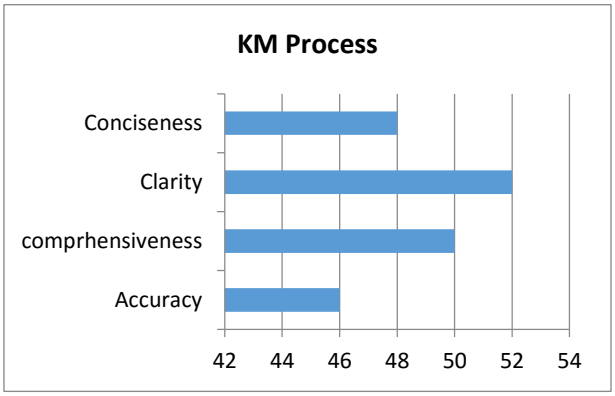


Figure 5.5: KM Process Component

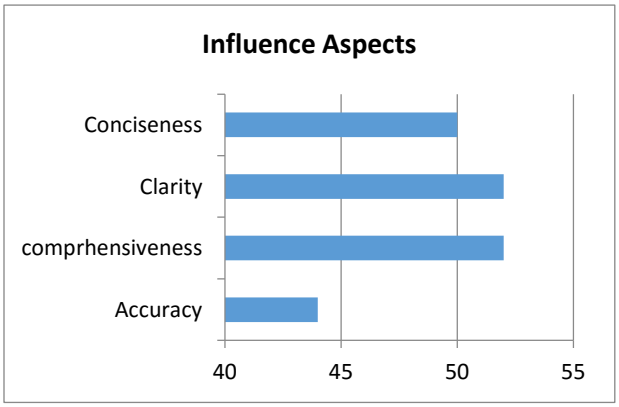


Figure 5.6: Influence Component

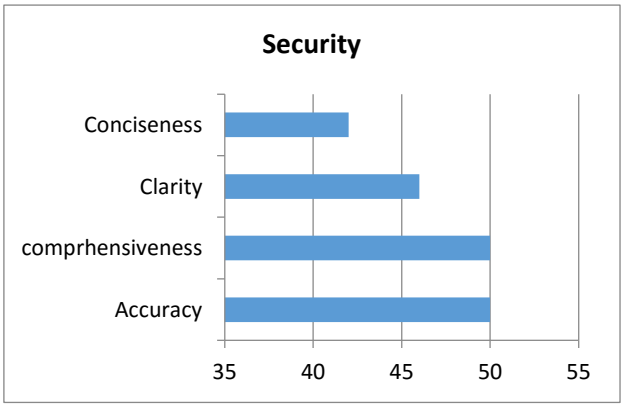


Figure 5.7: Security Component

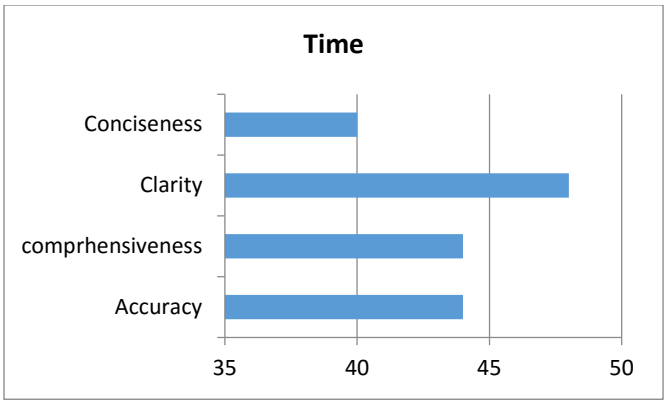


Figure 5.8: Time Component

CHAPTER SIX
CONCLUSION AND RECOMMENDATIONS

6.1 INTRODUCTION

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 the thesis. The chapter also provided recommendations which have emerged from this study and further research to be undertaken to evaluate the consistency and validity of the proposed framework as well as extensions, refinements, or corrections that could yield an improved KM framework.

6.2 CONCLUSION

The general objective of this research was to propose a KM Framework that the MoD can utilize in order to ensure that it is making the best use of its intellectual capital. In order to achieve this objective the research attempted to answer the following three basic research questions:

1. What is the current status of KM practice in the MoD?
2. What are the factors that have critical impact on the practices of KM in the MoD?
3. What KM framework can be best utilized by the MoD to ensure that it is making the best use of its intellectual capital?

The current status of KM practice in the MoD

In response to this question, primary data is collected and analyzed on the current practice of KM through survey, key informant interview (leaders and experts), and FGDs. In the course of the data analysis organizational KM capabilities, knowledge resources and KM activities, as well as KM tools and methods utilized in the conduct of KM in the MoD have been identified. The following are the key findings:

- The MoD has no designated manager and structure for administering KM. However, despite the absence of the designated structure, it is observed that the existing structure facilitates information flow in all direction in most part due to the strong organizational culture that promotes knowledge sharing in the MoD.
- The organization utilized different methods and tools for knowledge sharing. Some of them are specific to the military domain and some are common in the business world. Some of the major military specific units the MoD uses to share knowledge in the battlefield include

intelligence and signal corps. However, it has been known that the organization doesn't properly utilize ICT to support knowledge sharing among its employees. The existing ICT infrastructure does not meet the needs of individual users for knowledge sharing and the use of technology-based tools for knowledge sharing is limited to some areas in the organization. Therefore non-ICT tools are mostly used for knowledge sharing than the ICT based ones. The organization also has limitations in the utilization of databases to store policies, manuals, procedures and other organizational resources, in the provision of education and training opportunities in knowledge and KM, as well as encouraging social networks in the organization.

Factors that have critical impact on the practice of KM in the MoD

Similarly, in response to this, organizational factors that affect the practice of KM as enablers or impeders, and additional KM requirements critical to the MoD context have been identified. In addition to this, factors that haven't been addressed through primary data collection but could affect the KM practice of the organization as any organization in general and as a military organization in particular have also been identified from literature. The two questions established organizational context and KM requirements for the design of the KMF for the MoD. Therefore, the following conclusions have been drawn in an attempt to answer the first two questions of the research.

- As organizational requirements are concerned, the major factors that can affect knowledge sharing practices in the MoD are found to be lack of system and policy that support knowledge sharing, limited level of awareness regarding KM, and technological limitations. Leadership, culture, structure, time, skill, and expertise, as well as external factors including social, political, legal, and economic factors have been considered as enabling or obstructing factors in addition to those listed in the primary data collection.

- The MoD, as an organization, is similar to other large public and private sector organization, but it also differs in many aspects. Key differences include its organizational culture, mission, governance, and its operational environment. Members of the MoD often operate in high-risk and high-stake situations in dangerous environments. In combat, which is an extreme case, soldiers risk their lives fighting directly with enemies. They are expected to operate and make the best possible decisions in highly uncertain situations. Therefore they need real-time knowledge deeply embedded in the context of the operational area in order to

allow them to make good decision and implement it faster than the enemy. Secrecy is also the most important aspect in the military. Therefore, KM processes within the context of military operational environment at least require emphasis on additional requirements of security and time.

KM framework that can be best utilized by the MoD to ensure that it is making the best use of its intellectual capital

The design of the KMF was the main objective of the research. In order to achieve the design objective a review of literature on knowledge and KM was undertaken to develop a conceptual framework as a basis for discussion. In addition a review of selected comprehensive KMFs has also been conducted.

- A number of individuals and organizations have developed frameworks for KM. However, there is a lack of cohesiveness across frameworks. There is no single definition of what constitutes a KM framework and there are many concepts that are common to multiple frameworks, as well as the ordering or structure of the frameworks also varies. No such a framework specifically designed for the military context has also been found. Thus, it was necessary to identify which available frameworks can be used as a basis for building a framework for the MoD.
- From hundreds of available frameworks, the researcher analyzed five frameworks as an example to illustrate the structure and components of KMFs as an empirical study based on their coverage and literature recommendation. The purpose was specifically to identify commonalities and shortcomings in KMFs so as to develop a comprehensive KMF appropriate for the MoD, in a view that, though there are some specific differences, KM in military organizations is based on the same assumptions as corporate KM. However, since KM is highly dependent on the context and cannot be validated separately from its practical implementations, these KMFs couldn't be adopted as they are. The framework that is to be developed for the MoD, is obviously need to include military specific aspects as well.
- From the review of selected comprehensive KMFs, the three common themes i.e. KM resources, processes, and influences, have been identified as a minimum component a proposed KMF to include. Based on these three themes the individual components were then harmonized in terms of relationships in the context of KM. Therefore, some components

were combined, where possible, in the sense that they refer to the same thing. Similarly organizational requirements are gathered and two military specific additional requirements (security and time) and two general but critical components (organization and methods and tools) are identified.

- Therefore, the framework has been built as a Design Science Research approach, in which organization specific requirements (relevance cycle of the design science) and theories and conceptual frameworks as well review of existing KMFs (rigor cycle of the design science) are combined to develop a new artifact (Design cycle of the design science) which is a comprehensive KMF appropriate for the MoD.
- Therefore the KMF has been designed and proposed with the following seven components and each of them is provided with its respective discussion.
    1. Business process,
    2. Knowledge resources,
    3. Knowledge management processes,
    4. KM methods and tools,
    5. Security,
    6. Time, and
    7. KM influence aspects
- The proposed framework has been evaluated by key experts in the field of knowledge and information management by means of a Delphi-like methodology with accuracy, comprehensiveness, clarity, and conciseness as criteria. On the whole, the evaluation results are supportive of the framework with high level of acceptability and validity.

Therefore the researcher concluded that research objective is met and research questions are fully answered.

6.3 RECOMMENDATIONS

Based on the observed gaps and problem areas identified during the analysis and the research's concluding remarks the following recommendations covering four major aspects, the consideration of KM section, the development of KM technology and infrastructure, the formulation of KM policy and Strategy, and training, are forwarded.

- **MoD should include KM section in its structure**

The KM section has a paramount importance in the military organization. Knowledge management sections provide advice to commanders regarding the flow of knowledge and recommendations for improving knowledge flow for increasing situational awareness and shared understanding throughout the organization, to include that of other staff sections. Commanders, in turn, direct the implementation of KM improvements as per their priorities, considering the recommendations of the KM officer, and with consultation from the staff.

The responsibility to manage knowledge does not exclusively reside within the KM section; rather, it is an inherent responsibility for all Army leaders. The KM section assists Army leaders in implementing a sound KM approach to facilitate the flow of knowledge throughout the organization. Therefore, leaders at all levels will benefit by understanding KM section functions and how to best utilize the KM section to assist in enhancing knowledge flow and reducing organizational knowledge loss.

- **The organization need to develop its KM technology and infrastructure**

  Some kind of infrastructure is normally required to support an organization's knowledge activities. Today, technological tools are becoming more and more available for capturing, distributing and finding knowledge. Particularly in military organizations in which knowledge is a matter of life and death, technology is becoming a critical enabler. Technology connects sensor to shooters. Today's military operational settings require mobile solutions with the corresponding issues of security, bandwidth, robustness and reliability. Therefore the MoD must develop its technological infrastructure, so that soldiers in the field, in the area of CS, and CSS can be connected to knowledge. The technology also needs to be functional, easy to use and as appropriate, standardized, so that connectedness can be effectively realized. The technology will also focus on supporting various aspects of the knowledge activities.

- **MoD should formulate KM policy and Strategy**

  The organization need to formulate a KM strategy using the proposed KMF as a blueprint, with the aim to transform the MoD to a knowledge centric organization. The proposed KMF provides the reference for decisions about the formulation or design, implementation and application of a KM strategy, systems or projects within the organization. On the other hand it is through the KM strategy that the proposed KMF is implemented. Therefore the

formulation of KM strategy has twofold benefit for the organization. KM strategy is a plan of actions that describes how the organization will manage its knowledge better for the benefit of the organization. What is critically important to be considered in the formulation of KM strategy is the need to closely align it with the organization's overall strategy. The need to align KM strategy with organization strategy was identified as critical to the success of KM (Omotayo, 2015). According to du Plessis (2007), an organization KM strategy is supposed to create an understanding of the organization's KM resources and where they reside; articulate the role of knowledge in value creation; and comprise a number of integrated projects or activities phased over time including quick wins as well as long term benefits.

- **Trainings on knowledge and KM to be conducted on regular basis**

  Training, education, or any activity that help develop employee's capacity in knowledge and KM is important for successful KM. As it has been clearly revealed from the data analysis that there is a considerable gap in the MoD in this regard, the organization need to develop and implement a well focused and wide range of training and learning programs to its employees at all level in the hierarchy of the organization.

5. SUGGESTION FOR FUTURE RESEARCH

The KM framework serves as a basis for thinking about extensions, refinements, or corrections that could yield an improved KM framework. This framework is a starting point for gaining a deeper understanding on KM issues in the MoD. Each of the seven components and their arrangement as well as their relationship can be analyzed in greater detail. Therefore, more research needs to be conducted in the field of KM in the military in general and further research to look in to the evaluation of this framework in particular.

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ANNEXES

Annex 1: Survey Questionnaire

QUESTIONNAIRE

I am conducting a research which aims to develop a Knowledge Management (KM) framework for the Ministry of Defense (MoD), as part of the partial fulfillment of the Masters Degree in Information Science, at Addis Ababa University.

Knowledge can be defined as the fact or condition of knowing something with a considerable degree of familiarity through experience, association or contact. It can be shared between individuals, codified from individuals to explicit form, and new knowledge is internalized from codified knowledge back to individuals. KM is the methodology, tools and techniques required to gather, integrate and disseminate knowledge within an organization. This questionnaire is prepared to collect the necessary data on the practices of KM and factors that may influence the effectiveness of managing knowledge in the MoD, so that an appropriate organization specific KM framework can be developed. The framework can facilitate comprehension within the organization by identifying characteristic knowledge elements and their relationships, provides a foundation for implementing and executing KM.

This survey is completely confidential and anonymous. No personally identifiable information will be collected and all information will be analyzed and reported in aggregate. None of the information requested will identify you or your unit. Your data will be treated with **strictest confidentiality** and will only be used for the purpose of this study.

I kindly request you to carefully and attentively read all the questions and give your genuine answers to the best of your knowledge by selecting the response that best represents your view. Please put a tick mark (✓) or an (✗) sign for your selection in the corresponding box.

If you have any questions about this research in general and the questions in particular, you may contact me using the following address.

Mesfin Legese
Tel.: 0910994228
e-mail: mesfinlegese@gmail.com

	01. **Personal Data**				
01	**Gender**		02	**Area of work (specialization)**	
	Male	☐		*Field unit (Combatant)	☐
	Female	☐		**Combat Support (CS)	☐
				***Combat Service Support (CSS)	☐
03	Title/Rank		04	Age	
	NCO (private –Master sergeant)	☐		From 18-25 years	☐
	Line officer (lieutenant and Captain)	☐		From 26-35 years	☐
	Higher officer (Major and above)	☐		From 36-45 years	☐
	Civilian	☐		Above 45 years	☐

05	Level of education		06	Work experience in the MoD	
	High School graduate	☐		Less than 5 years	☐
	College Diploma	☐		From 5-10 years	☐
	First Degree	☐		From 11-20 years	☐
	Masters Degree	☐		More than 20 years	☐
	Above Masters Degree	☐			

* include: formed units, operation,…

** include: communication, engineering, intelligence,…

*** include: logistics, medical, human resource, budget and finance, inspection, training, research…

Please respond to the following four questions by selecting the response that best represents your view.

Q. No.	02. Knowledge management General	
01	**The Ministry of Defense (my department) . . .**	
	has a formal knowledge management policy	☐
	engages in knowledge management activities informally	☐
	do not have a knowledge management policy or engage in knowledge management activities	☐
02	**How many years does the MoD been engaged in knowledge management? If your answer is not "do not have a knowledge management policy …"**	
	Less than one	☐
	From 1-5 years	☐
	From 6-10 years	☐
	From 11-15 years	☐
	From 16-20 years	☐
	More than 20 years	☐
03	**How do you describe your level of understanding regarding Knowledge Management**	
	I have a good knowledge of Knowledge Management	☐
	I have some knowledge of it	☐
	I have no idea about it	☐
04	**How knowledge management is considered within the organization**	
	Effective Knowledge management is a matter of survival for the organization	☐
	Knowledge Management plays important role for effective mission accomplishment	☐
	Knowledge management is believed to be important, but not significant	☐

Please respond to the following questions by selecting the response from the five boxes provided that best represents your view.

03. Knowledge Management Practices

Q. No.	questions	Strongly Agree	Agree	Not Sure	Disagree	Strongly Disagree
01	The organization has standard process for storing reference materials such as policies, procedures, manuals, guidelines, ideas or other practical information	☐	☐	☐	☐	☐

02	The organization utilizes modern technology to facilitate knowledge sharing	☐	☐	☐	☐	☐
03	Key experts in the organization are readily identified and contacted	☐	☐	☐	☐	☐
04	For each activity conducted by individuals and units, there is a regular after action review from which lessons can be drawn	☐	☐	☐	☐	☐
05	Knowledge sharing is incorporated in staff performance review discussions	☐	☐	☐	☐	☐
06	The organization utilizes written documents such as newsletters, pamphlets, or manuals to share best practices from one unit to the other	☐	☐	☐	☐	☐
07	The organization has regular symposiums, lectures, conferences, or training sessions to share knowledge and ideas	☐	☐	☐	☐	☐
08	The organization has libraries, resource centers or other forums to disseminate information or expertise	☐	☐	☐	☐	☐
09	The organization provides training in its knowledge management processes	☐	☐	☐	☐	☐
10	The organization store knowledge in a form tat is readily accessible to employees	☐	☐	☐	☐	☐
11	The organization has mechanisms for converting tacit knowledge from individuals in to explicit form	☐	☐	☐	☐	☐
12	Information held in facilities such as databases, other information technology applications, manuals or resource centers, are updated regularly	☐	☐	☐	☐	☐
13	The organization provides training in new ways of doing things and overcoming potential challenges	☐	☐	☐	☐	☐
14	The organization has a knowledge retention program to ensure experience and expertise is not lost when staff leave	☐	☐	☐	☐	☐

04. Organizational Structure

S. No.	Questions	Strongly Agree	Agree	Not Sure	Disagree	Strongly Disagree
01	The organization knowledge management structure (if any) extends at all levels down the organizational hierarchy	☐	☐	☐	☐	☐
02	Te organizational structure facilitates information flow in all direction within the organization (top down, bottom up, and vertical)	☐	☐	☐	☐	☐
03	The organizational structure promotes team work to facilitate knowledge sharing rather than strict hierarchical structure (setup).	☐	☐	☐	☐	☐

05. Organizational Culture

S. No.	Questions	Strongly Agree	Agree	Not Sure	Disagree	Strongly Disagree
01	Mistakes are accepted as opportunities to learn and develop	☐	☐	☐	☐	☐
02	The benefits of knowledge sharing is acknowledged from the individual's as well as organization's perspective	☐	☐	☐	☐	☐
03	The organization reward employees for sharing their knowledge	☐	☐	☐	☐	☐
04	The organization rewards employees for new ideas	☐	☐	☐	☐	☐
05	The organization encourages the exchange of ideas and knowledge between individuals and groups	☐	☐	☐	☐	☐
06	Great attention is given to the role and importance of knowledge held by individuals	☐	☐	☐	☐	☐

06. Knowledge Management Infrastructure

S. No.	Questions	Strongly Agree	Agree	Not Sure	Disagree	Strongly Disagree
01	The organization provides appropriate resources to facilitate knowledge sharing	☐	☐	☐	☐	☐
02	The organization utilizes information communication technology to support knowledge sharing among its employees	☐	☐	☐	☐	☐
03	Social networks are encouraged in the organization	☐	☐	☐	☐	☐
04	Information and communication technologies meet the needs of individual users for knowledge sharing	☐	☐	☐	☐	☐
05	The physical work environment and layout of work area encourage knowledge sharing	☐	☐	☐	☐	☐
06	The organization has databases to store policies, manuals, procedures and other organizational resources	☐	☐	☐	☐	☐
07	Does the organization utilizes non-information technology supported knowledge management tools for knowledge sharing (white board, flipcharts, workflow diagrams…)?	☐	☐	☐	☐	☐

07. Leadership

S. No.	Questions	Strongly Agree	Agree	Not Sure	Disagree	Strongly Disagree
01	The organization has a formal knowledge management strategy that is aligned with its strategic vision	☐	☐	☐	☐	☐
02	Managers are openly supportive of knowledge sharing and learning opportunities	☐	☐	☐	☐	☐
03	Leaders are committed to developing effective knowledge sharing practices	☐	☐	☐	☐	☐

04	Leaders regularly involve staff in decision-making (Planning)	☐	☐	☐	☐	☐
05	Rank, status, formality, and organizational hierarchy do not impede employees at all levels from sharing knowledge with anyone	☐	☐	☐	☐	☐
06	Leaders empower their staff to enable them develop their potential	☐	☐	☐	☐	☐
07	Leaders at all levels are easy to be contacted and are openly supportive	☐	☐	☐	☐	☐

The following question may have more than one answer. Please mark all the corresponding boxes that represent your view.

08. Knowledge management tools and methods

S/n	**The Organization uses the following methods to manage and share knowledge**	
01	After action reviews	☐
02	Lesson Learned Systems	☐
03	Team work	☐
04	Training and education	☐
05	Commanders Time	☐
06	Formal and informal social networks	☐
07	Manuals, procedures and other reference materials	☐
08	Counseling, Coaching or mentoring	☐
	Others please specify…	
09		
10		
11		

09. Knowledge Storage and sharing technologies

s/n	**The Organization uses the following tools for storing and sharing of knowledge in the organization . . .**	
01	Electronic Document Management System (eg. SharePoint)	☐
02	Electronic Library	☐
03	Intranet	☐
04	Corporate e-mail	☐
05	Simulators	☐
06	Groupware	☐
07	Decision Support Systems	☐
08	other collaboration tools	☐
	Others please specify…	
9		
10		
11		

10. Challenges

s/n	**What do you think are the major challenges that may impede the effective knowledge sharing in the organization . . .**	
01	Lack of awareness regarding knowledge management in the organization	☐
02	No system and policy to support knowledge sharing	☐
03	Technology limitations	☐
04	Lack of reward and recognition	☐
05	Staff fear that sharing knowledge may jeopardize their job security	☐
06	High concern for information security	☐
07	The work environment impedes knowledge sharing	☐
	Others please specify…	
08		
09		
10		

Thank you

Annex 2: Interview and focus group discussion guideline

1. Does the organization has a KM policy, strategy, or any kind of formal document that governs KM in the organization?
2. How is the organization is engaging in knowledge management activities? Who is in charge of KM in the organization?
3. How do you describe the level of understanding regarding knowledge management and how knowledge management is considered within the organization?
4. How do you see the knowledge management practices in the MoD in terms of how it process knowledge, how it manages its knowledge resource, and issues related to training and education in knowledge and KM aspects?
5. Why managing knowledge is important for the MoD?
6. Do the military organizations in general and MoD in particular has its own organizational Culture and structure that differentiate from other organizations? How this affects the KM practice in the MoD?
7. How do you describe the status of information communication and other related technologies in support of KM in the MoD?
8. How do you see the role of leadership in the MoD, in relation to KM?
9. What types and kinds of tools, methods, and technologies does the organization uses for storing and sharing of knowledge within its members?
10. What do you think are the major challenges that may affect, in either positive or negative way, the effective knowledge management in the organization?
11. How do you describe the military organization in general and the MoD in particular, in relation to other corporate organizations? What is special for the military organization?
12. If you are asked to recommend a critical requirement that must be addressed in the practice of KM in the MoD, what do you recommend?
13. Anything you want to add which is relevant to the research?

Annex 3: Evaluation criteria for the proposed KMF

Evaluation of the proposed KMF for the Ethiopian MoD

1. Satisfaction level

Please express your level of satisfaction on the proposed KMF by putting a (✓) mark in the box corresponding to the level of satisfaction

Element of satisfaction	**Level of importance**						
	Not at all important	Slightly important	Somewhat important	Moderately important	Important	Very Important	Extremely important
Importance of a framework							

Element of satisfaction	**Level of success**						
	Not at all successful	Slightly successful	Somewhat successful	Moderately successful	successful	Very successful	Extremely successful
Degree of success in providing a comprehensive view							

Element of satisfaction	**Level of satisfaction**						
	Not at all satisfied	Slightly satisfied	Somewhat satisfied	Moderately satisfied	satisfied	Very satisfied	Extremely satisfied
Overall Framework satisfaction							

2. KMF component evaluation

Please put a number (1-7) for your evaluation in the corresponding box of the evaluation criteria for each component according to the following: **(1)** not at all successful, **(2)** slightly successful, **(3)** Somewhat successful, **(4)** moderately successful, **(5)** successful, **(6)** very successful, **(7)** Extremely successful.

KMF Components	**Evaluation criteria**			
	Accuracy	Comprehensiveness	Clarity	Conciseness
Business process component				
Knowledge resource component				
KM process component				
Tools and methods component				
Influence Component				
Security component				
Time component				