

**KNOWLEDGE MANAGEMENT IN PROJECT BASED  
ENVIRONMENTS FOR SELECTED ORGANISATIONS IN  
ZAMBIA**

By

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Requirements for the Degree of Master of Engineering in Project Management

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## DECLARATION

I hereby declare that this dissertation is the result of my own investigation and research, except to the extent indicated in the Acknowledgements and References and by comments included in the body of the report, and it has not been submitted previously for a degree, diploma or other qualification at this or another University.

Signature:.....

Date:.....

## **APPROVAL**

This dissertation of Wendy Mwiimbu is approved as fulfilling in the partial requirements for the award of the Degree of Master of Engineering in Project Management by the University of Zambia.

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Date: .....

## **ABSTRACT**

In any project based environment, knowledge is becoming one of the main assets required to remain competitive in a world that keeps evolving. To remain competitive in a dynamic market, different organisations are carrying out various projects. For every new project that's undertaken knowledge is created. Knowledge management is used by organizations to identify, create, apply and share the knowledge that is obtained from projects. Through the management of knowledge, the successes and failures of a project can be recorded. Knowledge management could aid the success of a project as knowledge acquired from previous project can prove resourceful. The lack of knowledge management could be the cause of repetitive failures in projects.

The main aim of the study was to identify if Knowledge Management was being practiced in project-based environments in the Telecommunications industry, Government ministries and Construction industry in Zambia. This was achieved by finding out the processes, tools and challenges faced in managing knowledge. Using stratified sampling, 13 interviews, 51 questionnaires and detailed literature review, results of the study were obtained. The results confirmed that knowledge management was being practiced. However, the challenges faced proved to be a lot ranging from lack of adequate tools to lack of time. The study showed that the respondents acknowledged that knowledge management was vital in the running of the projects but did not just consider it priority. Lack of tools was the main challenge faced in managing knowledge. Personal drives were identified as the main tool used in managing knowledge. From the study, a conclusion was drawn that it is important to use appropriate tools to manage knowledge efficiently and reduce the challenges that come due to lack of tools. It was established that project managers should be sensitized on importance of knowledge management and encourage team members to record lessons learnt in the projects. If project managers would come up with incentives to encourage team members to manage knowledge then it would prove more helpful. This would in turn aid in ensuring knowledge is managed efficiently and add to the success of project implementation.

**Key Words:** Knowledge, Knowledge Management, Project, Project Based Environments

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## ACRONYMS

AAR	After Action Review
APO	Asian Productive Organisation
CDC	Centre for Disease Control and prevention
IT	Information Technology
KM	Knowledge Management
KMS	Knowledge Management System
PKM	Project Knowledge Management
PM	Project Management
PMBOK	Project Management Body of Knowledge

## **CHAPTER 1: INTRODUCTION**

### **1.1 Background**

As the world keeps evolving, it brings with it new technologies and changes in the business environment. Such changes have brought with them a rise in the number of projects being carried out by organisations that seek to remain competitive in a dynamic market-place. A project is defined as a temporary endeavour undertaken to create a unique service, product, or result (PMBOK Guide, 2013). This implies a project should have a time frame in which it is to be implemented. Therefore, a project is time bound. Most projects however face challenges and end up being delayed. A project delayed leads to budget overruns. According to Kaliba et al (2009), there has been a consistent pattern of construction projects in Zambia costing more and taking longer than planned. For a project to be deemed successful, it has to be within the schedule, budget and quality expectations.

Various studies that have been carried out have varying reasons as to why projects are delayed and have cost overruns. Most significant causal factors for cost escalation is insufficient analysis of costs (Kaliba, 2010). Schedule overruns are because of delays such as client's late submission of drawings and specifications and frequent change orders (Ahmed et al, 2010). Each project comes with its own challenges and solutions differ from project to project. In any project based organisation, knowledge is a strategic asset and a critical source of competitive advantage (Olivier, 2012; (Akhavan & Zahedi, 2014). In order for organisations to remain competitive, effective knowledge management becomes a necessity.

### **1.2 Importance of knowledge management in project organisations**

According to Haapalainen (2013), knowledge is defined as meaningful information. It has been interpreted as the processing of perceived information by Martina et al. (2007). Knowledge provides an advantage for organisations that seek to remain competitive and innovative (Yeong, 2010). In order for an organisation to continue to offer products and services that are competitive, how knowledge is managed becomes important. There are two types of knowledge: tacit and explicit. Tacit knowledge relates to the cultural, social and individual experiences of reality which is difficult to capture. On the other hand, explicit knowledge involves explanations on how specific results are achieved. Explicit knowledge is easier to capture through process models

(Blosch, 2000). Knowledge management (KM) has been defined as the processes of creation, distribution, transfer and storage of knowledge in order to meet organisational objectives by Cassivi et al. (2009) and Montana (2000). KM is important for many organisations that seek to improve performance.

With the projects currently being implemented in Zambia (such as the case of road construction), how well the project is run will have an impact on the success or failure of the project. Each organisation aims at meeting its organisational objectives and having a competitive advantage. Project management plays a key role in ensuring that projects are implemented successfully. Project management (PM) is the application of knowledge, skills, tools and techniques to project activities to meet project requirements (PMBOK, 2008). According to Polyaninova (2011), the information on the way the project is implemented is usually not gathered. With the introduction of knowledge management, the information that is gathered is recorded and used for future projects. KM does not only cover knowledge within a project but also includes knowledge between different projects and knowledge about projects. This knowledge can be shared within the organisation or it can be open for other organisations to use. If knowledge management is practised in most, if not all projects, it would increase the chances of them being a success and having improved quality. When information is available on past projects carried out, when a similar project is to be done, reference can be made to the past experiences and past successes whilst failures can be avoided. It also assists in favourable staffing which goes beyond the optimal allocation of available resources and implies the staffing of projects along competences and expert knowledge of project workers. The continuous reference to past works can lead to improved products because the processes are constantly revised and implemented. Applying the knowledge acquired during earlier projects can lead to increased work efficiency and reduces risks involved in managing projects. This would imply reduction in costs involved in the project because instead of coming up with new concepts, the knowledge that is available would help in formulating new ideas to enhance what was done earlier (Hanisch et al, 2009). Management of knowledge, whether explicit or tacit, is a necessity for a project success in today's changing environment (Polyaninova, 2011).

### **1.3 Justification**

Currently in Zambia, there are so many projects that are being implemented especially in the construction industry. There are roads, houses and other types of infrastructure being constructed. With so many projects being carried out in the country, it is important that the projects are managed effectively to ensure they are successful. Many, if not most, of the construction projects have experienced quality short falls, cost escalations and schedule overruns (Kaliba, Muya, & Mumba, 2009). It is important to ensure that there is information on projects that have been successful and those that have failed. The lack of knowledge management (KM) could be the cause of repetitive failures in projects. In view of this, project knowledge management (PKM) is extremely useful in such organisations in cutting costs and increasing work efficiency.

Knowledge management is a discipline that is focused on systematic and innovative methods, practices and tools for managing the generation, acquisition, exchange, protection, distribution, and utilization of knowledge, intellectual capital and intangible assets (Montana, 2000). Project Knowledge management assists in ensuring that all the information with regards to success or failure of the project is recorded. Furthermore, with project knowledge management, the gained knowledge can be used to learn from past experiences whether from the failures or successes of the projects.

Project management (PM) plays an important role in running projects in various organisations. The success of a project is determined by how well the cost, quality and time are managed. Whereas PM will focus on the activities of the project at hand, PKM will focus not only at the current project but also previous similar projects which allows for continuous learning throughout the project work. KM helps in creating a knowledge base which provides information on current and previous projects and thus increasing the chances of resolving challenges that are common with previous projects and in ensuring they are prevented if possible (Hanisch et al. 2009).

Although there are so many projects running in Zambia especially in the construction industry, no study has been carried out to find out what knowledge management practices are in Zambia in these projects based environments. This study sought to find out what knowledge management practices were in place if any and to identify the tools that were used to gather information within project based environments.

## **1.4 Objectives**

### **1.4.1 Main Objective**

The main aim of the study was to identify if knowledge management was being practised in project based environments in Zambia.

### **1.4.2 Specific Objective**

To achieve the main objective, the specific objectives of the study were to:

- I. identify the tools used in gathering knowledge in project based environments if any;
- II. identify the processes in practice if any that were involved in KM; and
- III. Investigate challenges to implementing KM in projects in Zambia.

## **1.5 Scope**

Geographically, the research was focused on Lusaka province in Zambia. It targeted organisations in three sectors, namely the Telecommunications sector, the Construction sector and the government/quasi-government sector. The project managers, team members and on-lookers were the target for interviews.

## **1.6 Organisation of Dissertation**

The report consists of five chapters as stated below:

### **Chapter 1: Introduction**

Chapter 1 has a background, justification and objectives of the study. It also includes the scope of the research to give a guideline how much will covered in the study. It also presents an overview of the logical structure of the report.

### **Chapter 2: Literature Review**

Chapter 2 reviews the literature on KM and PM. It gives the definitions of KM and PM, the practices, and types of knowledge. It gives an overview of both KM and PM.

### **Chapter 3: Methodology**

Chapter 3 describes the method used to collect data and explains the reasons for selecting the method.

### **Chapter 4: Results and Analysis**

This chapter contains the findings and analysis of results obtained.

### **Chapter 5: Conclusion and Recommendations**

Chapter 5 discusses the conclusion based on the research findings. It relates the research findings to the objectives and offers a conclusion and recommendation based on that.

## **CHAPTER 2: LITERATURE REVIEW**

### **2.1 Introduction**

The importance of Knowledge management in project environments has been highlighted in the preceding chapter. The previous chapter also gives an overview of the challenges that are encountered during project implementation and how KM could be the solution. This chapter will review various literatures that explain the importance of knowledge management, what it is and how it is done. It reviews literature that links PM and KM.

### **2.2 Project Management**

PMBOK (2010) has defined PM as “the application of knowledge, skills, tools, and techniques to project activities to meet project requirements. PM ensures that the expected objectives are met. These objectives are met through the five processes that are found in project management, namely:

- Initiation;
- Planning;
- Executing;
- Monitoring and controlling; and
- Project closure (Serrat, 2012).

PM becomes very helpful in projects as it clearly defines the activities to be performed, the schedule and responsibilities each project team member has. It is therefore important for the project manager to ensure that all the lessons learnt in the project are gathered and recorded. During project implementation, different forms of knowledge is acquired and shared. The knowledge that is acquired needs to be stored in order for it to be useful for projects of a similar nature. It is important to highlight the five processes in PM and explain what is involved in the processes:

#### **2.2.1 Project Conception and Initiation**

The organisation looks at the suggested project and determines whether it is beneficial or not. A team determines whether the project is feasible or not.

#### **2.2.2 Project Definition and Planning**

At this phase of the project, the works to be performed should be written down outlining each phase of the project.

### **2.2.3 Project Execution**

The responsibilities of each team member are made clear and resources/tasks are distributed.

### **2.2.4 Project Monitoring and Control**

At this stage, the Project Manager compares the status and progress of the project to the actual plan. During this phase, the project manager might have to make any necessary adjustments to ensure that the project is on track

### **2.2.5 Project Closure**

Once the project is completed and the client is satisfied, an evaluation is important to highlight the successes / failures or lessons learnt from the project. This information is usually stored in form of a close out report.

### **2.2.6 Project close out Report**

A project close out report gives a summary of the project activities completed across the project. The purpose of a project close out report is to determine how the project is progressing to ensure project completion and derive lessons learnt. A lot of templates are available which show what comprises a close out report. Centres for disease control and prevention (CDC) highlights in their guide that a close out report gives a summary of all the activities conducted in the project (CDC, 2006). It categorised project close out into two main activity groups:

- i. **Administrative Closure** – The administrative closure process involves collecting of project records, analysis of project failures and successes, lessons learnt and also transferring of the project products or services to operations and productions and also ensuring the information is archived for future use; and
- ii. **Contract Closure** – The contract closure process among other things involves ensuring all contractual obligations are met. It involves verifying that all works were completed correctly and satisfactorily.

The template basically shows the summary of all the stages of the project as shown in Appendix 3.(AlRowaily & Alsadhan, 2012)Project close out according to CDC (2006) unified process practices guide involves gathering all the information throughout the project activities, failures, successes and lessons learnt. Keeping a record of all the information and ensuring knowledge is transferred.

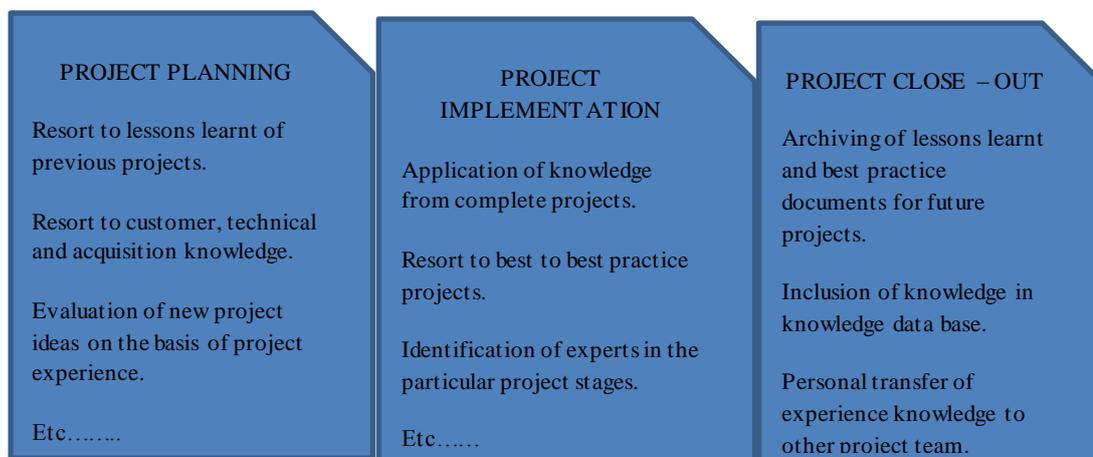
Whenever there is knowledge that is gained, it needs to be stored in such a way that it can be reused. A close out report is one of the ways knowledge is recorded in project environments. The knowledge that is gathered needs to be managed properly in order for it to be useful. This brings in the concept of Knowledge management.

### 2.3 Knowledge Management

Knowledge has been touted as the only asset that can offer organisations a competitive advantage as there is a strong linkage between core competence and knowledge (Yeong, 2010). On the other hand, knowledge is defined as meaningful information. (Haapalainen, 2013). The difference between information and knowledge is the interpretation. (Haapalainen, 2013). KM has emerged from and tends to synthesize ideas from various disciplines, such as psychology, philosophy and sociology and can be perceived as an ‘umbrella’ for wide spectrum of academic orientation. (Polyaninova, 2011).

Figure 2.1 also illustrates how knowledge management is linked with the project life cycle. (Hanisch et al, 2009). The types of knowledge are identified at three stages of the project life cycle. The project life cycles identified are planning, implementation and close out. Examples under planning for KM are resorting to the lessons learnt from previous projects. During the implementation phase of the life cycle, the knowledge that is applied is that from previously completed projects. In the close out phase the lessons learnt are recorded and archived for future reference.

The figure 2.1 below shows the types of KM and the project life cycles

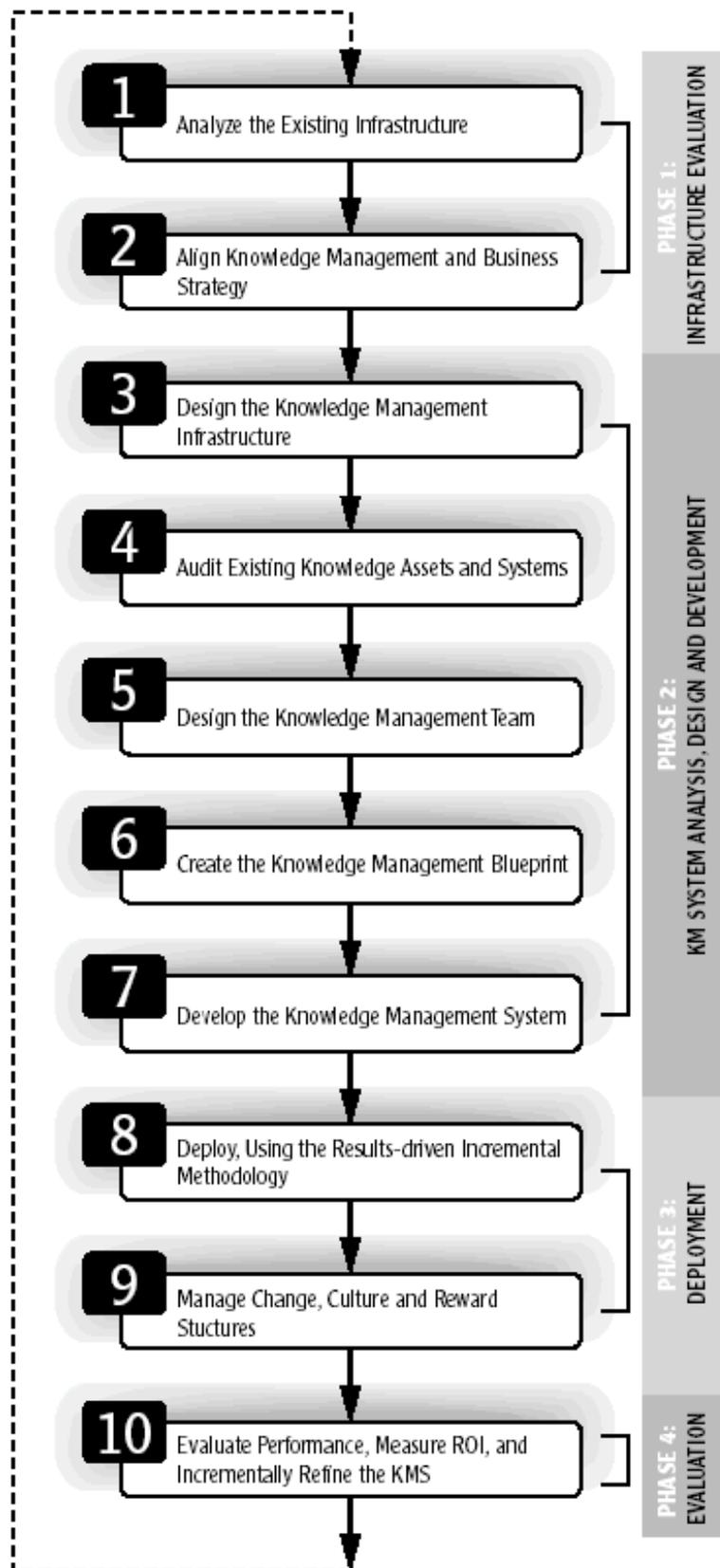


**Figure 2-1: Types of Knowledge and Project life cycle**

After (Hanisch, Lindner, Mueller, & Wald, 2009)

According to Jeffrey (2012), KM implementation procedures often include various common stages such as planning, initiation, development and integration. This provides a direct link between KM and PM. Another implementation scheme is illustrated in figure 2.2 below. This is called a 10-step knowledge management road map and has four phases. (Tiwana, 2002). This road-map can help guide managers at organizations to develop, execute and maintain a KM program that can enable the organization to properly manage the valuable knowledge that is often locked in place and needs release for competitive advantage both operationally and strategically (Alstete, 2012). The framework starts with analysis of the existing infrastructure and ends with performance evaluation.

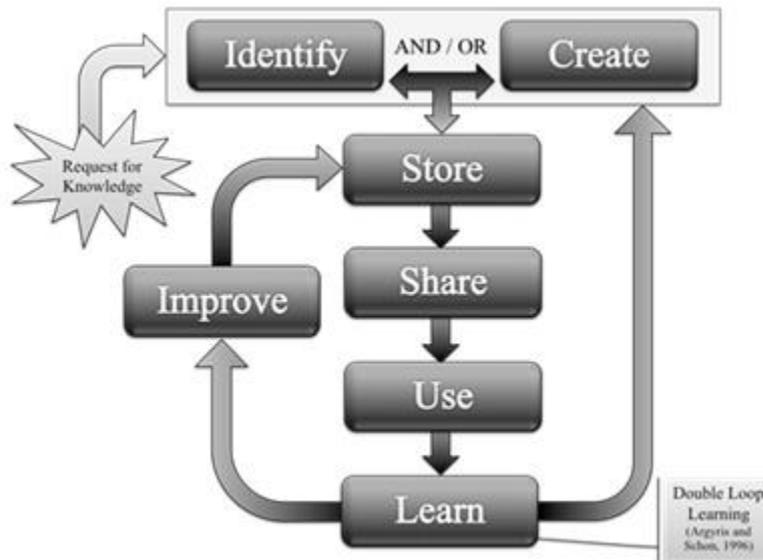
According to three authors mentioned above Jeffrey (2012), Hanisch (2009) and Tiwana (2002) KM played a key role in the various stages of a project life cycle. The knowledge life cycle is helpful in identifying how project knowledge can be managed. To organize KM thoughts, several KM life cycle models have been developed. Davenport and Prusak (2000) suggests a 3-stage model (“generate, codify/coordinate, and transfer”) for KM life cycle.



**Figure 2-2: The 10-Step KM Road-map**

After (Tiwana, 2002)

Figure 2.3 illustrates the Knowledge management life cycles (M. Max Evans, 2014) . The KM life cycle involves knowledge creation, acquisition, refinement, storage, transfer, sharing, and utilization and organization performance.



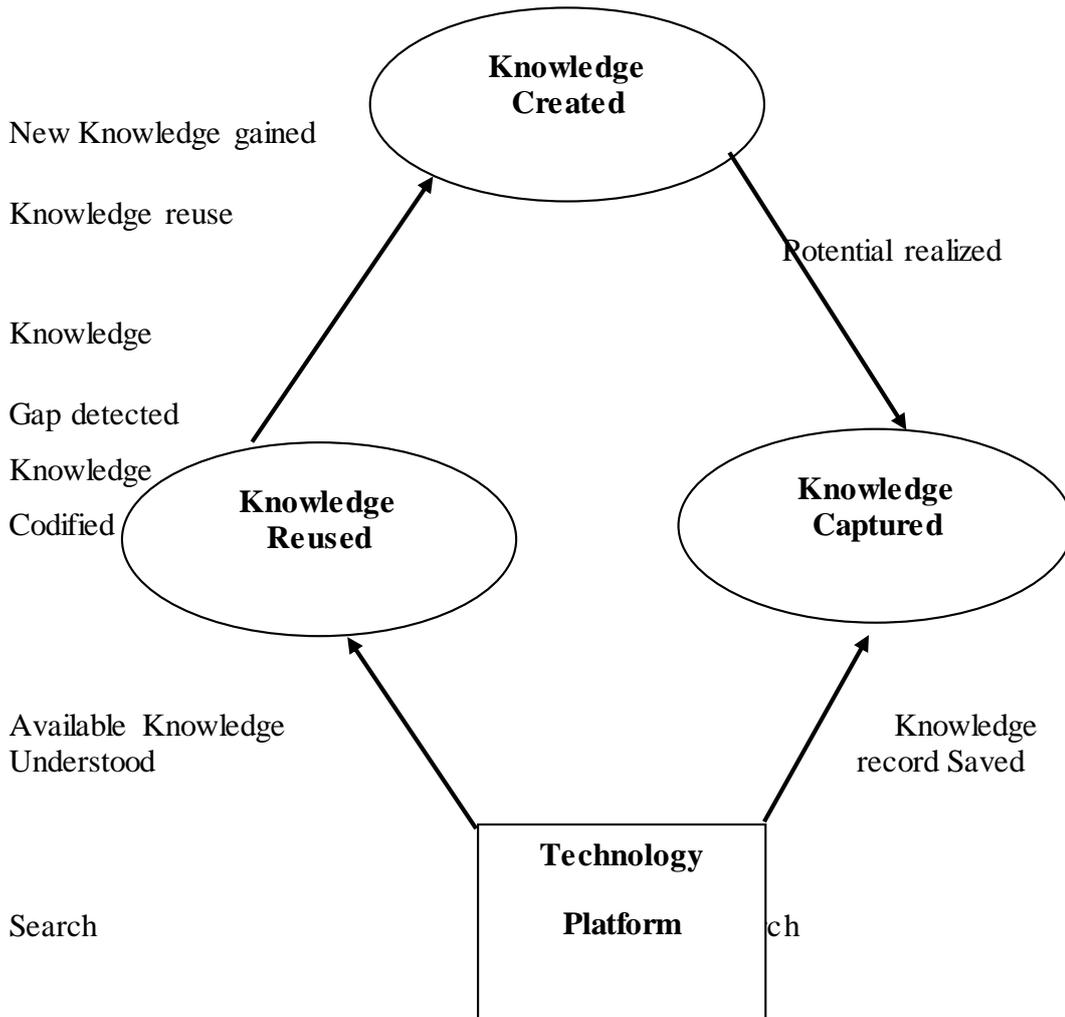
**Figure 2-3: Knowledge Management Cycle Model**

After (M. Max Evans, 2014)

The KM cycle model shown above illustrates the different stages involved in the management and creation of Knowledge. This gives a general view of how Knowledge is managed.

Another KM life cycle model was developed from an individual's perspective as seen from figure 2.4. (D. Stenholm, 2014)

**Individual Knowledge**  
**Individual benefit | Future user benefit**



**Organizational Knowledge**

**Figure 2-4 The proposed KM life cycle, presented from an individual's perspective**

After (D. Stenholm, 2014)

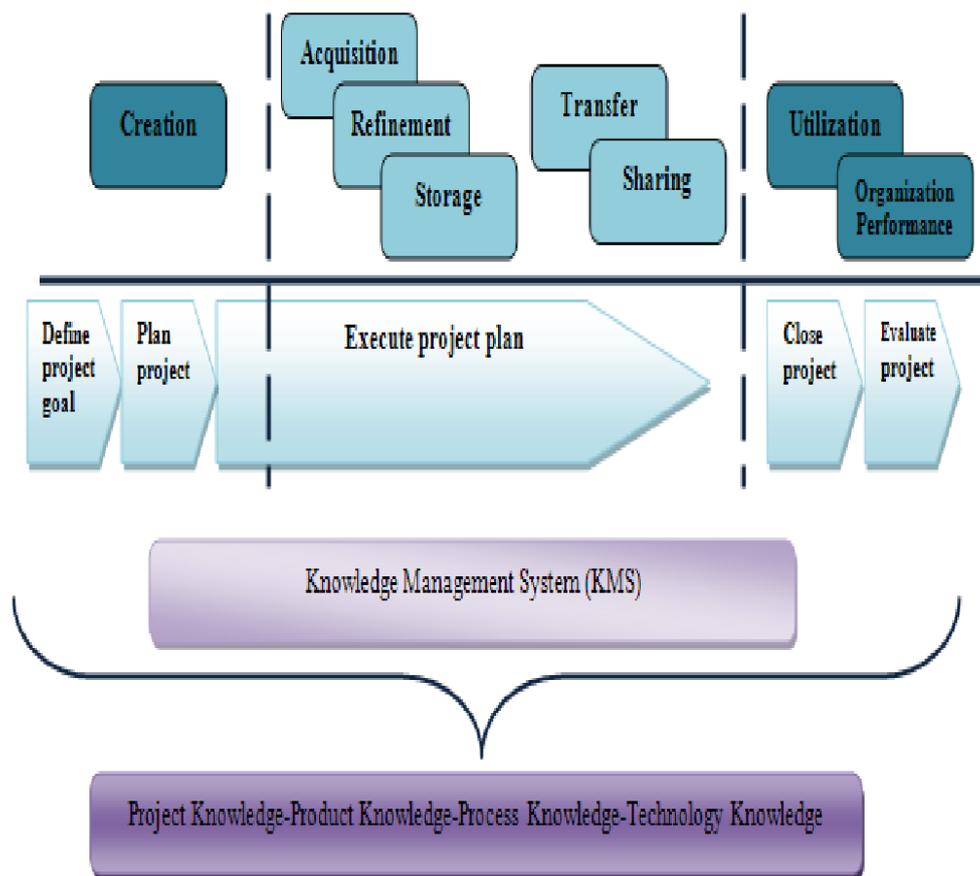
The model shown in figure 2.4 involves four processes, acquisition, creation, refinement” and “transfer/sharing” and three decision points (“knowledge reused”, “Knowledge created”, “knowledge captured”). In every decision point, the individual is encouraged to make decisions according to the knowledge that has made available.

**2.4 Knowledge Management in Project Environments**

KM and PM as mentioned above are linked because they are similar in so many ways. PM components include system, people and tools whilst KM components include

people, technology and organisational factors. (Polyaninova ,2011). Numerous studies have been carried out and have shown that some projects have been unsuccessful due to lack of KM. (Polyaninova , 2011). It is therefore imperative that knowledge is transferred, shared and archived for future use.

Just like knowledge management, Projects also have a life cycle. This life cycle involves project definition, project plan, project execution, project monitoring and control, and project close out. The two are linked as shown in figure 2.5



**Figure 2-5: Knowledge life cycle and Project life cycle.**

After (Beiryaei & Vaghefi, 2010)

As seen from Fig 2.5, at each stage of a project there is knowledge management. During project definition and planning, knowledge is created. This knowledge that is created is refined, stored and transferred during project execution. When the project comes to an end, evaluation is performed to assess how the project performed. All the

knowledge that is gathered can then be archived and used for future projects. This highlights the linkage between the knowledge life cycle and the project life cycle.

## **2.5 Knowledge Management Tools**

On the market today, so many KM tools are available. KM tools have been categorised into two: IT based and non-IT based ( (Frost, 2010), (Young, 2010), (Ghani, November 2009), (Marilyn Leask, 2008)). While the KM tools identified are numerous, a few were highlighted as follows:

### **2.5.1 IT based Tools**

#### **i. Document Management System**

Information overload can be overcome by effective and efficient access to documents (Young, 2010). Document management involves the Management of electronic documents, a system to search, edit, distribute, retrieve, archive and otherwise manage the complete lifecycle of documents (Ghani, November 2009). These systems aid in the publishing, storage, indexing, and retrieval of documents. Large volumes documents can easily be managed through the document management system (Frost, 2010);

#### **ii. Knowledge Bases**

Examples which were given for knowledge bases are Wikis such as Wikipedia. Knowledge bases give a full context of the topic at hand and enable people to view, create and access new knowledge;

#### **iii. Data Warehousing**

Data warehouses contain information ranging from measurements of performance to competitive intelligence. (Tanler, 1997); and

#### **iv. Intranet and Extranet**

Intranet is essentially a smaller version of the internet. Operations are restricted to within an organisation through firewalls. Outsiders are restricted to access through firewalls which act as security measure (Frost, 2010). Intranet enhances work practices within an organisation and helps disseminate a wide range of useful information. The Extranet on the other hand is an extension of the Intranet. It allows for partners, suppliers and so on to have access to the

information (Frost, 2010). It provides limited and controlled organisational information through security protocols. Extranet helps sharing knowledge with partners in the external network.

### **2.5.2 Non-IT based Tools**

#### **i. Peer Assist**

This is a technique used by a project team to solicit assistance from peers and subject matter experts regarding a significant issue the team is facing (Young, 2010). Knowledge gets created, shared, stored and applied between the peers.

#### **ii. After Action Review**

After Action Review (AAR) is a technique to evaluate and capture lessons learned upon completion of a project or at a key stage during a project. It allows project team members to discover for themselves what happened, why it happened, and how to sustain strengths and improve on weaknesses (Young, 2010). The project team can document the lessons learnt which can be used for future projects.

#### **iii. Story telling**

This is a narrative way of sharing knowledge that is gained through experience. Tacit Knowledge i.e. personal knowledge, contained within one's head is easily shared through storytelling. The sessions on storytelling can be captured and stored on the intranet for future use.

#### **iv. Knowledge Cafe**

This is a way to have a group discussion, it brings people together to reflect and have creative conversations on topics of mutual interest. It allows for maximum participation and sharing of insights that might emerge.

#### **v. APO KM Assessment tool**

This is a survey questionnaire designed to assess an organisation's readiness for KM. It helps an organisation identify where it needs to focus its KM initiatives. Asian productivity organisation (APO) KM assessment tool has the following specific objectives:

- a. Determine if KM is already being practiced in the organization and to what degree it is being applied;

- b. Determine if the organization has the right conditions for building and sustaining systematic KM processes; and
- c. Identify the organization's strengths and opportunities for improvement in managing knowledge (Young, 2010)

These are a few of the KM tools that were reviewed among the many that are available. Even if the tools might be available, challenges exist in implementing KM strategies.

## **2.6 Knowledge Management Challenges**

Different literatures were reviewed on challenges faced during KM. Polyani (2010) mentions many of them. The major challenge of managing knowledge is less its creation and more its capture and integration (Davenport T. H., 1997a); (Grant, 1996)). These challenges included:

### **a. Culture**

According to Polyani (2010) and Maryam & Dorothy (1999), culture played an important role in an organization. Simple people are responsible for creating and transferring knowledge, it's entirely up to individuals to share the Knowledge. This was a challenge in that the people responsible for sharing the knowledge would not be willing to transfer it. This introduced the need to methods and ways of convincing them to share the knowledge. Organizations need to create incentives to encourage Knowledge sharing and transfer in order for KMS (knowledge management systems) to be successful;

### **b. Technological Issues**

Considering that knowledge is stored through technical structures and the internet, issues of security are considered a challenge; and

### **c. Time and Budget Constraints**

Lack of time for the project members because they could have been assigned a different task immediately after completion of first the task. This can arise because the managing of the Knowledge is not considered as priority but the tasks and getting the work done takes priority.

These are the challenges identified by Polyani (2010) and Maryam & Dorothy (1999).

Below is a Table 2.1 summarizing the literature that has been reviewed.

**Table 2-1: Summary of Literature Reviewed**

S/N	AUTHOR	PURPOSE OF STUDY	METHOD	FINDINGS	COMMENTS
1.	Taya Polyaninova (2010)	To investigate the ways and challenges of Knowledge Management in project environment to identify Project-Knowledge Model.	Literature review and Questionnaires.	It was evident that the nature of the projects and organizational culture has a significant impact on the ability to manage project knowledge which in turn aids to the project's success or failure.	The research reviewed various tools that are used in PM and KM. The focus was on the CA software, clarity PPM software which is usually used by financial organizations. Surveys of other tools being used in PKM should have been conducted to give a broader view of the types of tools being used in PKM.
2.	Bastian Hanisch et al.(2009)	To show how the management of knowledge in temporary organizations is an increasingly important factor in many industries.	Interviews	An urgent need for a significant improvement of project knowledge management	
3.	Peyman Akhavan et al.(2014)	To study the critical success factors in Knowledge Management Among project based organizations through a multi-case approach	Case study questionnaires	Organizations need to construct suitable knowledge structure and set their knowledge strategies based on that	The paper indicates that correct environment can encourage knowledge sharing. It is important to encourage the culture of knowledge sharing as this helps in KM.

4.	Anthony Yeong, (2010).	To study the improvement of project success in organizations by integrating knowledge management strategies with project management practices in a typical project lifecycle.	Questionnaires	Knowledge is created via projects and continuous creation of innovative knowledge is essential for the survival of organizations.	
5.	Päivi Haapalainen,( 2013)	To examine the relationship between learning and knowledge management in construction projects	Interviews Literature Review	The Literature suggests that learning is often related to communication and creation of understanding, which in turn makes knowledge management processes possible.	
6.	M. Max Evans, K. D. (2014)	To improve how firms conceptualize, strategize, and manage organizational knowledge.	Literature Reviews	One of the major reasons to process knowledge is for individuals, groups and the organization itself to learn, to remember what it has learned and to leverage the collective expertise in order to perform more efficiently and more effectively.	
7.	D. Stenholm, J. L. (2014)	To show how the KM life cycle brings in a systematic management of knowledge, which leads to low probability of errors being repeated in and between projects over time.	Case study	Post project reviews were used for the capture of knowledge for the 2 organizations that were being studied.	Emphasis was made on continuous knowledge work as opposed to post project reviews. Continuous knowledge work allows for reuse of knowledge by ensuring knowledge is gathered

					during the project.
8.	Ghani, S. R. (November 2009).	To provide a framework for characterizing the various tools and techniques available to knowledge management practitioners.	Literature Review	Different tools were identified and categorized. There are tools to access knowledge, tools for semantic mapping, for knowledge extraction, for expertise localization and for collaboration work.	Tools used for KM are determined by the user to ease the process of creating, codifying and sharing of knowledge.
9.	Young, D. R. (2010)	The aim of this manual is to provide the KM consultant, KM practitioner, and those organizations, large and small, who are about to embark on a KM initiative, with a framework and some very practical tools to get started, to assist with a successful KM implementation.	Review of Methods and tools implemented by the most successful organizations in the world	The Km initiatives were categorized as non – information technology methods and tools and IT methods and tools.	Useful manual in helping to determine whether to use a Non-IT method and tool for managing knowledge or an IT method and tool. The advantages of each of the methods is mentioned in the manual.
10.	Serrat, O. (2012)	To give an insight on managing knowledge in project environments	Literature Review		
11.	Frost, A. (2010)	To provide a comprehensive overview of knowledge management by examining its objectives, scope, strategy, best practices, knowledge management tools, to help both the student and practitioner.	Literature Review	The author categorized the KM tools into two, IT based and non-IT based. KM failures were categorized in two as well: Causal failure factors and Resultant failure factors.	Like Young, D. R. (2010), the KM tools are categorised into IT and non IT based. An organisation has to determine the tool that will best assist them manage the knowledge.
12.	Greiner, M. E., Bohmann (2007)	To study the influence of the organizational environment on the selection of KM strategies.	Case Studies	The most successful KM projects were those that were driven by a strong business need.	

13.	Tiwana A (2002)	To provide a strategic roadmap for knowledge management and teach how to implement KM, step by step.	Literature Review	Gave a road map with four phases involving 10 different steps that will help leverage company's existing infrastructure; design, develop, and deploy a KM system that is aligned with your business strategy, on top of existing infrastructural capabilities; undertake cultural and organizational changes that can make knowledge management succeed in your company; and show you ways to evaluate both its effectiveness and return on investment	Culture is discussed in this toolkit and Taya Polyaninova (2010) also mentions the importance of Culture in KM. A supporting and sharing culture aids in a successful KM system.
14.	Beiryaei, H. S., & Vaghefi, S. E. (2010)	To present a framework for KMS strategic planning	Literature Review	The paper indicates that there is close relationship between KM and KMS. It also demonstrates that for each stage in the knowledge life circle, it can be covered by KMS.	The paper emphasized the importance of an effective KMS in order to aid KM.
15.	Polyaninova, T. (2011)	To define the reasons for managing project knowledge, the benefits it brings to organizations and challenges that exist within the organization that prevent the process from being successfully deployed.		The nature of the projects and organizational culture has a significant impact on the ability to manage project knowledge which in turn aids to the project's success or failure.	

16.	Alstete, J. (2012)	To find out what strategic and operational trials organizations face when implementing a knowledge management (KM) road-map system	Case studies	Strategic and operational challenges to effective implementation of knowledge management practices are similar to the difficulties in other management policies and procedures. Providing top-down guidance about how certain activities should be conducted, directing individual efforts that are linked to supporting the organization's overall quest for competitive advantage, ensuring consistency, and encouraging a work culture that enables excellent execution of the knowledge management policies are important	
17.	L.Tupenaite et al (2008)	To present KM models for construction projects	Literature Review	KM is the key factor to the successful implementation of construction projects	Various models for KM are identified that can be used in construction projects.
18.	Khalid Alrowailey, Abulaziz O.Alsadhan	To explore the emerging role of KM system in the Telecommunications industry	Interviews, Observations and Literature review	KM integration in Telecommunication sector helps improve monitoring in project environments	Most of the findings were based on Literature review. Also worth noting was emphasis on the success of KM implementation being dependant on passionate involvement

					of Top management
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## 2.7 Summary

This chapter provides an overview of the various literatures available on KM and the relationship that exists with PM. The literature reviewed indicates that KM is of importance not only in project based environments but also in every situation where knowledge is being created. The tools and techniques used in KM were also discussed as well as challenges faced in implementing an effective KMS.

The next chapter presents the research methods used in this study. It also discusses the advantages and disadvantages of various research methods.

## **CHAPTER 3: METHODOLOGY**

### **3.1 Introduction**

The previous chapter reviewed various literature on Knowledge management and the role it plays in project based environments. This chapter presents the research methods that can be used and highlights the ones that best suit the research being carried out. It further explains the tools that were employed to meet the aim and objectives of the research.

### **3.2 Research Type**

There are 3 types of research namely Explorative, Descriptive and Causal/Experimental research (Fluid Surveys, 2014). Explorative research is undertaken if a new idea is being investigated or little is known about an area of interest. It is usually used to obtain preliminary information for the problem that is under investigation. An example is open ended questions which can be in the form of interviews or surveys. Descriptive research is undertaken to understand the characteristics of the study group. It is quantitative in its nature and takes the form of close ended questions. It is by far the most commonly used type of research when it comes to online surveys (FluidSurveys, Fluid Surveys, 2014). Casual or Experimental research has the focus of testing the hypothesis. It attempts to reveal a cause and effect relationship between two variables (Fluid Surveys, 2014). Causal research answers the question why.

### **3.3 Research Methods**

There are various research methods that can be used to collect the required data. These methods can be broadly classified into two types and the output data classified as:

- a. Qualitative; and
- b. Quantitative (MacDonald & Headlam, 2012).

#### **3.3.1 Qualitative Method**

Qualitative research is concerned with qualitative phenomenon involving quality.

Some of the characteristics of qualitative research/method are:

- i. It is non-numerical, descriptive, applies reasoning and uses words;
- ii. Its aim is to get the meaning, feeling and describe the situation;
- iii. Qualitative data cannot be graphed;
- iv. It is exploratory; and

- v. It investigates the why and how of decision making (Rajasekar, Philominathan, & Chinnathambi, Oct 2013).

This method will pay attention to **open ended questions**. Open ended questions allow for the respondent to freely express their impressions on the topic of discussion. The main methods of collecting qualitative data are:

- i. Individual interviews;
- ii. Focus groups;
- iii. Observations; and
- iv. Action research (Institute of Lifelong Learning, 2009).

These methods are discussed in detail below.

#### **3.3.1.1 Individual Interviews**

Interviews are a qualitative way of getting respondents' perceptions and attitudes to issues. It is important to interview the key people and choose the right approach to the interview. There are three clearly identifiable styles of interview:

##### **i. Structured**

This style follows through a set of specific questions. It is used when the researcher wants to compare the responses acquired.

##### **ii. Semi structured**

This style follows a framework rather than specific questions. It is a more commonly used interview technique.

##### **iii. Unstructured**

This style does not follow any framework or specific questions. Rather, the interviewer addresses the issues as they arise. This method is useful when the researcher wishes to explore the full breadth of the topic. This method was chosen for this research to collect preliminary data.

#### **3.3.1.2 Focus Groups**

Focus groups also known as Discussion groups are widely used in research. This is used when data is to be collected from a group as opposed to an individual. Typically, the size of a Focus Group is 6 – 10 participants. This is a group interview which is

conducted to obtain the views of the people in the group on a subject (MacDonald & Headlam, 2012). A minimum of 3 focus groups is recommended for best practises. The advantage this method has over individual interview is that when in group, people would find it much easier to share their views. This method gives more insight on the views being discussed ( Institute of Lifelong Learning, 2009).

This method was not used for this research as it required having the group of people to be interviewed in one place at the same time which wasn't possible.

### **3.3.1.3 Observations**

This involves the researcher making observations of the happenings within the area of study ( Institute of Lifelong Learning, 2009). The researcher observes and records the behaviours he notices. This type of method is most suitable for studies which seek to study the different behaviours of a certain group or individuals. This method requires adequate time to observe behaviours. This method was not suitable for this research because there was limited time and no behaviours were under observation.

### **3.3.1.4 Action Research**

This involves not just asking about the topic under discussion but doing it ( Institute of Lifelong Learning, 2009). It is a framework that is collaborative, has a practical intervention and the researcher is actively involved in the intervention. This requires a lot of time and considerable resources to achieve. This method was not used in this research due to limited time and the nature of the study that was being done.

## **3.3.2 Quantitative Method**

This method involves the generation of data in quantitative form which can be subjected to rigorous quantitative analysis. It may look to measure the occurrence of various views or opinions for a chosen sample space. The aim of this method is to count things to explain what is observed. Quantitative research method involves data collection. Data collection is in two forms:

### **i. Primary**

Primary data is received from first hand sources such as direct observation, interview, questionnaire and survey etc (Nkhata, 1997). In this method of data collection, the researcher or investigator collects their own data.

**ii. Secondary**

Secondary data on the other hand is received from secondary sources such as printed materials, published material, etc. In this method of data collection, the researcher uses the available information. An example is through literature review of documentation that exists on the topic of study.

Surveys are a popular method of collecting primary data (MacDonald & Headlam, 2012). They can be used to produce both quantitative and qualitative information depending on how they are structured. When they are administered by the researcher, the survey is called a structured interview and when respondents administer questions it's called a questionnaire. For the quantitative method, the types of questions administered are known as **closed questions**. Closed questions have a number of possible answers in a list from which respondents can choose from. Usually another option for other is included to give the respondent an opportunity to give their answers in case there was no answer among the options given. Another type of questions used in quantitative surveys is **ranking scales**. Ranking scales is used when trying to ascertain of the items on a list which one is of more importance. Sliding scales is also another type of question that is used in the quantitative method. Respondents are given a series of statements and asked how much they agree or disagree with the statement by using a sliding scale where numbers represent different strengths of feelings. For example, I agree or I strongly as options for the respondent to choose from. Surveys can be delivered in many ways:

- i. Postal surveys;
- ii. Telephone surveys;
- iii. Email/internet surveys; and
- iv. Street/Self-administered surveys

Table 3.1 illustrates the advantages and disadvantages of each of the methods.

**Table 3-1: Ways a survey can be delivered**

	<b>ADVANTAGES</b>	<b>DISADVANTAGES</b>
<b>POSTAL</b>	Can reach a large geographical area.	No clarification available during completion.

	People are used to completing paper-and-pencil surveys need a motivated population to return the survey. Can take the survey with you and complete it anywhere and anytime Great for sensitive issues.	Need a motivated population to return the survey. Respondents must be able to read, see, and write.
<b>TELEPHONE</b>	Information is obtained immediately. Can explore answers with Respondents.	Possible bias from the administrator. Higher level of resources.
<b>EMAIL/INTERNET</b>	Negligible distribution costs Only “acceptable” answers can be allowed (validation). Can give respondent links that give additional explanation.	Respondent must be “online” Respondents must be able to use a computer, a mouse, and/or keyboard Respondent must be able to use a web browser Reliant on technology that can fail
<b>SELF-ADMINISTERED SURVEYS</b>	There is more focus on questions from the respondents. Responses are collected from as many respondents as are given the questionnaires.	Time consuming. Can prove to be costlier. Respondents may not wish to have the researcher in their homes/workplaces.

After (MacDonald & Headlam, 2012)

Apart from the researcher collecting his own data, he can also review already existing information. In the quantitative method, the information to be reviewed is of a statistical nature.

Qualitative and Quantitative methods have both been discussed. Another method which a researcher might want to employ is to use both qualitative and quantitative methods to collect data. This technique is known as **Triangulation Method**. **Triangulation data collection technique** is when more than one research method is employed to collect **data**. **Quantitative and qualitative methods** each have advantages and disadvantages of their own. This implies combining the two will help overcome the weaknesses that come with using a single method (Yeasmin & Rahman, 2012). Triangulation allows researchers to be more confident of their results which can stimulate the creation of inventive methods and a new way of capturing a problem. It minimises the inadequacies of a sole source research. According to Morse (1991), there are two ways in which qualitative and quantitative can be triangulated. First, qualitative method used as preliminary inquiries in a quantitative study; whereby, qualitative methods are regarded as supplementary methods. Secondly, quantitative

methods precede preliminary inquiry in a qualitative study in the sense that quantitative methods are regarded as auxiliary methods. Qualitative and quantitative methods should be viewed as complimentary rather than as substitutable. Thus, to reap the benefits of the two methods and minimize the drawbacks of each method, the combination of the two methods through Triangulation is advocated for (Yeasmin & Rahman, 2012).

### 3.4 Research Design

This study was designed to access the use of KM in project environments in Zambia. To get some insight on practices if any on KM in Zambia, it was considered essential to carry out various methods to get information. The objectives and aim of the research were clearly outlined from the onset. To achieve the objectives of the research, the type of research used was both exploratory and descriptive. This involved combining both Quantitative and qualitative method, a method known as triangulation. It was explorative in that semi structured interviews were conducted to get preliminary information on KM. The descriptive research took the form of an online survey which had close ended questions and open-ended questions. The survey was pretested before it was distributed to sample size. Various Literatures were also reviewed. The data was collected through interviews and questionnaires. This data was then analyzed and compared with the literature reviewed. A summary was then given on the data collected. Below is a Figure 3.1 showing a summary of the design.

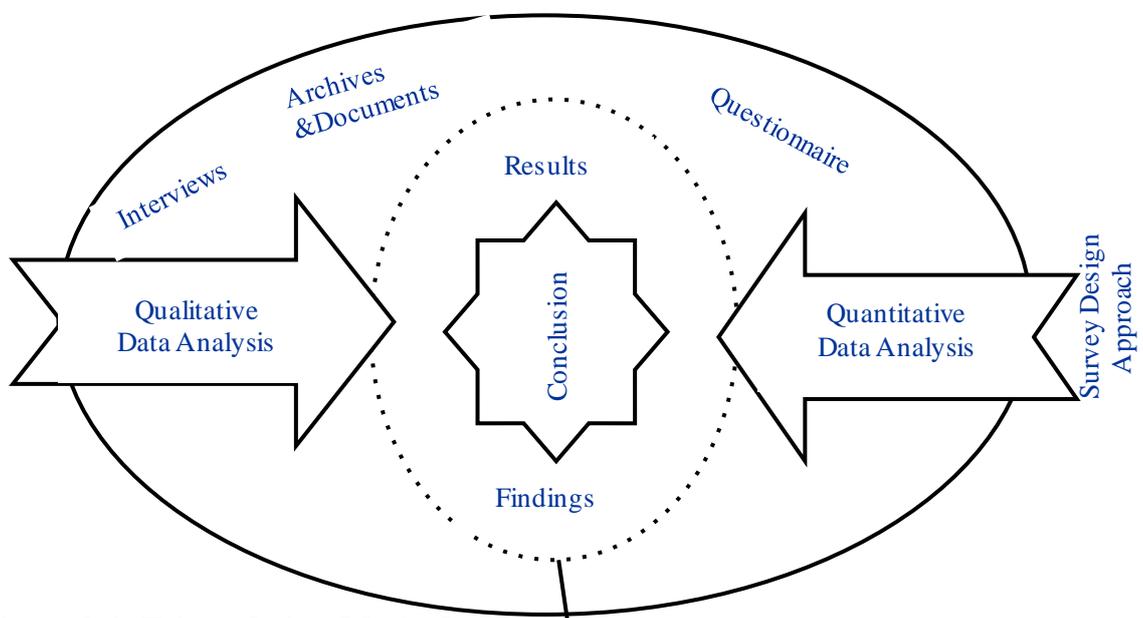


Figure 3-1: Triangulation Method

### **3.4.1 Literature Review**

The literature reviewed was done so in different phases. The sources of data reviewed were from journals, books, reports and meetings. Below is summary of the reviews:

- i. The first phase involved reviewing literature on PM and how knowledge is created through the different stages. The highlight of this review was project close out report which involves collection of data throughout the project phases. This acts as a form of tool for KM;
- ii. Different models on KM lifecycle were reviewed. These models highlight the processes that are involved in KM;
- iii. The tools used to gather knowledge were identified and these were used to gauge if they are used in project environments; and
- iv. Challenges which are faced during KM were also reviewed.

The objectives of the research as highlighted in section 1.4 were reviewed through the various literatures. These literatures helped to relate what is happening currently in Zambia to what has happened elsewhere.

### **3.4.2 Data Collection**

As discussed in the section 3.2, methods of research can be either qualitative or quantitative. The approach which was taken involved both qualitative through interviews and quantitative through questionnaires.

#### **I. Interviews**

The qualitative method that was employed was interviews. Interviews are good in that they accommodate even illiterate people and the response rate is high. It is because of that interaction between the interviewer and interviewee that any questions that can arise during the interview can be asked. The style of interview that was used was a semi structured type of interview where questions asked followed a certain type of frame work. This was done to get the views of the respondents on the topic at hand. The interviews targeted Sponsors of the project/stakeholders, Project managers, project team members and customer from the Telecommunications industry, construction and a selected ministry from the government. The number of participants was 13. The sample chosen for the interviews was randomly selected. Purposive

sampling was used. 5 participants were chosen from the Telecommunications industry, 5 from the construction industry and three from the selected government ministries. The aim of the interviews was to get preliminary data for the questionnaire survey. Due to limited time for the study, the participants were all from within Lusaka.

## II. Questionnaires

Questionnaires allow for anonymity that gives respondents an opportunity to give more honest responses. The method that was used to administer the questionnaires was through email. This method was chosen due to limited time in which to administer the questionnaire and the negligible costs of distribution. The tool that was used was **Survey Monkey**. This is an online survey tool which gives an opportunity to people with different experience levels to create their own surveys. It has an online survey designer which contains many questions and formats. (MacDonald & Headlam, 2012). It collects responses in real time and analyses them. The responses that are collected are interpreted through charts and graphs. The tool also allows to send reminders to those have not responded to the questionnaire. All these responses can then be downloaded and further analyzed using other statistical methods such as SPSS. The questions that were asked were categorized as follows:

- i. Biographical data

This section involved questions like the gender, age group, level of qualification and the type of sector the respondent is in;

- ii. KM processes data

The data collected in this section involved identifying what processes the respondent went through with regards to KM. The questions accessed the use of KM in the respondents' organizations;

- iii. KM tools

Questions asked bordered on identifying the tools used by the respondents in KM; and

- iv. KM challenges

The respondents were asked on what challenges they are faced with KM when implementing various projects.

The questions asked were closed questions and open-ended questions. The open-ended questions were aimed at getting a broader view from the respondents on issues that could not have been covered in the closed questions. The questionnaire was

pretested by sending to just a few respondents to get their views on the question and to find out how much time it was taking to complete the questionnaire. Then after the pretest, the questionnaire was then edited with the help of my research supervisor, approved and distributed. The respondents were given several options to choose from.

a. Distribution and Collection of Questionnaire

The questionnaire was written and distributed using the survey tool called Survey Monkey. This tool was also used to collect the results. The tool has an option of sending reminders to respondents that have not answered the questionnaire. Apart from using survey monkey to remind respondents to take the survey, follow ups were made via phone calls to ensure the questionnaires were answered in record time. The questionnaire was designed in such a way that within 20 – 30 minutes the respondents would be done.

b. The Study Sample

The targeted population was within Lusaka. It was composed of Project managers, project team members and project stake holders from selected organisations from the Telecommunications industry, some government ministries and some randomly selected construction organisations. The disproportionate stratified sampling technique and equation 3.3.2, by (Smith, 2013), was used to approximate the sample size. Using confidence level 90%, standard deviation of 0.5 and margin of error of  $\pm 10\%$ , sample size of 68 respondents was derived.

**Equation 1: Determining Sample Size**

$$\text{Necessary Sample Size} = (Z\text{-score})^2 * \text{StdDev} * (1 - \text{StdDev}) / (\text{margin of error})^2$$

Where: Z score in this case since confidence level 90% was used is 1.645. StdDev is standard deviation.

Therefore, 68 was used as the sample size for this study.

**3.5 Method of Analysis**

The data collected was analysed by using descriptive statistics. The survey monkey tool was used to generate bar graphs and pie charts. Survey monkey made it easy to generate graphs. All the responses were analysed using excel sheets.

**3.6 Research Ethics**

Given the importance of ethics for the conduct of research, it makes it necessary to ensure guidelines regarding ethical issues are followed. Confidentiality was assured

to the participants and no mention of names was done during the research. At the start of the questionnaire and interview, the confidentiality aspect was emphasized. Care was also taken to ensure data collected was accurate and reliable by taking into consideration the profiles of the participants.

### **3.7 Summary**

This Chapter presents the methodologies that can be used to carry out a research and highlights the ones that best suit the research being carried out. It presents the advantages and disadvantages of using certain methods of research. It also gives insight on the method that was used to collect data to meet the aims and objectives of the research. The study sample and the method of analysis are also presented.

## **CHAPTER 4: ANALYSIS AND DISCUSSION OF DATA COLLECTED**

### **4.1 Introduction**

The previous chapter explained the methodology that was used to obtain the data that was collected. This chapter shows how the collected data was analysed using the methods of analysis described in the previous chapter. The results are discussed in two parts, those obtained through the interview and those through the questionnaire. Section 4.2 discusses the results obtained from the interview whilst section 4.3 discusses the results obtained from the questionnaire.

### **4.2 Analysis of Data obtained from Interview**

The Interviews targeted the Telecommunications industry, the construction industry and selected government ministries. 5 interviewees were targeted from each of the selected industries. The interviews were conducted to get preliminary data. The organisations were selected based on their prominence in the industry.

#### **4.2.1 Analysis of Interviewees from the Telecommunications Industry**

##### **a) Background of the Interviewees**

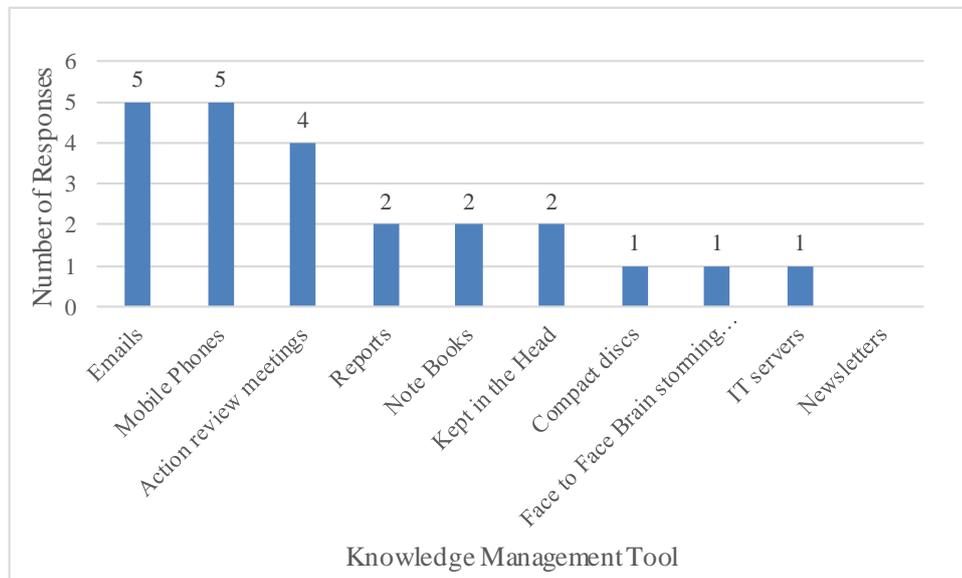
Of the 5 professionals that were interviewed, 2 were project managers and 3 were project stakeholders. The project managers and 2 of the stakeholders had over 10years experience in project based environments whilst one of the project stakeholders had 6years experience. They had reasonable number of years' experience in project based environments.

##### **b) Knowledge Management Process**

All the 5 interviewees agreed on that knowledge was created during and after the project. What was varying was how the knowledge created was stored and shared. They all agreed that after knowledge was created, it was shared with the team through meetings and then the project manager would take note of the knowledge shared. They acknowledged that they could identify, create, share, use and store knowledge.

##### **c) Knowledge Management tools**

All the interviewees identified emails as the main means of communication. Action review meetings were also identified as a means of communication during projects. Mobile phones were also mentioned as means of communication through the WhatsApp application. Below in Figure 4.1 is a summary of the tools the interviewees mentioned they use to manage the knowledge.

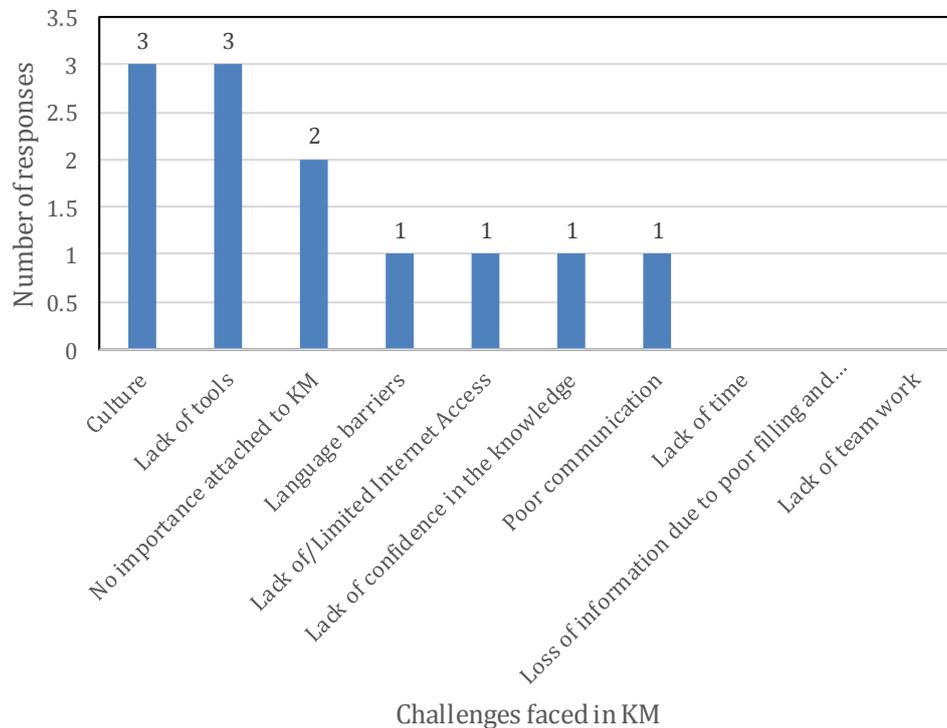


**Figure 4-1: Knowledge Management Tools**

#### **d) Challenges faced in managing Knowledge**

All the interviewees mentioned facing challenges in managing knowledge. The challenges which were faced by the highest number of interviewees were culture and lack of tools. The interviewees explained on culture that there was a myth that if one shared their knowledge, their role would be taken up by others. Another mentioned that for some tools, only certain individuals had access to update the knowledge base. This created a problem in that if that individual was not there then it wouldn't be possible to record the knowledge acquired. On tools, it was mentioned that in some instances no IT tools were available and in cases where they were available they did not know how to go about using the tools. They mentioned that there was need to have tools that can be easily used to manage the knowledge. Figure 4.2 below shows the challenges that interviewees face in managing knowledge. Other challenges faced are lack of importance is attached in managing knowledge. One respondent mentioned language barriers in the case of

projects whose team members were of various nationalities which made it difficult to share knowledge. In the case where IT based methods are used limited internet access, in some cases lack of it make it difficult for the respondents to manage knowledge.



**Figure 4-2: Knowledge Management Challenges**

#### 4.2.2 Analysis of Results from the construction industry

##### a) Background of the Interviewees

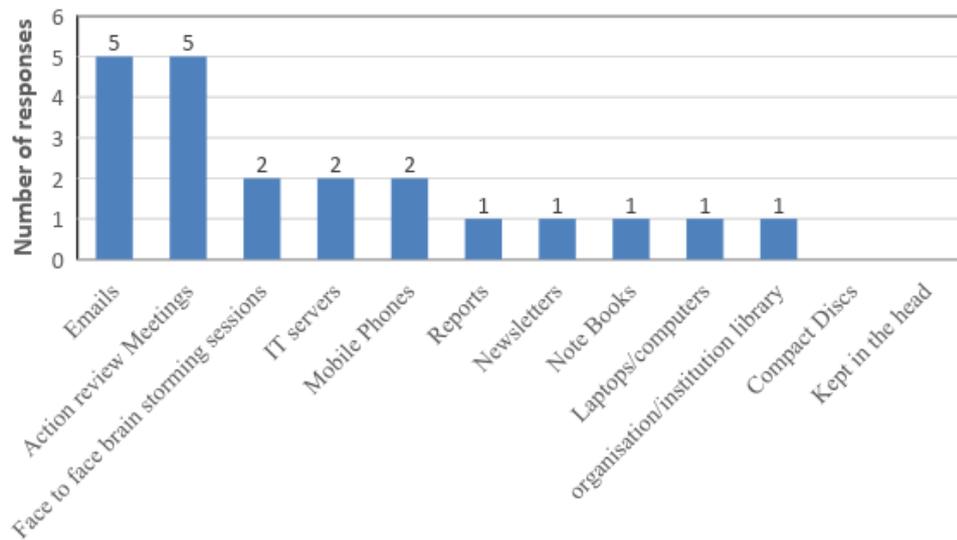
Of the 5 interviewees, 2 were project managers and 3 were project team members. The 2 project managers and 2 of the team members had over 10 years' experiences whilst 1 of them had about 6years experience. They had considerable enough experience in project based environments.

##### b) Knowledge Management Process

All the interviewees mentioned that knowledge is created, shared, applied and stored. No process was mentioned but just the fact that they create and share knowledge in different ways.

### c) Knowledge Management Tools

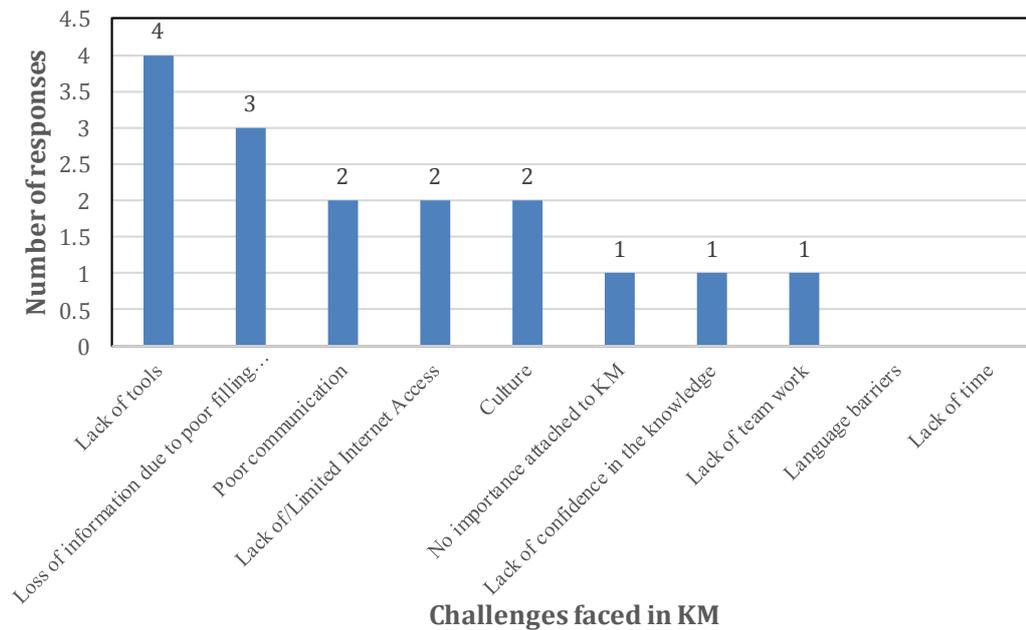
Emails and action review meetings were identified by all the interviewees as means of communication during and after a project. 2 of the interviewees mentioned phones, face to face brain storming sessions and IT servers/ Databases as tools they use in managing knowledge. Other tools identified were notebooks, newsletters, laptops and institutional/organisational libraries. Figure 4.3 illustrates the information in chart as shown below.



**Figure 4-3: Tools used in KM**

### d) Challenges Faced in managing Knowledge

Various challenges were mentioned by the interviewees. The most common of the challenges being lack of tools. The interviewees mentioned that tools were not there that could aid in managing knowledge. They mentioned that the tools that were available were not adequate and some needed more knowledge on how to go about using them. They mentioned poor filing and record keeping methods also affected how knowledge was managed. Among other challenges faced was poor communication, lack of/limited internet access, culture and many others which are mentioned in Figure 4.4 below.



**Figure 4-4: KM challenges**

#### **4.2.3 Analysis of the results from selected Government Ministries**

##### **a) Background of interviewees**

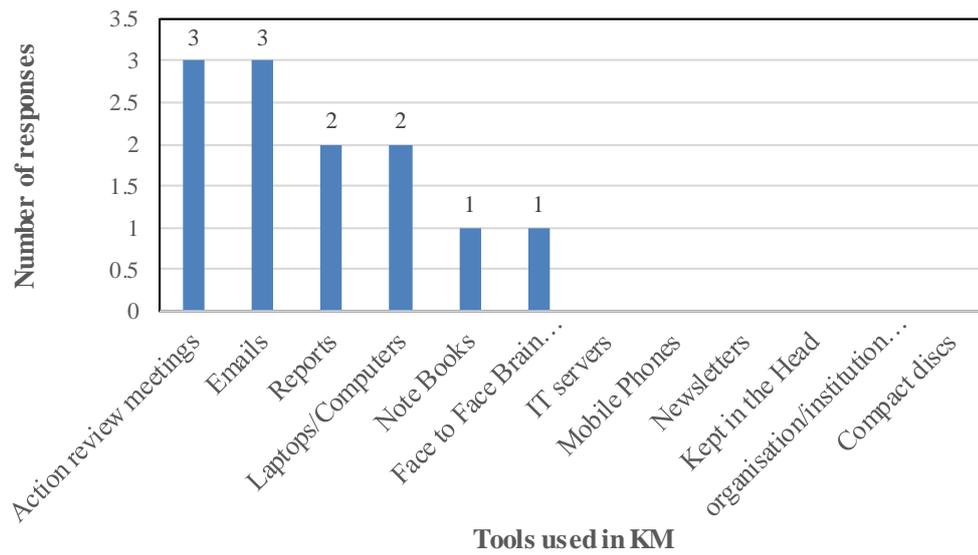
The target for the interviewees was 5 but only 3 were interviewed. Of the 3, 1 was a project manager and 2 were project team members. The experience for all the interviewees was over 10 years.

##### **b) Knowledge Management Process**

The 3 interviewees mentioned that they create, share, apply and store knowledge. This constitutes a KM process. The differences were only in how they managed the knowledge.

##### **c) Knowledge Management Tools**

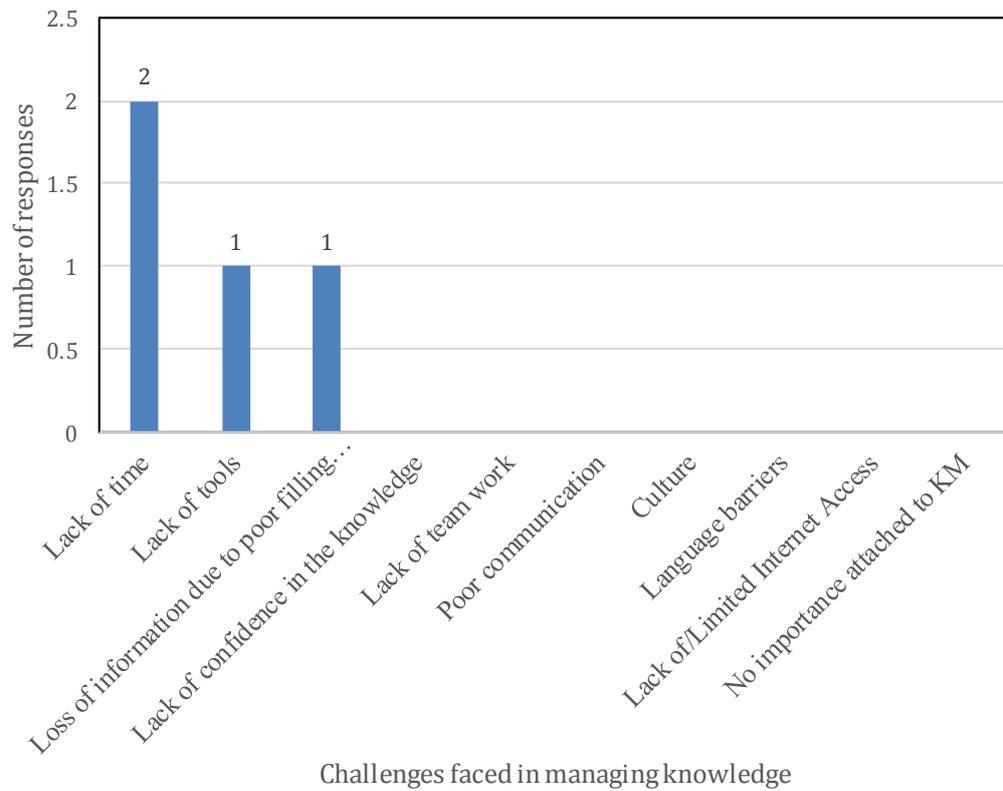
The interviewees did not have much to say on the tools they use in managing knowledge. All three mentioned emails and action review meetings as means of managing knowledge. Reports, laptops/computers note books and face to face brain storming sessions were also mentioned as tools used in managing knowledge. Figure 4.5 illustrates the information obtained in a chart form as shown below.



**Figure 4-5: Tools used in managing knowledge**

**d) Challenges Faced in managing knowledge**

Only 3 challenges were identified. One was that of poor record keeping, the other was that of lack of IT tools to manage knowledge and lastly lack of time. An illustration of the responses is given in a chart as presented below in Figure 4.6.

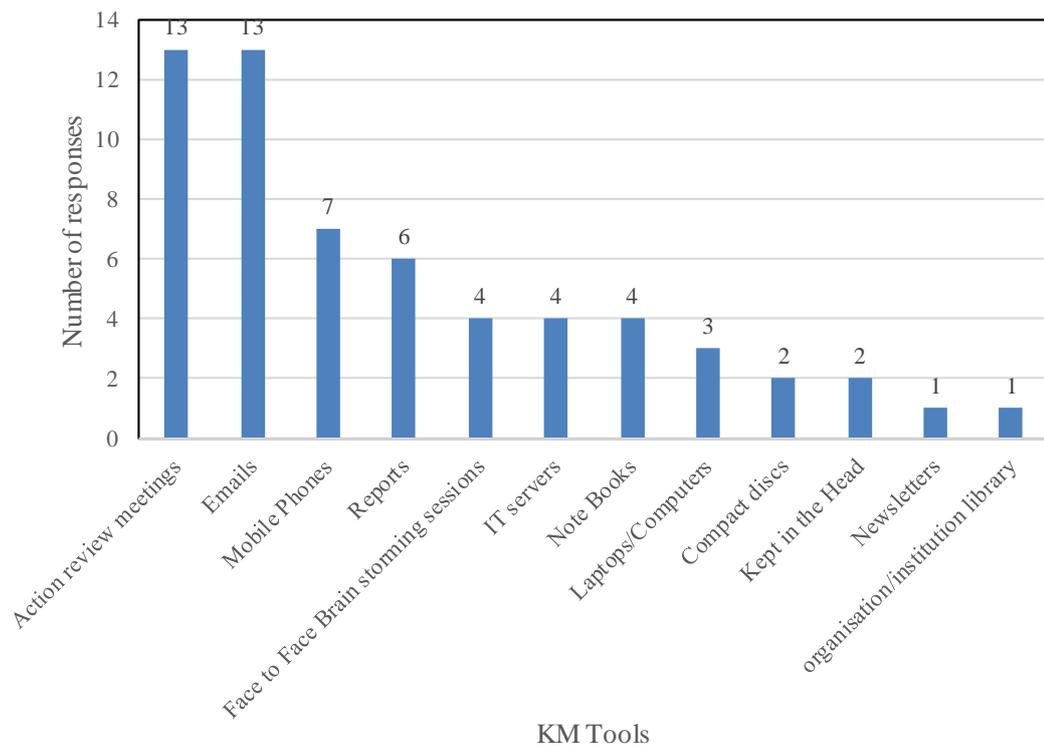


**Figure 4-6: Challenges faced in KM**

Having analysed the results separately, the information was then collectively analysed regardless of the organisation the interviewees were from.

**4.2.4 Analysis of the Knowledge Management tools used by all the Interviewees**

Figure 4.7 below illustrates the tools used by all the interviewees regardless of the sector they are in.



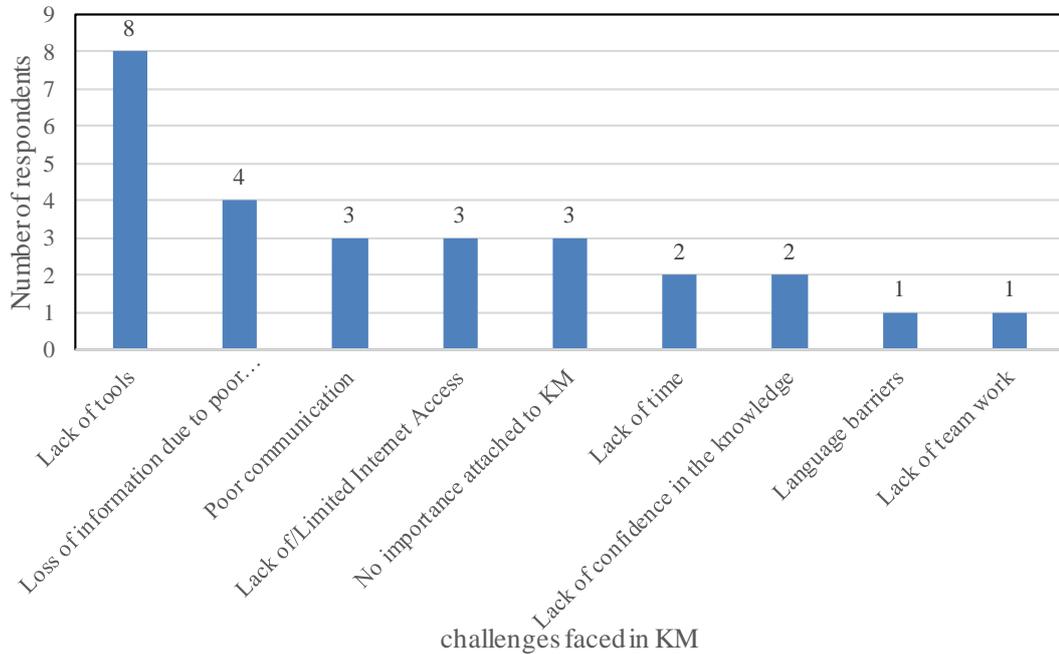
**Figure 4-7: KM tools used by all Interviewees**

As can be seen from the responses in Figure 4.7, Emails and Action review meetings are the widely-used methods for managing knowledge. Phones are second in ranking from the two. It can be seen from these responses that the most widely used tools in managing knowledge are the non-IT tools. The IT tools are not widely used as seen above. We will now analyse the challenges which explain why IT methods are not widely used in comparison to the non-IT methods.

#### **4.2.5 Analysis of the Challenges faced by all the interviewees**

Various challenges which are depicted in Figure 4.8 were faced by the interviewees. The most common challenge that was mentioned was that of lack of tools. On lack of tools, the interviews mentioned with modern technology it was imperative that the methods of managing knowledge involved were IT based. The interviewees mentioned that IT based KM tools also faced challenges on how to use the technology and internet access in some areas was a problem. Other interviewees were not aware of the tools that were available for the management of knowledge. For non-IT KM tools, the

challenge mentioned was that of poor filling and record keeping. Another interviewee even mentioned the lack of record clerks. The other challenges are as highlighted in Figure 4.8 below.

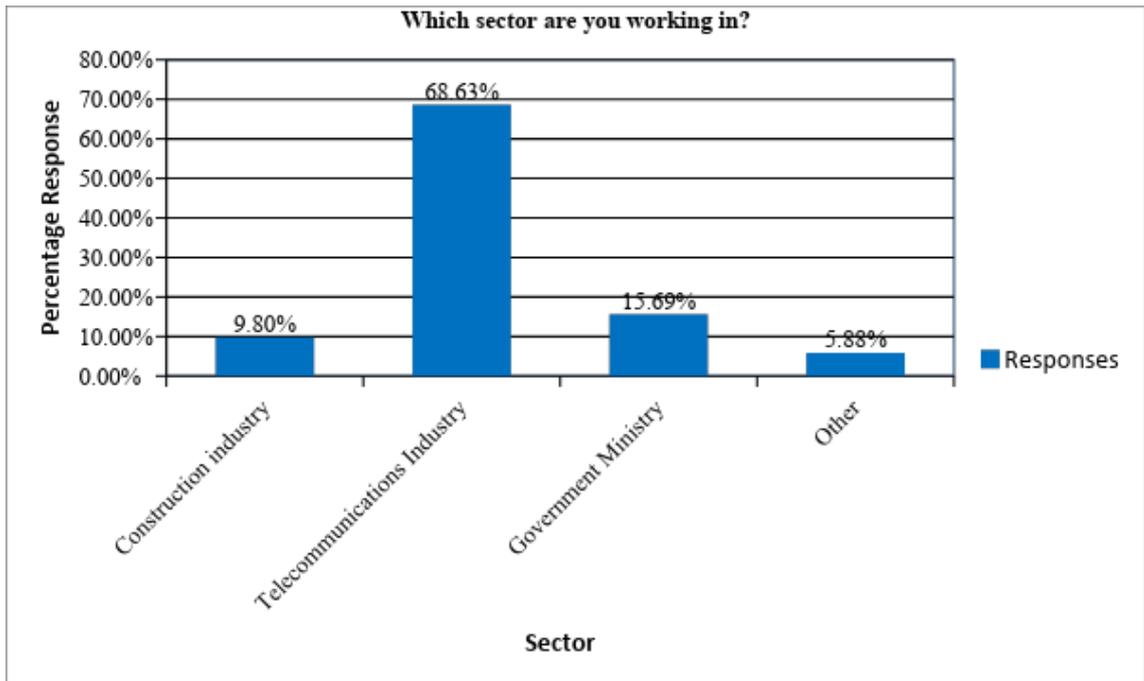


**Figure 4-8: KM challenges**

What could be drawn from the interviewee’s response was that they were aware of KM management processes. They knew that it was important to manage knowledge. The KM process identified from the interviewees was: Create, Share, apply and Store. The biggest challenge was that of lack of tools. Of interest was also the use of mobile phones as one of the tools for managing knowledge, via WhatsApp and other useful applications.

### 4.3 Analysis of data obtained from questionnaire

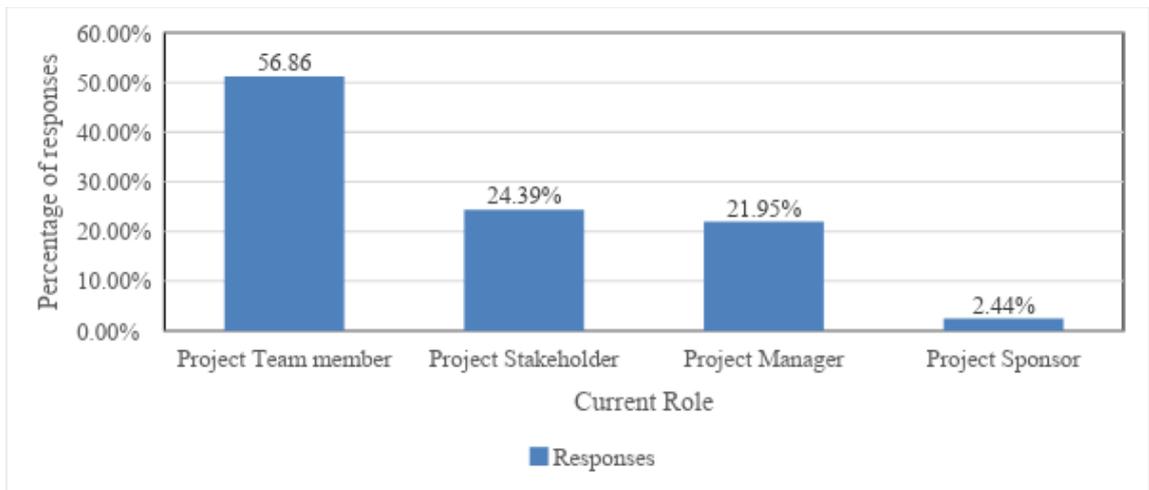
A total of 70 questionnaires was distributed, out of which 51 responses were obtained. These questionnaires targeted the Telecommunications Sector, Construction industry and a few selected government ministries. Most of the respondents were from the Telecommunications industry which comprised 68%, 24% from the construction industry and 8 % from the government. This information is as shown in Figure 4.9 below. The questionnaire survey was distributed over a period of 2 months from 1<sup>st</sup> May to 30<sup>th</sup> June 2017.



**Figure 4-9: Sectors Respondents are working in**

#### 4.3.1 Background of the Respondents

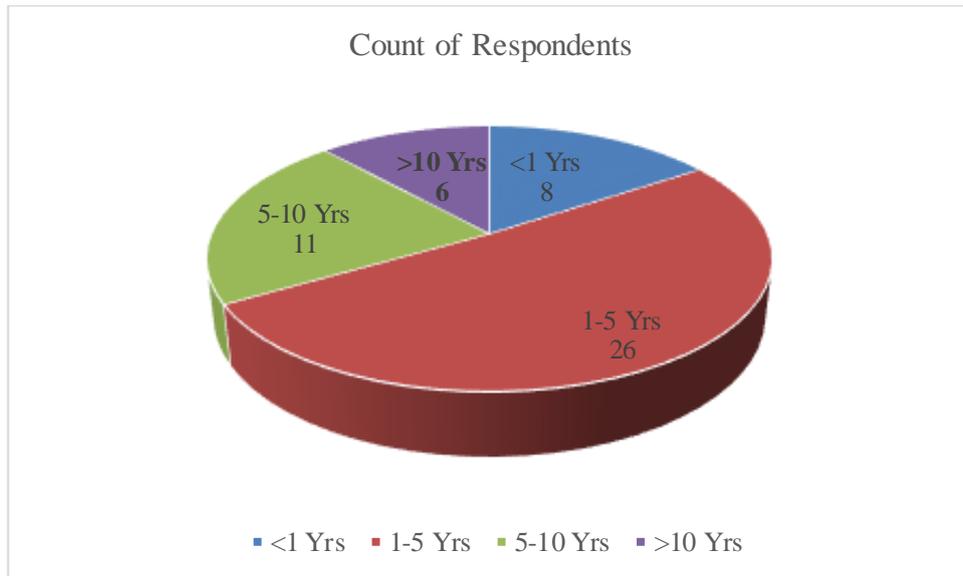
The respondents that answered the questionnaire ranged from Project Managers, project team members, project stakeholders and project sponsors. The majority were project team members. Fig 4.10 below demonstrates the profile of the respondents.



**Figure 4-10: Profile of Respondents**

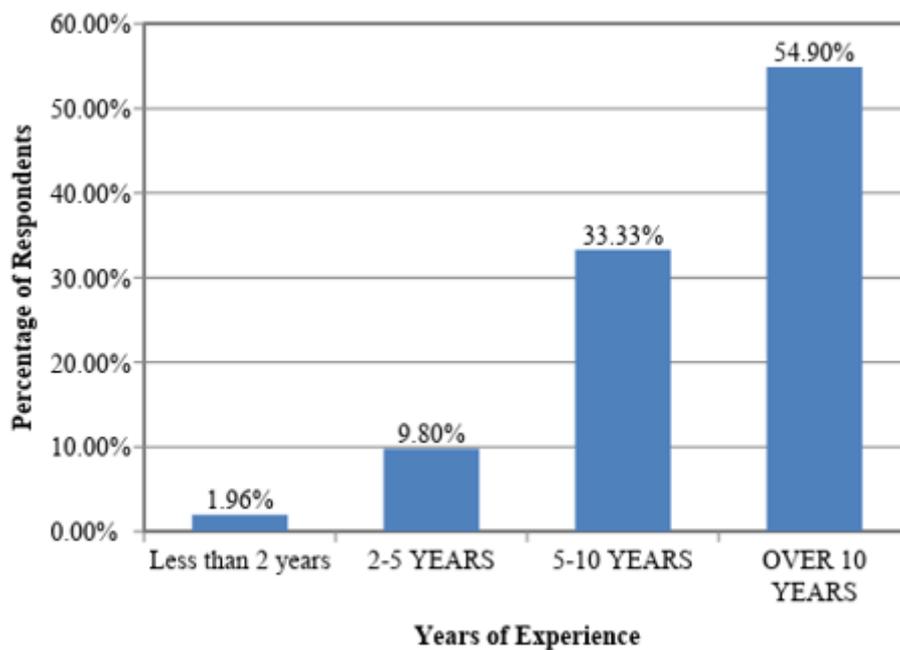
As shown in Figure 4.10, 56.86% which was the highest comprised of Project Team members. The percent for other was 27.45 for those that couldn't identify themselves with the categories that were given in the options. The respondents had varying number

of years' experience as shown in Figure 4.11. The experience ranged from 7months to 16years.



**Figure 4-11: Years of Experience for respondents**

As can be seen from Figure 4.11, most of the respondents, 51% had between 1-5years experience, followed by 22% between 5 - 10 years. This years of experience was with reference to the roles they are currently holding which was represented in Figure 4.10. The years of experience in their organisations is presented in Figure 4.12.



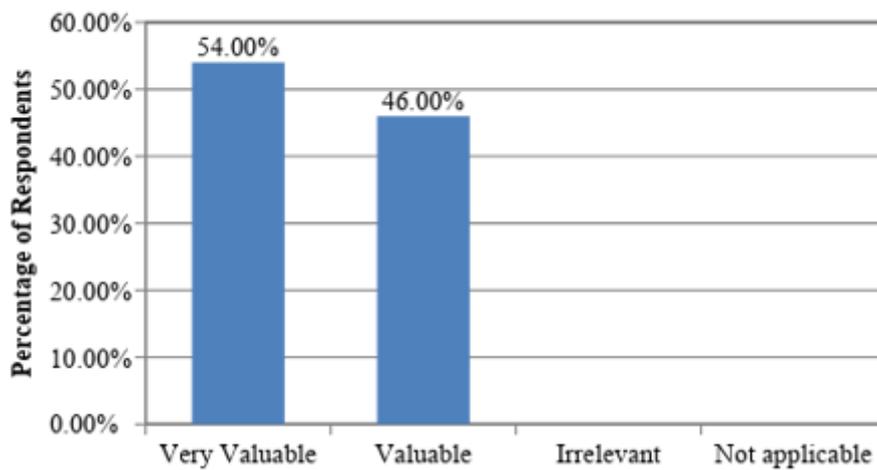
**Figure 4-12: Numbers of years' experience in the Industry**

As shown in Figure 4.12, 54.9% of the respondents had over 10years experience in the various sectors they were working in.

### 4.3.2 Knowledge Management Process

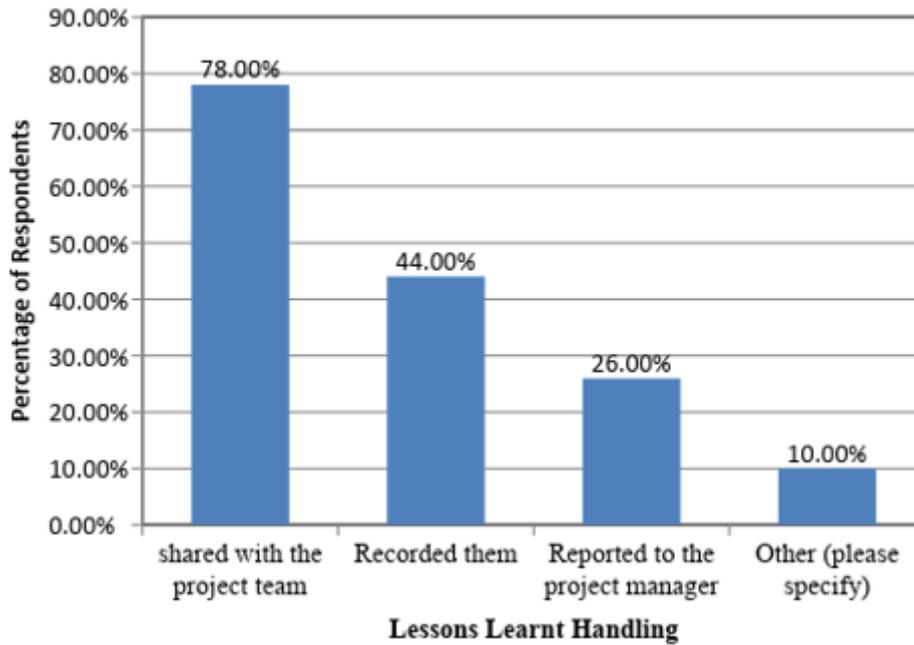
All the respondents except one acknowledged learning new things in the project. This response showed that the respondents create knowledge.

Of the 51 respondents, 54% said the lessons learnt were very valuable whilst 46% said it was valuable. Figure 4.13 shows their responses. This response showed that the knowledge created is very valuable to most of the respondents.



**Figure 4-13 Classification of Lessons Learnt**

These lessons learnt were shared with the project team according to 78% of the respondents. 44% answered that they recorded them whilst 26% responded that they report to the project manager. Of the 10% that had other ways of handling the lessons learnt, they wrote that they implemented the lessons learnt and used them on other projects. Figure 4.14 gives chart view of their responses.

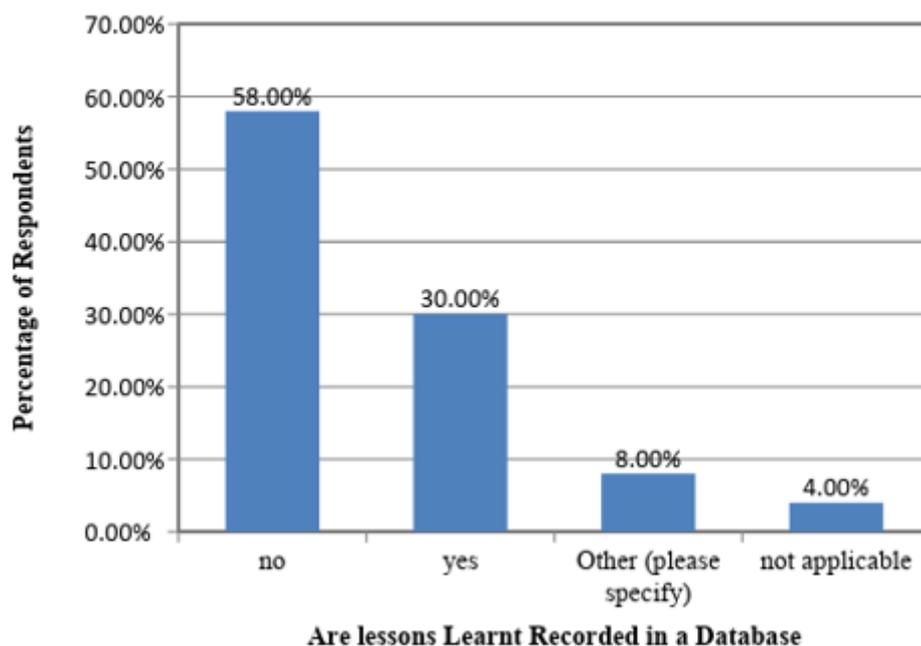


**Figure 4-14: How lessons Learnt were handled**

### 4.3.3 Knowledge Management Tools

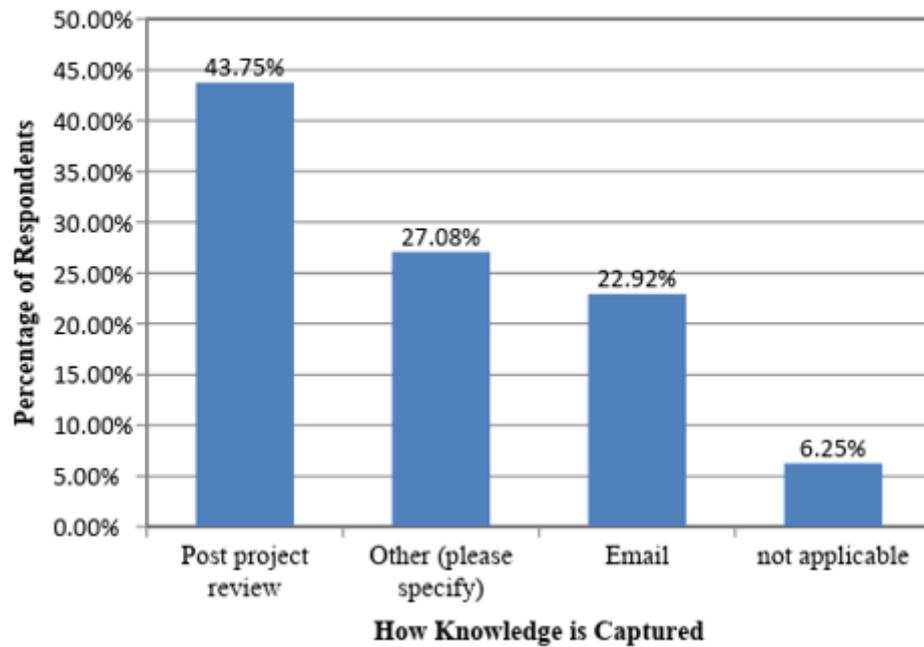
The respondents were asked questions designed to find out what tools they use in managing knowledge. The respondents were asked if they have database which they use to store knowledge. 58% of the respondents answered no, 30% answered yes, 8% shared their opinion through the other comment and 4% answered not applicable. On the 8% that answered on the other option, one of the respondents mentioned that they write in a note book whilst another mentioned in the comments that there is no common database. Figure 4.15 shows how the respondents answered this question.

Most of the respondents as shown in Figure 4.15 had no database they were using to record the lessons learnt. This implies the capture of the lessons learnt was not effective. Worse still the recording of the lessons learnt in a note book means the information was personalized. This implies if the person that recorded the lessons in the note book is unavailable or the book is lost, then the lessons are also lost.



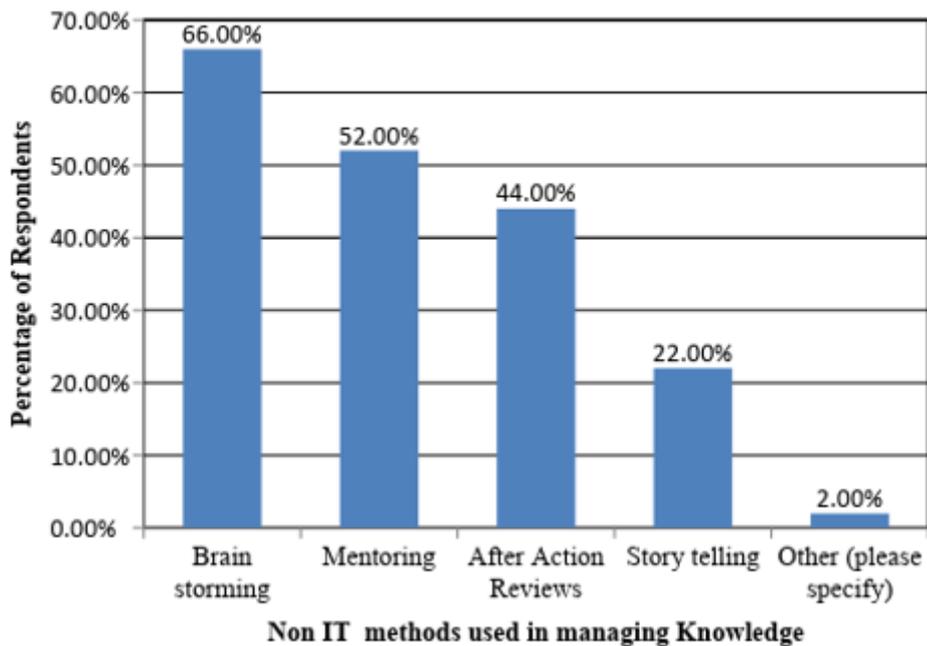
**Figure 4-15: Database where lessons learnt are recorded**

The other question that was asked was how the respondents generally capture knowledge in the projects they have been involved in. 43% of the respondents answered post project reviews, 27% made various comments ranging from notebooks, weekly and monthly reports and personal records. 22.9% answered emails and 6.25% answered not applicable. Figure 4.16 depicts the responses as shown. To find out what type of non-IT methods were used to manage knowledge, a question was asked. 66% mentioned brain storming, 52% answered mentoring, 44% answered after action reviews, 22% answered storytelling and 2% which comprised of one respondent commented on other and just put in “ok”. There were no other suggestions that the respondents gave apart from the ones given in the responses.



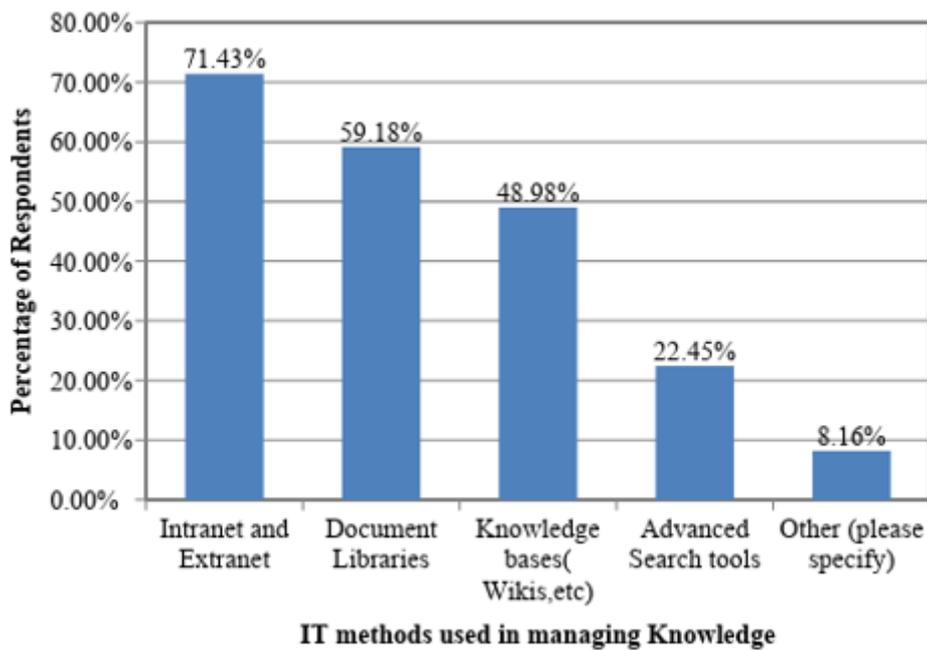
**Figure 4-16: How Knowledge is Captured in Projects**

Figure 4.17 below shows the respondents answers on the non-IT methods used in managing knowledge.



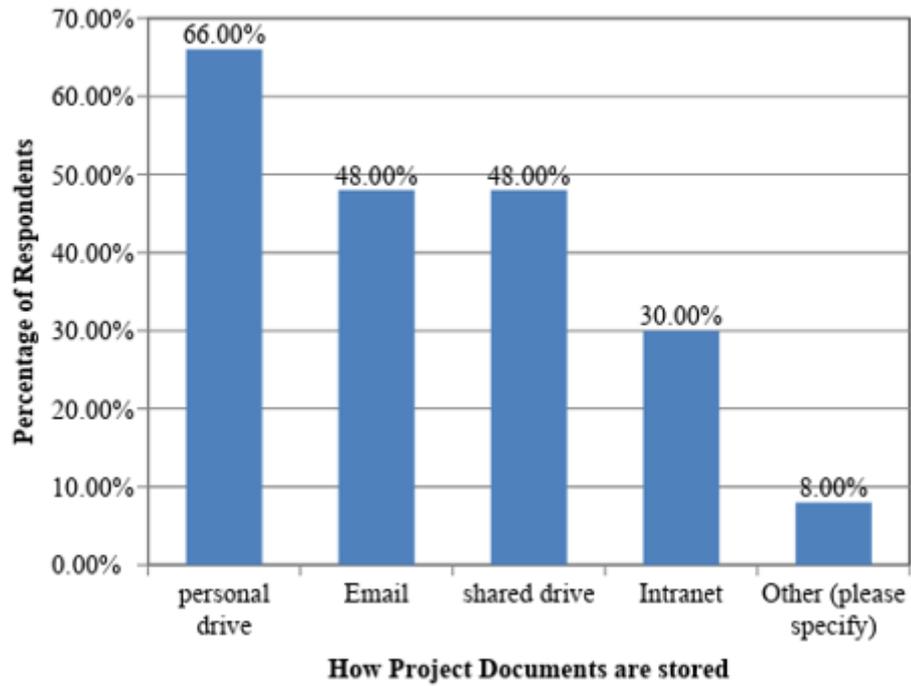
**Figure 4-17: Non-IT methods used in KM**

As shown above, their responses pertained to the non-IT methods used to manage knowledge. Apart from non-IT methods, a question was asked to find out if the respondents use any IT methods to manage knowledge. 71% of respondents answered that they use the intranet and extranet. 59.18% of the respondents that they use documents libraries whilst 48.98% answered that they use knowledge bases. 22.45% answered that they use advanced search tools whilst in the comment box 8.16% of the respondents put in their comments. One of the respondents in the comments mentioned that no IT methods have been used. Another mentioned the phone through WhatsApp and Skype group chats. Figure 4.18 below gives a view of the responses given.



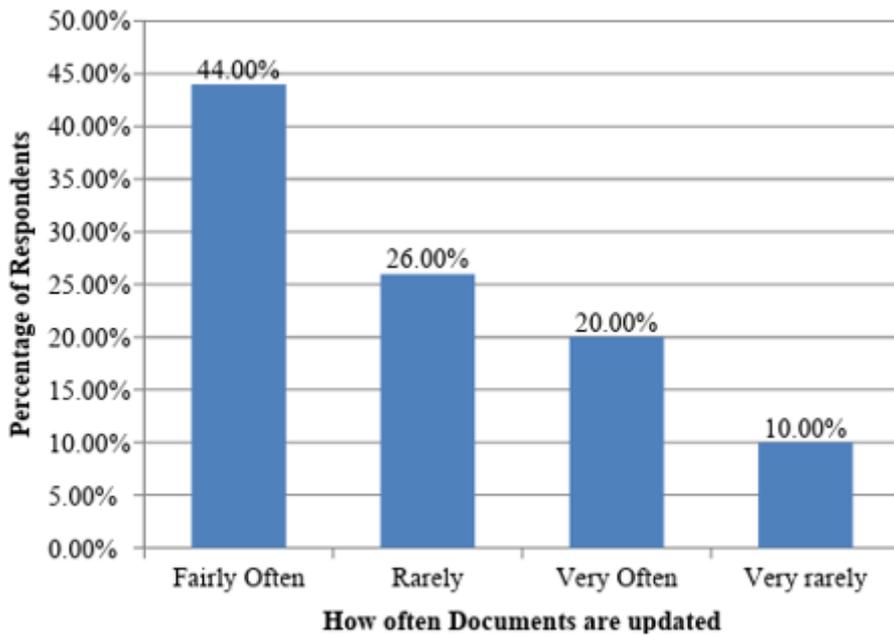
**Figure 4-18: IT methods used in KM**

Figure 4.18 above shows the IT methods the respondents had used before to manage knowledge. Storage of documentation which plays a key role in KM was also asked to the respondents. 66 % said they store the documents on a personal drive, 48% mentioned Email, 48% again answered shared drives whilst 30% answered intranet. 8% answered in the other comment box, one of the respondents answered share net, whilst another answered soft and hard copy filing and the other put not applicable. Figure 4.19 below shows their responses accordingly.



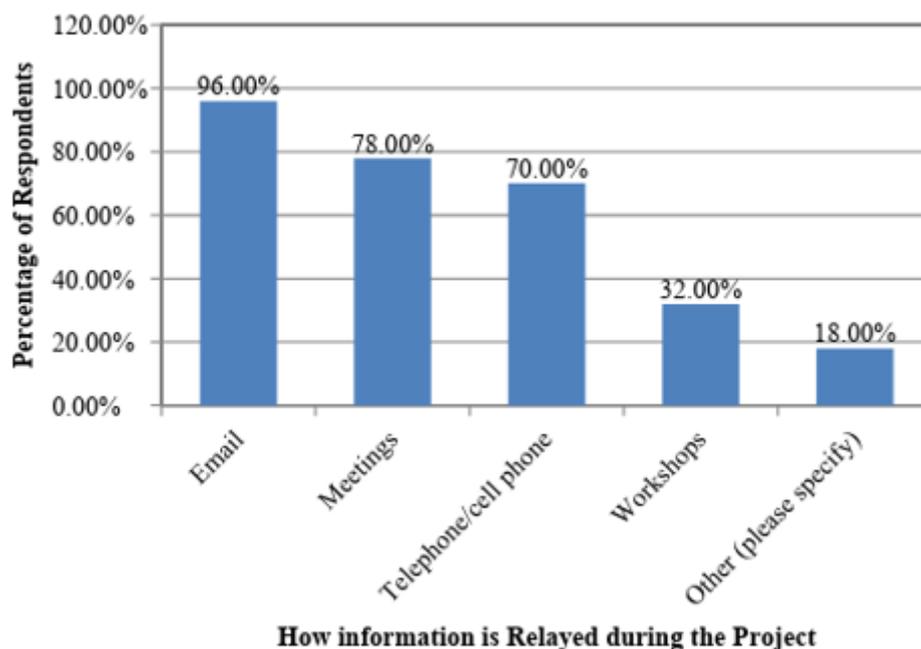
**Figure 4-19: Storage of Documentation**

Most of the respondents mentioned that the documents were updated fairly often. Figure 4.20 shows how often the documents are updated.



**Figure 4-20: How often Documents are Updated**

As shown above in Figure 4.20, 10% answered that they very rarely update the documents while 26% mentioned they rarely update the documents. 20% mentioned that very often the documents are updated. To know how information is relayed in a project, the respondents were asked a question. 96% answered that they relay information through email whilst 78% answered that through meetings. 70% answered that they use Telephone/cell phones whilst 32% answered that they relay information through workshops. In the other comment box, 18% put comments most of which mentioned WhatsApp which is part of cell phone. Figure 4.21 illustrates the responses.



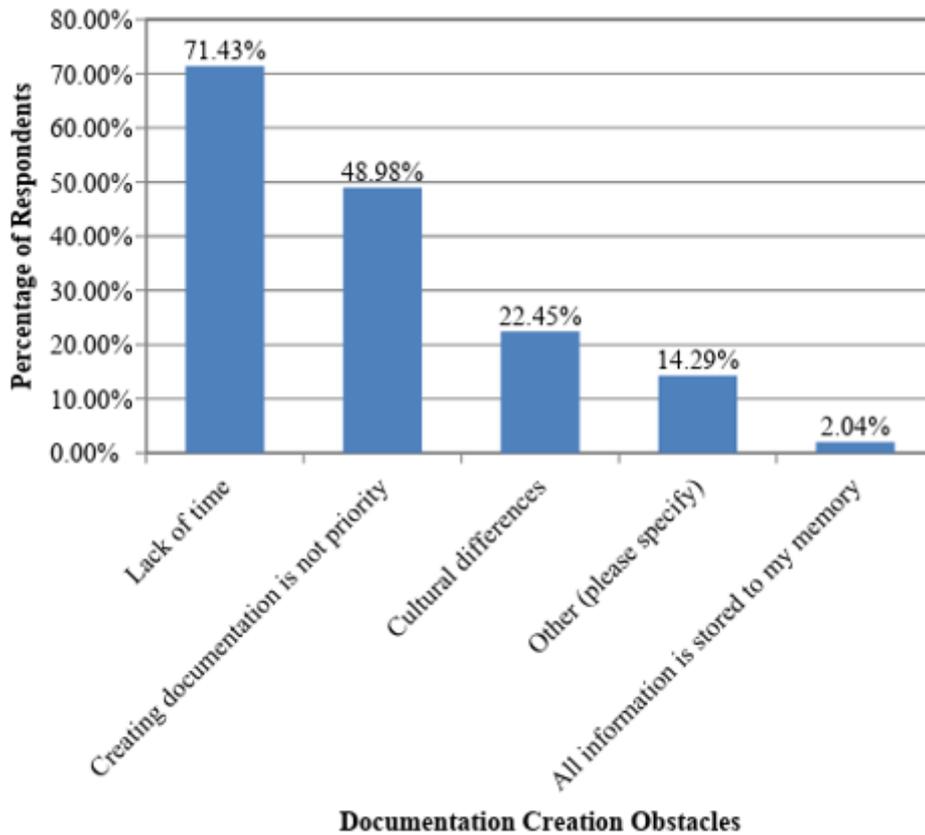
**Figure 4-21: Means of communication during Project**

These were the different questions and responses obtained to help find out what tools were being used to manage knowledge.

#### **4.3.4 Challenges faced in managing Knowledge**

The first question that was asked to get the challenges being faced in documenting the lessons learnt in a project. The biggest obstacle to the respondents was the lack of time. 71.43% respondents gave lack of time as an obstacle to documentation. 48.98% respondents answered that creating documentation was not priority. With

multinational organisations, cultural differences are bound to arise. 22.45% answered that cultural differences are an obstacle in documentation. In the other comment box, 14.29% of respondents gave comments. The comments given are given Table 4.1. Figure 4.22 shows responses obtained. 2.04% answered that they store the information to memory and thus see no need to document the knowledge.



**Figure 4-22: Obstacles in creating documentation**

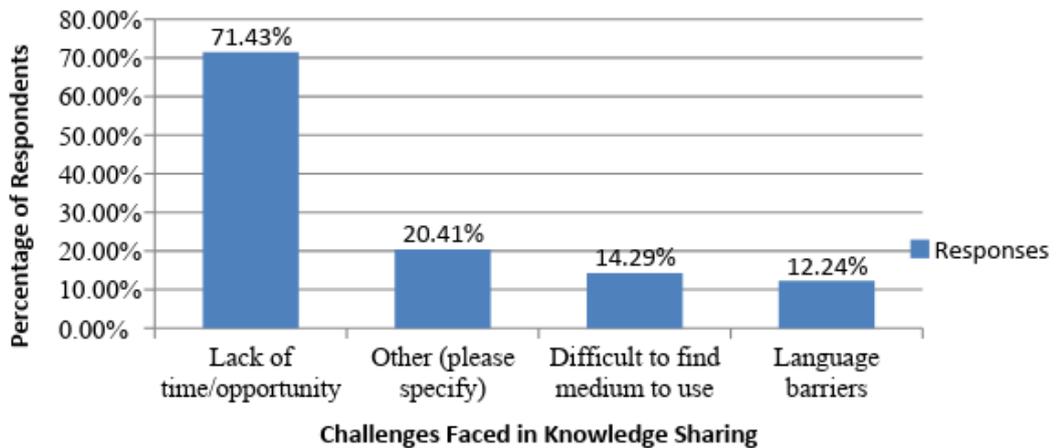
The Table 4.1 below shows the responses obtained in the comment box on the other option.

**Table 4-1: Obstacles in creating Documentation**

Respondent	Comments on documentation
1	Focus is more on closing the project than documentation.
2	Lack of right tools and templates.
3	Inadequate knowledge on how to create user friendly and easy to use documentation.
4	Lack of knowledge on information management
5	Lack of commitment to accurate documentation process

6	Some Team members take too long in terms of contributions on shared responsibilities
7	ok

As can be seen, the responses varied for the respondents on the obstacles faced during documentation. Figure 4.23 shows the challenges faced by the respondents in sharing knowledge.



**Figure 4-23: Challenges faced in sharing Knowledge**

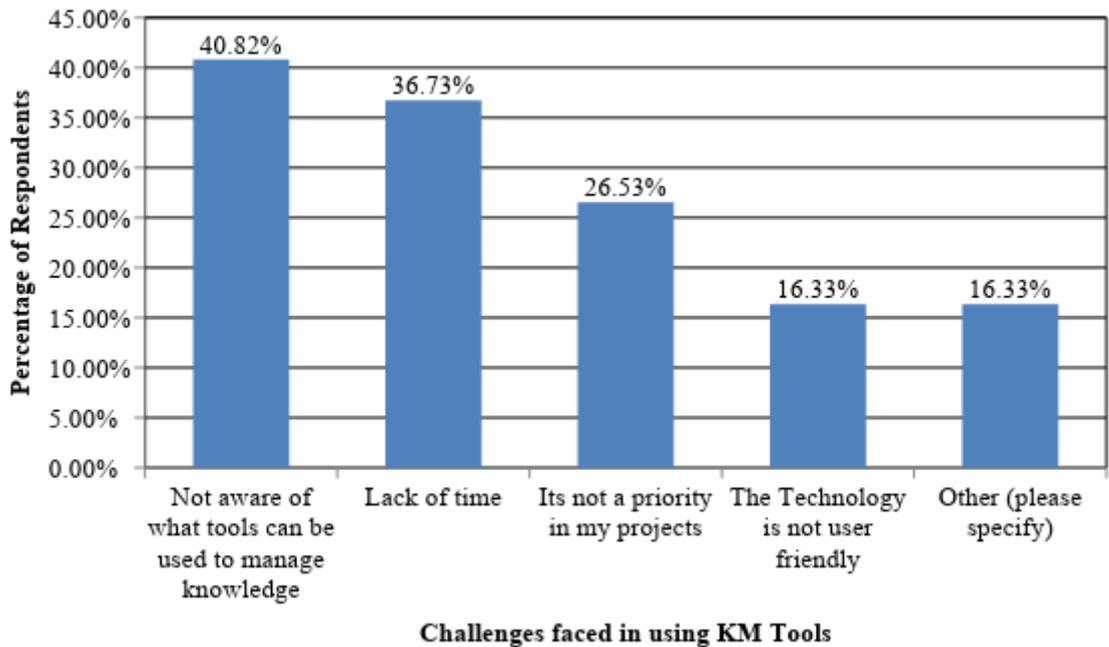
Most of the respondents i.e. 71.43% answered lack of time/opportunity as the challenge in sharing project knowledge. 20.41 % gave some comments in the comment box on other. Table 4.2 gives the responses in the comment box. 14.29% answered that it was difficult to find a medium to use whilst 12.24% answered language barrier as a challenge faced in sharing project knowledge.

**Table 4-2: Challenges faced in sharing project knowledge in creating**

Respondent	Comments on challenges faced in sharing knowledge
1	Reading culture is bad. You are assured no one will read documents even after documentation is done
2	Access to intranet for stakeholders in remote locations
3	I have not had any challenges yet
4	None
5	Ok
6	knowledge is best shared through cases
7	The organisation structure is not enabling

8	None
9	Other team members literally depend on other to do research for them as such project get delayed at times even missing the dead line
10	Limited will to share by recipients

As shown from Table 4.2, some respondents have not faced any challenges. When the respondents were asked what challenges they face in using knowledge management tools, 40.82% answered that they were not aware of the tools that can be used to manage knowledge. 36.73% answered that due to lack of time whilst 26.53% answered that it was not a priority for them during the project. 16.33% answered that technology is not user friendly. This is shown in Figure 4.24. In the other comment box, 16.33% gave their responses which are shown Table 4.3.



**Figure 4-24: Challenges faced in using KM Tools**

**Table 4-3: Challenges faced in using KM tools**

Respondent	comments
1	Focus is on project closure, time to update the tool is limited
2	Tools are internet based. Access sometimes is challenging to some teams in the project
3	no challenges per se
4	ok
5	none
6	there are no knowledge management tools

7	At times, it's difficult to get the right stuff you are looking for since most proper knowledge bases you must subscribe to get the right materials
8	Poor network connectivity to storage servers

As shown in the above table, some respondents had no challenges in using KM tools. Then for IT methods, there are challenges in connectivity i.e. poor network connectivity.

The respondents were also given an opportunity to write their views on KM. Table 4.4 below shows the various comments that were given.

**Table 4-4: Views on KM during and after project Implementation**

Respondent	Comments
1	lessons learnt can help to do future projects in an efficient and economical way
2	In my view, management of knowledge needs to be part of business practices as this reduces errors learnt from previous projects.
3	Knowledge management is rarely prioritized and projects lose out on key benefits as a result
4	It is very important to have good knowledge sharing platform before and after project implementation as project resources change anytime. It becomes easier for new project members to catch and manage the project. Also, problems and hurdles are easily tackled if there is proper project documentation
5	necessary for project success both current and future ones as it becomes the reference. Just need to be simple to minimize time spent by project resource on just updating the tool instead of working on the actual project.
6	It promotes synergies within the project team. A awareness of weaknesses and how to enhance KT. Easy reference and right resource mobilization for future projects
7	It needs to be enhanced through timely sharing of knowledge with key stakeholders. This process could help improve implementation of the project and provide valuable inputs to future projects
8	Very helpful and can be used as reference on another project. Can also be used as training material for teams who are new to the project
9	Knowledge should be shared during and after project implementation to help improve where projects go wrong. This is also vital to ensure that factors that may affect new projects are mitigated.
10	It is an important part of the project However due to ineffective tools and not being prioritized, it does not get enough focus
11	Knowledge management is key to the success of projects and must be kept safely for easy access by project members
12	information and knowledge gained need to be stored and shared for future use
13	Dedicated Time essential to review knowledge bases, update them
14	Knowledge management is key because it forms the basis of project success with regards to how it is collected, shared and used in the project. During project execution knowledge management plays a critical role in guiding the various stakeholders on how they relate to each other for the sake of integrated collaboration.
15	let other project team to avoid the same mistake, lesson learnt.
16	Record keeping is beneficial for future reference and in implementation other projects.

17	non-recording of data is a draw back in any a project. The habit of storing information should be enhanced to increased information availability and improve project performance in troubleshooting project snags and helping in deadline timeline improvements.
18	Even though knowledge management is becoming popular nowadays, few organizations are making use of it. If used properly and effectively, it can save a lot of time and effort during project management. This is because knowledge and experiences from previous projects can simply be re-applied for future projects. To get the best of knowledge management, the following processes should be observed: acquisition, storage, distribution, and use of knowledge.
19	Extremely important particularly for litigation purposes and for les sons learnt.
20	Key references for future projects
21	Documentation especially when so many changes have taken place during the project is very poor
22	it improves project efficiency
23	Knowledge management is a vital part of project implementation. It enables sharing of data and information can enhance the project delivery by team members. Post the project, it provides lessons that can be taken into consideration in planning and execution of future projects.
24	It helps in executing projects effectively
25	It is interpreted as work for a knowledge specialist and not the project team
26	Very important as it greatly aids in success of the overall objective.
27	Knowledge management is very important as it helps during the project and useful in future projects too.
28	knowledge management during and after implementation is very vital as this will aid in efficiency and effectiveness on other projects to come.
29	Rarely a priority in our environment. Mostly projects are closed without any a formal closeout reports
30	very important to be used for gauging the project performance and for future reference
31	It is important because all les sons learnt will assist to complete projects in time and for decision making purposes
32	Knowledge management during and after project implementation is very important as it creates a team spirit and aids in future projects. But generally, management after implementation is poor.
33	Managers are bombarded with an almost constant stream of data every day. According to David Derbyshire, “Scientists have worked out exactly how much data is sent to a typical person during a year - the equivalent of every person in the world reading 174 newspapers every single day” (Derbyshire, 2011, p. 1). This overload of data is making knowledge management increasingly more important. Three key reasons why actively managing knowledge is important to a company’s success are: 1.) Facilitates decision-making capabilities, 2.) Builds learning organizations by making learning routine, and, 3.) Stimulates cultural change and innovation.
34	it aids in capturing les sons learnt, aids in keeping the project on track and ensures there is less of scope creep, more quality etc.
35	It helps keep solutions and risks which can be useful when carrying out similar projects in future
36	Knowledge management should be encouraged in the sense that it works to our advantage if in the future we want to under a similar project, we will have reference point through the knowledge management.
37	It is very key. It makes project managers keep track of the progress and making informed decisions on whether the project is on track or not and what remedial measures need to be taken thereby improving chances of project success. Knowledge management also

	aides learning and improves ability to complete future projects as lessons are recorded. Further it makes project reporting easy and reports generated are informative.
38	Helpful for another project
39	It is essential as it acts as a point of reference in case similar projects later, which in tum aids in management of costs and avoidance of possible liabilities
40	it's important because it gives you the practical experience of what is needed to successfully implement a project
41	knowledge management is an under-utilized hub which can make project implementation even easier
42	During Project it's a priority, after no one cares, but it is important
43	Key aspects on operations and projects implementation. Lessons learnt is beneficial to future projects

Table 4.4 above gives the general view of the respondents. This is in response to the open-ended question on the view they have on KM. From the responses, the respondents emphasized the need to manage knowledge and its importance. One of the respondents, respondent 33 wrote how managers are bombarded with a constant stream of data every day. He quoted David Derbyshire, "Scientists have worked out exactly how much data is sent to a typical person during a year - the equivalent of every person in the world reading 174 newspapers every single day" (Derbyshire, 2011, p. 1). He emphasized that this overload of information making KM increasingly more important.

#### **4.4 Summary of Results**

The results obtained were from interviews and questionnaires. This method is called triangulation. Below is a summary.

##### **4.4.1 Knowledge Management Processes**

From both the interviews and the questionnaire, the respondents answered that knowledge was created, shared, applied and stored. What was varying was how the knowledge created was shared and stored. The lessons learnt were considered valuable and knowledge is meaningful information.

##### **4.4.2 Knowledge Management Tools**

The tools for the management of knowledge involved both IT and non-IT methods. The non-IT methods had brain storming as the main means of managing knowledge. Other respondents mentioned note books as a means of recording knowledge. Very

few respondents mentioned that they store information to memory. This poses a risk as the one that has the knowledge once they leave the organisation the information goes with them. Note books also not a very reliable way of keeping information. Also, worth noting was that most of the respondents mentioned that they keep project documentation on personal drives. This information should be best stored on a drive that is accessible to the project team. On the IT methods, the most common method used was Intranet and extranet. Intranet is a good means of managing knowledge except in instances where the knowledge is only accessible to one person as mentioned by one the interviewees. This poses a challenge if the individual having access to the knowledge base is unavailable.

Of interest was the growing use of cell phones to manage knowledge through WhatsApp groups and voice calls. This according to the respondents made it easier to communicate during the project. Also, worth noting was that project close out reports were not mentioned as much. Project close out reports were not used as much to manage knowledge compared to after action review meetings.

#### **4.4.3 KM Challenges**

The respondents highlighted a lot of challenges faced in managing knowledge. The most familiar challenges mentioned for both interviews and questionnaires was the lack of time and the lack of tools. The respondents mentioned that they were not aware of the tools they could use. Others mentioned that even if the tools to use were there, they didn't have time to start using them because managing knowledge was not considered a priority or important during the project. Also, not being aware of how to use the available tools. The other challenge faced for the IT methods was that of poor or lack of internet connectivity. This meant most of the respondents were not managing knowledge as they should due to the many challenges being faced.

## **CHAPTER 5: CONCLUSIONS, STUDY LIMITATIONS AND RECOMMENDATIONS**

### **5.1 Introduction**

The previous chapter discussed and analysed the results obtained from both interviews and questionnaires. This chapter presents the final remarks on the study whose main objective was to identify if knowledge management was being practised in selected organisations in Zambia.

### **5.2 Conclusion**

Knowledge is a key asset for any organisation that seeks to remain competitive in a dynamic market. From the study, the importance of knowledge could not be over emphasised. Knowledge proved to be useful and thus the need for it to be managed. From the study, the management of the knowledge was not straight forward.

To know if knowledge management is practised, there was need to find out what tools were in use. From the study, it was discovered that the main challenge was the lack of tools. Without tools, it is not possible to manage knowledge efficiently. It was evident that even if knowledge was being managed, it was poorly managed. Personal drives were the main means of managing knowledge which is not a reliable way of ensuring knowledge is shared. Knowledge is poorly managed as is seen from the study.

The poor management as seen from the study is due to the challenges highlighted in the results. Tools need to be availed to project members to ensure they can manage knowledge. When these tools are availed, there is also a need to ensure they are taught how to use the available tools. With the world that keeps evolving, it is important to highlight the IT methods available for the management of knowledge. The other main challenge that was mentioned was the lack of time. From the study, it was clear that importance of KM was known, but then incorporating it in the schedule for the project was a problem. The need to make time for managing knowledge during a project cannot be over emphasized. There is need for PMs to motivate team members to record and share knowledge using the available tools. Methods are available of providing incentives to those that create, record and distribute knowledge. Ideally, the process of knowledge management shouldn't take up a lot of time away from the project schedule. It is just perception that it will take time to manage the knowledge and its

importance is not emphasized. If there is time to record information in personal drives and note books then surely there is time to manage knowledge.

Knowledge Management models have been developed by various authors which can be used by different organisations. These models if implemented by the selected organisations in Zambia can assist to better manage knowledge.

### **5.3 Study Limitations**

The study focused on only a few selected organisations in a few sectors in the industry, with the majority being in the Telecommunications industry. The selected organisations were all within Lusaka, Zambia.

The questionnaires were distributed online and thus targeted only those with email addresses, implying the respondents needed to have internet access. Due to limited time, it was difficult to go to the organisations to administer the questionnaires in person.

The interviews only targeted 15 interviewees and 13 were interviewed.

### **5.4 Recommendations**

From the study, it was seen that the value of KM was understood and appreciated. For KM to be successful, the tools being used, challenges faced and the processes used need to be carefully reviewed. Below are the recommendations arising from the research:

- A study should be done to investigate the tools in use and why other tools are not being used. Also, a study to investigate organizations that have implemented knowledge management successfully and how the projects have turned out;
- A case study for one of the Industries would also be recommended in order to see how best they can implement KM systems
- Project managers should be sensitized on the importance of knowledge management and the need for them to ensure all their team members are aware. As a way of helping to sensitize, I will share my findings with my interviewees;

- If an incentive can be provided to the project team as a means of encouraging management of knowledge, it would prove helpful. Project team members if rewarded for creating, recording and sharing knowledge, it will encourage others to do the same; and
- The selected organizations should adopt KM models that will best suit their project environments. The model I would recommend is by Max (2014). The model shows the knowledge management cycle. Would recommend that an incentive be given when the knowledge management cycle is followed

## REFERENCES

- Institute of Lifelong Learning. (2009, November 12). *University of Leicester*. Retrieved from Module 9: Introduction to Research: <https://www2.le.ac.uk/projects/oer/oers/lill/oers/fdmvco/module9/module9cg.pdf>
- Ahmed, S. M., Azhar, S., Castillo, M., & Kappagantula, P. (2010). *Construction Delays in Florida: An Empirical Study*.
- Akhavan, P., & Zahedi, M. R. (2014). Critical Success Factors in Knowledge Management Among Project-Based Organizations: A Multi-Case Analysis. *The IUP Journal of Knowledge Management, Vol. XII*.
- Alstete, J. (2012). Challenges And Opportunities In Implementing A Knowledge Management Road-Map. *Knowledge Management Practice, Vol. 13, No. 3*.
- Beiryaei, H. S., & Vaghefi, S. E. (2010). Implementing Knowledge life cycle in the body of project life cycle by using knowledge management system.
- Blosch, M. (2000). Customer Knowledge. *Knowledge and Process Management, 265-268*.
- Cassivi, L., Saives, A.-L., Labzagui, E., & Hadaya, P. (2009). Developing a Knowledge Sharing Platform: The Case of a Bio-industry Research Consortium. *Information, Process, and Knowledge Management*.
- CDC. (2006, November 30). *Center for disease control and prevention*. Retrieved from CDC: <http://www.cdc>
- D. Stenholm, J. L. (2014). KNOWLEDGE MANAGEMENT LIFE CYCLE: AN INDIVIDUAL'S PERSPECTIVE. *INTERNATIONAL DESIGN CONFERENCE*. Dubrovnik - Croatia.
- Davenport, T. H. (1997a). *Knowledge Management at Ernst and Young*. Retrieved from <http://knowman.bus.utexas.edu/E&Y.htm>.
- Davenport, T., & Prusak, L. (2000). Working knowledge: How organizations manage what they know. *Harvard Business Press Place*.

- FluidSurveys. (2014, June). Retrieved from Fluid Surveys:  
<http://fluidsurveys.com/university/causal-research-identifying-relationships-making-business-decisions-experimentation/>
- FluidSurveys. (2014, June). *Fluid Surveys*. Retrieved from Fluid Surveys:  
<http://fluidsurveys.com/university/descriptive-research-defining-respondents-drawing-conclusions/>
- Frost, A. (2010). *Knowledge Management*. Retrieved from An Educational Knowledge Management Site: <http://www.knowledge-management-tools.net/>
- Ghani, S. R. (November 2009). Knowledge Management: Tools and Techniques. *Journal of Library & Information Technology, Vol. 29, No. 6*, pp. 33-38.
- Grant, R. (1996). Prospering in Dynamically-Competitive Environments: Organizational Capability as Knowledge Integration", *Organization Science*. pp. pp. 375-387.
- Greiner, M. E., Bohmann, T., & H. K. (2007). A strategy for knowledge management. *Journal of Knowledge Management*, 3-15.
- Haapalainen, P. (2013). Learning And Knowledge Management In Construction Projects. *Journal of Knowledge Management Practice, Vol. 14*.
- Hanisch, B., Lindner, F., Mueller, A., & Wald, A. (2009). Knowledge management in project environments. *Journal of Knowledge Management*.
- Kaliba, C., Muya, M., & Mumba, K. (2009). Cost escalations, Schedule overruns and Quality shortfalls on construction projects. *Internal journal of Project management*.
- Kerzner, H. R. (2013). *Project Management: A systems approach to Planning, Scheduling, and Controlling, 11th Edition*.
- M. Max Evans, K. D. (2014). A Holistic View of the Knowledge Life Cycle: The Knowledge Management Cycle (KMC) Model. *Electronic Journal of Knowledge Management Volume 12 Issue 2*, 92.
- MacDonald, S., & Headlam, N. (2012). *Introductory guide to research methods for social research*. Centre for Local Economic Strategies.

- Marilyn Leask, C. L. (2008). *Knowledge Management Tools and Techniques: Helping you access the right knowledge at the right time*. The Improvement and Development Agency for Local Government.
- Montana, J. (2000). The legal system and knowledge management. *Information Management Journal*, Vol. 34 Issue 3, p. 54-7.
- Nkhata, L. (1997). *Methodological Options in Policy Relevant Social Research*. Lusaka: Study fund.
- perkins, e. (2011). linking quality management and risk management. *linking quality management and risk management*, 3.
- PMBOK Guide. (2013). *A Guide to the Project Management Body of Knowledge (PMBOK Guide)– Fifth Edition*. Project Management Institute.
- Polyaninova, T. (2010). Suitable Knowledge Management in Project. *Masters Dissertations. Dublin, Dublin Institute of Technology*.
- Polyaninova, T. (2011). Knowledge Management in a Project Environment: Organisational CT and Project Influences. *Knowledge Management, Vine*, vol:41, iss:3.
- Rajasekar, S., Philominathan, P., & Chinnathambi, V. (Oct 2013). *RESEARCH METHODOLOGY*. Tamilnadu.
- Serrat, O. (2012). Managing Knowledge in Project Environments. *Asian Development Bank*.
- Smith, S. (2013, April 8). *Determining Sample Size*. Retrieved from Qualtrics: <https://www.qualtrics.com/blog/determining-sample-size/>
- Tanler, R. (1997). *The Intranet Data Warehouse: Tools and Techniques for Building an Intranet-Enabled Data Warehouse*.
- Team, F., & Team, F. (2014, February). *Fluid Surveys*. Retrieved from Fluid Surveys: <http://fluidsurveys.com/university/3-types-survey-research-use-can-benefit-organization/>

Tiwana, A. (2002). *Knowledge Management Toolkit, The: Orchestrating IT, Strategy, and Knowledge Platforms*. Prentice Hall.

Yeasmin, S., & Rahman, K. F. (2012). 'Triangulation' Research Method as the Tool of Social. *BUP JOURNAL*, Volume 1, Issue 1.

Yeong, A. (2010). Integrating knowledge management with project management for project success. *Journal of Project, Program & Portfolio Management*, 9-10.

Yeoung, A. (2010). Integrating Knowledge management with project management for project success. *Journal of Project, Program & Portfolio Management*, 9-10.

Young, D. R. (2010). *Knowledge Management Tools and Techniques Manual*. 1-2-10 Hirakawacho, Chiyoda-ku, Tokyo 102-0093: Published by the Asian Productivity Organization.

## APPENDICES

### Appendix 1

#### Structured Interview Questions

My name is Wendy Mwiimbu Mulawa. I am currently pursuing a master of engineering in Project Management at the University of Zambia. A dissertation is a school requirement which must be met to complete my studies. The title of my study is Knowledge Management in project based environments whose main purpose is to find out how knowledge is managed in project based environments, processes and tools used as well as challenges faced during knowledge management.

Thank you for participating in the interview and please note that the information provided is purely for academic purposes and will be treated in the strictest confidence.

#### Section 1. Personal Information.

- 1.1 Gender of Interviewee.....
- 1.2 Age group.....
- 1.3 Name of firm of Interviewee.....
- 1.4 Current position of Interviewee.....
- 1.5 Years of Experience in Project based environments.....
- 1.6 Interviewee's Firm's core business.....

#### Section 2. Knowledge Management Processes and Tools

- 2.1 What new knowledge have you acquired in any of the projects you have been involved in?.....
- 2.2 How did you handle the knowledge you acquired?  
.....
- 2.3 How do you record and store information during project implementation?  
.....
- 2.4 Do you share information during project implementation? If so, what means do you use to share information?  
.....

2.5 How do you record lessons learnt in a project?  
.....

2.6 Have you ever used any knowledge from a previous project? If so was it helpful?  
.....

2.7 Have you ever shared any information or lessons learnt from your project with another project? .....

2.8 What means of communication do you use to relay information during the project?  
.....

2.9 How do you keep your project documents?  
.....

2.10 Please share the non-IT and the IT methods you use to manage knowledge.  
.....

**Section 3. Challenges Faced in managing knowledge during project implementation**

3.1 What in your opinion are the challenges you face in sharing knowledge during the project?  
.....

3.2 What challenges do you face in recording and storing information during and after project implementation?  
.....

3.3 What challenges do you face in using knowledge management tools?  
.....

Thank you for your Time.

## Appendix 2

### Knowledge Management in Project Based Environments for selected Organisations in Zambia

#### Welcome to my Survey

I am a student at the University of Zambia in the school of engineering currently pursuing my masters of engineering in Project Management. My research topic is Knowledge Management in Project Based Environments. The main purpose of this study is to find out how knowledge is managed in project based environments, processes and tools used in knowledge management as well as challenges faced during knowledge management. This is part of the school requirement in order for me to complete my studies. It is purely for academic purposes and all responses will be taken in confidence. Please tick the appropriate answer and where applicable you can select more than one answer. The questionnaire should take you between 20-35minutes.

Thank you for taking time to participate in the Survey.

Wendy Mwiimbu Mulawa

### Knowledge Management in Project Based Environments

#### 2. Biographical Data

1. What is your gender?

- Female  
 Male

2. What is your age?

- 18 to 24
- 25 to 34
- 35 to 44
- 45 to 54
- 55 to 64
- 65 to 74
- 75 or older

3. Which sector are you working in?

- Construction industry
- Telecommunications Industry
- Government Ministry
- Other

Other (please specify)

4. What positions have you held in your organisation?

- Project Manager
- Project Team Member
- Project Sponsor
- Project Stakeholder
- other

Other (please specify)

5. What is your current role?

- Project Manager
- Project Team member
- Project Sponsor
- Project Stakeholder

Other (please specify)

6. About how long have you been in your current position?

Years

Months

7. How long have been working in this industry?

- Less than 2 years
- 2-5 YEARS
- 5-10 YEARS
- OVER 10 YEARS

---

## Knowledge Management in Project Based Environments

### 3. Knowledge Management Processes and Tools

This part of the questionnaire seeks to find out what processes and tools are used in order to manage knowledge. Please respond to the questions with the option that best suits your experience.

8. Have you ever learnt anything new in any of the projects you were involved in?

- No
- Yes

9. How can you classify the lessons learnt from the project?

- Very Valuable
- Valuable
- Irrelevant
- Not applicable

10. How did you handle the lessons learnt during the project?

- Recorded them
- Reported to the project manager
- shared with the project team
- Other (please specify)

11. Have you ever used any knowledge from a previous project to aid in project you were handling?

- yes
- no
- Other (please specify)

12. How did you obtain the knowledge from the previous project

Project close out report

Email

Case study

Knowledge bases( Wikis,etc)

Other (please specify)

13. Was the knowledge obtained from previous project helpful in your project?

yes

no

not applicable

Other (please specify)

14. Do you have a database where all the lessons learnt from your projects are recorded?

yes

no

not applicable

Other (please specify)

15. How do you generally capture knowledge in your projects?

Post project review

Email

not applicable

Other (please specify)

16. Have you ever shared lessons learnt from your project with another project team?

- yes
- no
- not applicable
- Other (please specify)

17. What non IT methods have you ever used to manage knowledge?

- After Action Reviews
- Brain storming
- Story telling
- Mentoring
- Other (please specify)

18. What IT methods have you ever used to manage knowledge?

- Knowledge bases( Wikis,etc)
- Document Libraries
- Advanced Search tools
- Intranet and Extranet
- Other (please specify)

19. How do you store your documents or files e.g. close out report?

- Email
- shared drive
- personal drive
- Intranet
- Other (please specify)

20. How often are these documents updated?

- Very Often
- Fairly Often
- Rarely
- Very rarely

21. What means of communication is usually employed to relay information during the project?

- Email
- Meetings
- Workshops
- Telephone/cell phone
- Other (please specify)

22. Please rate information sharing within your team?

- Very Good
- Good
- Average
- Poor
- Very Poor

4. Challenges Faced in Managing knowledge During Project Implementation

This part of the questionnaire is there to aid find out challenges which are faced in knowledge management during project implementation. Please tick the appropriate answer.

23. What in your opinion are the obstacles in creating documentation?

- Lack of time
- Creating documentation is not priority
- Cultural differences
- All information is stored to my memory
- Other (please specify)

24. What challenges do you face in sharing project knowledge?

- Lack of time/opportunity
- Language barriers
- Difficult to find medium to use
- Other (please specify)

25. What challenge do you face in using knowledge management tools?

- The Technology is not user friendly
- Not aware of what tools can be used to manage knowledge
- Its not a priority in my projects
- Lack of time
- Other (please specify)

26. In your opinion what are the advantages of managing knowledge during project implementation?

- None
- Aids in improving the way the project is carried out
- It can prove to be helpful for another project in the future
- It can assist in the success of a project
- Other (please specify)

27. In your own words, what are your views on Knowledge management during and after project implementation?

---

***THE END !!! Thank You!!!***

### Appendix 3

#### Project Close Out Report Template by CDC

---

<PROJECT NAME>

---

#### PROJECT CLOSE-OUT

Version <1.0>

<mm/dd/yyyy>

#### VERSION HISTORY

*[Provide information on how the development and distribution of the **Project Close Out**, up to the final point of approval, was controlled and tracked. Use the table below to provide the version number, the author implementing the version, the date of the version, the name of the person approving the version, the date that particular version was approved, and a brief description of the reason for creating the revised version.]*

Version #	Implemented By	Revision Date	Approved By	Approval Date	Reason
1.0	<Author name>	<mm/dd/yyyy>	<name>	<mm/dd/yyyy>	<reason>

UP Template Version: 11/30/06

*Note to the Author*

*[This document is a template of a Project Close Out document for a project. The template includes instructions to the author, boilerplate text, and fields that should be replaced with the values specific to the project.]*

- *Blue italicized text enclosed in square brackets ([text]) provides instructions to the document author, or describes the intent, assumptions and context for content included in this document.*
- *Blue italicized text enclosed in angle brackets (<text>) indicates a field that should be replaced with information specific to a particular project.*
- *Text and tables in black are provided as boilerplate examples of wording and formats that may be used or modified as appropriate to a specific project. These are offered only as suggestions to assist in developing project documents; they are not mandatory formats.*

*When using this template for your project document, it is recommended that you follow these steps:*

- 1. Replace all text enclosed in angle brackets (i.e., <Project Name>) with the correct field values. These angle brackets appear in both the body of the document and in headers and footers. To customize fields in Microsoft Word (which display a gray background when selected):*
  - a. Select File>Properties>Summary and fill in the Title field with the Document Name and the Subject field with the Project Name.*
  - b. Select File>Properties>Custom and fill in the Last Modified, Status, and Version fields with the appropriate information for this document.*
  - c. After you click OK to close the dialog box, update the fields throughout the document with these values by selecting Edit>Select All (or Ctrl-A) and pressing F9. Or you can update an individual field by clicking on it and pressing F9. This must be done separately for Headers and Footers.*
- 2. Modify boilerplate text as appropriate to the specific project.*
- 3. To add any new sections to the document, ensure that the appropriate header and body text styles are maintained. Styles used for the Section Headings are Heading 1, Heading 2 and Heading 3. Style used for boilerplate text is Body Text.*
- 4. To update the Table of Contents, right-click and select "Update field" and choose the option- "Update entire table"*
- 5. Before submission of the first draft of this document, delete this "Notes to the Author" page and all instructions to the author, which appear throughout the document as blue italicized text enclosed in square brackets.]*

## General Project Information

*[Enter high-level general project information. Expand this section to include more information if needed for the project..]*

	Description
<b>Project Name</b>	<i>[project name]</i>
<b>Project Description</b>	<i>[description of project]</i>
<b>Project Manager</b>	<i>[project Manager name]</i>
<b>Project Sponsor</b>	<i>[project Sponsor name]</i>
<b>General Comments</b>	<i>[additional general comments]</i>

	Baseline	Actual	Variance	% Variance
<b>Start Date</b>	<i>[dd/yyyy]</i>	<i>[dd/yyyy]</i>	<i>[days]</i>	<i>[0%]</i>
<b>Finish Date</b>	<i>[dd/yyyy]</i>	<i>[dd/yyyy]</i>	<i>[days]</i>	<i>[0%]</i>
<b>Hours</b>	<i>[hours]</i>	<i>[hours]</i>	<i>[hours]</i>	<i>[0%]</i>
<b>Days</b>	<i>[days]</i>	<i>[days]</i>	<i>[days]</i>	<i>[0%]</i>
<b>Budget</b>	<i>[000.00s]</i>	<i>[000.00s]</i>	<i>[000.00s]</i>	<i>[0%]</i>

## Management Effectiveness

*[Summarize how effectively the management needs of the customer and project were met. Highlight the significance of approved changes to the baseline, their impact on the project, and how they were managed. Compare baselines to actual and describe discrepancies. Identify and discuss specific issues that challenged the project/project team. Consider areas such as cost, schedule, scope, quality, risk, issue, change, communication, implementation and transition, regulatory compliance, and overall project team performance.]*

## Lessons Learned

*[Summarize project lessons learned including the cause of issues, reasoning behind the corrective action chosen, and other types of lessons learned. Identify and discuss specific issues that challenged the project/project team.]*

## Administrative Closure

*[Summarize project administrative closure activities such as procedures to transfer the project products or services to production and/or operations; stakeholder approval for all deliverables; confirmation that the project has met all sponsors, clients, and other stakeholder's requirements; verification that all deliverables have been provided and accepted; validation that completion and exit criteria have been met; regulatory compliance items.]*

**Contract Closure**

*[Summarize project contract closure activities such as formally closing all contracts associated with the completed project.]*

**Information Distribution & Archive**

*[Summarize the data archived in the project repository. The type of information actually archived will differ depending on the scope and type of project. Consider items such as contracts and proposals, business case, charter, scope statement, schedule, budget estimate, project management documents, surveys, status reports, checklists, and emails.]*

*[Archived items distributed to individual upon project close out. Note that this list may include individual without access to the project’s archive repository. This should be considered when deciding on an appropriate distribution medium.]*

Item	Distribution List	Distribution Medium
<i>[Archived Item]</i>	<i>[List]</i>	<i>[Email, fax, website, etc]</i>
<i>[Archived Item]</i>	<i>[List]</i>	<i>[Email, fax, website, etc]</i>

**Appendix A: Project Close-Out Approval**

The undersigned acknowledge they have reviewed the **Project Close-Out Form** and agree with the approach it presents. Changes to this **Project Close-Out Form** will be coordinated with and approved by the undersigned or their designated representatives.

*[List the individuals whose signatures are required. Examples of such individuals are Project Sponsor, Business Steward, Technical Steward and Project Manager. Add additional signature lines as necessary.]*

Signature: \_\_\_\_\_ Date: \_\_\_\_\_  
 Print Name: \_\_\_\_\_  
 Title: \_\_\_\_\_  
 Role: \_\_\_\_\_

Signature: \_\_\_\_\_ Date: \_\_\_\_\_  
 Print Name: \_\_\_\_\_  
 Title: \_\_\_\_\_

Role: \_\_\_\_\_  
\_\_\_\_\_

Signature: \_\_\_\_\_ Date: \_\_\_\_\_

Print Name: \_\_\_\_\_

Title: \_\_\_\_\_

Role: \_\_\_\_\_  
\_\_\_\_\_

### **Appendix B: References**

*[Insert the name, version number, description, and physical location of any documents referenced in this document. Add rows to the table as necessary.]*

The following table summarizes the documents referenced in this document.

<b>Document Name and Version</b>	<b>Description</b>	<b>Location</b>
<i>&lt;Document Name and Version Number&gt;</i>	<i>Provide description of the document]</i>	<i>Local or Network path where document is located&gt;</i>

### **Appendix C: Key Terms**

*[Insert terms and definitions used in this document. Add rows to the table as necessary. Follow the link below to for definitions of project management terms and acronyms used in this and other documents.*

*<http://www2.cdc.gov/cdcup/library/other/help.htm>*

The following table provides definitions for terms relevant to this document.

<b>Term</b>	<b>Definition</b>
<i>&lt;Term&gt;</i>	<i>&lt;Definition&gt;</i>
<i>&lt;Term&gt;</i>	<i>&lt;Definition&gt;</i>
<i>&lt;Term&gt;</i>	<i>&lt;Definition&gt;</i>