The Effect of Knowledge Management Practice on Project Performance: Case Study at Commercial Bank of Ethiopia

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Declaration

I hereby certify that this thesis is my own work. All the information gathered under the university's academic rules and regulation. The use of other people's work has been acknowledged and fully referenced.

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Acknowledgement

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Abstract

The purpose of this paper is to look at the impact of knowledge management on the project performance. The knowledge management maturity level and the average project performance level of the organization was also one of the areas to be measured. The research aimed to see the correlation and effect between the knowledge management and project performance. For this purpose 389 samples from staffs working in Commercial Bank of Ethiopia has been selected for the study. Questionnaire which can measure the required data was distributed using a simple random sampling within the selected sample frame. The research was designed using descriptive and explanatory research design. For this research quantitative approach was employed. The collected data was then analyzed using SPSS. The correlation was evaluated using Pearson's correlation analysis. To see the effect of knowledge management on project performance, the data was analyzed using regression analysis. The findings from this research shows that both knowledge management practice and project performance level of the organization were poor. The study showed that there is strong correlation between knowledge management and project performance. In addition to this, the research also revealed that knowledge management has a significant effect on project performance. Based on this the Commercial Bank of Ethiopia has been recommended to develop a strong knowledge management system which can capture the knowledge asset e organization and benefit from it.

Contents

Abbreviations am Acronyms

ANOVA	Analysis of variance
APQC	American Productivity and Quality Centre
CBE	Commercial Bank of Ethiopia
G-KMMM	General Knowledge Management Maturity Model
ICT	Information Communication Technology
KM	Knowledge Management
KMAT	Knowledge Management Assessment Tool
KMCA	Knowledge Management Capability Assessment Model
KMMM	Knowledge Management Maturity Model
KMMM-Siemens	Siemens Knowledge Management Maturity Model
KMMM-Strategic	strategic Knowledge Management Maturity Model
KMS	Knowledge Management System
PMBOK	Project Management Body of Knowledge
PMKM	Project Management Knowledge Management
SPSS	Statistical Package for the Social Science
VIF	Variance Inflation Factor

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Chapter One

Introduction

1.1 Background of the Study

In today's world the word project is a common term we hear usually at time of inauguration ceremonies of various successful projects. In contrary to this, the failure of various mega projects is also center of discussion at various occasions. One of the reasons for this is poor project performance.

1.1.1 Project Performance

During the life of a project, a projects overall performance has to be checked for the project to be delivered on time, budget and agreed quality. This in turn is a contributing factor for project success. The PMI in its book "A Guide to Project Management 5th edition p.35", stating the temporary nature of projects, describes, the success of the project should be measured in terms of completing the project within the constraints of scope, time, cost, quality, resources, and risk as approved between the project managers and senior management. For this to be achieved, a continuous and systematic technique is usually implemented to measure the level of performance.

Project performance is affected by numerous factors. Some organizations are better of other organizations in completing some projects due to better experience and knowledge possessed

in these project areas. One field that gives advantage to organization is Knowledge Management (KM).(Figurska 2014).

1.1.2 Knowledge Management

Various studies are indicating performance can be increased through effective Knowledge Management. According to (Davenport and Prusak, 2000) for achieving sustainable competitive advantage, business organizations labeling Knowledge as most valuable and strategic resource.

Finding one global definition for KM is impossible. Different authors in this area has proposed different definition. After a review of around 100 definitions, Girard, J.P., & Girard, J.L. (2015) defined Knowledge Management as the process of creating, sharing, using and managing the knowledge and information of an organization. Groff and Jones (2003), refer to KM as the tools, techniques and strategies to retain, analyze, organize, improve and share business expertise.

In relation to Project Management, Ritchie, P. & Jorgensen, K. (2007), have defined KM based on the elements required for Project Management Knowledge Management (PMKM). According to them KM would find holistic definition if it contains these elements which are; Process (process of converting raw information to value added information), community (the people involved in the KM system), tools, that are required for recording, processing and retrieval of knowledge and strategy. For this purpose they used Dictionary Accounting Terms' definition which states, KM as "The process of connecting people to people and people to information to create a competitive advantage."

Based on the above definitions one can see that KM is about the process of identifying, storing and using knowledge acquired in an organization to get a competitive advantage.

Therefore developing a Knowledge Management system is in the best benefit of the organization in achieving its competitive advantage. Organizations that embark on various projects, therefore, have to have a Knowledge Management System (KMS) that captures and uses Knowledge acquired from the various projects they undertake. Therefore the purpose of this study is to investigate the practice of KM and its impact on projects.

1.2 Statement of the problem

Finding a reliable and full information to perform a given task at the right time is one of facilitating factors for efficiency and effectiveness when performing a given task. Various professionals and academia in KM area are advising organizations to develop a robust KMS to maximize performance, reduce cost and increase effectiveness and efficiency. However, in contrary to this, even some big organizations here in Ethiopia are not giving this valuable resource a due emphasis in one or another way. For examples some organizations makes no attempt or have no platform to manage their organizational knowledge. Some other organizations encourages and value the idea but does not do KM in an organized manner. The reasons for this little attention to this area could be various. One of the areas that is affected by this is projects undertaken by organization. There are various organizations that runs various projects. Hence the major problem to be addressed in this research is, identifying the level of KM practice and show the impact it has on project performance.

1.3 Research questions

In this research in an attempt to address the above problems, the researcher will try to answer the following basic research questions.

- ❖ What is the level of KM practice in the selected organization?
- ❖ What is the average level of project performance?
- ❖ What is the relationship between KM and project performance?
- ❖ What is the effect of KM on project performance?

1.4 Research objective

The objective of this research is therefore, assessing the implementation level of KM and showing the effect of knowledge management on project performance. In order to understand the full picture, the researcher examined the level of various project performances and their relationship with the KM practice of the organization.

Specific objective

- Assess the KM maturity level of the organization.
- Assess the average project performance level.
- Assess the relationship between KM and project performance.

1.5 Significance of the study

This research can help project managers to use this study to consider the KM perspective of projects in order to enhance their project performance. Organizations can use this study to review where they stand in regard to KM. In addition to this, if these organizations want to develop knowledge management system, they can use this research findings as an input. Other researcher can use the findings from this study to further their research. Academies can use this for teaching and learning.

1.6 Scope of the study

Performance of a projects is affected by numerous factors. Different researchers have studied various factors that are significant in determining the performance of a project. However, this research's main focus is on the impact knowledge management has over a projects success.

1.7 Limitation of the study

This research has been conducted using limited resource of time and capital. For this reason, only one organizations which is, CBE, has been considered. However, various aspects of the effect KM can have on project performance can be assessed by considering various organizations that take on projects.

Chapter Two

Review of Related Literature

2.1 Overview

This chapter provides an overview of the various literatures on knowledge Management and the factors that influence knowledge sharing behavior. Reviewing the literature provides readers with a coherent, focused review of the current state of knowledge, identifies gaps/limitations in current state of knowledge, helps to formulate research questions for the issue, and gives readers with an up-to-date grasp of the study topic.

The purpose of this literature review is to see some overview regarding Project Management and Knowledge Management.

2.2 Project Performance

2.2.1 What is project?

Robert K. (2017)define project as a " sequence of unique, complex, and connected activities that have one goal or purpose and that must be completed by a specific time, within budget, and according to specification."

The PMBOK defines, Project as "A temporary endeavor undertaken to create a unique product, service, or result". Project management is "The application of knowledge, skills, tools, and techniques to project activities to meet the project requirements"

2.2.2 Project performance

The oxford definition for performance states performance is how well or badly you do something; or how well or badly something works.

Project performance covers methodologies, metrics, processes, software tools, and systems that are responsible for managing performance in the organization (Cokins, 2004).

But when it comes to project, performance is not easily defined. To achieve a desired outcome in projects, a set of interactive, interrelated and interdependent activities of project have to be accomplished. These activities are called project performance domains which includes; Stakeholders, Team, Development Approach and Life Cycle, Planning, Project Work, Delivery, Measurement, and Uncertainty (PMBOK 7th edition.)

The two main areas that employees are expected to achieve for better performance are effectiveness and efficiency (Kara, 2018). Employees who aspire to achieve these two are expected to increase performance in an organization.

When measuring organizational performance four elements are considered which are; general, technical, administrative and human (Ratnawat and Jha, 2019)

2.2.3 Factors Affecting Project Performance

Various researches have been conducted on factors that affects project performance. However, the attention of different researchers who have described and explored factors affecting projects' performance and outcomes has been mainly directed at three main streams (Faisal et al, 2015). These are; the *Project Manager* (Competencies and Skills, Capabilities, Self-Efficiency, Leadership Style), *Project Management Culture* (Strategic emphasis, Top

management support, Project management methodology, Different stakeholder commitment and involvement, Communication system, Project review and learning) and *Organizational Culture* (Values, Norms, Artefacts, Leadership)

2.3 Knowledge Management

2.3.1 Concept of knowledge

Before going through Knowledge Management first let's see about the concept of Knowledge. (Uriarte 2008), states that Knowledge is created when one realizes the pattern and implication of data and information. Data is a number or word or letter without any context. And information is collection of data whose relationship between the pieces of data or between the collection of data and other information is understood.

In today's world knowledge is one of the strategic resources of an organization. For an organization to grow, its knowledge has to be shared among managers and staffs (Uriate 2008) On the organizational level Knowledge can also be viewed as the outcome of organizational learning, as information that has been understood by all or at least a critical mass of members of the organization Maier (2007). Knowledge comprises all cognitive expectancies—observations that have been meaningfully organized, accumulated and embedded in a context through experience, communication, or inference—that an individual or organizational actor uses to interpret situations and to generate activities, behavior and solutions no matter whether these expectancies are rational or used intentionally.

Deming (1994) explains that knowledge and information are two different things. He states that the amount of information one can have does not determine the level of his or her

knowledge. He also argues that, people are slow when acquiring knowledge. Finding substitute for knowledge is not possible according to this author. However, he pointed out there is no substitute for knowledge. But information has to be processed and transformed to become knowledge.

2.3.2 Knowledge Asset

The human, structural and market knowledge that is owned by an organization which will give this organization a competitive advantage is referred as knowledge asset. (Mentzas et.al 2003)

2.3.3 Types of Organizational Knowledge

At organizational level there are two types of knowledge; Tacit and Explicit. (Uriate 2008).

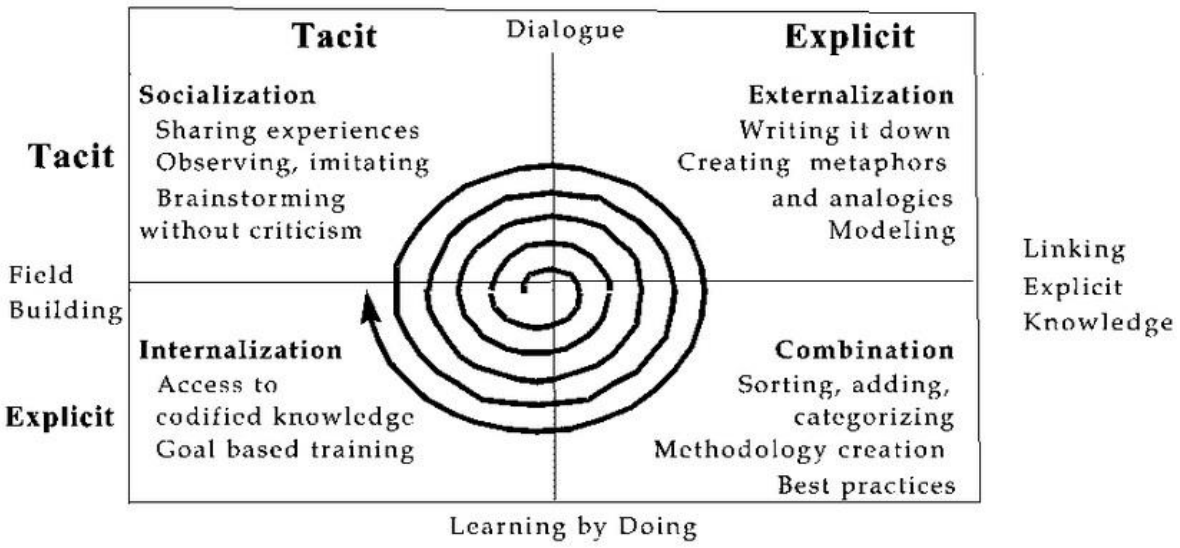
Tacit knowledge is private, which is put away in the heads of individuals. It is aggregated through study and experience. Unsaid information develops through the act of experimentation and the experience of achievement and disappointment. Implicit knowledge is developed through action, procedure, routines, commitment, values and emotions. Since this Knowledge is private to the holder of the information this type of knowledge is shared usually through conversations, workshops, on-the-job training.

Explicit knowledge is knowledge that is codified, documented and archived on a paper or paperless media (like database). These include knowledge assets such as reports, memos, business plans, drawings, patents, trademarks, customer lists, methodologies, and the like.

They represent an accumulation of the organization's experience kept in a form that can readily be accessed by interested parties and replicated if desired. In many organizations these knowledge assets are stored with the help of computers and information technology. Explicit knowledge has a tangible dimension that can be more easily be captured, codified and communicated. It can be processed, transmitted and stored relatively easily.

These two types of knowledge interact with each other. This interaction between the two types of knowledge brings about what is called the SECI (Socialization, Externalization, Combination and Internalization) modes of knowledge conversion (Nonaka 1996).

Figure 2.1 SECI Model



It is this interaction that leads to the four models of knowledge conversion. These are: socialization (from individual tacit knowledge to another individual tacit knowledge), externalization (from tacit knowledge to explicit knowledge), combination (from separate

explicit knowledge to systemic explicit knowledge), and internalization (from explicit knowledge to tacit knowledge).

Socialization: when an individual's tacit knowledge is transferred and becomes another individual's tacit knowledge, the process is called socialization. This process happens primarily between individuals.

Externalization: when an individual's tacit knowledge is made explicit. In this process an individual's tacit knowledge is articulated and fully described in such a way that enables other people understand it and do the same thing the individual did. An example for this could be, preparation of standards for some tasks based on an individual's tacit knowledge. So that other people can easily understand the process and do the task. This happens within individuals in group.

Combination: this happens when people synthesize different source of knowledge in to one document. A thesis prepared for the purpose of fulfilling MA programs could be a good example.

Internalization: this process involves understanding and absorbing of explicit knowledge in to and individuals tacit knowledge.

2.3.4 Knowledge management

Knowledge is power! These days this is a common Phrase we usually listen. According to (Davenport and Prusak, 2000) Knowledge is the most valuable and strategic resource for having a competitive advantage. Such a resource then has to be managed.

Girard, J.P., & Girard, J.L. (2015) defined Knowledge Management as the process of creating, sharing, using and managing the knowledge and information of an organization.

The Dictionary of Accounting Terms' defines, KM as "The process of connecting people to people and people to information to create a competitive advantage."

2.3.5 Elements of KM

A complete knowledge management system must contain four elements. These are: (a) knowledge creation and capture, (b) knowledge sharing and enrichment, (c) information storage and retrieval, and (d) knowledge dissemination (Uriarte, 2008)

Knowledge creation and capture: the first element in knowledge management is creation and capture of knowledge. The interaction among people generates knowledge in any group corporation or organization. This knowledge should be captured and utilized in today's competitive market. This is the primary aim of knowledge management. Sometimes the survival of corporations largely depends on how much new and advanced knowledge it can generate, capture and utilize in order to produce a more competitive or attractive products and services.

Knowledge sharing and enrichment: this element is stated as the most crucial among the four elements by the author (Uriarte, 2008). Knowledge sharing takes various forms. Organization to employees, among employees of an organization and employees with other people outside of the organization. It is the sharing of knowledge that leads to refinement and enrichment of knowledge.

Information storage and retrieval: the third element states that for effective knowledge management to happen, an organization should ensure that the acquired or shared knowledge is readily accessible to others. This can be done by storing information in a centralized location where it can easily be retrieved.

Knowledge dissemination: for knowledge to have unlimited impact in and organization, it should be disseminated effectively. One way to ensure this is by transforming highly individualized tacit knowledge in to explicit knowledge that can be more widely shared.

2.3.6 Knowledge Management Maturity Model

If one wants to measure the knowledge management practice of an entity, then one has to be familiar with the term Knowledge Management Maturity Models (KMMM). Schwartz and Tauber (2009) defined KM maturity model as "a mirror image of the distinct, repeatable, and identifiable stages that an organization goes through as it evolves from an initial stage to a final stage". In fact various models have been developed over time. Among these are;

General Knowledge Management Maturity Model (G-KMMM)-developed by Pee and Kankanhalli (2009); states that KMMM has five maturity stages which are, initial, aware, defined, managed and optimizing. The key areas to be addressed in this model are people, process & technology.

Strategic Knowledge Management Maturity Model (Strategic KMMM)-which has six phases i.e. ICT as an enabler of KM, deciding on KM principles, ability to formulate organization-wide knowledge policy, building knowledge strategies, formulation of KM strategies and ubiquitous knowledge, has been developed by Kruger and Snyman (2007).

KMMM (Siemens) developed by Ehms and Langen (2002) has five phases; initial, repeated, defined, managed and optimizing. The eight key areas identified for assessment are strategy & knowledge goals, environment & partnerships, people & competencies, collaboration & culture, leadership & support, knowledge structures& knowledge forms, technology & infrastructure, and processes, roles & organization.

Knowledge Management Capability Assessment Model (KMCA)by Kulkarni and Freeze (2004). KMCA categorizes knowledge in four areas which are; data, knowledge document, expertise and lessons learned. And for the assessment, the have developed a six capability assessment model. These are; difficult, possible, encouraged, enabled, managed and continuously improved.

Knowledge Management Assessment Tool(KMAT) by Arthur Andersen and American Productivity and Quality Centre (APQC) (1997) which is consisted of 24 items measuring knowledge management maturity level in five dimension. These are process, leadership, culture, technology and measurement (Dalkir 2005).It is a collaborative benchmarking tool which helps organizations to make an initial high-level assessment of how well they manage knowledge (Jager, 1999). The 2001 version of the tool is divided into five sections. (Banacka 2013).

- **Knowledge Management Process:** This category evaluates how knowledge is used in managing, implementing, and improving the organization's key work processes, and the extent to which the organization continually evaluates and improves its work processes to achieve better performance
- **Leadership in Knowledge Management:** This category assesses organizational leadership capabilities, and leadership in terms of efforts to initiate, guide, and sustain KM practices in the organization.
- **Knowledge Management Culture:** This category evaluates organizational culture in terms of efforts to encourage and facilitate knowledge sharing, innovation and learning process within organization
- **Knowledge Management Technology:** This category assesses the technological capabilities of the organization in terms of development and delivery of collaborative tools and content management systems, and accessibility and reliability of these tools within the organization.

- **Knowledge Management Measurement:** The available measurements that measures the link between knowledge and financial results of the organization is assessed using this category.

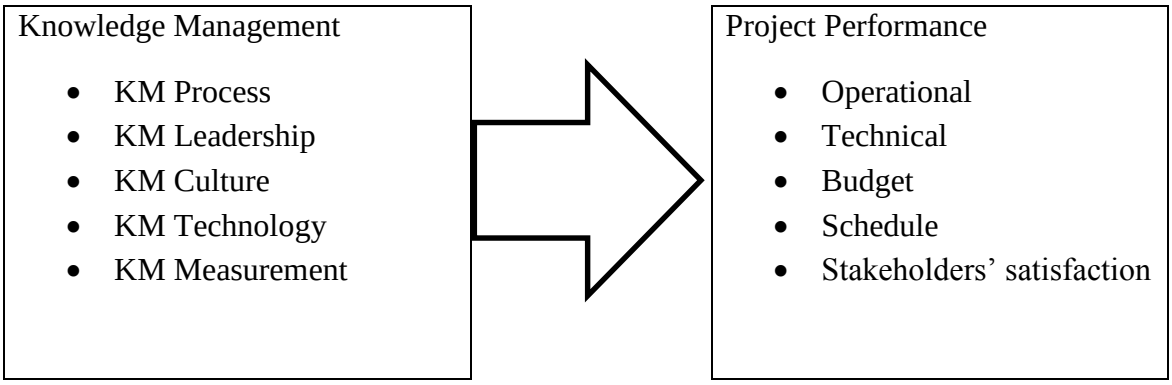
In this model the five dimensions are assessed by a total of 24 questions. Each of the questions are rated from 1(No) to 5(Excellent). The total scores has a maximum of 120 points (Banacka 2013).

For the purpose of this study the researcher has chosen this KMAT model of APQC assessment model as it generates fast and initial level KM maturity assessment.

2.4 Conceptual Framework

The conceptual framework in this research that shows the effect of knowledge management in project performance is presented hereunder.

Figure 2.2 Conceptual Framework



Chapter Three

Research Design and Methodology

In this chapter, the design and methodologies implemented in this research will be discussed. In addition to this some insights will be discussed regarding some concepts in research methodology.

3.1 Research design

(Kothari 2004), states that a research design is the arrangement of conditions for collection and analysis of data in a manner that aims to combine relevance to the research purpose with economy in procedure. The research design is the conceptual structure within which research is conducted; it constitutes the blueprint for the collection, measurement and analysis of data. As such the design includes an outline of what the researcher will do from writing the hypothesis and its operational implications to the final analysis of data.

Research design is needed because it facilitates the smooth sailing of the various research operations, thereby making research as efficient as possible yielding maximal information with minimal expenditure of effort, time and money

Different research designs can be conveniently described if we categorize them as:

1. Research design in case of Exploratory research studies;
2. Research design in case of Descriptive and Diagnostic research (Explanatory) studies, and
3. Research design in case of Hypothesis-testing (Experimental) research studies.

3.1.1. Exploratory Research

The main purpose of such studies is that of formulating a problem for more precise investigation or of developing the working hypotheses from an operational. Researchers conducting exploratory research are typically at the early stages of examining their topics. Usually very little prior research has been conducted on this subject. This type of research is conducted to discover ideas and insights about the topic. If this is the case, a researcher may wish to do some exploratory work to learn what method to use in collecting data, how best to approach research participants, or even what sorts of questions are reasonable to ask. A researcher wanting to simply satisfy his or her own curiosity about a topic could also conduct exploratory research. Conducting exploratory research on a topic is often a necessary first step, both to satisfy researcher curiosity about the subject and to better understand the phenomenon and the research participants in order to design a larger, subsequent study. One important thing not to forget in this type is to remain flexible in order to find out the various facets of the problem.

3.1.2. Descriptive and Diagnostic Research

Descriptive research studies are those studies which are concerned with describing the characteristics of a particular individual, or of a group, whereas diagnostic research studies determine the frequency with which something occurs or its association with something else. The studies concerning whether certain variables are associated are examples of diagnostic research studies. As against this, studies concerned with specific predictions, with narration of facts and characteristics concerning individual, group or situation are all examples of

descriptive research studies. Most of the social research comes under this category. In this research type what is to be measured should be clearly defined together with adequate methods for measuring it along with a clear cut definition of 'population' to be studied.

In contrary to exploratory type of research discussed above the design in such studies must be rigid and not flexible and must focus attention on the following:

- Formulating the objective of the study (what the study is about and why is it being made?)
- Designing the methods of data collection (what techniques of gathering data will be adopted? i.e. observation, questionnaires, interviewing, examination of records etc.)
- Selecting the sample (how much material will be needed?)
- Collecting the data (where can the required data be found and with what time period should the data be related?)
- Processing and analyzing the data.
- Reporting the findings.

3.1.3. Hypothesis-Testing (Experimental) Research

Hypothesis-testing research studies (generally known as experimental studies) are those where the researcher tests the hypotheses of causal relationships between variables. Such studies require procedures that will not only reduce bias and increase reliability, but will permit drawing inferences about causality. Usually experiments meet this requirement. Hence, when we talk of research design in such studies, we often mean the design of experiments.

For the purpose of this research descriptive and explanatory type of research will be employed. The main reason for this is that, this research's main focus is to assess the level at which KM is being practiced in the selected organization and find out the effect KM can have on project performance.

3.2 Research Approach

As to the types of data to be collected, are plans and the procedures for research that span the decisions from broad assumptions to detailed methods of data collection and analysis (Cresswell 2009). Accordingly there are three types of approach; qualitative, quantitative and mixed. Hence on has to choose the appropriate

• ***Qualitative research*** is a means for exploring and understanding the meaning individuals or groups ascribe to a social or human problem. The process of research involves emerging questions and procedures, data typically collected in the participant's setting, data analysis inductively building from particulars to general themes, and the researcher making interpretations of the meaning of the data. The final written report has a flexible structure. Those who engage in this form of inquiry support a way of looking at research that honors an inductive style, a focus on individual meaning, and the importance of rendering the complexity of a situation adapted from (Creswell 2007).

• ***Quantitative research*** is a means for testing objective theories by examining the relationship among variables. These variables, in turn, can be measured, typically on instruments, so that numbered data can be analyzed using statistical procedures. The final written report has a set structure consisting of introduction, literature and theory, methods, results, and discussion

(Creswell 2008). Like qualitative researchers, those who engage in this form of inquiry have assumptions about testing theories deductively, building in protections against bias, controlling for alternative explanations, and being able to generalize and replicate the findings.

• ***Mixed methods research*** is an approach to inquiry that combines or associates both qualitative and quantitative forms. It involves philosophical assumptions, the use of qualitative and quantitative approaches, and the mixing of both approaches in a study. Thus, it is more than simply collecting and analyzing both kinds of data; it also involves the use of both approaches in tandem so that the overall strength of a study is greater than either qualitative or quantitative research (Creswell & Plano Clark 2007).

For the sake of this research, quantitative research was employed by using a questionnaire with a five level likert scale that measures the respondents response for the items used to measure knowledge management maturity level.

3.3 Research Population

According to (Polit & Hungler 1999), population consists of the whole group of people that the researcher is interested and to whom the result of the research can be generalized.

Accordingly, though this research's main area of focus is the project management office, the practice of knowledge management is organizational. Hence, for the assessment of Knowledge Management practice level all the employees of CBE has been considered. The total number of employees of Commercial Bank of Ethiopia at the time of this research are 40,008. However, to study the relation and effect KM can have on Project management only participants whose works are related to projects in the organization have been taken for investigation. These includes, employees who are working in Project Management Office and other people who are participants in the company's projects are taken in to account.

3.4 Sampling

A sample is a subgroup of the target population that the researcher plans to study for generalizing about the target population (Creswell 2012)

3.4.1 Sampling Frame

In this research due to the similarity of the various regions and districts, staffs who are working in Addis Ababa under Head office and two districts namely Bole and Nifas Silk districts has been selected for sampling**.**

3.4.2 Sampling Technique

To gain the best results and give all members equal chance, a simple random sampling was employed for distribution of questionnaires.

3.4.3 Sample Size

As stated by (Cochran 1997) sample size for a finite population can be determined by using the following formula;

$$n = \frac{N}{1+N(e^2)}.$$

Where:

n=sample size for finite population

N=Total Population of the study (40.008)

e=Margin of Error (allowable error)

1=is a constant

Using this formula the sample size for the population with 5% margin error i.e. 95% confidence level, is calculated as follows:

$$n = \frac{40{,}008}{1+40{,}008(0.05)2}.$$

n=396

3.5 Data Source and Type

(Kothari 2004) states that, while deciding about the method of data collection to be used for the study, the researcher should keep in mind two types of data viz., primary and secondary. The *primary data* are those which are collected afresh and for the first time, and thus happen to be original in character. The *secondary data*, on the other hand, are those which have already been collected by someone else and which have already been passed through the statistical process.

In this research in order to measure the level of KM practice fresh data from employees of the organization was collected in order to understand the current state of KM practice. This was done by preparing and distributing a well-structured questionnaire.

3.6 Measurement

In this section, the mechanism by which the measurement of level of KM practice will be discussed. According to (Kothari 2004), Measurement is a process of mapping aspects of a domain onto other aspects of a range according to some rule of correspondence. In measuring, we devise some form of scale in the range (in terms of set theory, range may refer to some set) and then transform or map the properties of objects from the domain (in terms of set theory, domain may refer to some other set) onto this scale. Hence, a questioner that can clearly measure KM practice level and current perceived performance level of projects was developed. The questionnaire has to four main section. The first one was drafted to collect general information about the respondents like employees' role and experience in the

organization. The second one, measures employees' response regarding level of KM practice and current perceived performance of projects of the organization. For this purpose, knowledge management was assessed with a five level likert scale close-ended questions that ranges from (1) No to (5) Excellent was used. The third and fourth sections aimed at collecting data regarding the average overall performance level of the organizational projects and the effect of knowledge management on project performance respectively. These were measured by using a five level likert scale ranging from Strongly Disagree (1) to Strongly Agree (5).

Validity of Measurement Tools

The questionnaire was drafted by incorporating various previously developed models like Knowledge Management Assessment Tool (KMAT) which was suggested by professionals and based on relevant preliminary study made by the researcher.

Reliability of Measurement Tools

Reliability for each dimension was calculated using Cronbach alpha using SPSS v23. Accordingly the internal consistency is presented here under. According to (Zikmund et al., 2012), a Cronbach alpha within the range of 0.8 and 0.95 is accepted as a very reliable measure. The following table shows the reliability test result calculated for the independent as well as dependent variable.

Table 3.1 Reliability test with Cronbach alpha

Variables	**No. of question**	**Conbach alpha value**	**Remark**
The Knowledge Management Process	5	.893	Accepted
Leadership in Knowledge Management	4	.878	Accepted
Knowledge Management Culture	5	.888	Accepted
Knowledge Management Technology	6	.885	Accepted
Knowledge Management Measurement	4	.758	Accepted
Project Performance Level	5	.885	Accepted
Effect of KM on Project Performance	5	.878	Accepted

Source: survey by the researcher 2022

3.7 Data Analysis

(Kothari 2004) claims that data analysis is computation of certain indices or measures along with searching for patterns of relationship that exist among the data groups. Analysis may, therefore, be categorized as descriptive analysis and inferential analysis (Inferential analysis is often known as statistical analysis). For the purpose of this research, data collected will be analyzed using both descriptive and inferential analysis method. For this purpose, the collected data were processed and analyzed using SPSS. Hence, the results gained were then analyzed using descriptive and inferential analysis.

3.8 Ethical Consideration

Ethics is one of the best qualities to be followed by a researcher. Therefore, the researcher considered ethical issues critically as much as possible. All the participants were approached with their full consent and their response was solely used for this research only. Hence their response is not disclosed to any other third party.

Chapter Four

Data Presentation, Analysis and Interpretation

In this chapter the data collected through the questionnaire from the participants will be presented, analyzed and interpreted. To measure the

4.1 Rate of Responses

In this research 410 questionnaires that measures the KM maturity level were given to the selected participants who are working in CBE. From which 394 questionnaireswere collected. However, 5questionnaires were not completed hence 389 of them were used for the data analysis. The following table shows the response rate of the distributed instrument.

Table 4.1 Sample size

Total population	Total no of distributed questionnaires	Total no of collected questionnaires	Number of rejected questionnaires	Number of accepted questionnaires
40,008	410	394	5	389

4.2 Demography of Respondents

The frequency and percentage of respondents demography in this research is presented as follows. This includes gender of respondents, the position (role) the respondents assume in the organization and the total experience acquired so far.

Table 4.2 Demographic profile of respondents

Demographic profile		Frequency	Percentage
Gender	Male	226	58%
	Female	163	42%
	Total	**389**	**100%**
Organizational Position	Operational Level	355	91%
	Middle	26	7%
	Top Management	8	2%
	Total	389	100%
Experience Level	Below 1 year	24	6%
	From 1-5 years	129	33%
	Above 5 years	236	61%
	Total	**389**	**100%**

Source: Source: survey by the researcher 2022

From the table above one can see that in terms of gender, the number of male which is 226 (58%) is somehow greater than the number of female163 (42%) respondents.

Regarding the position of respondents in the organization, operational level respondents accounts for 355 (91%) which shows that most of these respondents are the frontline operators who have direct operational participation in executing organizational tasks. On the other hand, middle level management accounts for 26 (7%). These respondents have close interactions with the operational level respondents who would be close to have inputs from the operational level staffs. Finally, 8 (2%) are top Management level. In this study all level of positions are involved.

The experience level of the respondents in this research shows that; respondents who are less than covers 24 (6%). 129 (33%) of the respondents are between one and five years which are the second largest in terms of experience. Most of the respondents which accounts for 236 (61%) have the experience level of above five years. From this one can infer that, most of respondents in this research are experienced members of the organization.

4.3 Knowledge Management Practice Level Analysis

In this section, the response of participants regarding the level of Knowledge Management maturity level of the organization is presented. This was measured by assessing five KM enablers presented in the questionnaire which are; KM Process, KM Leadership, KM Culture, KM Technology and KM Measurement.

4.3.1 Descriptive statistics for KM Process

In this section the KM process of the organization has been assessed. Accordingly, the respondents have been asked their level of agreement to the following five questions.

Table 4.3 Results for KM Process

The Knowledge Management Process	Frequency and Percentage						Mean	Standard Deviation
	1 (N)	2 (P)	3 (F)	4 (G)	5 (E)	Total		
P1. Knowledge Gaps are systematically identified and well-defined processes are used to close them.	324 83%	55 14%	7 2%	2 1%	1 0%	389 100%	1.20	0.510
P2. A sophisticated and ethical intelligence gathering mechanism has been developed.	245 63%	132 34%	4 1%	5 1%	3 1%	389 100%	1.43	0.661
P3. All members of the organization are involved in looking for ideas in traditional and nontraditional places.	74 19%	65 17%	88 23%	76 20%	86 22%	389 100%	3.09	1.416
P4. The organization has formalized the process of transferring best practices, including documentation and lessons learned.	91 23%	104 27%	90 23%	70 18%	34 9%	389 100%	2.62	1.262
P5. "Tacit" knowledge (what employees know how to do, but cannot express) is valued and transferred across the organization.	96 25%	156 40%	22 6%	66 17%	49 13%	389 100%	2.53	1.357
Total points for KM Process indicators	830 43%	512 26%	211 11%	219 11%	173 9%	1945 100%		
N=389 aggregated mean=2.17 Std. Deviation=.927								

Source: survey by the researcher 2022

By looking the above table one can infer the majority of the points830 (43%) accounts for "No" showing that the organization does not have the required KM Process practice in place. The response found shows512 (26%) of the total points shows KM Process practice is still poor. However, the average response found from the above table shows that an average of 211 (11%) of points puts the organization at a fair level in terms of KM Process. Around this same number 219 (11%) of points places the organizations KM Process is at a good level. The rest 173 (9%) of points positions the organization as one that has an excellent KM Process.

Based on the above finding, the aggregated mean 2.17 which is close to 2 shows there is poor KM Process in the organization.

4.3.2 Descriptive statistics for KM Leadership

One of the enablers in KM Leadership of the organization has been measured using the following four questions and the results found from the survey is summarized by table as follows.

Table 4.4 Results for KM Leadership

Leadership in Knowledge Management	Frequency and Percentage						Mean	Standard Deviation
	1 (N)	2 (P)	3 (F)	4 (G)	5 (E)	Total		
L1. Managing organizational knowledge is central to the organization's strategy.	232 60%	26 7%	89 23%	26 7%	16 4%	389 100%	1.89	1.206
L2. The organization understands the revenue-generating potential of its knowledge assets and develops strategies for marketing and selling them.	165 42%	103 26%	63 16%	24 6%	34 9%	389 100%	2.12	1.268
L3. The organization uses learning to support existing core competencies and create new ones.	66 17%	26 7%	87 22%	96 25%	114 29%	389 100%	3.43	1.41
L4. Individuals are hired, evaluated and compensated for their contributions to the development of organizational knowledge.	76 20%	65 17%	95 24%	69 18%	84 22%	389 100%	3.05	1.411
Total points for KM Leadership indicators	539 35%	220 14%	334 21%	215 14%	248 16%	1945 100%		
N=389 aggregated mean=2.62 Std. Deviation= 1.135								

Source: survey by the researcher 2022

Accordingly, instrument used to measure KM Leadership shows on average of 35% (539) of points puts the organization as having no Leadership in Knowledge Management. The other 220 (14%) of points positions the organization in poor stage of KM Leadership. Those who classified the organization at fair level of KM leadership accounts for 21% (334). The respondents that classify the organization at good level in this regard are 14% (215). But 16% (248) of the total points demonstrates that CBE is an excellent in Leadership aspect of Knowledge Management.

The aggregated mean of 2.62 for Leadership which is closer to 3 proves that there is fair level of knowledge management leadership in the organization

4.3.3 Descriptive statistics for KM Culture

The organization's culture for KM has been assessed using the five questions listed the following table. The result from the assessment has been presented in the following table.

Table 4.5 Results for KM Culture

Knowledge Management Culture	Frequency and Percentage						Mean	Standard Deviation
	1 (N)	2 (P)	3 (F)	4 (G)	5 (E)	Total		
C1. The organization encourages and facilitates knowledge sharing.	119 31%	103 26%	96 25%	46 12%	25 6%	389 100%	2.37	1.213
C2. A climate of openness and trust permeates the organization.	106 27%	143 37%	62 16%	60 15%	18 5%	389 100%	2.33	1.165
C3. Customer value creation is acknowledged as a major objective of knowledge management.	43 11%	96 25%	201 52%	36 9%	13 3%	389 100%	2.69	0.907
C4. Flexibility and a desire to innovate drive the learning process.	186 48%	112 29%	50 13%	21 5%	20 5%	389 100%	1.91	1.132
C5. Employees take responsibility for their own learning.	29 7%	56 14%	75 19%	207 53%	22 6%	389 100%	3.35	1.039
Total points for KM Culture indicators	483 25%	510 26%	484 25%	370 19%	98 5%	1945 100%		
N=389 aggregated mean=2.53 Std. Deviation=.911								

Source: survey by the researcher 2022

Based on the study 483 (25%) of total points depicts the organization as having no knowledge management culture. While 510 (26%) of the respondents point confirms the organization has poor culture when it comes to knowledge management. Those who sees the organizational culture for KM is fair comprises, on average 484 (25 %) of the total points. 370 (19%) of the points are given as good for the organizations knowledge management culture. Based on 98 (5%) of these points the organization has the best culture that puts it at the excellent level.

The culture of the organization for enabling knowledge management is at fair level based on the calculated aggregated mean which is 2.53.

4.3.4 Descriptive statistics for KM Technology

Technology which was aforementioned as one of the enablers of KM was assessed with a six question metrics. The technological advancement of the organization based on the assessment is presented in the following table.

Table 4.6 Results for KM Technology

Knowledge Management Technology	Frequency and Percentage						Mean	Standard Deviation
	1 (N)	2 (P)	3 (F)	4 (G)	5 (E)	Total		
T1. Technology links all members of the enterprise to one another and to all relevant external publics.	122 31%	96 25%	26 7%	89 23%	56 14%	389 100%	2.64	1.478
T2. Technology creates an institutional memory that is accessible to the entire enterprise.	301 77%	66 17%	14 4%	7 2%	1 0%	389 100%	1.31	.651
T3. Technology brings the organization closer to its customers.	40 10%	69 18%	131 34 %	86 22%	63 16%	389 100%	3.16	1.198
T4. The organization fosters development of "human-centered" information technology.	86 22%	85 22%	145 37 %	51 13%	22 6%	389 100%	2.58	1.136
T5. Technology that supports collaboration is rapidly placed in the hands of employees.	121 31%	124 32%	113 29 %	21 5%	10 3%	389 100%	2.16	1.012
T6. Information systems are real-time, integrated, and "smart."	59 15%	46 12%	29 7%	166 43%	89 23%	389 100%	3.46	1.363
Total points for KM Technology indicators	729 31%	486 21%	458 20 %	420 18%	241 10%	1945 100%		
N=389 aggregated mean=2.55 Std. Deviation= .932								

Source: survey by the researcher 2022

In this assessment the majority of points729 (31%) have affirms that the required technology for KM is not possessed by the organization. While 486 (21%) and 458 (20%) of the points show the technological requirement for KM is poor and fair level respectively. 18% (420) of the points shows that the available technology is good to support the KM practice. Furthermore, there are those that argues the available technology is at an excellent level. These responses comprise of 10% (241) of the total points.

4.3.5 Descriptive statistics for KM Measurement

How the organization measures its KM has been studied with the KM Measurement tool consisting of four questions. The next table shows the result obtained from the questionnaire.

Table 4.7 Results for KM Measurement

Knowledge Management Measurement	Frequency and Percentage						Mean	Standard Deviation
	1 (N)	2 (P)	3 (F)	4 (G)	5 (E)	Total		
M1. The organization has invented ways to link knowledge to financial results.	244 63%	112 29%	26 7%	1 0%	6 2%	389 100%	1.49	0.765
M2. The organization has developed a specific set of indicators to manage knowledge.	308 79%	56 14%	14 4%	7 2%	4 1%	389 100%	1.31	0.720
M3. The organization's set of measures balances hard and soft as well as financial and non-financial indicators.	104 27%	66 17%	97 25%	75 19%	47 12%	389 100%	2.73	1.359
M4. The organization allocates resources toward efforts that measurably increase its knowledge base.	203 52%	82 21%	44 11%	24 6%	36 9%	389 100%	1.99	1.311
Total points for KM Measurement indicators	859 55%	316 20%	181 12%	107 7%	93 6%	1945 100%		
N=389 aggregated mean=1.88 Std. Deviation=.822								

Source: survey by the researcher 2022

Unlike the above for enablers, larger average number of points, 859 (55%) rates the KM measurement practice of the organization unavailable (No). Those who put the organization's KM Measurement practice to the second lowest level (poor) accounts for 20% (316) of the total points. The other 141 (12%) indicates the availability of fair KM Measurement practice in the bank. Smaller portion of the points accounting for 107 (7%) and 93 (6%) asserts that the organizations KM Measurement practice is at good and excellent level respectively.

This is a clear indicator that the organization knowledge management measurement practice when it comes to KM is poor.

4.4 Descriptive statistics for Project Performance Level

One of the inputs required for this research is the average performance level of projects in the selected organization. To this end, an assessment of the prevailing average performance level, as per the perception of the respondents was examined. Since the respondents for this question should be the ones that are close to projects and not all employees of the bank, to obtain accurate data only staffs in the project department were taken in to consideration. This makes the respondents to be the managerial and operational level personnel project management office. After these staffs have been identified, the respondents were asked their level of agreement on the pre-identified five project performance indicators; operational performance, technical performance, budget, schedule and stakeholders expectation. The following is the data gathered and presented in table

Table 4.8 Results for Project Performance Level

Project Performance Level	Frequency and Percentage						Mean	Standard Deviation
	1 (SD)	2 (D)	3 (N)	4 (A)	5 (SA)	Total		
PP1. Projects meet their operational performance goals	46 73%	11 17%	3 5%	2 3%	1 2%	63 100%	1.43	0.856
PP2.Projects meet their technical performance goals	22 35%	21 33%	14 22%	4 6%	2 3%	63 100%	2.10	1.058
PP3.Projects meet their schedule objectives	36 57%	17 27%	9 14%	1 2%	0 0%	63 100%	1.60	0.794
PP4.Projects stay within budget limits	28 44%	26 41%	9 14%	0 0%	0 0%	63 100%	1.70	0.710
PP5.Project results meet stakeholders expectations	17 27%	12 19%	26 41%	5 8%	3 5%	63 100%	2.44	1.118
Total for Project Performance	149 47%	87 28%	61 19%	12 4%	6 2%	63 100%		
N=63 aggregated mean=1.85 Std. Deviation=.762								

Source: survey by the researcher 2022

The above table shows that, the average performance of the various projects undertaken by the organization have a tendency of not meeting their performance goal. Around 47 % (149) of points show strong disagreement on the achievement project performance goals. While average of 28% (87) points shows disagreement on project performance goals are met, the other 19% (61) believe projects fairly meet their performance goal. The 4% (12) of the points

states the projects almost always meet their performance goal. Only 6 (2%) of the respondents replied that projects always meet their performance goal.

4.5 Relationship between Knowledge Management and Project Performance

In this section the relationship between Knowledge management and project performance has been studied based on data collected from CBE. For this purpose Pearson correlation between knowledge management dimension and project performance has been calculated.

4.5.1 The Pearson correlation

To study if there is an association between two variable, researchers use correlation analysis. One such mathematical method that shows the intensity of linear relationship between variables is Pearson correlation analysis tool.

The Pearson correlation coefficient *r* shows the degree to which, on average, two variables change correspondently and its value ranges between -1 and 1. Where negative *r* (-*r* shows a perfect inverse relationship between the variables i.e. when one variable changes the other variable changes inversely. Whereas, positive *r (r)* shows the change in one variable is associated with a change in the other variable in the same direction.

The P-value shows the probability that the computed correlation found is in fact 0. Which means the probability wrong correlation value has been obtained when actually there is no relationship at all. The acceptable p-value is $p<.05$.

The following table shows the relationship between knowledge management dimensions and projects performance evaluated using this method.

Table 4.9 Results for Pearson's correlation between KM and Project Performance dimensions

Variables	Process Maturity	Leadership Maturity	Culture Maturity	Technology Maturity	Measurement Maturity	Project Performance
Process Maturity	1					
Leadership Maturity	.805**	1				
Culture Maturity	.629**	.570**	1			
Technology Maturity	.662**	.557**	.818**	1		
Measurement Maturity	.747**	.622**	.456**	.621**	1	
Project Performance	.795**	.643**	.710**	.638**	.788**	1
**. Correlation Is Significant At The 0.01 Level (2-Tailed).						

Source: survey by the researcher 2022

From the above table the relationship between the dependent variable (Project Performance) and the independent variables (Knowledge Management) can be observed. The Pearson correlation states for the dependent variable to be correlated with the independent variable,

the p value should be <.05. In this case, p=.01 which shows the correlation in the above table is acceptable.

According to (Salkind 2012), the r value is interpreted as follows.

Table 4.10 Correlation interpretation table

Correlations between	Are said to be
.8 and 1.0	Very strong
.6 and .8	Strong
.4 and .6	Moderate
.2 and .4	Weak
.0 and .2	Very weak

Source: Adopted from (Salkind 2012)

Accordingly the relation between knowledge management process and project performance is r=.80.This can be interpreted as these two variables are strongly and positively correlated. In addition to this the, this result is significant at p value p=.01 which is less than p<.05. This indicates that the obtained r value is acceptable to show the relationship between the two variables.

The correlation between leadership and project performance equals r=.64 at significance level of p=.01. From this, one can interpret the result as, knowledge management leadership maturity is strongly and positively correlated with project performance. This correlation is

supported by the p value 0.01 which shows the obtained correlation is acceptable with a confidence level of 0.99.

Knowledge management culture and project performance are correlated at r value r=.71. Once again, based on the (Salkind 2012), this level of correlation is interpreted as strong and positive correlation. This value is further strengthened by this significance level of p p=.01. These two values together can show that knowledge management culture and project performance level of the organization are strongly correlated.

The fourth dimension of knowledge management stated in this research is the technological capacity of the organization to support knowledge management. Based on the Pearson correlation computed in the above table shows that, this dimension and Project performance are correlated at r value r=.64. This level of correlation is taken as a positive and strong correlation between the two variables. The significance level of this result is p=.01 which is acceptable to conclude that, the variables actually are actually strongly correlated.

The last dimension is measurement maturity which is, the maturity level of the organizations in measuring and linking knowledge management with project performance. In this regard, the measurement maturity level of the organization and projects performance is found to be r=.79. This is interpreted as the correlation is very strong at p=.01 significance level. Therefore, it can be concluded from this that organizational performance is strongly correlated with the maturity level of knowledge management measurement.

The above inferences made from the correlation analysis can be generalized as, knowledge management and organization performance are strongly correlated. Knowledge management process and knowledge management measurement has relatively stronger covariance with organizational performance. On the other hand, knowledge management technology and leadership are relatively less strong than the other dimension.

4.6. Regression Analysis

In the above section the correlation between knowledge management and project performance has been assessed. In this section this correlation has been moved a step further to evaluate the degree of effect knowledge management has on project performance. To this end, a regression analysis between the dependent and independent variables has been computed.

One of the objectives in this study is to identify the areas of knowledge management that needs to be improved so that the organization can benefit from it by focusing on these relevant areas. To achieve this the effect of each of the five dimensions of knowledge management has to be evaluated. One of factors to be tested firs when assessing the effect of independent variables over the dependent variable is multicollinearity. Multicollinearity happens when the variables in the independent variable are interdependent to each other i.e. when an independent variable in a regression co-varies based on other change in other independent variable in the same regression (Kumar & Paul 2004).

Multicollinearity is tested by using the variance inflation factor (VIF) and tolerance. Some of the guidelines from (Field 2009), states that the largest VIF should not be more than 10. If there is a cause for concern. If the average VIF is greater than 1, then the regression may be biased. Tolerance below 0.1 indicates a serious problem and if it is below 02 it is an indication for a potential problem.

Table 4.11 Result for Multicollinearity Test

Model	Collinearity Statistics	
	Tolerance	VIF
Process Maturity	.226	4.420
Leadership Maturity	.341	2.934
Culture Maturity	.284	3.517
Technology Maturity	.252	3.972
Measurement Maturity	.377	2.650

Dependent Variable: Project Performance
Source: survey by the researcher 2022

The results in the above table shows that process maturity has a tolerance of .226 and 4.420 VIF. Leadership maturity has .341 tolerance and 2.934 VIF. The collinearity test for knowledge management culture is has tolerance of .284 and VIF of 3.517. Tolerance of .252 and VIF of 3.972 was obtained for knowledge management technology. The highest tolerance of .377 in these variable was observed for knowledge management measurement with a VIF of 2.650.

In general, all the above dimensions in knowledge management shows collinearity is not a problem here.

4.6.1. Multiple Regression Analysis

Once the collinearity has been tested and found to pose no problem, the regression analysis discussed above can be conducted. Since there are five dimension of the independent variable knowledge management (process, leadership, culture, technology and measurement), their effect on the dependent variable Project performance has been analyzed by multiple regression analysis. To see the fit of the regression, Model summary and ANOVA tables are presented below. The model summary tells us the proportion of variance explained by the model. Whereas, the ANOVA table shows us if the model is a significant fit the data overall.

4.6.2 Model Summary

Table 4.12 results for Model Summary[b]

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.911[a]	.830	.815	.39796

a. Predictors: (Constant), Measurement Maturity, Culture Maturity, Leadership Maturity, Technology Maturity, Process Maturity.

b. Dependent Variable: Project Performance

Source: survey by the researcher 2022

From table above the R square equals .83=83%. This implies that 83% of the variation in project performance can be predicted by knowledge management dimensions (Measurement, Culture, Leadership, Technology and Process) (Field 2009).

4.6.3 ANOVA Table

This table shows weather the regression model is a significant fit for the overall data collected. This is indicated in the column labelled *sig*. in the ANOVA table and its value should be less than .05. Therefore, in our case the p-value is .000 which is in the range of the acceptable significance level .05. Hence, we can conclude from this, the model is applicable or significant fit for the overall data.

Table 4.13 Results for ANOVA Test

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	44.173	5	8.835	55.784	.000[b]
	Residual	9.027	57	.158		
	Total	53.200	62			

a. Dependent Variable: Project Performance

b. Predictors: (Constant), Measurement Maturity, Culture Maturity, Leadership Maturity, Technology Maturity, Process Maturity.

Source: survey by the researcher 2022

After looking at the above two summaries, now we move on to the parameters of the model. In multiple regression model, the outcome variable (dependent variable) is predicted by

summing up all the predictors (independent variable) multiplied by their respective coefficient plus the residual term. (Field 2009)

Table 4.14 Results for Coefficients[a]

Model	Unstandardized Coefficients		Standardized Coefficients	t	Sig.	95.0% Confidence Interval for B	
	B	Std. Error	Beta			Lower Bound	Upper Bound
(Constant)	.423	.164		2.584	.012	.095	.752
Process Maturity	.322	.117	.316	2.759	.008	.088	.556
Leadership Maturity	-.092	.077	-.112	-1.194	.237	-.247	.063
Culture Maturity	.616	.103	.612	5.985	.000	.410	.823
Technology Maturity	-.341	.103	-.361	-3.320	.002	-.547	-.135
Measurement Maturity	.609	.096	.566	6.369	.000	.417	.800

a. Dependent Variable: Project Performance
Source: survey by the researcher 2022

$Y_i = (b_0 + b_1 X i_1 + b_2 X i_2 + ... + b_n X n) + \varepsilon_i$

Y is the outcome variable,

b_1 is the coefficient of the first predictor (X_1),

b_2 is the coefficient of the second predictor (X_2),

bn is the coefficient of the nth predictor (X_n), and

εi is the difference between the predicted and the observed value of Y for the i^{th} participant.

In our case the outcome Y represents project performance and the predictors X_1 is process maturity, X_2 is leadership maturity, X_3 is for culture maturity, X_4 is technology maturity and finally X_5 is measurement maturity.

From the table above, the model for project performance can be presented as follows.

$$Y=0.423+0.322*X_1-0.092*X_2+0.616*X_3-0.341*X_4+0.609*X_5$$

The other important input from the above table is the significance level of each predictors. Accordingly, except for leadership dimension (p=.237), all other variables significantly predict the outcome. Process dimension has a p value of p=.008, culture dimension has a p value of p=.000, technology dimension has a p value of and p=.002 measurement p=.000.

The standardized beta, which are not dependent on the unit of measurement, tells us the number of standard deviations that the outcome will change as a result of one standard deviation change in the predictor. The standardized beta values are all measured in standard deviation units and so are directly comparable: therefore, they provide a better insight into the importance of a predictor in the mode. (Field 2009).

The significance level and coefficient of each predictors tells us how knowledge management affects project performance. Hence, the effect of each predictor on the outcome is presented as follows.

Process (standardized beta β=.316): The standardized beta value for this dimension of knowledge management tells us, an increase of one standardized deviation of process dimension, will increase performance of projects by 0.316 standard deviation with significance level of (p=.008). This effect is true if the effect the other variable is constant.

Leadership (standardized beta β=-.112): The standardized beta value for this dimension of knowledge management tells us, an increase of one standardized deviation of leadership dimension, will decrease performance of projects by -.112 standard deviation. However, this is negated by the fact that its significance level (p=.237) which is out of the acceptable significance level (p<.05). This effect is true if the effect the other variable is constant.

Culture (standardized beta β=.612): The standardized beta value for this dimension of knowledge management tells us, an increase of one standardized deviation of culture dimension, will increase performance of projects by .612 standard deviation. With a significance level of (p=.000). This effect is true if the effect the other variable is constant.

Technology (standardized beta β=-.361): The standardized beta value for this dimension of knowledge management tells us, an increase of one standardized deviation of technology dimension, will decrease performance of projects by .361 standard deviation. With a significance level of (p=.002). This effect is true if the effect the other variable is constant.

Measurement (standardized beta β=-.566): The standardized beta value for this dimension of knowledge management tells us, an increase of one standardized deviation of measurement dimension, will increase performance of projects by .566 standard deviation. With a significance level of (p=.000). This effect is true if the effect the other variable is constant.

Chapter Five

Summary of Findings, Conclusion & Recommendations

Introduction

This chapter deals with the major findings conclusions and recommendations based on the data collected and analyzed in this study.

5.1 Summary of Findings

Based on the data collected and analyzed, the organizations knowledge management maturity level, the average performance level of projects and the relationship and effect of knowledge management and project performance has been evaluated.

When we see the level of knowledge management maturity of the organization its aggregated mean is closer 2.35(process equals 2.17, leadership equals 2.62, culture equals 2.53, technology equals 2.55 and measurement equals 1.88). This value, is closer to the KMAT level 2 (poor) stage.

The other variable measured in this study is the average performance level of projects. A questionnaire containing five parameters namely, technical performance, operational performance, schedule performance, budget performance and stakeholders' satisfaction, was developed and distributed to respondents. Based on the data collected the aggregated mean of the performance level was computed. The result shows the average performance of project performance is 1.83. This value indicates that, performance of projects in the organization is poor.

Proceeding from measuring knowledge management maturity level and performance level, the relationship between the two variables has been assessed. For this purpose, their correlation was computed using Pearson's correlation model. According to the results from the analysis, knowledge management and organization performance have a strongly correlation. When we see the individual correlation of the independent variables, knowledge management process and knowledge management measurement has relatively stronger covariance with organizational performance with r=.795 and r=.788 respectively. On the other hand, knowledge management leadership (r=.643) and technology (r=.638) are relatively less strong than the other dimension. Knowledge management culture and project performance has a correlation of correlation (r=.710).

After the correlation has been computed and the correlation was found to be significant, the next step is evaluating the effect of the independent variable (knowledge management) on the dependent variable (project performance). This was done by using the statistical method of regression. Since there are five dimensions in the independent side of the variables (process, leadership, culture, technology and measurement), multicollinearity test has to be conducted to see if there is a covariance between these variables. Accordingly, no significant collinearity was observed in the dependent variables that could be considered as problematic i.e. all the variables has a tolerance above 0.2 and VIF below 10.

In addition to multicollinearity test, to see the fit of the regression model, model summary and ANOVA tables have been generated. From the model summary table, the finding shows that the R squared equals (R2= 83), i.e.83% of the variation in the dependent variable (project performance) can be predicted by the independent variable which is knowledge management.

In order to make sure that the regression model is a significant fit for the overall data, ANOVA test was run. The results from the test shows the significance level p=.000 which is below the acceptable p-value p<0. Hence, it was accepted and moved to the next step.

After the preliminary tests has been completed, the next step was to see the significance and the magnitude of the impact of the independent variable on the dependent variable. This was presented in the coefficient table. The results in this regard shows that, *process* has standardized beta β=.316 and significance level of (p=.008), *leadership* has standardized beta β=-.112 with significance level (p=.237) which is out of the acceptable significance level (p<.05), *culture* has standardized beta β=.612 and significance level of (p=.000), *technology* has standardized beta β=-.361 and significance level of (p=.002) and *measurement* has standardized beta β=-.566 and significance level of (p=.000). Hence, except from leadership, the impact of all other predictors are significant i.e. below the acceptable significance level (p<.05).

5.2 Conclusion

In this section the conclusion drawn from the research findings are presented.

The first conclusion is in relation to the level of knowledge management practice level. Based on this research's finding, the organizations knowledge management practice is classified the second least level. From this, the researcher concluded that the knowledge management level of the organization is poor.

The project performance level is the other variable that this research has measured. The results from this research indicates that, the performance level of projects is also poor. Hence, it can be concluded that the organizations project performance level is poor.

Furthermore, the relationship between knowledge management and project performance has been examined. The finding of this research shows that, there is a strong correlation between knowledge management and project performance. Therefore, it has been concluded that there is relationship between knowledge management and project performance.

Finally, the research indicates that except for leadership dimension of knowledge management, the other four dimensions have impact on project performance. Accordingly, it has been concluded that, while process culture and measurement have a positive effect on in improving project performance.

5.3 Recommendation

The findings in this research shows the organizations project performance level has to be improved. One factor that can promote this is improving the management of the organizational knowledge. It has to be known that the benefit from having a robust knowledge management system is not limited only to projects. In fact, project teams are usually temporary, for this reason, members who have low knowledge in their projects would be more benefited if a strong knowledge management system exists in the organization. The implementation of KM would reduce the time to train team members.

To implement a KMS, a KM process that can be easily aligned and synchronized with the prevailing organization process should be developed. Hence, it is recommended that the available process should be studied and exploited and a KM process be developed accordingly.

The strength of emphasis given by top management of organization on the implementation of various initiatives usually defines the success or failure of the initiative. Hence, the researcher recommends that, leaders of the organization should take the ownership and overseeing responsibility of KM implementation.

It is the researcher's recommendation that, the project managers take the lead in developing a culture of knowledge management that can promote and support the KMS in their office. By doing so, they can have a better knowledge when new related projects are started.

The researcher believes that, the organization's KM would improve if the organization places a knowledge management technology that can easily enable staffs to participate in the creation, storage, dissemination, use and evaluation of the organizational knowledge.

One of the benefit of KM for the overall organization is, when employees leave the organization, the knowledge that will leave with them can be retained through the implementation of effective knowledge management system.

Linking KM to performance is one of the factors that facilitates and improves KM practice in organizations. Hence, developing a system that can accurately link the KM with performance is recommended.

This organization has been in the industry for a very long time. The knowledge asset accumulated so far could help the organization to have a competitive advantage. For this reason, the organization should consider setting up a knowledge management department that can capture this asset.

List of References

A Guide to Project Management Body of Knowledge PMBOK GUIDE 5th Edition

A Guide to Project Management Body of Knowledge PMBOK GUIDE 7th Edition

BABIN, B. J., CARR, J. C., GRIFFIN, M., & ZIKMUND, W. G. (2012). *Business research methods*.

Cochran, W. G. (1997). *Sampling techniques*.

Creswell, J. W. (2007). *Qualitative Inquiry and Research Design: Choosing among Five Approaches (2nd ed.).* Thousand Oaks, CA: Sage Publications.

Creswell, J. W. (2008). *Educational research: Planning, conducting, and evaluating quantitative and qualitative research (3rd ed.).* Upper Saddle River, NJ: Pearson Education, Inc.

Creswell, J. W. (2009) *Research Design: Qualitative, Quantitative, and Mixed Methods Approaches (3rd ed.)*. Thousand Oaks, CA: Sage Publications.

Creswell, J. W. (2012). *Educational research: Planning, conducting, and evaluating quantitative and qualitative research (4th ed.)*. Boston, MA: Pearson.

Creswell, J. W., & Plano-Clark, V. L. (2007). *Designing and conducting mixed methods research*. Thousand Oaks, Calif: SAGE Publications.

Deming, W. E. (1994). *The new economics for industry, government, and education*. Cambridge, MA: Massachusetts Institute of Technology.

Ehms,K. and Langen.M. (2002), *Holistic Development of Knowledge Management with KMM*

Faisal Alqahtani, Dr. Ezekiel Chinyio, Prof. Sabah Mushatat, Dr. David Oloke (2015), *Factors Effecting Performance of Projects: A Conceptual Framework*- International Journal of Scientific & Engineering Research, Volume 6, Issue 4, April-2015

Field, A. (2009), *Discovering statistics using SPSS " 3rd Edition*, SAGE Publications Ltd

Filemon A. Uriarte (2008), *Introduction to knowledge management: A brief introduction to the basic elements of knowledge management for non-practitioners interested in understanding the subject*

Fisal et al. (2015). *Factors Effecting Performance of Projects: A Conceptual Framework. International Journal of Scientific & Engineering Research*, Volume 6, Issue 4, April-2015 ISSN 2229-5518

G. Cokins, (2004). Performance Management: Finding the Missing Pieces (to Close the Intelligence Gap)

Girard, J.P., & Girard, J.L. (2015). *Defining knowledge management: Toward an applied compendium, Online Journal of Applied Knowledge Management*. Vol 3iss(1), 1-20

Irena Figurska (2014), *The benefits of knowledge management in organizations: Market in the modern economy. Management – processes* (pp.55-64), Publisher: KartPrint, Bratislava

Jager, M. (1999), *The KMAT: Benchmarking Knowledge Management*, Library Management, 20(7): 367–372.

Kara, E. (2018). *The effects of total quality management on employees' performance: a study on textile business*. Business & Management Studies: An International Journal, 6(3), 551-563.

Kimiz Dalkir (2005), *Knowledge management knowledge management in theory and practice*

Kothari, C.R. (2004) *Research Methodology: Methods and Techniques. 2nd Edition*, New Age International Publishers, New Delhi.

Kruger, C.J. and Snyman, M.M.M. (2005), *Formulation of a Strategic Knowledge Management Maturity Model*

Kulkarni, U. and Freeze, R. (2004), *Development and Validation of a Knowledge Management Capability Assessment Model*, Proceeding of Twenty fifth International Conference on Information Systems, PP 657-670

Lucia Banacka (2013), *Knowledge Management Practice in Small-Scaled Project-Based Software Engineering Organization- The case of Enverian Ltd*

Mentzas, G.et.al (2003). *Knowledge Asset Management: Beyond the Process-centred and Product-centred approaches*

Neil J. Salkind (2012), *Exploring Research, 8th Edition*

Nonaka, L., Takeuchi, H., & Umemoto, K. (1996). *A Theory of Organizational Knowledge Creation.*

Pee, L.G. and Kankanhalli, A. (2009), *A Model of Organizational Knowledge Management Maturity Based on People, Process and Technology*, Journal of Information & Knowledge Management Vol. 8, No. 2, PP 79-99

Polit, D. and Hungler, B (1999), *Nursing Research: Principle and Method, 6th ed*.; Philadelphia: Lippincott Company

R. Kumar, Paul, (2004), *Multicollinearity: causes, effects and remedies*

Ratnawat, R. G., & Jha, P. C. (2019). *Impact of Job Related Stress on Employee Performance: A Review and Research Agenda*. JOSR Journal of Business and Management (IOSR-JBM), 16(11), 01-06

Ritchie, P. & Jorgensen, K. (2007). *Project management knowledge management: moving from standards to leadership*. Paper presented at PMI® Global Congress 2007—EMEA, Budapest, Hungary. Newtown Square, PA: Project Management Institute.

Robert K. Yin, (2017), *Case Study Research and Applications: Design and Methods, 6th edition.*

Ronald Maier, (2007). *Knowledge Management Systems: Information and Communication Technologies for Knowledge Management*

Schwartz, D. G. & Tauber, D. (2009). *Toward a maturity model for knowledge management systems integration*. Annals of Information Systems, 4, 59-78

Thomas H. Davenport, Laurence Prusak (2000). *Working Knowledge: How Organizations Manage What They Know*

Todd R. Groff, Thomas P. Jones, (2003). *Introduction to Knowledge Management: KM in Business, 1st edition.*

Uriarte, F. (2008) *Introduction to Knowledge Management. Asean Foundation, Jakartato Knowledge* Management. Asean Foundation, Jakarta

Appendix A

Dear Respondents,

Expressing my utmost gratitude for your participation in this research, I would like to ask your cooperation in completing the following survey. Under no circumstances you are obliged to answer any of the questions; however, your participation will greatly assist me in completing my research and enhancing outcome of this research. The data collected will remain confidential and used solely for academic purposes. The aim of this research is to investigate the level of Knowledge Management practice and the effect it has on projects performance. Knowledge Management (KM) is a discipline that promotes an integrated approach that enables organizations to identify, capture, evaluate, retrieve, and share all of an enterprise's information assets. These assets may include databases, documents, policies, procedures, and previously un-captured expertise and experience of individual workers. Hence, an individual can refer from this organizational knowledge and can have a better understanding on what he/she does. This survey revolves around this topic.

With best regards.

Yonas Sifir

For any questions or explanation, please don't hesitate to contact me via 0919-90-27-56 or yonasifir1@gmail.com.

Part I: Demographic information of the respondents

Please put an ''X'' in the appropriate box for all questions.

1. Gender:
   - Male ☐
   - Female ☐
2. Please specify the level of management you are in:
   - Operational level ☐
   - Middle Management ☐
   - Top Management ☐
3. Work Experience:
   - 0<1 years ☐
   - 1-5 years ☐
   - Above 5 years ☐

Part II: Knowledge Management Assessment Tool (KMAT)

This tool is divided in to five sections: the KM Process, KM Leadership, KM Culture, KM Technology and KM Measurement.

Directions: by reading the statements below, please evaluate your organizations KM level.

Note: 1 represents No; 2 Poor; 3 Fair; 4 Good and 5 Excellent.

I. The Knowledge Management Process	1	2	3	4	5
P1. Knowledge Gaps are systematically identified and well-defined processes are used to close them.					
P2. A sophisticated and ethical intelligence gathering mechanism has been developed.					
P3. All members of the organization are involved in looking for ideas in traditional and nontraditional places.					
P4. The organization has formalized the process of transferring best practices, including documentation and lessons learned.					
P5. "Tacit" knowledge (what employees know how to do, but cannot express) is valued and transferred across the organization.					
II. Leadership in Knowledge Management					
1. Managing organizational knowledge is central to the organization's strategy.					
L2. The organization understands the revenue-generating potential of its knowledge assets and develops strategies for marketing and selling them.					
L3. The organization uses learning to support existing core competencies and create new ones.					
L4. Individuals are hired, evaluated and compensated for their contributions to the development of organizational knowledge.					
III. Knowledge Management Culture					
C1. The organization encourages and facilitates knowledge sharing.					
C2. A climate of openness and trust permeates the organization.					
C3. Customer value creation is acknowledged as a major objective of knowledge management.					
C4. Flexibility and a desire to innovate drive the learning process.					
C5. Employees take responsibility for their own learning.					

IV. Knowledge Management Technology					
T1. Technology links all members of the enterprise to one another and to all relevant external publics.					
T2. Technology creates an institutional memory that is accessible to the entire enterprise.					
T3. Technology brings the organization closer to its customers.					
T4. The organization fosters development of "human-centered" information technology.					
T5. Technology that supports collaboration is rapidly placed in the hands of employees.					
T6. Information systems are real-time, integrated, and "smart."					
V. Knowledge Management Measurement					
M1. The organization has invented ways to link knowledge to financial results.					
M2. The organization has developed a specific set of indicators to manage knowledge.					
M3. The organization's set of measures balances hard and soft as well as financial and non-financial indicators.					
M4. The organization allocates resources toward efforts that measurably increase its knowledge base.					

FOR PROJECT STAFFS ONLY

Dear respondents the following parts (Part III and Part IV) are to be filled only by staffs under the various projects.

Part III: Project Performance Assessment

The following table was developed to measure project performance. Therefore, please evaluate your organizations Project Performance level.

Note: 1 represents Strongly Disagree, 2 Disagree, 3 Neutral, 4 Agree and 5 Strongly Agree.

Project Performance Level	1	2	3	4	5
PP1 Projects meet their operational performance goals.					
PP2.Projects meet their technical performance goals.					
PP3.Projects meet their schedule objectives.					
PP4.Projects stay within budget limits.					
PP5.Project results meet stakeholders' expectations.					

Part IV: Effect of Knowledge Management on Project Performance.

The following table was developed to measure the effect KM has on project performance. Therefore, please evaluate your organizations Project Performance level.

Note: 1 represents Strongly Disagree, 2 Disagree, 3 Neutral, 4 Agree and 5 Strongly Agree.

Effect of knowledge management on project performance.	1	2	3	4	5
E1. The prevailing technical performance of projects is partially the effect of the knowledge management level of the organization.					
E2. The prevailing operational performance of projects is partially the effect of the knowledge management level of the organization.					
E3. The prevailing schedule performance of projects is partially the effect of the knowledge management level of the organization.					
E4. The prevailing budget performance of projects is partially the effect of the knowledge management level of the organization.					
E5. The prevailing project stakeholders' satisfaction level is partially the effect of the knowledge management level of the organization.					

Thank you for your cooperation!