ADDIS ABABA UNIVERSITY

COLLEGE OF NATURAL AND COMPUTATIONAL SCIENCES

SCHOOL OF INFORMATION SCIENCE

THE ROLE OF KNOWLEDGE MANAGEMENT PRACTICE AND ENABLERS TO IMPROVE PROJECT PERFORMANCE IN A PROJECT BASED ORGANIZATION

By

AYELE MIGA

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ADDIS ABABA, ETHIOPIA

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A Thesis Submitted to School of Graduate Studies of Addis Ababa University in Partial Fulfillment of the Requirements for the Degree of Master of Science in Information Science and Systems (Information Systems Specialization)

By: AYELE MIGA

Advisor: Temtim Assefa (Ph.D.)

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By: Ayele Miga

Name and signature of Members of the Examining Board

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Advisor	Signature	Date
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Examiner	Signature	Date
_____	_____	_____
Examiner	Signature	Date

Declaration

This thesis has not previously been accepted for any degree and is not being concurrently submitted in candidature for any degree in any university.

I declare that the thesis is a result of my own investigation, except where otherwise stated. I have undertaken the study independently with the guidance and support of my research advisor. Other sources are acknowledged by citations giving explicit references. A list of references is appended.

Signature: _____

Ayele Miga

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

Advisor's Signature: _____

Temtim Assefa (PhD)

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Before everything, I would like to thank God, the creator and controller of the universe, for helping me in every situation of my life.

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Dedication

I want to dedicate this thesis to the memory of my father, Miga Abza, who I lost two years back. His unreserved support from childhood helped me to get in the right direction. Not only his continuous encouragement and advise but also his exemplary life put my heart in a higher place in times of difficulties. He was and will be the reason for my educational and career achievement.

Abstract

In a project based organization where multiple projects are managed the need to leverage expertise knowledge and experience is essential to prevent from loss of project knowledge and the negative impact that might be created due to lack of systematic knowledge management. This study was conducted with the aim to understand the impact of knowledge management practice on project performance with key strategic enablers at TechnoServe, Ethiopia. Causal research approach was followed to undertake this study and empirical finding shows that joint influence of KM enablers can explain 29.1% of the variance in KM Practice, which in turn explains 35.9% of the variance in project performance. Cultivating the culture of individuals and team to create and build an environment is crucial for KM practice, while attention has to be given for implementing appropriate strategy and technological tools from organizational leaders to enhance knowledge management practice. Knowledge driven management and execution of projects through effective leverage of expertise and experience helps individuals and teams to achieve project constraints and requirements.

Keywords: Knowledge, Knowledge Management Practice, Knowledge Management Enablers, Project Based Organization, Project Performance

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List of Acronyms

IT	Information Technology
KM	Knowledge Management
KMS	Knowledge Management System
KMP	Knowledge Management Practice
KMT	Knowledge Management Technology
KOL	Knowledge Oriented Leadership
OC	Organization Culture
PP	Project Performance
PMO	Project Management Office
PLS	Partial Least Square
PBO	Project Based Organization
SECI	Socialization, Externalization, Combination and Internalization

CHAPTER ONE

INTRODUCTION

1.1 Chapter Overview

This introductory chapter will touch basic part of the study and lay a foundation to investigate the research in detail. It will discuss on the motivation and importance of studying on the selected area. Problem identified will be clearly explained to set forth the research questions that should be examined. Then, objective of the study will be formulated within a defined scope to answer the research questions specified. Contribution of the research work also mentioned from theoretical and practical aspect.

1.2 Background of the Study

In today's business environment, knowledge can be considered as a key asset. It has the potential of bringing competitive advantage and strategic position in the market (King, 2009). Joshi & Holsapple (2002) affirmed that "in order to have a long lasting competitive advantage organization should have to be knowledge driven". Knowledge can be defined and used in different context depending on business need of the organization. For instance, Davenport & Prusak (1998) described knowledge as a "mix of framed experience, values, contextual information and expert insight that provides a structure for evaluating and integrating new experiences and information". It can take many forms in organizational processes and people; in the form of technical best practice or expressed in context-specific form.

Similarly, the discipline of knowledge management plays a critical role for discovery, capture, sharing and application of knowledge among and within team members of a project-based organization. It has been studied since 1980s in the organization and emerges in a project environment beginning of 2000 (Koskinen & Pihlanto, 2008). In a project work environment where knowledge is highly required and created, the need for KM is greatly valued for improved management and leverage of expertise to the benefit of the organization. It creates the opportunity to learn from past and ongoing projects in an organization by creating and utilizing the knowledge gained from each projects. Project based organization

like TechnoServe, execute multiple type of projects which necessities effective management of knowledge resources in the organizations that might lead them to improved performance (Terzieva, 2014).

Because projects are characterized as knowledge intensive, where knowledge is vital during all project phases (Initiation, Planning, Execution and Closing-down), the capture and transfer of knowledge among employees and teams will facilitate organizational learning by leveraging expertise within the organization. It will create an opportunity for project teams to collaborate regarding project development. Even though its unique and temporary nature of projects would make KM complex, its contribution is very high to preserve the knowledge gained from each projects with the help of KM enablers (Soon & Zainol, 2011). In this way, organizations have the chance to utilize knowledge efficiently for their projects instead of reinventing the wheel when there is a need to acquire knowledge, which will have implication for both the project and the organization.

Organizations use different techniques and methods while engaged on project tasks and activities to deliver the project successfully. Important resource like knowledge has to be managed well to achieve the desired performance. KM in projects has become an invaluable tool and a fundamental necessity for the success of projects (Srikantaiah, 2010). It creates an opportunity to capture lesson learned from projects, record the work being done and reuse of knowledge assets. All insight, experience and expertise can be transformed into reusable and useful knowledge when an individuals and teams take part in the practice of knowledge management. They can easily access and share the required knowledge to perform well in the project. By taking different cases, Oluikpe et al., (2011) indicate the nature and impact of KM practice in a project work environment. He found that the contribution was high in speeding up completion times, achieving project success, innovation, operational efficiency and the generation of new knowledge. Engaging project teams in the practice of KM is essential to overcome the challenges they face in a project environment and meet the requirement and constraints of projects.

A number of key strategic enablers of KM have been recognized in previous research (Ramachandran et al., 2013; Theriou et al., 2011). They have paramount importance in

supporting the practice of KM. They have benefit from both technical and social aspect to facilitate the flow of tacit and explicit form of knowledge. The presence of technology enables individuals and groups in different location to connect with each other and to internal and external systems. The social aspect of KM is expressed by developing good organization culture, which creates a suitable environment for people to interact through learning and collaboration. Besides that, organization need strategic leadership to effectively plan and implement the socio-technical means of creating, storing, transferring and acquiring knowledge.

Project based organization manages multiple type of projects and they are heavily depending on the success of projects to exist as an organization. By nature, projects are bounded by their own requirements and constraints. Besides that, knowledge is highly required and produced in this type of organization. For this reason, the study of KM in a project work environment is very essential. Generally speaking, we may not differentiate managing knowledge in PBO and non-PBO. However, its relevance outweighs in project organizations, which typically involve people with different knowledge, experience and skills who come together to solve a common task. Projects can thus be seen as arenas for knowledge creation, integration and sharing, where new and proven ideas and thoughts are combined. In contrast, non-project organizations are supported both by the organizational structure and knowledge-absorbing routines and knowledge becomes routinized and socialized into the organization (Irani et al., 2005). The unique and temporary nature of projects involved in project based organization will create an opportunity to learn from the different projects and necessitates KM to prevent from losing project knowledge. We may think that the challenges confronted in project environment and its general nature are a barrier for KM, however it is drawing an attention due to the fact that the process of knowledge capture, transfer and learning in project settings rely very heavily upon social patterns, practices and processes (Mannan, 2013).

TechnoServe is a project based organization that enables staff to access and share information and knowledge resources through intranet network and applications as well as other means of knowledge transfer and sharing methods, however it is not tracking the knowledge created from each individuals and projects. Employees will leave the project at

any time and new project worker will come or the project itself come to an end and a new project will be initiated or extended. It is important to prevent knowledge loss during such cases and ensure knowledge are being utilized for current and future projects with strong KM initiative. It needs to be sure that project staff are engaged on KM activities to get the most out of it. KM should be internalized in each and every project with good social and technical aspect of it. In addition, projects in TechnoServe are operated in dispersed geographical locations with most of them have limited infrastructure. In this kind of work environment, knowledge is sensitive and can be lost easily and access to required knowledge is also difficult. Hence, implementation of systematic and efficient management of knowledge is crucial for the benefit of the organization.

This research paper will attempt to study the role of knowledge management practice and its enablers in improving project performance at TechnoServe, Ethiopia, which is a non-profit project based organization that manages multiple type of projects throughout the country.

1.3 Problem Statement

Knowledge Management is one of the focus area in TechnoServe work, enabling staff to learn from multiple projects implemented around the world. There are KM platforms that help them to access and share information and knowledge resources through intranet network and applications as well as other means of knowledge transfer and sharing methods. According to Manna, Jameel & Haleem (2013) utilizing and managing KM platform has a benefit for project teams to learn new experience and develop their skill. Especially, during project startup, project managers may require knowledge resources from related past and ongoing projects and at execution time, experts working in different sectors may need to collaborate and share experience on technical issues of the project work and the same for others professionals. KM serves as a platform to capture and disseminate project related information and knowledge to project staff in the organization.

In the organization, new business or projects are launched that stays a maximum of five years period. Currently ten projects are active and some others are to be launched soon in Ethiopia office and there are hundreds throughout the world where TechnoServe operates. This will create an opportunity for project staff to access and share resources, collaborate with their

preference practice group and asking expertise people in any area they want to know from the central knowledge management platform. In addition to that there are internal events where every team will share what they learn from their project work and external events with beneficiary and stakeholders. In this way knowledge can flow from different dimension in different ways. This point out the need to efficiently utilize and manage knowledge with the support of key enablers for improved project performance. Uncovering this through this research is vital to motivate staff and engage in the practice of knowledge management and for the success of the project as well.

In an organization in which multiple and various type of projects are managed, the efficient utilization and management of knowledge resources is important to tackle the intensive knowledge required from projects. Organization may not be able to effectively manage the knowledge created from each individuals and projects due to the fact that their main focus is on immediate deliverables from each project tasks. In addition to that, the various challenges confronted in a project environment and general nature of projects limits the application and value of knowledge management. In situation like this, knowledge will be hidden or lost at some point and a rework is required, which will have an implication on project cost and time and consequently on project performance (Srikantaiah, 2010). It also results organizational knowledge fragmentation and loss of organizational learning (Dalkir, 2013). Problems in projects may not be solved quickly and the tendency to make repeated mistakes also increase without good management of knowledge (Koskinen & Pihlanto, 2008). In addition, it will create a gap on employees to get new and updated experiences and skills while performing their project work, especially for novice and newly hired project staff.

By nature, project is bounded by time and budget and has specific requirements that should be delivered at closing time. So, the project team in collaboration with partners and stakeholders work toward on achieving the project goal. Because the performance of the project determines its existence, the need for well-equipped project staff is critical to produce quality results. Without learning mechanism between and within a project, staff might face challenge to easily cope up with all the required knowledge of the project to perform well within the specified duration. The same challenge, issues and failures once faced should not

be new for others. Without proper use of KM all failures and success stories, best practice and lesson learned, challenges, issues and all other experiences have the possibility to be forgotten or lose through time. As a result, the possibility to learn and grow toward project achievement will be affected.

In order to analyze this problem and fill the gap this study will find empirical evidence about the relationship between KM enablers, KM practice and project performance to suggest an integrative solution. Previous studies shows either the relationship between KM enablers and KM practice (Ramachandran et al., 2013; Watanabe et al., 2011) or between KM practice and organizational or project performance (Ahmed et al., 2015; Hanisch et al., 2009; Lierni & Ribière, 2008; Reich et al., 2014; Valmohammadi & Ahmadi, 2015). There are few studies done with a single enabler of KM (Anantatmula & Kanungo, 2008; Yang et al., 2012). They lack to address the socio-technical aspects of KM enablers to effectively carry out KM practice for improved performance in a project environment. With the addition of key strategic enablers and integrating the three variables it creates a better approach for organization who want to be effective on managing tacit and explicit form of knowledge for better outcome. It is important to find empirical evidence in the context of non-profit development organization that manages various projects in a dispersed geographical location as recommended by (Anantatmula & Kanungo, 2008; Ramachandran et al., 2013).

This type of study is important and should be promoted because the existence of project based organizations depends on the performance of the projects and knowledge is a key for project implementation success. Therefore, this study aims to investigate the extent to which KM practice supported by key enablers will influence project success and how it will contribute to project success by answering the following research questions:

- How knowledge management practices affect project performance?
- How knowledge management enablers influence knowledge management practice?

1.4 Objective of the Study

The general objective of this research paper is to find out the extent in which KM enablers

can influence KM practice, which in turn, the influence on project performance. Specifically, it will attempt:

- To explore important KM practices and enablers in a project work environment.
- To investigate the relationship between KM practices and KM enablers.
- To investigate the relationship between KM practices and project success.

1.5 Significance of the Study

This study will contribute to KM practitioners and academicians to conceptualize the value of KM practice in a project work environment. It will give insight on how KM practice supported by technology, organization culture and knowledge based leadership enable the effective management of project knowledge, which leads to improving project performance. It will show the importance of collaboration and knowledge sharing to create organizational memory, which facilitate the reuse of knowledge resources. The study explores the effect of these key enablers as a means to improve knowledge creation and utilization. It will address the knowledge gap found in the organization through continuous creation and utilization of knowledge and prevent from losing the produced knowledge.

The outcome from effective management of knowledge indicates one way to improve project performance. Because in today's competitive age, losing knowledge means almost losing projects in project based organization. Investigating the role of KM enablers and practices in a project work environment will give direction and guidance for practitioners in developing a strategy that integrates KM in project management to prevent project failure. The study contributes to those who engaged on projects to meet the criteria or requirements set at initial time through effective management of knowledge. Overall this research will have contribution by showing the importance of utilizing and managing project knowledge created from multiple type of project in a project work environment with the support of socio-technical enablers of KM to improve the likelihood success of current and future projects.

1.6 Scope of the Study

This study will focus on a single project based non-profit organization to understand effect relationship between KM enablers, KM practice and project performance. It will discuss on important KM enablers, KM practices and their influence on project performance. Since the organization is Global, Ethiopia country office is selected for this purpose and participants are only from project staff working in different geographical locations, it does not include operational units like HR, Finance and Admin. External bodies such as donors, partners and beneficiaries are not included in this study. The study did not focus on the required skills and knowledge to manage projects successfully, rather it will find out some of the project success criteria that will be influenced by KM practice with the support of key strategic enablers. It will address important concepts and aspects of KM activities and the contribution of technology, organization culture and knowledge based leadership to facilitate the flow of tacit and explicit form of knowledge between individuals and teams in a project work environment.

1.7 Operational definition of key terms

Table 1.1: Definition of key terms

Knowledge	A key asset in the form of experience, documents, procedures, process, values, contextual information and expert insight that provides a structure for evaluating and integrating new experiences and information.
Knowledge Management Practice	It refers to the activities and initiatives that organizations use to generate, store, share and utilize knowledge between project staff for improved performance (Reich et al., 2014).
Knowledge Management	Systematic means of administrating knowledge resource in order to implement KM Practice successfully.
Knowledge Management Technology	Information Technology application and infrastructure mainly related to communication, collaboration and networking technologies that support knowledge

	management activities anytime and anyplace, across the team, across teams, across the organization.
Knowledge Management Enablers	Influencing factors that can facilitate knowledge management activity
Knowledge Oriented Leadership	The capability of leaders to actively engage and commit to support knowledge and learning activities of project workers (DeTienne et al., 2004)
Organization Culture	The people values, norms and attitudes toward knowledge management activity
Project Success or Performance	Criteria to measure the achievements of projects from schedule, cost and quality dimensions (Oluikpe et al., 2011).

1.8 Organization of the Study

This research is organized into five main chapters. The first Chapter gives general overview of the study and deals with the research problem identified and the specific actions undertaken to address it. Chapter two is focused on reviewing related literature to get understanding about the research area chosen to be studied. The third chapter describes the research approach and specific methods followed that help to come across the research findings. Chapter four is about presenting the statistical output derived from analyzing the data. Lastly, Chapter five is engaged on discussing the major findings and conclusion made along with the research relevance and limitation.

CHAPTER TWO

REVIEW OF RELATED LITERATURE

2.1 Chapter Overview

This chapter presents the important role of knowledge management in a project work environment with the extant of literature support. It starts by creating basic understanding of knowledge and knowledge management issues in the field. Discussion of KM process will be carried out to describe the main steps involved in the process. Identifying and explaining key KM practices and enablers also reviewed to show their relationship. After showing what a project work and success criteria looks like in a project based organization, both theoretical and empirical evidence that shows the relationship between KM and project performance will be reviewed. Then, research gap will be identified that will be covered by this study.

2.2 Knowledge and Knowledge Management

2.2.1 Concept of Knowledge

The term knowledge is often used for different purpose in different ways at individual, group or organization level. It can be described as "a fluid mix of framed experience, values, contextual information, expert insight, and grounded intuition that provides an environment and framework for evaluating and incorporating new experiences and information" (Davenport & Prusak, 1998). This means that past experience and understanding will have a great influence on the decision we make to gain a new knowledge in the future. Similarly, the way we interpret knowledge will have different implication in the context it will be used. For example, if we see knowledge as a process it can be defined as a process of applying expertise and KM will focus on knowledge flows and the process of creation, sharing, and distributing knowledge. The role of IT becomes providing the link among sources of knowledge to create wider breadth and depth of knowledge flows (Alavi & Leidner, 2001). The same thing if we interpret knowledge as an object, state of mind, capability or something else. So it is important to understand knowledge from different perspective to appropriately use for our specific context.

Knowledge has the capability to add value once it has been used for our intended purpose and hence considered as an intellectual asset. This nature of knowledge will make it different from other type of commodity. Daye & Wendler (1998) characterize knowledge as 'sticky' which makes it difficult to extract and use from people's mind and worldviews. Knowledge is constantly changing and usually created in practice for a particular use, and as such is context specific (Dalkir, 2013; Koskinen, 2013). Today's experts become tomorrow's common standard as fields of knowledge grow deeper and more complex unless it is refreshed with new knowledge. These paradoxical natures and added value of knowledge attracted the field to be studied widely from both theoretical and practical aspect. Knowledge is a key asset that we do not lose or consume when it is used or shared to another one, instead it will grow, expand and the return is high as it is leveraged by multiple people. This indicated that knowledge is the most important resource that we should manage it effectively to gain the benefit from it.

2.2.2 Knowledge Dimensions

Knowledge is categorized in different forms which requires different tools, methods and techniques to create and share among people. One popular way of knowledge classification is tacit, implicit and explicit (Dalkir, 2013; Davies, 2015; Nickols, 2010). Tacit forms of knowledge are usually hidden in an individual's experiences, intuition, insight, judgment, and organizational values and norms. The person may or may not be aware of what he or she knows and how he or she uses to accomplish particular results (Alavi & Leidner, 1999). Because It is highly personalized, contextual and hard to formalize, communicate or share with others, this type of knowledge is attained through dialogue, storytelling, and sharing of best practices and lessons learned (Dalkir, 2013; Koskinen & Pihlanto, 2008). Individuals with tacit knowledge are usually considered to be experts within their organizations and frequently sought out for guidance and input (Terzieva, 2014). In this case it is very important for an individual, team or organization to capture and organize such knowledge to realize its existence and be able to share it for others.

Implicit form of knowledge is transferred from observable behavior or performance, perhaps without even being aware of it. In an organization where project activities and conversation

exists there are likely instance of implicit knowledge in which its existence is implied or inferred from (Nickols, 2010). For example, assume asking a project team member how to perform a specific task. This could trigger a discussion of alternative ways to perform the task, as well as possible results, leading to a thoughtful process to determine the best course of action. It is that team member's implicit knowledge that shows how to do something and what could happen.

Explicit type of knowledge is the one that can be more easily managed, communicated or documented in a formal and organized form. Such type of knowledge includes management directives, executive orders, policy manuals, meeting minutes, technical documentation and reference guides (Terzieva, 2014).

Table 2.1: Properties of tacit and explicit knowledge

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 org.
• 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

Source: (Dalkir, 2013)

Knowledge is further classified into procedural and declarative knowledge (Dalkir, 2013; Nickols, 2010). As its name implies procedural knowledge is knowledge of how to do things, how to make decisions, how to diagnose and prescribe (Dalkir, 2013). It is reflected in processes, events, activities, actions, manuals. On the other hand, declarative knowledge, was used to denote descriptive knowledge or knowing what as opposed to knowing how (Nickols, 2010). It is expressed in concepts, categories, definitions, assumptions. Because

procedural knowledge manifest itself in the doing of somethings instead of saying and hence it is difficult to articulate or capture in the form of something visible, whereas declarative knowledge consists of descriptions of facts and things or of methods and procedures, so it can be and has been articulated in explicit form.

2.2.3 Levels of Knowledge Creation

Knowledge creation started from the hierarchical form of data, information and then grows to knowledge. Data is unprocessed raw facts. It is the symbolic representation of numbers, letters, facts, or magnitudes and is the means through which knowledge is stored and transferred (Koskinen & Pihlanto, 2008). Information is the combination of these elements and placing of them in a context that gives valuable evidence. In other words, information is an aggregation of data that have meaning. Knowledge is considered to be individual's perception, skills and experience. It involves the individual combining his experience, skills, intuition, ideas, judgements, context, motivations and interpretation (Koskinen & Pihlanto, 2008). It encompasses both elements of an individual thinking and feeling.

Knowledge can be created at individual, group or organization level through the process of learning at each levels (Leidner & Becerra-Fernandez, 2008). Individuals creates knowledge by interpreting and assimilating a diversity of tacit and/or explicit information. And a group of individuals also create knowledge mainly merging from knowledge developed at individual level with the aim of creating collective knowledge, shared by all group members. In the same way knowledge is created at organization level through the different processes of group learning that crystallizes in organizational routines (Balbastre et al., 2003; Koskinen, 2013). That is formally institutionalizable by means of managerial commitment, with a view to facilitating the achievement of organizational goals.

Knowledge flows between individuals, which may be facilitated by KM processes and the tools supporting them are important (Ribière & Román, 2008). They provide the integrative ability of knowledge, from individual to group, and from group to the organizational level. The acquisition and use of individuals' knowledge depends on absorptive capacity and perceptual filters they use to interpret events and action. According to Nonaka, Toyama, & Konno (2000) internalization process, explicit knowledge may be embodied in action and

practice, so that the individual acquiring the knowledge can re-experience what others go through. Alternatively, individuals could acquire tacit knowledge by observing, reading or listening other stories. Learning by doing, on-the-job training, learning by observation, and face-to-face meetings are some of the internalization processes by which individuals acquire knowledge (Leidner & Becerra-Fernandez, 2008). Through externalization, professionals may use techniques for expressing ideas or images as words, concepts, visuals, or figurative language (e.g., metaphors, analogies, narratives) and deductive/inductive reasoning or creative inference (Leidner & Becerra-Fernandez, 2008). It assists the conversion of their tacit knowledge into explicit forms that can be easily understand.

The progress from an individual to group level knowledge continues through the aggregation of individual knowledge. It is highly dependable in social interaction of members (Balbastre et al., 2003), which help them to have shared beliefs and exchange of tacit and explicit knowledge (Ajmal, 2009). Employs joint activities in the same work environment as well as through the support of KM tools & system in disparate location. Group level knowledge involves processes that are not present at the individual level. For instance, group knowledge requires information supplied by its members to be shared by all of them. In addition, for group knowledge to be regarded as agreed, information needs to be integrated and a consensus must be reached by all the group members in a way that it gains meaning as a whole for all of them. Besides that, the participation of members from outside the group such as stakeholders are also included. Finally, the knowledge flows grow to organization level through combination of groups and individuals' knowledge.

These three levels of knowledge creation happen through a process of progressive learning and an integrative manner. Individuals who capture the tacit knowledge they acquire during project activities might be reused by others to take lessons for another work. And enormous knowledge is created in a group because of the varieties of experts and close interaction among members of project workers. The relationship grows after a period of time and it forms beliefs about what works well and what does not, and this knowledge is over and above the knowledge residing in each individual member (Balbastre et al., 2003). Communities of practice illustrate such embedding of knowledge within groups. Knowledge creation at organizational level combines individuals and groups knowledge to enhance

innovativeness, results in increased competitive advantage and performance (Leidner & Becerra-Fernandez, 2008). Organization gains sustainable advances from what it collectively knows, how efficiently it uses what it knows, and how quickly it acquires and uses new knowledge(Davenport & Prusak, 1998).

2.2.4 Knowledge Management practice

Since knowledge is the most important aspect in today's business environment, knowledge management in projects and project-based companies is becoming a prerequisite to sustain a competitive advantage (Carlucci & Schiuma, 2006; Irani et al., 2005). Through KM practice, the knowledge reside in people can be effectively used. It provides an environment to generate and transfer high valued tacit knowledge (Srikantaiah, 2010). Through various mechanism of KM practice individuals initiate fresh ideas and they will be responsiveness to changing environment. Alavi & Leidner (2001) define KM as "a systemic and organizationally specified process for acquiring, organizing and communicating both tacit and explicit knowledge of employees so that other employees may make use of it to be more effective and productive in their work". By applying different methods of KM practice knowledge can be leveraged to the benefit of individuals and team members. Major KM practices in project work environment will be discussed here below.

Debriefing: It is a systematic process of participating each members of project to reflect on project experiences and identify lessons learned(Maier & Hadrich, 2007). Hence, leverage tacit knowledge of project members. It enables staff to share knowledge and helps to create an operational knowledge base for improved quality in project and program design and implementation (Srikantaiah, 2010). Debriefing is done in one-on-one or team interviews after assignments to capture and disseminate lessons learned. Through this method we can identify what worked, what didn't work, and why on project matters that were discussed.

Mentoring: Mostly occurs between two people, the mentor and the mentee, for the purpose of sharing experiences, issues and concerns within an open and trusting environment so that the mentee is able to develop and grow. For example, in project work the project manager is responsible to mentor the team in formal or informal way. He/She will give direction and follow up their track toward solving project problems. Through this process knowledge is

transferred by giving the mentee an access to a level and range of practical experiences, skills and knowledge (tacit knowledge in particular) that would be difficult to replicate through written material (i.e. explicit knowledge).(Koskinen & Pihlanto, 2008).

Training: It is another form of KM practice that mostly takes place in project work environment to utilize experts' knowledge and build the skill and ability of project worker. The training provided could be either directly related to the work he/she has been doing or a skill that support or increase the staff competency. By capturing and managing the training provided, project time can be saved as well as the cost associated with doing the same training every time (Srikantaiah, 2010).

Codification: The aim is to put knowledge in an organized, explicit, and easy to understand form inorder to be accessible for those who need to use it. It differs from personalization in that it relatively more dependable on IT and its approach of knowledge sharing is from people to documents, database or other systems instead of people to people (Ribière & Román, 2008). It can be used as strategy for storing knowledge and provide high-quality, reliable, and fast information-systems implementation by reusing codified knowledge (Lu & Tsai, 2011).

2.2.5 Importance of Knowledge Management

Study shows that the importance of KM is increasing, especially in a project work environment (Sokhanvar et al., 2014; Srikantaiah, 2010). According to Srikantaiah there are five reasons for the dramatic increase of KM in today's business environment. First, the advancement and harnessing of today's technology enables organization to manage their knowledge assets. Second, the exploding of online information through websites, search engines, e-mails, and others make digital information to take over and replacing hard-copy format and KM has become more necessity. Third, the survival of organizations is depending on the success of projects. Because most projects are operating globally, which poses more strategic challenge and. In order to stay competitive and survive, organizations are making KM a priority in projects. Fourth, the change in culture of managing knowledge from hoarding to knowledge sharing culture. According to the author, collaboration among various members of the project team in a synergic way will increase trust and morale,

resulting in success of the project. It also has the potential to cut costs and fulfill the goals and objectives of the project more effectively. Finally, projects are influenced by external economic conditions and internal management styles. It means projects should be managed at increased productivity with fewer resources with the help of KM.

Recent studies show that the contribution of knowledge management is widely accepted in both academic and practitioners of the field (Ibrahim & Reid, 2009). This is because the recognition of knowledge as a fundamental resource and significant factor in the organization to create competitive advantage and business performance (Irani et al., 2005). The main goal of KM is to efficiently utilize and apply knowledge resources in the company, it builds a strong learning environment among team members of an organization by identifying, creating and sharing of knowledge for reuse and awareness creation. The flow of knowledge from one individual to another or from one project team to another is crucial to take lesson and minimize rework.

As a result of its competitive advantage that will bring to the organization, the study of KM have been increasing to address the research gap in the field (Mannan, 2013). Sokhanvar, Matthews, & Yarlagadda (2014) tried to address the issues of KM practice at various maturity level of PMO by developing a framework and the finding indicates knowledge creation and capturing were the most important processes. In a similar study by Jasemi & Piri (2018) they motivated to develop and present the conceptual model of a KMS for the need to reuse knowledge effectively in the context of research and development. On the other hand, a study by Egbu et al., (2002) in the context of construction project, there was a high dependency on the knowledge of employees, but there was often no formal way of transferring and storing and chances are high to lose that knowledge. All these work indicate the process of capturing, creating, transferring and utilizing knowledge is an essential practice in a project and project based companies.

Literature views KM from three interrelated components: people, process and technology (Davenport & Prusak, 2000; Ruggles, 1998; Engidashet, 2015). People are those that actually engage on the project and knowledge management practice with the knowledge they possess, the process aspect of KM is the tasks and procedures involved in knowledge creation, storing, sharing and utilization of knowledge, and technology is the tools,

techniques or systems that assist KM practice. In this study, the people aspect of KM will be discussed in terms of the project team culture, which consists of norms, routines, and unspoken rules of how things are done in that organization or team. Both culture and technology are the basic enablers in knowledge management practice (Reich et al., 2014). The figure below illustrates these three aspect of KM.

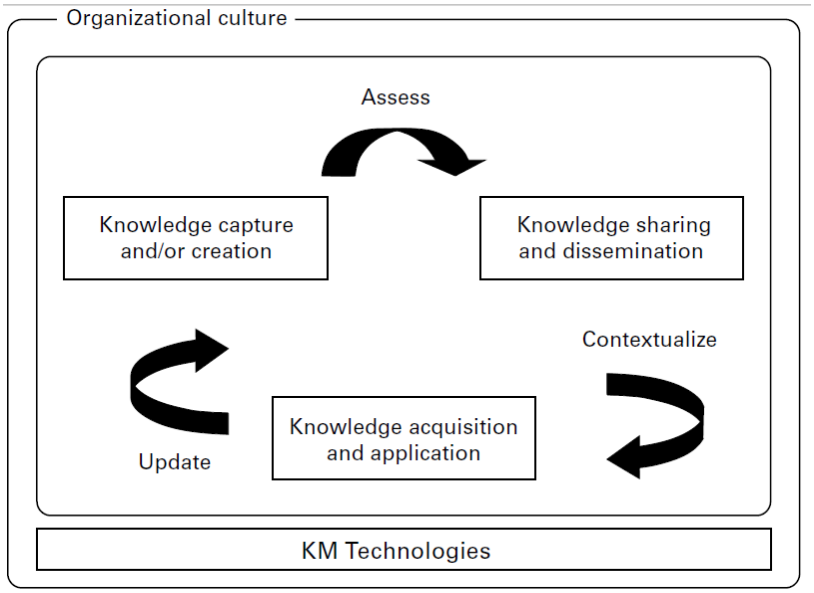

Figure 2.1: Cultural, Technological and Process aspect of KM (Dalkir, 2013)

2.3 Knowledge management process

Knowledge Management process is all the tasks and procedures involved to optimize the knowledge resources in the organization. Effective knowledge management requires an organization to identify, generate, acquire, diffuse, and capture the benefits of knowledge that provide a strategic advantage to that organization (Dalkir, 2013). It is a means to make knowledge useful by carrying out all the necessary steps. KM process facilitate knowledge flows between individuals with supporting tools to provide the integrative ability of knowledge, from individual to group, and from group to the organizational level.

To transform knowledge into valuable asset that can be used at all levels of the organization, knowledge, experience, and expertise must be formalized, distributed, shared, and applied (Engidashet, 2015). KM process started from identifying and locating knowledge and knowledge sources within the organization. Valuable knowledge is then organized to

facilitate its dissemination. Then, networks and practice groups are introduced for the transfer of knowledge among individuals and groups to improve problem solving experience, for better decision making or act based on best knowledge base. This valuable, rich in experience and know-how knowledge is transferred to an organizational knowledge repository or corporate memory for future utilization.

There are approaches or life cycles of KM that appears in the literatures for the steps involved in KM process. Dalkir (2013) identified four or five models that satisfies certain criteria and developed an integrated and comprehensive knowledge processing steps by synthesizing, classifying and regrouping those that refer similar meaning. These are knowledge capture and/or creation; knowledge sharing and dissemination; knowledge acquisition and application as in the fig 2.1 above. Similarly, based on Owen & Burstein (2005), Sokhanvar et al., (2014) developed a framework that represent interconnected processes of KM which comprises capturing, creating, transferring and reusing and other sub-processes. So, this paper will select these four processes and examine each to study their significance in project knowledge management.

2.3.1 Knowledge creation

Nonaka's SECI model explained knowledge creation as the continuous transfer, combination, and conversion of the different types of knowledge, as individuals practice, interact, and learn. It is the shift in condition between the possession of knowledge and the act of knowing that comes through practice, action, and interaction, which is the driving force in the creation of new knowledge. With the help of social connections and collaborative actions knowledge is generated, shared, expanded incrementally, and validated in organizational environments (Alavi & Leidner, 2001). Effective knowledge creation requires a conducive environment where novel and creative ideas are generated, mostly unstructured or informal work environment.

The four modes of knowledge creation that have been identified as socialization, externalization, internalization, and combination (Nonaka et al., 2000). The socialization refers to expanding the tacit knowledge of project worker through shared experience with the team in the form of formal and informal meeting, training, coaching, mentoring,

conferencing, best practice etc. The combination mode uses different project sources to develop a comprehensive project documentation. It utilizes a wide variety of tools and materials that exist in the organization such as project archives, repositories, graphic materials, intranet, Email etc. In a project environment internalization occurs when the project worker is able to embody the explicit knowledge shared from the project team and can practice in the field work. In other words, his/her technical know-how increases to support the client. The final one which is externalization is the ability of a project worker to exploit his/her existing knowledge and experience to develop a project documentation in the form that will be used by others. It requires articulating different thoughts, ideas and concepts to be shared for others as a basis of new knowledge creation.

Thus managing knowledge creation process will enable and encourage knowledge sharing in the form of both tactical and strategic side. On the tactical side, it must understand where and in what forms knowledge exists and on strategic side, it must create/design the right environments, processes, and systems that provide the means and willingness for knowledge sharing to take place (Hajiric, 2018). Managing knowledge creation process also play a role to create a suitable work environment, which allows new knowledge to be created through interaction, practice, and experimentation. Botha, Kourie, & Snyman (2008) indicated the importance of shared experiences in the knowledge creation process when dealing with tacit knowledge, and the need for an environment where these can be formed. Lastly, it will provide systems that support the work process such as groupware systems that facilitate communication or brainstorming.

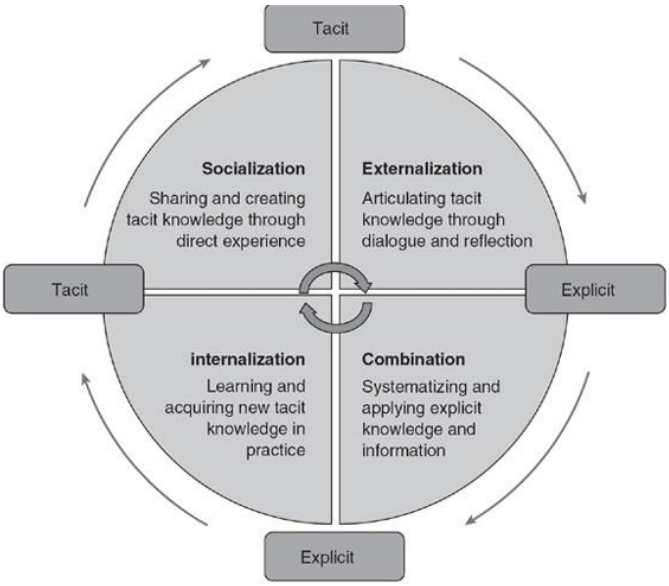

Figure 2.2: Modes of knowledge creation (Takeuchi & Nonaka, 2004)

2.3.2 Knowledge capturing/storing

It refers how knowledge is made explicit and stored within a database or in documents and how the created and transferred knowledge is reflected in organizational routines, processes and culture. This is what we call organizational memory where knowledge is collected in such a way that it can easily accessible for the individuals and groups who need to use it. Alavi & Leidner (2001) explained it as a process of organizational memory formation in which knowledge is formally stored in physical memory systems and informally retained as values, rules and beliefs that are associated to culture and organizational structure. It is a mechanism that we retain the experience acquired through project learning. Project team members need to take lesson that are already known in other projects. And this means, in turn, that the project team members draw both on the company's memory and contribute to it.

Because PBO are temporary in nature, they have the tendency to forget or lose track of the acquired knowledge if it is not organized, structured, stored and retrieved for future use. Thus organizational memory is an important aspect of effective organizational knowledge management and the application of IT becomes important for encoding and knowledge sharing; creation of corporate knowledge directories; creation of networks of knowledge (Alavi & Leidner, 2001). Corporate memory constitutes knowledge residing in various

forms that includes written documentation, structured information stored in electronic databases, codified human knowledge stored in expert systems, documented organizational procedures and processes, and tacit knowledge acquired by individuals and networks of individuals (Gottschalk, 2011). Other forms of explicit knowledge reside in unstructured documents in the form of memos, notes, meetings minutes.

2.3.3 Knowledge transfer/sharing

KM is about making the right knowledge or the right knowledge sources available to the right people at the right time (Hajiric, 2018). The author mentioned knowledge sharing as an important aspect of KM that can be described as either knowledge push or pull. Knowledge pull is when the knowledge worker actively seeks out knowledge sources such as intranet web resources, seeking out an expert, collaborating with a colleague etc. where as knowledge push is when knowledge is pushed into the project worker which could be company success stories, publication or articles sent through an Email. Therefore, knowledge sharing depends on the habit and willingness of the knowledge worker to seek out and/or be receptive to these knowledge sources (Hajiric, 2018).

KS is a process which creates an environment for newly created and existing knowledge to be exploited in the organization. According to Christensen (2007) the goal of KS can either be to create new knowledge by combining existing knowledge in a different way or to become better at exploiting existing knowledge. It will enhance the reusability of knowledge by identifying accessible knowledge in order to transfer and apply knowledge for specific tasks or problems. It is also important for organizations success by enabling to learn about customers, to seek best practices, to recognize internal competencies and products, to discover emerging market trends, and to find competitive intelligence (Riesenberger, 1998).

The same as its benefit that will give to the organization, there are considerable challenge to effectively share or transfer knowledge in a project environment. Hall & Sapsed (2005) categorized into four areas. One is related to the resource constraints of the project, the other one is absorptive capacity to receive and process the sticky nature of knowledge, environmental factors which might be dispersed team, lastly motivational factors of people for contributing to the corporate memory and their team as well. On the hand, the culture of

knowledge sharing can easily be facilitated with a smaller team and suitable for informal interaction. Beside that if the team are worked together for longer period they know and trust each other more and the possibility of knowledge sharing increased.

2.3.4 Knowledge utilization

It refers to the activity of project staff to locate, access and reuse of knowledge stored in different forms of the corporate memory. It consists of three roles which they can be done by an individual or a group of team, these are the producer that creates the knowledge, the intermediary who packages and prepares the knowledge so that it may be stored, retrieved, and shared and the knowledge consumer who is the recipient or user of the knowledge (Markus, 2001). Managing knowledge reuse requires time and money necessary to organize, package, store, and retrieve the knowledge particularly in the cases when tacit knowledge is externalized into explicit knowledge such as projects documents (Hajiric, 2018). It also requires to be aware of the different requirement specific to an individual or groups to effectively utilize both tacit and explicit knowledge.

Oshri (2008) said achieving successful knowledge reuse requires the involvement of different process related to information system and learning aspect. The information system aspect is necessary for the storage and retrieval of knowledge where as the learning aspect is good for improvement of reuse activities. Markus (2001) further adds at least four different types of situation in which knowledge can be reused depends on the knowledge reuser and the purpose of the reuse. These are: reuse by shared knowledge producers, reuse by shared work practitioners, reuse by expertise-seeking novices, and reuse by secondary knowledge miners. Therefore, organization requires to understand the various aspects of knowledge reuse to create a suitable system for knowledge utilization

2.4 Enabling factors of KM

Previous literature has studied numerous type of KM enablers that facilitate KM activity in the organization as you see in Table 2.2. Because they were conducted at different times in various settings, the terminology used may be different from study to study even if some of them have common meaning. The study made by Watanabe et al., (2011) to assess the effects

of leadership, Ba (shared context in motion), organizational culture, organizational control, and work style on KM defined in terms of the SECI process of socialization, externalization, combination, and internalization. On the basis of data gathered from a questionnaire survey of one central company and three other subsidiaries in different countries, it was found that organizational factors affect KM practices differently in each of the targeted countries.

KM enablers support and determine the effectiveness of KM activity and initiative in the organization. They form a system that motivates project staff to develop knowledge and overcome various constraints in carrying out the various knowledge management practices. So, this study focus on three key strategic enablers, namely technology, organization culture and knowledge oriented leadership based on the idea of supporting KM practice from social and technical perspective.

Table 2.2 Knowledge Management enablers

Authors	**KM enablers**
Ramachandran et al., (2013)	- Leadership - Organization Culture - Information Technology - Performance Measurement
Watanabe et al., (2011)	- Organization culture - Organizational control - Leadership - Work styles - Ba (Shared context in motion)
Lee & Choi, (2003)	- Culture (Collaboration, Trust and Learning) - Structure (Centralization and Formalization) - People (T-Shaped skill) - Information Technology (IT support)
Theriou et al., (2011)	- Leadership - Culture - Technology

	- KM Strategy - People

2.4.1 Technology aspect of KM

The technology aspect of KM facilitates the practice of KM in a project based organization (Hosseini et al., 2014). The effective utilization of technology makes knowledge to be easily created and transferred between employees (Alavi & Leidner, 2001). It has the benefit for knowledge to be secured and accessed whenever needed and the capability to extract and keep both tacit and explicit knowledge using different techniques (Terzieva, 2014). The technological conditions that support KM practice consist of physical resources, typically the IT infrastructure including the communications infrastructure, project websites, shared repositories and other elements of a technology-based knowledge management system.

KM should be supported by a technology to improve the collaboration and sharing of knowledge among project staff. There are varieties of tools and system that are available for the carrying out of effective KM and they have their own features and functionalities in the process of KM practice (Alavi & Leidner, 2001). Four main features identified by Ghani (2009) are tools that facilitate information contextualization; intelligently transfer information; facilitate social interactions and networking; and present a customized human-computer interface that meets user needs. They assist KM process in the form of accessing or discovering knowledge, semantic mapping, extracting knowledge, locating expertise, managing explicit knowledge, business process management and global solutions and suites (Balmisse et al., 2007). Some of these collective features and benefits of KM tools that will facilitate the process of KM and their usage and impact in a project work will be explored below.

Table 2.3: KM techniques, tools and technologies

Knowledge creation & codification	Knowledge sharing & dissemination	Knowledge acquisition & application
Content creation	Communication and Collaboration technologies	E-learning technologies

• Authoring tools • Templates • Annotation • Data mining • Expertise profiling • Blog • Mashups Content management • Taxonomies • Folksonomies • Metadata tagging • Classification • Archiving • Personal KM	• Telephone/IP phone/Fax • Videoconferencing • Chat rooms/IM/iwitter • E-mail/discussion forums/wikis • Groupware • Work flow management • Folksonomies • Social networking • Web 2.0/KM 2.0 Networking technologies • Intranets • Extranets • Web servers, browsers • Knowledge repository • Portal	• CBT • WBT • EPSS Emerging technologies • Folksonomies • Metadata AI technologies • Expert systems • DSS • Personalization • Push/pull technologies • Recommender systems • Visualization • Knowledge maps • Automated taxonomy • Text analysis

Source: (Dalkir, 2013)

Content creation and management technology: the purpose of content creation is to explicate knowledge efficiently with some form of document type while content management is to allow efficient access by manipulating the valuable content throughout the useful life span of the content. Authoring tools are the most commonly used content creation tools that range from the general word processing to the more specialized web page design software (Dalkir, 2013). XML is increasingly being used to tag knowledge content and taxonomies serve to better organize and classify content for easier future retrieval and use (Dalkir, 2013). Authoring tools support the collaboration of several knowledge workers to work on the same documents so each individual contribution will be retained and maintained through continuous update of the content. However, it requires appropriate selection and usage of

them in the right way to gain their maximum benefit. Content creation supports not only creates new documents from scratch, but also of enriching existing documents. In this way it becomes a valuable way of learning and sharing knowledge among the different knowledge worker and stimulate creativity (Rollett, 2003).

Communication technology: Which includes IP telephony, Video conferencing, Chatrooms, IMs, SMS, Email, Discussion forum (Rechberg & Syed, 2014). These tools are crucial for the communication takes place inside an organization, which is the basic thing in the process of KM. Communication technologies play an essential role in enabling people to communicate and share knowledge in situations in which they could not do so without technology support (Dalkir, 2013). It will leverage the power of expertise and professionals by providing a virtual platform like a discussion forum or mailing lists when regular face-to-face meetings are not possible or as a follow-up to seminars and other forms of training, allowing participants to keep in touch both with the meeting leader and other members.

However, just because electronic means of communication are prevalent in today's business environment, that does not mean they can be applied under all circumstances. Email will never be able to provide the nuances of face-to-face contact, which not only serves to convey meaning more accurately, but also plays an important role in social bonding (Rollett, 2003). Electronic means of communication are generally useful for maintaining communications, but initially face-to-face meetings are preferable for getting to know each other, establishing a relationship, and building trust.

Collaboration technologies: Some of the forms of collaboration includes shared spaces collaboration, real-time collaboration, idea collection, voting mechanism, collaborative writing, file sharing, collaborative organizing and workflow management (Rechberg & Syed, 2014; Rollett, 2003). They are also called groupware, used for systems which provide a shared environment to enable knowledge workers for managing their project lifecycle; editing and publishing materials; conducting live discussions and interactions; and maintaining a repository of materials associated with every step of the process (Rollett, 2003). It supports geographically dispersed groups as well as groups which are separated by time to collaborate.

Even though the tools we use for both seems different, it is difficult to differentiate between them or draw a line where one end and the other begins (Rollett, 2003). For example, email system is more likely to be used for communication to transfer the information we want to disseminate at once whereas MS SharePoint service assist teams to collaborate by quickly create password-managed and secure project areas and follow the lifecycle of document creation and exchanges. Their roles are vital in knowledge production, coordination and communication as explained by Balmisse et al., (2007) in three steps. However, they require a stable IT environment and the technical skills of participant involved in the process.

Networking technologies: consists of intranets, extranets, knowledge portals, and web based shared workspaces (Balmisse et al., 2007; Dalkir, 2013). They are essential enabler of knowledge management applications by connecting people, communities and business partner of an organization. These technologies are functioning based on different hardware, software and internet technology. They are essential for creating a corporate repository or memory and enables sharing and transfer of knowledge from the central place. Because they are sensitive to intruders mostly the communication is protected with different authentication and encryption methods (Rollett, 2003).

Knowledge portals provide access to diverse corporate project contents, communities, expertise, and to internal and external services and information of the organization. They are means of storing and disseminating organizational knowledge such as business processes, policies, procedures, documents, and other codified knowledge (Dalkir, 2013). They have the feature of searching capability through the contents it incorporates. Project staff and communities can be accessed via the portal for communication and collaboration purposes. It may incorporate services that users can subscribe on a certain agenda or join a practice group as well as web-based learning modules on selected topics. The main topic will consist of the best practices and lessons learned that have been accumulated over the years and to which many organizational members have added value.

Portals combine content from a variety of sources into a central place where relevant content can be accessed from. It enables access to internal and external project knowledge of the organization that can be consolidated, analyzed, and used as inputs to decision making (Firestone, 2003; Dalkir, 2013). It will take into account the different needs of project staff

and the different sorts of knowledge work they carry out in order to provide the best fit with both the content and the format in which the content is presented (Firestone, 2003). Knowledge portals link people, processes, and valuable knowledge content and provide the organizational glue or common thread that serves to support knowledge workers. Previously portals were a means of broadcasting information to all organizational members. Today, they have evolved into sophisticated shared workspaces where knowledge workers can not only contribute content and share content but also acquire and apply valuable organizational knowledge (Dalkir, 2013).

Portals serve to promote knowledge creation by providing a common virtual space where knowledge workers can contribute their knowledge to organizational memory (Dalkir, 2013). It promotes knowledge sharing by providing links to other members of the organization through expertise location systems. Practice group will typically have a dedicated space for their members on the organizational portal and their own membership location system included in the virtual workspace. Relevant content is organized using taxonomies or classification schemes to store integrated project knowledge of both structured (e.g., documents) and unstructured content (e.g., stories, lessons learned, and best practices) (Maier & Hadrich, 2007; Rollett, 2003). Its relevance to knowledge acquisition and application is also noticeable by providing access to the accumulated knowledge, know-how, experience, and expertise of all those who have worked within that organization (Dalkir, 2013; Rollett, 2003).

2.4.2 Organizational Culture

Some authors defined culture in terms of ideologies, sets of beliefs, basic assumptions, shared set of core values, important understandings, and the collective will of people (Dalkir, 2013; Irani et al., 2005). Whereas others suggest that culture includes more explicit, observable cultural artifacts such as norms and practices, symbols, as well as language, ideology, rituals, myths, and ceremony (Koskinen & Pihlanto, 2008; Leidner & Becerra-Fernandez, 2008). On the other hand, Alavi et al., (2006) suggest a three-level model that depicts culture in terms of basic assumptions, values, and artifacts. Despite all these understanding and perspective of culture, the fact that culture as main drivers for KM activities has been raised in most literature (Ajmal et al., 2010; Alavi et al., 2006; Lindner & Wald, 2011).

Culture is reflected in each step of the project activities, influencing the dynamics of how people perform, relate and perceive the project's impact on their lives. However, individuals, project teams and organizations may not fit one particular type of culture because they represent complex social systems and mixtures of many cultural patterns (Koskinen & Pihlanto, 2008). This patterns of basic assumptions builds up through time by a group of team as it learns to cope with their problems of internal and external environment. Mannan et al., (2013) mentioned culture as critical to any project or organizational activity because of its potential to determine how organizations function, how employees interact, and how decisions are made. They said it represents a core set of values governing the attitudes that employees adopt toward change and their approaches to the introduction of something new.

Therefore, a culture that is able to harness knowledge as an important asset to enhance project learning experience should be created in the team. Developing a team culture increases the likelihood of learning to becomes a natural process in the project work. For example, it is important for encouraging and motivating team members to share knowledge and experience either in explicit or tacit form. By creating an environment that fosters teamwork and collective initiative the team can achieve great accomplishment (Peterson, 2007). He stated that a positive culture facilitates the creation and retention of knowledge through shared collaboration of team for competitive advantage of the organization.

In a project work, the importance of promoting trust, respect and open communication is vital among team members through different team activities and meeting. When people are respected and trusted each other, they feel free to generate constructive ideas and input. Their interaction will increase thereby the exchange of knowledge can easily takesplace. They feel ownership and engage themselves more on project tasks and decision within the defined guidelines. This is important to increase users' creativeness and innovativeness thereby knowledge is created as well as the tendency to seek knowledge is increased to overcome challenging situation.

Organization culture is an important factor for KM initiative, which is agreed by most authors (Abdela, 2016; Alavi et al., 2006; Mekonnen, 2017), It has the power to influence organizational performance. An empirical study by Alavi et al., (2006) highlight the finding of cultural influence on the use of knowledge management technologies and the outcomes of

such use. Another study made by Mekonnen (2017) on selected international NGOs also found a significant effect of knowledge management on corporate performance, which is related to the finding by Abdela (2016) with two important factors, knowledge enabler capability (includes culture) and knowledge process capability.

2.4.3 Knowledge Oriented Leadership

Leadership can be referred as the ability and commitment of leaders in an organization to align KM initiative with business strategy (Donate & Sánchez de Pablo, 2015). They identify opportunities, promote the value of KM, communicate best strategies, facilitate the development of learning organization, and provide an indication for assessing the impact of knowledge. It involves defining a clear management approach toward employees and encouraging them to achieve business goals. Project workers should perceive leaders as actively engaging and committing to supporting knowledge and learning activities (DeTienne et al., 2004). Moreover, knowledge oriented leaders should recognize and reward KM activities between project members (Ribière & Sitar, 2003), instead of letting negative behaviors developed in the team that jeopardize knowledge transfer, sharing, and application.

A leader who is oriented in knowledge leadership will have the vison and strategy of KM. In order to take advantage of knowledge explorative and exploitative initiative, leaders in knowledge-intensive organization should have a vision which could use it as a means of knowledge lens. In other words, leaders must guide project workers to learn and use knowledge, thereby achieving the business goal of the organization. Leaders who have the vision and strategy align organizational knowledge to a defined business strategy to optimize the creation, sharing, and leverage of knowledge assets and core capabilities for improved business performance (Nguyen & Mohamed, 2011). Leaders create the conditions that allow project staff to exercise and cultivate their knowledge manipulation skills, to contribute their own individual knowledge resources to the organization’s pool of knowledge, and to have easy access to relevant knowledge. In this regard, knowledge-oriented leaders should champion the development of KM channels and initiatives for both knowledge exploration and knowledge exploitation.

Importantly, Politis, (2002) suggests that the role of leadership is increasingly changing from information and knowledge gate-keeping to knowledge creation and knowledge sharing for all employees. The challenge for most leaders is to develop capacity in others by creating a climate in which acquiring and sharing knowledge is encouraged or even demanded. Knowledge-oriented leadership is thus a necessary instrument that is based on a mixture of transformational and transactional leadership to enhance organizational knowledge, attracting and transferring it, organizing knowledge, creating insight and managing knowledge and information (Donate & Sánchez de Pablo, 2015). It is important that knowledge workers perceive their leaders as being actively engaged and committed to supporting knowledge and learning activities by implementing knowledge strategy.

2.5 Project Performance in Project Based Organizations

2.5.1 Project and Project Management

Project is a temporary tasks of activity in which resources are assigned to carry out a unique, novel and transient endeavor (PMBOK, 2013; Marchewka, 2003). It involves managing the inherent uncertainty and need for integration in order to deliver beneficial objectives of change (Turner & Müller, 2003). There are different types of projects but all of them have common attributes which distinguish it from a specific task or job of an organization. The time frame, purpose, ownership, resources (includes time, money, people and technology), roles, risks and assumptions, interdependent tasks, organizational change, and operating environment are the basic ones listed by (Marchewka, 2003). Campbell (2008) explained project interms of five essential elements which make up projects: the tasks, objectives, timeline, cost and owner. Project is highly autonomous within goals set, in terms of time, money and outcome qualities. In particular, projects have strict time target (Kodama, 2007).

The tasks involved in projects requires the knowledge and competence of project leader and team members (Campbell, 2008; Lierni & Ribière, 2008). It combines the knowledge and skills of domain specific experts and coordination capability of the project manager as well as the collaboration of other stakeholders to bring the desired outcome. Projects are managed with the discipline of project management, which applies knowledge, skills, tools, and techniques to project activities to meet project requirements and stakeholder expectation

(PMBOK, 2013). Project has its own lifecycle, which is a collection of logical phases that maps the life of a project from its initiation to the closing phase in order to define, build, and deliver the product of a project (Marchewka, 2003). Each phases of the project requires the art and science of experts' knowledge, skills and management for better integration of knowledge and achieve good results.

2.5.2 Project Based Organization

It refers to a variety of organizational forms that involve the creation of temporary systems to effectively manage the project tasks (Sydow et al., 2004). It comprises of people with diverse knowledge, experience and skills who come together to solve a common problem or project tasks. In this type of organization, new and proven ideas and thoughts are combined to serve as a source of product, service and business models with a new competitive value (Kodama, 2007). They are mainly engaged on project activities during the lifespan of the project rather than routine or continuous operation, which they are likely the characteristics of functional or service organization. The project itself is the key unit for production organization, innovation, and competition in PBO (Mannan et al., 2013).

Project-based organizations face challenges that may not commonly encountered by other type of organization (Fong, 2005). Because projects are temporary in nature and extended frequently, it is difficult to properly organize the knowledge flows in the organization. Beside that projects operate in a geographically scattered manner, and the teams are organized specifically for the project and often separated upon its completion. It will create fragmented knowledge reside in the organization and has influence on effective knowledge transfer among project staff and team. Fong (2005) explained this difficulty situation on creating the right KM culture and locating knowledge assets, so that accessing and internalizing previous knowledge and learning over the lifetime of a project as well as across project boundaries becomes problematic.

2.5.3 Project success/performance

The success of the project is the basic thing that should be tracked and evaluated along the life cycle of the project to ensure whether it is progressing well based on different success

criteria. Eventhough there is no consensus among researchers of what constitutes projects success (Almamlook, 2018). Turner (2009) mentioned the different stakeholders such as sponsors, clients, project team and managers might interpret project success in various ways and it is very important to reach a harmony of those different requirement. Kerzner (2009) said that it is one of the difficult tasks to predict whether a project will be successful. However, Almamlook (2018) suggest to differentiate project success from project management success. Because a project can be completed on time and within budget but considered as a failed project if it did not meet company strategic objectives.

This leads us to studying project success interms of two different variables: success criteria and success factors. The success factors are indicators which will influence achievement of the success criteria and the success criteria are indicated by which the successful outcome of the project is determined (Turner & Müller, 2003). These outcomes might come directly or indirectly, during or after completion of project. The most common but narrower aspect of measuring success is the iron triangle of time, cost and scope of the project, they are mostly related to project management accomplishment (Almamlook, 2018). A wider perspective of Turner (2008) project success criteria that entertains all stakeholders are identified as the project increases the shareholder value, generates a profit or new solution, or when it provides the desired performance improvement and he relates these to the higher level strategic goals, and the result is obtained after few years of project completion. The other three criteria which he mentioned as when the solution works as expected, the product or service is desired by the consumer, or the solution is easy to apply and related them to the project's outcome, to evaluate whether the project perform as expected and produce the desired benefit. Lastly, he put the others as the project is finished on time, with budget, and with the desired quality, the team is satisfied with the project experience, or consultant made a profit and these three criteria are related to the operation of the project and its output.

Overall, project should be measured based on the impact that will create on economic, social and environmental sustainability. Their effect is both short and long term and described by Shenhar, Levy and Dvir (1997) as

- The combination of time and budget, which determine whether the project was well-

managed.

- Impact of the project on the customer and/or on the end-user, which might include important aspects such as meeting performance rates, functional requirements, technical specifications and customer satisfaction as well.
- The overall impact of the project on the organization like improvement of services or similar benefits.
- The maturity level of the organization through building of new skills, improvement of decision making and developing of new knowledge.

In the context of development organizations, a research made by Bayiley & Teklu (2016) on projects funded by EU in Ethiopia to explore and identify success factors and success criteria as well as to explain the relationship between critical success factors (CSFs) and project success as perceived by the project managers and team members of the organizations participated in the survey. The result showed that relevance, impact, effectiveness, sustainability and efficiency were ranked the most important to evaluate the success of projects. The authors argued that if a project is not relevant, it cannot bring impact and to bring impact it need to be effective by achieving its intended objective. It also indicates that the continuous positive outcome of the project after project completion is critical in development project. The final criteria is related to the efficient of the project by interpreting how well the various activities have transformed the available resources into the intended results and measured in terms of quantity, quality and timeliness. Parameters which they are related to the traditional success criteria.

A related research made by Khang & Moe (2008) in a similar context of development projects at developing countries but with objective of success criteria based on project lifecycle. By adopting the Logical Framework Approach (LFA) they developed a comprehensive framework that identifies different sets of success criteria and factors in the project life-cycle phases and provide the dynamic linkages among these criteria and factors. So, by dividing the success of the project into project management success and project success they suggested that since the process oriented nature of PM has been assessed by the input, activity and output elements of the LFA, and progressively evaluated in the different stages of the project. So, they broken down into success of project life-cycle phases, and

then measured by evaluating the quality of the end products generated and the achievement of the results intended for each of these phases. On the other hand, the project success was evaluated at the end of the project by a different set of criteria that are based essentially on the development impacts, the sustainability and the acceptance of the project achievements by the stakeholders and the development community in general. The two perspectives is presented below.

Table 2.4: Success criteria on each phase of project life cycle

Project Phases	Success Criteria
Conceptualizing	Addressing relevant needs of the right target group of beneficiaries Identifying the right implementing agency capable and willing to deliver Matching policy priorities and raising the interests of key stakeholders
Planning	Approval of, and commitment to, the project by the key parties Sufficient resources committed and ready to be disbursed Core organizational capacity established for PM
Implementing	Resources mobilized and used as planned Activities carried out as scheduled Outputs produced meet the planned specifications and quality Good accountability of resources utilization Key stakeholders informed of and satisfied with project progress
Closing	Project assets transferred, financial settlements completed, and team dissolved to the satisfaction of key stakeholders. Project end outputs are accepted and used by target beneficiaries. Project completion report accepted by the key stakeholders.

Overall Success	Project has a visible impact on the beneficiaries. Project has built institutional capacity within the country. Project has good reputation. Project has good chance of being extended as result of success. Project's outcomes are likely to be sustained.

Source: (Khang & Moe, 2008)

As we can see from the above literature review important terms like schedule, cost, quality, profit, impact, sustainability, benefit, satisfaction are the most frequently used to evaluate project success during, at closing and after project completion. Efficiently managing the project during the course of the project is important in order to ensure its effectiveness at the end of the project. Its efficiency and effectiveness of the project should create an impact or benefit in different dimensions at the level of the project purpose. Empirical study shows that cost and schedule are the main reasons for poor project performance in development projects (Ahsan & Gunawan, 2010). Because projects might be delayed due to different reasons and this delay causes cost underrun (Ahsan & Gunawan, 2010). The tendency of overlapping project activities also increases and has an effect on meeting project objective as per the standard (quality). So, managing the project with good project management approach to meet the project requirements. However, project should also create an impact or benefit in different dimensions to realize the importance of its outcome. Its impact or benefit should reach outside the boundary of the project team to see the significance on the socioeconomic and environmental aspect of the community. These impact or benefits might be tangible or intangible asset created in short and long term advantage.

2.6 Review of related papers: KM and Project Performance

Project based organization typically tied knowledge management initiative to their objectives intending to achieve specific outcomes, such as shared understanding, improved performance, competitive advantage, or higher levels of innovation (Ahmed et al., 2015; Koskinen & Pihlanto, 2008; Oluikpe et al., 2011; Todorović et al., 2015; Yang, 2010). These empirical evidences show that the efficient management of knowledge has significant effect

in an organization and particularly in a project environment. Because of high production and necessity of knowledge in a project environment many point out the need to further explore its contribution from different perspective and context. One study shows that KM practices improved organizations' operational activity in a variety of ways, such as reducing the design cycle time, lead time, cost, reducing time product-to-market, and improving the quality of product (Ibrahim & Reid, 2009). In addition to that, business process was improved through KM initiatives and the two added values enable the organization to gain financial values. In a similar study by, Ahmed et al., (2015) KM practice results in provision of quality services to customers, high customer satisfaction, efficiency in resource utilization, more profits and overall improved organizational performance. Jayasingam et al., (2013) also suggest that organizations should embark on KM initiatives in order to experience improved performance and enhanced competitive advantage by providing empirical validation for the link between KM practices and project success.

In light of this, Reich et al., (2014) have shown the relationship between knowledge management and various aspects of performance in IT-enabled business projects. The finding indicated that KM has significant effect on project performance when mediated by knowledge alignment, which is defined as the shared understanding between the IT, business and governance teams. In that case, KM is found to explain more than 38% of the variance on business value (in terms of quality and customer satisfaction). However, no adverse impact on the attainment of budget and schedule targets. While this case might be true in IT-based projects such as software products, where quality criteria and client satisfaction can be seen as the primary aspects of success. They argued engaging on KM will increase project time and cost which contradict with the finding of (Oluikpe et al., 2011; L. R. Yang et al., 2012). Rather lessons learned during the life-cycle of a project may prevent the repetition of errors thus it will help to reduce costs and time for rework. Similarly, Lierni & Ribière, (2008) have shown the contribution of KM practices in improving the management of projects thus resulting in the successful delivery of the project within schedule, within budget and met technical requirements. However, the study address most importantly on the technical contribution of KM. It did not show the people or social aspect of KM where the flow of tacit knowledge takes place. Effective knowledge management should combine both

codification and personalization form of knowledge transfer.

Previous studies were focused on either the relationship between KM enablers and KM practice (Ramachandran et al., 2013; Watanabe et al., 2011) or between KM practice and organizational or project performance (Ahmed et al., 2015; Hanisch et al., 2009; Lierni & Ribière, 2008; Reich et al., 2014; Valmohammadi & Ahmadi, 2015). They lack to address the socio-technical aspects of KM enablers to effectively carry out KM practice for improved performance in a project environment. Combining these variables is necessary to address the issue at hand with an integrated view. It creates a better approach for organization who want to be effective on managing both tacit and explicit form of knowledge for better outcome. Studying the value of KM in a project environment alone without the means to tackle the challenge surround to create and utilize knowledge is not enough. Important aspects that facilitate to increase the flow and use of knowledge need to be addressed.

KM in project environments involves the creation, manipulation, distribution and utilization of knowledge between individuals and teams. A mechanism must be in place in order to support all these activities and optimize the knowledge gained from each projects. Technically, IT systems have the capability to support administration of project documentation and reports and transfer them when needed. Tacit form of knowledge such as best practice and lesson learned are acquired through socialization. Besides that, the existence of good leadership across the projects is required to handle such aspects of KM. They have a great role in leading project team through knowledge lens. These three things should be taken together to effectively carry out KM activities in the projects. They facilitate the production and utilization of relevant knowledge to perform well in each activities of the projects.

Yang et al., (2012) studied the impact of IT on project success through knowledge management practice with the objectives of validating a model for assessing the relationships among IT application, KM practice adoption, and project success (project performance and project benefits). The finding showed that levels of IT application is positively associated with projects' levels of knowledge management and project outcomes can be achieved with higher levels of knowledge management. While the research has found a good result with

KM and IT application variables explain 38.8% of the variance in project performance it lacks to address other important social factors that initiate KM activities.

Mekonnen (2017) investigated the influence of KM on organizational performance from Cultural, IT and knowledge practice aspect of the organization. The finding on the regression model indicated that a moderate value of 47.5% of the variation in organization performance can be explained by these three factors. While there exists some similarity with this research paper it lacks to address important aspect of KM practice and technology which facilitates effective management of knowledge. A distinction should also be made whether to address the KM from its practice aspect or the knowledge reside in the organization. Because activity aspect concerns on codification and personalization, and the knowledge aspect intends to address knowledge found in people, process, methods, repositories and other explicit knowledge.

KM practice supported by enabling factors of technology, culture and knowledge based leadership in the team will increase the effective management of project knowledge produced in PBO. Furthermore, if the organization manages multiple and diversified projects, there is an opportunity to expand its knowledge in different areas through experience. However, this could not be possible if the knowledge created from different individuals and projects are not effectively managed (Arnetz, 2013). Through KM approach one project knowledge might be an input for another to improve future projects. In a PBO, projects might be different interms of clients, intervention areas, project implementation approach. However, they might face similar challenges and need to take lesson to solve problems systematically. Besides that, project requires close collaboration and communication in everyday project activities between different expertise. So the need to emphasis on KM from beginning to end of project is crucial for the survival of the project.

It is the result of all projects that make up project based organization achieve its goal. Disterer (2002) argues that most firms were not able to evaluate projects and learn from their past experiences. This comes from the lack of efficient utilization of KM. Expert's knowledge should be leveraged and retained as a repository throughout the entire life of the project. This means it can be utilized later by an individual who come to the project or when

the expert need to reuse on another project in the same organization. As we see in the figure 2.3 below KM can be applied in all phases of the project lifecycle.

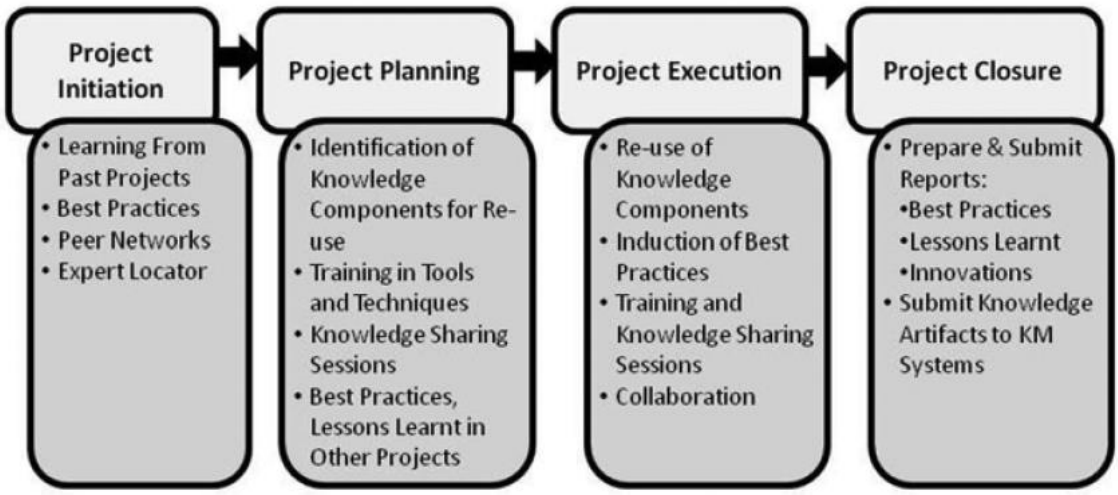

Figure 2.3: KM Practices on four main stages of Projects (Latha et al., 2010)

Conceptualizing and explicating overall approach of the project are the main activities involved in the initial phase of the project, at this time it is critical to create network with others who might get involved in similar projects or taking lesson from previous project to build understanding on the new project. At planning phase, identification of core knowledge and the tools and techniques required for managing schedules and resources, expected deliverable and team formation. Since main development and quality checks has been done in project execution close collaboration and induction of best practice increased and finally project documentation and reports will be produced that includes lesson learned and best practice found from the projects.

Projects face various challenges during their course in multiple dimensions including changing demands and requirements from the customer, mismatch of the team's skills with the requirements, and geographical distribution of people (Latha et al., 2010). These challenges, coupled with the need to continuously improve quality and productivity parameters, require the project team to be highly enabled and motivated in spite of the complexity of the project and work-life pressures. According to Srikantaiah (2010) KM in projects has become an invaluable tool and a fundamental necessity for the success of projects. He said it has major benefits for deliverables on schedule, cost savings, time

savings, and quality. By retaining existing knowledge in project it helps to avoid waste, duplication, and some mistake. It facilitates the sharing of best practices by capturing lesson learned and retaining the knowledge of experienced employees without having to pay for that knowledge. Problems or issues encountered and solutions devised in past projects can be applied to current and future projects.

2.7 Chapter Summary

In this chapter, the need to manage knowledge as one of the most important resource in today's business organization, specifically in project based organization was discussed. Study showed that the importance of KM is increasing, especially in a project work environment. Literature review showed that, because of high production and necessity of knowledge in a project environment, the efficient management of knowledge has significant effect in an organization and particularly in a project environment for improved performance. Effective knowledge management requires an organization to create, capture, transfer and acquire knowledge to optimize and make use of knowledge resource. So, important KM practices such as best practice and lesson learnt through debriefing, mentoring, and training etc…were identified and discussed their role to increase the flow of knowledge between project staff. Key enablers which includes Technology, organization culture and knowledge oriented leadership were also identified as an important factor for KM activity and initiative in an organization.

CHAPTER THREE

RESEARCH DESIGN AND METHODOLOGY

3.1 Chapter overview

This chapter discusses the research model and the research methodology used to address the stated research questions. The research model shows the relationship between exogenous (KM technology, organization culture and knowledge oriented leadership) and endogenous variables (KM practice and project performance). It gives detail explanation of the four hypothesis proposed based on the evidence of the literature review. The research design shows the detail procedures followed to statistically test the hypotheses. Mainly it will discuss about the research approach selected, instrument design, sampling and data analysis method.

3.2 Research Model

The research model shows the conceptual representation of the research phenomena. It is represented by variables and the laws of their interactions. There are many factors that enable KM practice, the researcher, by reviewing current literature, selected variables that are relevant to project based organizations.

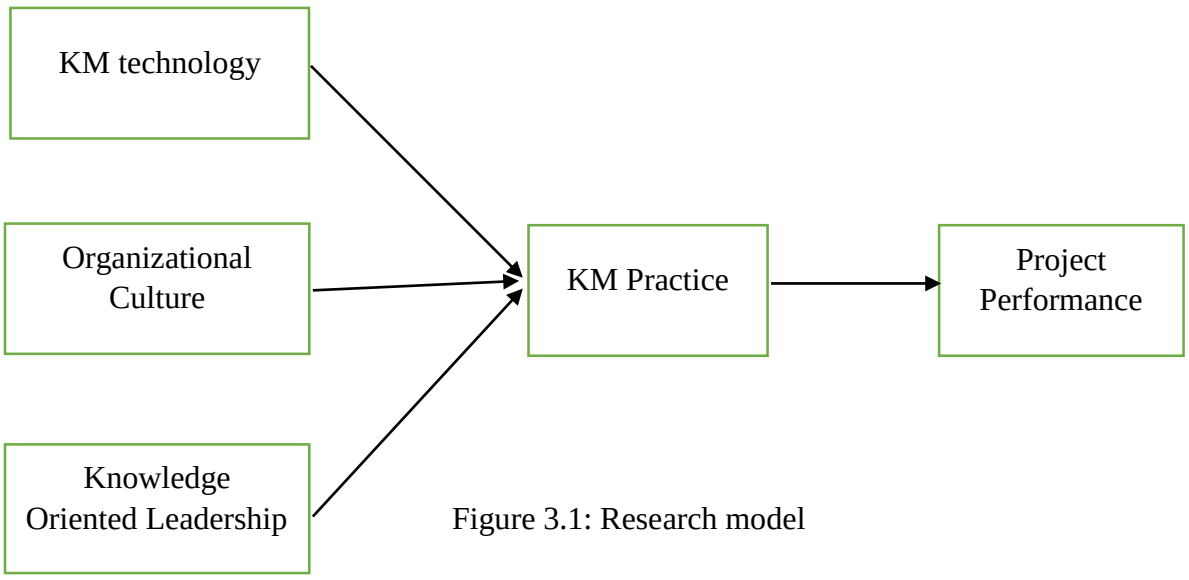

Figure 3.1: Research model

The technology factor used in this study refers to the IT application and infrastructure used to support KM processes such as internet, communication databases, intranet, email and

portal. These technologies can serve as a platform for effective knowledge management (J. Lee, 2018). The extent to which knowledge conversion within and between tacit and explicit forms can be supported by these technologies (Marwick, 2001). It contributes for knowledge creation and sharing within an organization. Prior research indicated the important role of technology as a key enabler to the field of knowledge management (Pérez-López & Alegre, 2012; Yang et al., 2012). An empirical investigation indicated that technology and KM activity have a positive relationship with path coefficient of 0.671 (Yang et al., 2012) and β value of 0.581 (Hawajreh & Sharabati, 2014). Based on the review of literature, the following hypothesis was developed and tested:

H1. Knowledge management technology positively enables knowledge management practice.

Organization culture refers in this study is the people values, norms and attitudes toward KM activity. Organization can have a knowledge culture, where KM is expressed through the application of various knowledge initiatives, tools and techniques and an organization can 'be' a knowledge organization KM is totally ingrained within the operations of the organization (Moffett et al., 2002). This results in a knowledge culture that has been adopted throughout the organization. Knowledge oriented culture challenges people to create and share knowledge as well seek knowledge from different sources. A culture of trust and respect encourages for the application and development of knowledge among project members. A culture where knowledge creating and sharing is seen as a strength, team members became supportive and helpful. An empirical finding shows that organization culture explains 23.5% of the variance in knowledge creation and another empirical evidence shows the cultural aspect of an organization can significantly impact KM process with a path coefficient of 0.73 (Idris et al., 2015). Based on this relevant literature the following hypothesis was proposed and tested:

H2. Organization culture positively enables knowledge management practice.

Knowledge oriented leadership implies the capability of leaders to actively engage and commit to support knowledge and learning activities of project workers. This kind of leaders understand the competitive advantage of knowledge assets. So, they play an important role

in enhancing organizational knowledge, creating insight and managing knowledge (Donate & Pablo, 2015). They act as a role model, encourage learning by challenging workers and stimulating them intellectually, institutionalize learning through the provision of incentives and training, foster a pro-learning culture that tolerates mistakes and develop knowledge transfer, storage and application mechanisms (Williams & Sullivan, 2011). An empirical finding shows there is a positive relationship between KO leadership and KM practice (creating, storage, transfer and application) with an average path coefficient of 0.47 (Donate & Pablo, 2015). Based on this literature review, the following hypothesis was proposed and tested.

H3. Knowledge oriented leadership positively enables knowledge management practice.

Knowledge management practice refers to the activities and initiatives that organizations use to generate, store, transfer and utilize knowledge for the improvement of performance. Review of literature suggests that it improves firm's innovation capacity (Donate & Pablo, 2015), improves management and performance of projects (Lierni & Ribière, 2008; Reich et al., 2014) and improve organization performance as well (Valmohammadi & Ahmadi, 2015). Important project knowledge resources can be organized and managed through the process of KM practice to leverage expertise knowledge and experience. This will reduce rework of the same project activities that have been done by others, mistake in project can be corrected easily with knowledge sharing. Best practice and lessons learned in project work can improve project performance as suggested by literature (Lierni & Ribière, 2008; Yang et al., 2012). Empirical finding shows knowledge management practice has positive impact on project performance with a path coefficient of 0.67 (Yang et al., 2012). Based on this literature review this study proposed the following hypothesis:

H4. Knowledge management practice positively enables project performance.

3.3 Research design

This research will follow a causal design model to explain the relationship between exogenous and endogenous latent variables. Using causal research approach, we can identify the extent and nature of cause-and-effect relationships by doing analysis of a situation or a

specific problem (Henseler, 2018). It determines how one variable influences the change in another variable. Though it is difficult to prove a causal relationship between variables, evidence will be developed through statistical point of view based on the premise that knowledge management enablers (KM technology, organization culture and knowledge oriented leadership) have influence on KM activities of individuals and team and which in turn the practice of KM will positively influence project performance.

Prior to data collection, instrument is developed that contains structured questioners grouped into four categories. The first group is prepared to gather basic information about the participants. The next group is organized to investigate about the practice of KM in creating, capturing, sharing and utilizing knowledge. Thirdly, participant will rate project performance interms of schedule, cost, quality parameters and lastly questionnaire related to basic enablers of KM practice which includes KM technology, organizational culture and knowledge oriented leadership.

3.3.1 Sampling technique and Sample Size

Primary data were collected using survey questionnaire. The data was collected from project staff: project managers and technical team working in each projects. Because the context of the study is a project environment in an organization, target population became project staff working in different types of projects under the management of TechnoServe, Ethiopia. the researcher believes that the manager has the overall skill, experience, practice and activities of a specific project he/she manages and the technical team are the experts engaged in supporting field work. Staff engaged in a routine operation unit like finance, HR and admin team have excluded from participating in the survey. The project staff is about two third (2/3) or about 102 out of the total staff (150) working in the organization. According to Bartlett et al., (2001) this sample size meets the criteria.

3.3.2 Data collection instrument and procedures

Because Primary data were collected using survey questionnaires. This helps to collect data from multiple geographically scattered respondents at a time electronically and respondents can get time to think and give accurate information. The questions are adapted from (Maltz,

2001; Choi & Lee, 2002; Mageswari, 2012; Mekonnen, 2017; Yang et al., 2012) and properly drafted in MS word. After participant names and email addresses were obtained from HR unit and global address list, the questionnaires were sent to the intended respondents using google form.

As intervals do not capture the subjective nature of such criteria, ordinal scales with choices (Likert scales) was used to capture staff perceptions. Pilot testing was made on selected 8 project staff to improve the credibility of the instruments through reliability and validity testing. It also enhanced the content validity of the questionnaire (Saunders et al., 2009). Project staff list was taken from HR unit and their email was retrieved from the global email address book. Because online data collection is more convenient for organizing the data, respondents was suggested to send through online google form. After getting approval for data collection from the company, an email is sent to the respondents explaining the purpose of the data collection and final expectation date of feedback. Confidentiality and anonymity of the data also clearly informed to the participant. A reminding email and follow up through mobile call and SMS had been took place until appropriate amount of data was collected. The table below shows the demographics of the 85 respondents out of 102 participants.

Table 3.1: Demographics of the respondents

		In number	In percentage
Gender	Male	71	83.5
	Female	14	16.5
	Total	85	100
Education background	Diploma	0	0
	Degree	44	51.8
	Masters	41	48.2
	Total	85	100

3.3.3 Data analysis method

After survey data was collected through google form, basic cleaning and coding of the data took place using MS excel and Statistical Package for Social Scientists (SPSS) software, as

well as basic descriptive and analysis part of the study. In order to examine the data deeply, SmartPLS (partial least squares) was used for modeling causal paths among latent variables (Garson, 2016). PLS is useful when the sample size is small. It is simple to analyze the measurement and structural model (Wong, 2013). To investigate the strength and causal effect of the independent variables on the dependent variables, regression technique was applied by determining the model parameters.

3.3.4 Reliability and validity

The researcher did an effort to ensure the trustworthiness of the study by measuring the reliability and validity of the instrument. Cronbach Alpha (α), convergent and discriminant validity are the main ones used in this paper to assess the measurement model. Cronbach Alpha (α) measures the internal consistency of each construct. By common rule of thumb a value of .70 or higher is acceptable scale for reliability testing (Garson, 2016). Validity also checked using average variance extracted (AVE) and composite reliability (CR).

3.4 Chapter Summary

This chapter outlined the specific research methods involved in the process answering the research questions at hand. Causal design was followed to explain the relationship between exogenous and endogenous latent variables. Research model was drawn to show the relationship between KM enablers, practice and project performance variables and four hypotheses was formulated. Instrument was developed from literature to collect survey data from project staff of the organization. As intervals do not capture the subjective nature of such criteria, ordinal scales with choices (Likert scales) was used to capture staff perceptions. Demographics showed that 85 staff was responded out of 102 participants. Due to simplicity and small sample size, SmartPLS software was used to investigate the strength and causal effect of the independent variables on the dependent variable.

CHAPTER FOUR

DATA ANALYSIS AND DISCUSSION OF RESULTS

4.1 Chapter Overview

This chapter presents the statistical findings of the study after applying different statistical techniques and discuss on the results. Assessment of measurement model was performed to ensure it is reliable and valid for further analysis. The data analysis involved the administration of questionnaire survey as a means of getting opinions from project staff. The results are presented systematically to address the research objectives and to answer the research questions. Demographics of respondents' based on different factors was presented in tabular form to visualize distribution of data. To test whether the hypothesis formulated are supported, different techniques of SmartPLS algorithm were applied and effect relationship between variables was discussed based on the findings.

4.2 Reliability and Validity test

Reliability indicates the internal consistency of people's responses across the items on a multiple-item measure (Ahmed et al., 2015). The Cronbach's alpha test scores provided alphas above the threshold level of 0.7 was obtained from all constructs. In general, all the items on such measures are supposed to reflect the same underlying construct, so people's scores on those items should be correlated with each other. Items with low inter-item correlation (below the value of 0.3) across the rows were identified on the process of testing the reliability.

Validity is the extent to which the results really measure what they are supposed to measure (Mohapatra et al., 2014). Assessment of convergent and discriminant validity determines the validation of the measurement model (Lee, 2018). Convergent validity of the scales is based on the condition of three criteria (Garson, 2016; Lee, 2018; Yang et al., 2012) (1) all indicator loadings should exceed 0.50 (2) composite reliabilities greater than 0.8 is considered as better and (3) the average variance extracted (AVE) for each construct should exceed 0.5. Removal of outer loading of indicators whose values were smaller was dropped one by one until a desired result was found, for example, an AVE values becomes greater than 0.5. As a result, from KM practice variable, item number 3, 4, 6, 8 and 9 were dropped; Item number 4 from project performance; item number 1 from organizational culture

variable to meet the criteria of measurement model. The two Tables below illustrate outer loading values before and after this process.

Table 4.1: Outer loading before item removal

	KM Practice	Project Performance	KM Technology	Organizational Culture	Knowledge Oriented Leadership
Item 1	0.611	0.692	0.85	0.646	0.642
Item 2	0.61	0.674	0.833	0.764	0.716
Item 3	0.613	0.615	0.64	0.614	0.861
Item 4	0.526	0.571	0.613	0.712	0.628
Item 5	0.676	0.786	0.734	0.736	0.681
Item 6	0.486	0.741			0.841
Item 7	0.674	0.659			
Items 8	0.576				
Item 9	0.509				
Item 10	0.771				
Item 11	0.767				
Item 12	0.791				

Table 4.2: Outer loading after items were dropped

	KM Practice	Project Performance	KM Technology	Organizational Culture	Knowledge Oriented Leadership
Item 1	0.658	0.683	0.861	Dropped	0.677
Item 2	0.636	0.677	0.85	0.668	0.723
Item 3	Dropped	0.565	0.643	0.711	0.861
Item 4	Dropped	Dropped	0.593	0.738	0.618
Item 5	0.671	0.812	0.708	0.796	0.662
Item 6	Dropped	0.776			0.824
Item 7	0.612	0.684			
Items 8	Dropped				

Item 9	Dropped
Item 10	0.821
Item 11	0.833
Item 12	0.798

In Table 4.3 below all CR and AVE values are above the recommended threshold values. All three conditions for convergent validity thus hold.

Table 4.3: Computed values Cronbach's alpha (α), CR and AVE using SmartPLS

	Cronbach's Alpha	Composite Reliability (CR)	Average Variance Extracted (AVE)
KM Practice	0.845	0.883	0.524
Project Performance	0.791	0.853	0.495
Organization Culture	0.832	0.819	0.532
KM Technology	0.708	0.855	0.546
KO Leadership	0.794	0.873	0.537

Discriminant validity measures whether a latent construct is more closely related to its own measures than to measures of other constructs in the model (Chin, 2010). It is checked by comparing the square root of the Average Variance Extracted (AVE) with the inter-construct correlations (Wong, 2013). To evaluate discriminant validity, the square root of the AVE of a latent variable should be greater than the correlations between the rest of the latent variables. In Table 4.4 shows, discriminant validity holds for the model, as the diagonal elements, the square root of AVE, are greater than their corresponding off-diagonal elements.

Table 4.4: Discriminant validity: correlations and square root of AVE

Latent Variable	KM Practice	Project Performance	KM Technology	Organization Culture	Knowledge Oriented Leadership
KMP	**0.724**				
PP	0.599	**0.704**			
KMT	0.318	0.201	**0.739**		

OC	0.511	0.371	0.417	**0.73**	
KOL	0.434	0.327	0.513	0.574	**0.733**

Table 4.5: Summary of measurement model assessment

	Items	Loadings	AVE	CR	Alpha (α)
KM Practice	KMP1	0.658	0.524	0.883	0.845
	KMP2	0.636			
	KMP3	0.671			
	KMP4	0.612			
	KMP5	0.821			
	KMP6	0.833			
	KMP7	0.798			
Project Performance	PP1	0.683	0.495	0.853	0.791
	PP2	0.677			
	PP3	0.565			
	PP4	0.812			
	PP5	0.776			
	PP6	0.684			
KM Technology	KMT1	0.861	0.546	0.855	0.708
	KMT2	0.85			
	KMT3	0.643			
	KMT4	0.593			
	KMT5	0.708			
Organization Culture	OC1	0.668	0.532	0.819	0.832
	OC2	0.711			
	OC3	0.738			
	OC4	0.796			
Knowledge Oriented Leadership	KOL1	0.677	0.537	0.873	0.794
	KOL2	0.723			
	KOL3	0.861			

	KOL4	0.618
	KOL5	0.662
	KOL6	0.824

4.3 Characteristics of the respondents

After assessment of the measurement model 35 questions were used for further analysis from the total of 42 items. Due to outlier 1 case was dropped and 85 cases, which represent 83.3% of the target population was to used analyze the data. The distribution of the respondent by different parameters are explained here below.

As the figure shows in Table 4.6 below, out of the 85 respondents' to the questionnaires, 83.5% were males while the remaining 16.5% were females. Corresponding to the male/female ratio of the entire project workers, the study sample indicates male respondents proportionally dominate over female ones. The possible reason for a very less number of female respondents could be the interest toward working in a project work environment or the perception that working in a project environment is difficult to manage for females. It is known that development projects required the energy to actively engaging in the field and follow up of project tasks and activities with project stakeholders and beneficiaries. While this figure might be different from project to project or from one location to another one, the distribution of gender requires the attention of employer to further study and appropriate feedback to increase the role of females in project work.

Table 4.6: Distribution of respondents by Gender

Gender	Frequency	Percentage
Male	71	83.5
Female	14	16.5
Total	85	100

The result showed that age group between 31 and 40 years were the largest distribution in the study, which holds 62.4% of the respondents. In this age category, the probability of

project workers that are more energetic, educated, experienced and those explores from different knowledge sources is high.

Table 4.7: Distribution of respondents by Age

Age in years	Frequency	Percentage
20 – 30	16	18.8
31 – 40	53	62.4
Above 40	16	18.8
Total	85	100

It is obvious that education level is the most important criteria that directly related to productivity or performance of the employee. Because education is one of the common source of knowledge, the more educated an employee becomes the more knowledge he/she could have to apply on project work. As the Table 4.8 shows below, the project workers have at least first degree that represent 51.8% of the respondents and the others have master's degree.

Table 4.8: Distribution of respondents by level of Education

Level of Education	Frequency	Percentage
Diploma	0	0
Degree	44	51.8
Masters	41	48.2
Total	85	100

The project type indicated on the Table 4.9 figure shows, the organization is more engaged on value chain or market assessment projects; client services: business strategy and capital raising; client services: operational efficiency/capacity building. They represent 24.7%, 28.2% and 25.9% respectively.

Table 4.9: Distribution of respondents by project type

Project type	Frequency	Percentage
Value Chain/Market Assessment	21	24.7
Client Services: Business strategy and capital raising	24	28.2
Client Services: Operational efficiency/capacity building	22	25.9
Research, Communications and Marketing	5	5.9
Project and Proposal design	3	3.5
Others	10	11.8
Total	85	100

Another finding here below shows that more mid-level and senior experts are engaged on different project positions. 70.6% of the project worker have engaged more than one year in the organization and half of this worked more than 5 years. This is an indication that more experienced employees are working on project works in addition to those who have higher academic position.

Table 5: Distribution of respondents by service years

Service Years	Frequency	Percentage
< = 1	25	29.4
1 - 5	30	35.3
> = 5	30	35.3
Total	85	100

4.4 Data Analysis

4.4.1 Collinearity and Correlation analysis

Collinearity occurs when two or more independent variables are highly intercorrelated. It inflates standard errors, makes significance tests of independent variables unreliable, and prevents the researcher from assessing the relative importance of one independent variable compared to another (Garson, 2016). Multicollinearity becomes a problem when tolerance is less than 0.20 or if the variance inflation factor (VIF) exceeds 5. Some researchers used the more stringent cutoff values of .25 and 4, respectively (Hair Jr et al., 2016; Wong, 2013).

VIF is the inverse of tolerance and contains the same information. It was found that all were below VIF value of below 2 and passed collinearity issues as indicated in Table 4.11.

Correlation coefficients (r) can take regard from -1 to +1. It tells us both the strength and direction of the linear relationship between two variables. If the relationship is positive, both variables will increase in parallel, If the relationship is negative, one variable increases while the other becomes decreased. The third type is when there is no apparent correlation exist between the two variables.

The data analysis report demonstrates there is a moderate positive relationship between the exogenous and endogenous latent variables that ranges from 0.310 to 0.599. It was found that a correlation coefficient (r) value of 0.599 with p value less 0.001 between KM practice and project performance. r value also identified for the relationship between KM enablers (KM technology, organization culture and knowledge oriented leadership) and KM practice. A respective r values of 0.310, 0.510 and 0.431 were found.

Table 6: VIF and Correlation values of latent variables

	KM Practice (VIF)	1	2	3	4	5
1. KM Practice		1.000				
2. Project Performance	**1.00**	**0.599**	1.000			
3. KM Technology	**1.40**	**0.310**	0.201	1.000		
4. Organization Culture	**1.54**	**0.511**	0.371	0.417	1.000	
5. KO Leadership	**1.72**	**0.431**	0.327	0.513	0.574	1.000

4.4.2 Regression Analysis

Two regression analyses were created between exogenous and endogenous latent variables. The first regression is based on the dependent variable of project performance against the mediating variable, KM practice and the second was analyzed the effect of KM enablers (KM Technology, Organization Culture and Knowledge Leadership) on KM Practice. Results of these regression are shown in Table 4.12 the arrows indicate the path effect of exogenous on endogenous variable.

Table 7: Result of regression

	R^2	Adjusted R^2	Path Coefficient	T-value	P-value
KM Technology -> KM Practice			0.057	0.368	0.356
Org. Culture -> KM Practice	0.291	0.26.5	0.381	3.104	0.001
KO Leadership -> KM Practice			0.183	1.183	0.119
KM Practice -> Project Perf.	0.359	0.351	0.599	8.529	0.000

4.4.2.1 Model diagram

The SmartPLS reflective model diagram shown below has inner and outer model. A path model is reflective if the path diagram causal arrows go from the latent variable (factor) to the measured indicator variables (Garson, 2016). The factor ellipses (the five variables) and arrow creating them are called the inner or structural model. The indicator rectangles and arrows connecting them are called the outer or measurement model. The inner model consists of exogenous and endogenous variables. A latent variable is exogenous if it is not an effect of any other latent variable in the model and a latent variable is endogenous it is an effect of at least one other latent variable (Garson, 2016). Organization culture, KM technology and knowledge oriented leadership are exogenous variables and on the other hand KM practice and project performance are endogenous.

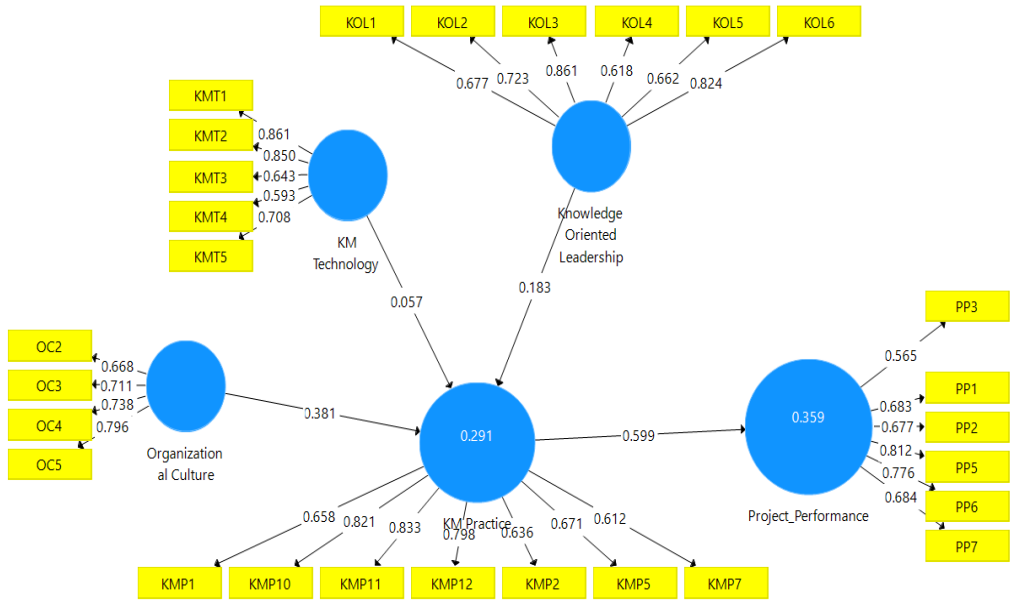

Figure 4.1: Model diagram using SmartPLS

4.4.2.2 Path Coefficient

The path coefficient estimates are the standardized regression coefficients and interpreted as the change in the dependent variable measured by standard deviation, if an independent variable is increased by one standard deviation while keeping all other explanatory variable constant (Benitez et al., 2020). For example, as shown in the table, increasing KM practice by one standard deviation will increase project performance by 0.599 standard deviations if all other variables are kept constant. Path coefficients (loadings) as illustrated in the path diagram after computation, are the path weights connecting the factors to each other. It varies from -1 to 1. The strength of the relationships was obtained by applying the PLS algorithm. Thereby, the path coefficients indicate to which extent an independent variable affects a dependent variable. A marginal high value path coefficient was found between the KM practice and project performance, which is 0.599. However, for the path from KM technology, knowledge oriented leadership and organizational culture to KM practice have coefficient value of 0.057, 0.183 and 0.381 respectively. The first two has weaker strength, whereas the other has moderate strength.

4.4.2.3 Significance testing

Bootstrapping algorithm with 1000 subsample was used to analyze the significance level of effect relationship. Accordingly, the first model has shown positive and significance effect ($t = 8.529$, $p < 0.001$) and the second model was only significant for the variable between organizational culture and KM practice ($t = 3.104$, $p < 0.05$) and the others are insignificant ($t = 0.368$, $p = 0.356$; $t = 1.183$, $p = 0.119$) for KM technology and KO leadership respectively with KM practice as shown in Table 4.11 above at the 95% confidence interval.

4.4.2.4 The coefficient of determination (R^2)

The output from the first regression produced a model that provided a moderate effect of the independent variable on project performance. It generates R^2 value of 0.359, which indicates how much of the total variation in the dependent variable, Project Performance, can be explained by the independent variable, KM practice. In this case, 35.9% can be explained. Because there is one independent variable an adjusted R^2 (35.1%) explanation did not change

much. The second regression from the three independent variables taken as a whole had produced R^2 value of 0.291, which they explain 29.1% of the variance in the dependent variable, KM practice and adjusted R^2 value of 26.5%. There is a change of 2.6% to improve the model by removing the bias created from additional variables that are insignificant.

4.4.2.5 Effect size (f^2)

The practical relevance of significant effects should be investigated by effect sizes of the relationships between the variables (Benitez et al., 2020). It measures the magnitude of an effect independent of sample size (Benitez et al., 2020). It is the change in the value of R^2, when an exogenous construct is omitted from the model can be used to evaluate whether the omitted construct has a substantive impact on the endogenous constructs (Garson, 2016). The f^2 values ranging from 0.020 to 0.150, 0.150 to 0.350, or larger or equal to 0.350, indicating weak, medium, or larger effect size respectively (Cohen, 1988). In this model all the hypothesized relationship between KM technology, KO leadership and organization culture and KM practice were in the weak range (0.003, 0.027, 0.133) except for the relationship between KM practice and project performance, it is the same as R^2 value.

4.4.2.6 Overall model fit

Eventhough the model fit should be applied for confirmatory research, literature suggest for causal research (Benitez et al., 2020). The standardized root mean square residual (SRMR) was used to evaluate the goodness of fit. It is the difference between the observed correlation and the predicted correlation (Garson, 2016). It allows assessing the average magnitude of the discrepancies between observed and expected correlations as an absolute measure of (model) fit criterion. A value less than 0.12 and of 0.08 (in conservative sense) are considered a good fit (Hair Jr et al., 2016). A marginal value of 0.10 was found from the model, which indicated a slight model fit.

4.4.3 Hypothesis testing

Because this is an explanatory research that tries to understand the causal relationship between variables, the model was evaluated by examining the overall fit of the estimated

model, the path coefficient estimates, their significance, the effect size(f^2), and the coefficient of determination (R^2) (Benitez et al., 2020; Henseler, 2018).

The research model proposes a total of 4 direct hypotheses for explaining the dependent endogenous variables, KM Practice and project performance. Running the PLS algorithm and Bootstrapping calculations in SmartPLS software provided the following summary results in Table 4.13. All the four proposed hypothesis relationship supported the model and positively influence the dependent variables. However, only H2 and H4 have significance values. This means the direct influence of organization culture on the practice of KM is significant, and which in turn KM practice also directly influence project performance.

Table 8: Direct effect relationship

Hypothesis relationship	Path Coefficient	t-value	p-value	f^2	95% CI	Supported?
H1: KMT -> KMP	0.057	0.368	0.356	0.003	0.314	Yes
H2: OC -> KMP	0.381	3.104	0.001	0.133	0.576	Yes
H3: KOL -> KMP	0.183	1.183	0.119	0.027	0.458	Yes
H4: KMP -> PP	0.599	8.529	0.000	0.559	0.717	Yes

Significance level, two-tailed test * (t-value = 1.65, $p < 0.10$), ** (t-value = 1.96, $p < 0.05$), ***(t-value = 2.57, $p < 0.01$)

4.5 Discussion

4.5.1 The impact of knowledge management enablers

KM enablers are facilitator that influence the practice of KM. In this study, three key enablers (KM technology, organization culture and knowledge oriented leadership) were selected to study their impact. The result found that their joint influence to explain KM practice is encouraging when compared to the findings of (Watanabe et al., 2011; Soon & Zainol, 2011; Theriou et al., 2011) and it is lower as compared to some other finding (Lee & Choi, 2003). This may be the cause of organizational factor influence varies across offices in different countries (Watanabe et al., 2011). Their individual contribution is explained here below starting from the highest one.

Contribution of organization culture

The study found that organization culture had a great influence to facilitate the practice of KM in TechnoServe. The relative contribution was very high compared to that of technology and leadership in a project work environment. Actually, it is difficult to separate culture from KM activity once it becomes the identity of that organization (Chang & Lin, 2015; Ramachandran et al., 2013; Idris et al., 2015). Culture is a critical factor that defines how organization runs and support KM practice (Ramachandran et al., 2013). The organization benefited from the culture of learning and collaboration to increase the knowledge flows in the organization. Saeed et al., (2010) noted the importance of cultivating culture that supports and encourages knowledge acquisition and learning than any technological advancements. This means the presence of technology is almost meaningless if an individual or team are not interested in seeking knowledge and collaborate each other. A learning culture opens up all formal and informal channel of knowledge sources and through collaboration, knowledge exchange increases. Therefore, the degree of learning and collaboration in the organization determines the amount of knowledge generated and shared between project team.

The finding indicated that the existence of organizational culture was very important to enhance social interaction of individuals and teams through which more tacit knowledge can flow. It helped the team to create and build an environment where sharing and utilizing of knowledge can smoothly carried out. Building the team with trust, respect and transparency increased learning and collaboration of individuals and teams. A team that promotes and encourages to maintain this kind of culture became more supportive and share their knowledge. Without trust and acknowledging insight of others it is impossible to create mutual relationship of the team toward common goals. It helps the creation of new, useful, and lucrative knowledge (Theriou et al., 2011). The existence of trust helped the team to be motivated and willing full to learn from others and collaborate each other. Therefore, developing a culture where knowledge is valued is the main concern of the organization to create an environment of knowledge exploration, sharing and utilizing among individuals and team.

Contribution of knowledge oriented leadership

The other factor studied in this research was the vision and strategy of the organization toward orientation of knowledge. A positive relation was found but the strength to influence the practice of KM was slightly lower compared to other findings (Donate & Pablo, 2015; Nguyen & Mohamed, 2011). Even if we can see the impact created on KM activity due to leadership role at some level, the empirical evidence indicated its significance level was above the cutoff point or p value greater than 0.01. One reason for this may be the gap exist in designing and implementing knowledge management strategy. A strategy or vision developed at higher level without considering the projects working environment from different factors and lacks to implement properly at project level will have limited influence on KM initiative. A leader who understand the competitive advantage of knowledge should have a workable strategy that hires and reward individuals and team for their contribution to the development of organizational knowledge creation and transfer.

Choi & Lee, (2002) mentioned the three different perspective of KM strategies: The first one is focusing on either personalization or codification and using the other to support it. The second perspective emphasize on striking the balance of the two by combining system and human oriented strategies to acquire and share knowledge. While the third one considers the dynamic nature or characteristics of knowledge. It was recommended that companies should have to align knowledge strategy with the knowledge creation process. Because the effectiveness of knowledge creation process and utilization is depending on the appropriate implementation of strategy, leaders in TechnoServe has to consider this while designing and implementing strategies to improve the impact of leadership.

Contribution of knowledge management technology

Even if there was a positive moderate correlation between technology and KM practice, the contribution of technology was small when the three variables taken together. The finding from this study showed the applicability or usage of technology to facilitate KM activity was low in the organization.

It is known that technology plays a great role in removing boundaries of communication that inhibit interaction of individuals and facilitate the process of knowledge creation and transfer. Its relative contribution was below the expected level. It seems that Technology does not support all modes of knowledge creation and transfer directly. Although technologies like portals, groupware, Email, intranet, or videoconferencing can help communication and collaborative works, they cannot replace face to face contact for tacit knowledge transfer. Accessing the tacit knowledge such as knowledge inside experts' mind is not possible simply by availing this kind of technologies.

In addition to that, Pérez-López & Alegre, (2012) point out that IT infrastructure is just one requirement for knowledge management processes. It needs to be complemented with IT knowledge and IT operations. Taken together, these three dimensions of IT, interact and provide an indication of the organization's ability to understand and utilize the IT tools and processes that are needed to manage knowledge appropriately. The application of knowledge management technologies without ensuring that the employees are well informed about the organization's overall goals and objectives, and how this technology can facilitate the success of these goals, will lead to disappointing returns on the technology investment. This is because it does not bring the expected level of benefit. Vahedi & Irani, (2011) argue that the best way of applying information technology to knowledge management is by combining two factors: on the one hand, the awareness of the limits of information technology, and of the fact that any IT deployment will not achieve much, if it is not accompanied by a global cultural change toward knowledge values; on the other hand, the availability of information technologies that have been expressly designed with knowledge management in view. These perspective will lead us it is not only providing the necessary IT infrastructure that improves KM initiative, rather it should be combined with the appropriate selection, application and utilization of technology.

4.5.2 The impact of knowledge management practice

The result of the study indicated that there was a strong positive correlation between KM practice and improving project performance. This means the extent in which project success criteria met was directly related to the practice of KM between project staff. However, other

variables that may influence the relationship between the two are not considered, this result may also indicate more work is expected from the organization to increase the influence of knowledge management practice. Since the data shows that there are lots of novice project workers joining the organization and senior project workers switching from one project to another project, it is important to work on minimizing knowledge gap or loss of knowledge that might be created due to this. The diverse and intensive knowledge required for handling projects might trouble project workers who are new to it. By leveraging and effectively managing the knowledge created from each individuals and projects, organization can meet the knowledge essential to managing projects so as to increase the outcome on performance.

Performance in project can be viewed from three dimensions (schedule, cost and quality) (Anantatmula & Kanungo, 2008; Oluikpe et al., 2011; Yang et al., 2012). The completion of project as per the schedule and cost plan is very important as they are core constraints of projects. To complete project within the defined time limit and allocate resources for each activities and task, it requires the skill and experience to manage and execute projects. The effective utilizing of knowledge helps project workers in TechoServe to know more about the project through best practice and lessons learned from the team in order to deal with project issues and problems instead of doing things by trial and error. Oluikpe et al., (2011) reported the importance of leveraging knowledge to prevent from project overrun. Late completion of projects directly impacts cost and resource utilization (Ahsan & Gunawan, 2010). Projects are divided in tasks and activities, mostly completed step by step and delayance of the previous will have effect on the next activity. The empirical finding showed that it is important for project staff to learn from others success and failure stories, and use them for another project issues. Otherwise, project failures will be repeated which will require to go back and correct issues every time they occurred.

As discussed in literature review, in project work, intensive knowledge is required and generated. This can be achieved at TechnoServe through KM initiative to meet the requirements of project and customers need. By exploring different knowledge sources and reusing of existing knowledge, project worker can enhance their skill and experience to perform well in the project (Alekseev, 2010). Customers need also achieved if a project is performed with the expected functional and technical specification (Anantatmula &

Kanungo, 2008). Therefore, a project team that learns from the past, record the work being done and reuse previous work will be competent, skilled and qualified team and can easily meet the quality criteria of projects (Alekseev, 2010; Lierni & Ribière, 2008).

4.6 Chapter Summary

In this chapter, the data analysis and discussion part of the study was performed. Cronbach's alpha, composite reliability and average variance extracted are the main ones used to evaluate the measurement model. Greater than the minimum suggested values of 0.7,0.8 and 0.5 was found respectively. Effect relationship between variables was determined by running SmartPLS algorithm. The finding shows that the joint influence of KM enablers (KM technology, Organization Culture and Knowledge Oriented Leadership) explains 29.1% of the variance on KM practice, and in turn, KM practice also explains 35.9% of the variance on project performance. The figure indicates how the three variables are inter-related each other and creating an enabling environment for KM practice helps organization to save important knowledge resources and able to meet the knowledge required to manage projects for better performance outcome. Even if it seems that engaging on this process is time consuming and wastage of resources, the finding sheds light to see the opposite and take the advantage of managing knowledge resources in a project work environment. It covers how the effective utilization and management of knowledge helped project workers in TechoServe to meet project constraints and requirements by stressing the significance of organization culture to create and build an environment for carrying out KM initiative. It calls all actors including organization leaders, project managers, IT experts, project workers etc. to coordinate for creating a suitable environment for KM activity in order to increase the rate of project success.

CHAPTER FIVE

CONCLUSION AND RECOMMENDATIONS

5.1 Chapter Overview

This section will conclude and recommend the major statistical findings from the results section. It will try to evaluate what was found and discussed in previous chapter in support of the overall conclusion. Because this research was aimed to analyze and find out the cause and effect relationship between different variables, it assesses whether the objective is met and all the research questions are answered after summarizing and reflecting the overall work of this research paper. Finally, suggestion along with research limitation will be provided.

5.2 Conclusion

In literature review, it has been noted and an understanding has been made that KM has a great importance in a project work environment. However, enough study was not made in relation with its enablers and bringing project performance. So, a single organization that manages multiple and different type of projects was selected for this study. The projects are located and operated in different parts of Ethiopia and managed mainly by project managers and technical team of each specific project. The success of these projects is the ultimate goal of the project members and the organization itself. And the practice of knowledge management was considered in this study as one of the basic causes of this success. Beside that the contribution of KM enablers which includes knowledge management technology, organization culture and knowledge oriented leadership were also incorporated in the study to see their effect on improving the practice of KM.

Projects requires a knowledge based management approach for the success of projects. A knowledge driven management and execution of project through effective leverage of expertise and experience helps project team to gain the skill and experience required to deal with project issues and problems. Because problems or issues encountered and solutions devised in past projects can be applied to current and future projects. Project is bounded by its own constraints such as schedule, cost and quality. To meet the criteria of these project performance measurement, KM initiative among and within project team is essential. This

way, more knowledge can be created and transferred to be utilized for the tasks and activities involved in the projects. An individual or team who has more knowledge will have the capacity to complete tasks quickly with the available resources to prevent from project overrun. In addition, the possibility of completing projects as per the technical and functional requirements is increased with knowledgeable project workers. So, organization should retain existing knowledge in project work to avoid waste, duplication, and some mistake and attain the expected level of project success.

Key enablers of KM were identified and studied to see their effect on KM practice between individuals and teams. The study found that cultivating the culture of individuals and team to create and build an environment is suitable for creating and sharing knowledge. Without building a culture that promotes and encourages learning and collaboration between project staff, knowledge exchange becomes difficult. Technology plays a great role in removing boundaries of communication that inhibit interaction of individuals and facilitate the process of knowledge capture and transfer. However, it requires appropriate planning to ensure it is properly applied and utilized in a specific organizational context. The other important factor is knowledge oriented leadership, which is characterized by the vision and strategy of leaders for the development and use of organization knowledge. This kind of leaders understand the competitive advantage of knowledge and have a great influence on the process of knowledge creation and utilization. They promote and encourage individuals and team for their contribution to the development of organization knowledge.

Since knowledge is a key resource in today's business environment, this study tries to show the importance of managing project knowledge and how it should be supported for improved performance by associating important KM enablers, practices and project success dimensions. Knowledge manager, project manager, leaders in an organization can benefit from this study in different ways. They can assess knowledge gap in project development in order to optimize the knowledge creation and utilization between individuals and teams. In light of this study, organizations can plan and implement knowledge retention mechanism or strengthen what they already have. By doing this, they may save important resources that might be spent for or wasted due to lack of knowledge. They can also minimize project completion time with better quality requirements. Overall this study has contribution to those

who engaged in project work to have efficient management of project knowledge for increased project success rate or minimize failure. The more they can perform on projects mean their competitiveness increase to win or run more projects.

5.3 Recommendations

After detail study was performed on the organization based on the research gaps and problems identified the following points are suggested.

- Since project environment has different challenges and limitations, organization should consider to have KM platforms that can easily attract project staff to participate on KM activities.
- The knowledge generated from each and every project should be documented in a central platform in a way that can be easily accessed and used for other projects.
- Organization should track usage of KM platforms and evaluate the knowledge contribution of individuals and teams
- Organization leaders should develop and implement knowledge driven strategies in aligned with business objective of the organization to promote and encourage KM practice between project staff.
- At all levels of the organization, understanding should be created to aware individuals and teams the value and competitive advantage of knowledge and implement a system that supports and acknowledge KM activities.
- Trust, respect and open communication are a suitable environment for KM activities between project staff. To create, build and maintain, continuous follow up should be made by promoting and encouraging them in a project work environment.

5.4 Research Limitation

Like any other research works, the empirical results reported herein should be considered in light of some limitations. The study was conducted in a single project based organization with smaller sample size. This might raise issues of generalizability to take the result for other similar organizations. However, effort has been made to get the right data from the right people who are currently involved in different project tasks; instruments are developed

from related papers and easy to respond; the data also passed through appropriate reliability and validity test. This study does not attempt to control cofounding or moderating variable that might affect the relationship between KM practice and project performance. To minimize complexity, the research model proposed does not consider this in the study. To address such issues, further research and verification are necessary to further develop and reinforce the findings.

5.5 Future Research

In order to address issues that are not covered by this research and build a more detailed understanding relevant to the topic, additional research should be made based on this recommendation. This research has covered major KM practices and enablers identified from the literature in a project environment but there are some not explained in this study. Moreover, this study tries to investigate empirical finding of the general KM practice influence on few project success dimension. It might be important to find out the significance or contribution of each individual KM practices for the success of projects by considering some other success dimensions reviewed in previous chapter but not included in empirical investigation. By identifying this and giving priorities to essential KM practices, it will help organizations to focus on those practices for their specific problems. It is also important to add value on this research by controlling variables that may impact the relationship between KM practice and project success such as geographical location, project size and project type. By taking multiple organizational settings combined with mixed data collection methods this research can further be explored.

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APPENDICES

Appendix A: Questionnaire

PART I: GENERAL PARTICIPANT INFORMATION

1.1 Gender	☐ Male		☐ Female	
1.2 Age in years	☐ 20 – 30		☐ 31 – 40	☐ Above 40
1.3 Level of Education	☐ Diploma	☐ Degree	☐ Masters	
1.4 Project type	☐ Value Chain/Market Assessment			
	☐ Client Services: Business strategy and capital raising			
	☐ Client Services: Operational efficiency/capacity building			
	☐ Research, Communications and Marketing			
	☐ Project and Proposal design			
	☐ Other			
1.5 Position level	☐ Junior expert	☐ Expert	☐ Senior Expert	☐ Manager
1.6 Duty station	☐ Main office	☐ Regional office		☐ Project office
1.7 Service year(s)	☐ < =1	☐ 1 – 5		☐ > =5

PART II: KNOWLEDGE MANAGMENT PRACTICE - is the activities of creating, capturing, sharing and utilizing knowledge through different mechanism for improved management and leverage of expertise to the benefit of the project and the organization.

PLEASE RESPOND THE RATE AT WHICH KM IS PRACTICED IN YOUR PROJECT

1=Strongly Disagree, 2 = Disagree, 3 = Neutral, 4 = Agree and 5= Strongly Agree.

Put a tick "X" mark against the relevant column to the right

	KNOWLEDGE MANAGEMENT PRACTICE	1	2	3	4	5
2.1	My project team do research to explore future possibilities					
2.2	New ideas using existing knowledge is generated in a creative way					
2.3	Brainstorming, debriefing, lesson learned etc.. sessions are frequently takes place between our team members.					
2.4	Useful ideas and new knowledge is stored and updated periodically on the project.					
2.5	Project failures and successes are evaluated and results are documented					
2.6	Project work is organized and stored that can easily be used or accessed by others					
2.7	Project team members exchange knowledge, skill and experience.					
2.8	Knowledge is shared between different project team members					
2.9	Team members share business manuals, models, proposals, reports and methodologies					
2.10	The project members utilize knowledge to solve problems					
2.11	The project members utilize knowledge to make work more efficient and effective.					
2.12	I usually benefited from my team members experience and lesson learned					

PART III: KNOWLEDGE MANAGEMENT ENABLER – are factors that facilitate Knowledge Management practice

In your opinion please respond the contribution or application of Technology, Culture and Knowledge Oriented Leadership in your project

1=Strongly Disagree, 2 = Disagree, 3 = Neutral, 4 = Agree and 5= Strongly Agree.

	Knowledge Management Technology	**1**	**2**	**3**	**4**	**5**
3.1	Our team has the right IT systems to capture, create and share new ideas and experiences					
3.2	There are IT systems in which our team can easily find the knowledge they need					
3.3	My project work depends on email, phone, conference call and internal network					
3.4	My project work depends on collaborating with others using collaboration tools					
3.5	I can access project documents from knowledge portal available in the organization					

	Organization Culture	**1**	**2**	**3**	**4**	**5**
3.6	KM practice is a routine task like any other daily works in our team.					
3.7	KM practice is actively promoted, encouraged and seen as the strength by project members.					
3.8	Building trust, respect and open communication motivates for KM practice.					
3.9	Team members participate formal and informal training, seminar and experience sharing.					
3.10	Team members are supportive and helpful.					

	Knowledge Oriented Leadership	1	2	3	4	5
3.11	Managing organizational knowledge is important in the organization strategic plan					
3.12	The organization understands the competitive advantage of its knowledge assets					
3.13	The organization develops strategies to leverage its knowledge assets					
3.14	Individuals are hired for their contributions to the development of organizational knowledge					
3.15	Individuals are evaluated and rewarded for their contributions to the development of organizational knowledge					
3.16	The organization has a vision for managing knowledge					

PART IV: PROJECT PERFORMANCE - In your opinion please rate your project performance based on the project success criteria below.

1=Strongly Disagree, 2 = Disagree, 3 = Neutral, 4 = Agree and 5= Strongly Agree.

	Project Performance	1	2	3	4	5
4.1	The schedule for each phase of the project was essentially the same as planned.					
4.2	All project assignments were proceeding as planned.					
4.3	The cost objectives were met for the project					
4.4	The budget for each phase of the project was essentially the same as planned					
4.5	The project meets functional performance					
4.6	The project meets technical specifications					
4.7	The project achieves customer needs					