

KNOWLEDGE AUDIT METHODOLOGIES: THE IMPORTANCE OF KNOWLEDGE MANAGEMENT INFRASTRUCTURE

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DECLARATION

By submitting this thesis electronically, I declare that the entirety of the work contained therein is my own, original work, that I am the owner of the copyright thereof (unless to the extent explicitly otherwise stated) and that I have not previously in its entirety or in part submitted it for obtaining any qualification.

Date: March 2020

OPSOMMING

Die tesis oorweeg verskeie kennis-opname metodologieë in terme van kennisbestuursinfrastruktuur faktore.

Die hoofstroom kennis-opname metodologieë poog om vas te stel watter kennis reeds in die organisasie bestaan om die gaping te bepaal tussen die kennis wat deur die organisasie benodig word om sy doelwitte te bereik en die kennis wat reeds beskikbaar in die organisasie geakkumuleer is.

Huidige modelle en metodes vir kennis-opnames word geanaliseer in terme van 'n spesifieke raamwerk vir kennisbestuur wat infrastruktuur insluit as onderliggend aan en ondersteunend vir verskeie kennisbestuurstelsels. Hierdie infrastruktuur elemente bestaan uit organisasiekultuur, organisasie-struktuur, inligtingstegnologie-infrastruktuur, algemene gedeelde kennis en die fisiese omgewing.

Die analise toon dat kennis-opnames hoofsaaklik in die breër kennisbestuursraamwerk pas as deel van kennis-ontdekkingstelsels. Daar word egter aangevoer dat kennis-ontdekkingstelsels ook kennisbestuursinfrastruktuur-elemente bevat wat nie noodwendig oorweeg word deur die hoofstroom kennis-opname metodologieë nie, aangesien die klem hoofsaaklik op die vaslegging (eerder as die ondersteuning) van kennisinhoud lê. Daar word tot die gevolgtrekking gekom dat kennis-opname metodologieë wat hoofsaaklik fokus op die vaslegging van versweë kennisinhoud nie die mate waartoe daardie kennisinhoud in die onderliggende infrastruktuur ingebed is en die manier waarop dit deur daardie infrastruktuur gemedieer word waardeer nie.

Ten slotte stel die tesis maniere waarmee kennis-opnames ook die breër elemente van kennisbestuursinfrastruktuur in ag kan neem voor.

SUMMARY

The thesis considers various knowledge audit methodologies in terms of knowledge management infrastructure factors.

The mainstream knowledge audit methodologies all seek to determine what knowledge exists in the organisation to determine the gap between the knowledge required by the organisation to meet its goals and knowledge already available and accumulated in the organisation.

Current methodologies and methods for knowledge audits are analysed in terms of a particular framework for knowledge management that includes infrastructure as underlying and supporting various knowledge management systems. These infrastructure elements comprise of organisational culture, organisational structure, information technology infrastructure, common knowledge, and the physical environment.

The analysis shows that knowledge audits fit in the broader knowledge management framework primarily as part of knowledge discovery systems. However, it is argued that knowledge discovery systems also contain knowledge management infrastructure elements that are not necessarily considered by mainstream knowledge audit methodologies, because the focus is primarily on capturing knowledge content rather than considering the conduits of that content. It is concluded that knowledge audit methodologies focused primarily on the capturing of tacit knowledge content do not appreciate the extent to which that knowledge content is embedded in and mediated by the underlying infrastructure that is normally not considered as part of such knowledge audits.

Finally, the thesis proposes ways in which knowledge audits could also consider the wider knowledge management infrastructure elements.

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DEDICATION

This thesis is dedicated to my late mother, Thembekile Nene who taught me to persevere and prepared me to face the challenges with faith and humility. She was constant source of inspiration to my life. Although she is not here to give me strength and support I always feel her presence that used to urge me to strive to achieve my goals in life.

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CHAPTER ONE: INTRODUCTION

1.1 Introduction and rationale

Knowledge management is both a management intervention and an organisational systems feature that aims to improve the productivity of an organisation's knowledge and information assets, such as the expertise of the employees or the intellectual capital and business intelligence that can be considered proprietary or part of organisational memory, by designing and managing various knowledge processes such as knowledge creation, -capture, -codification, -sharing, and -integration.

Broadbent (1997, 8-9) state, “knowledge management is about understanding the organisation’s information flows and implementing organisational learning practices which make explicit key aspects of its knowledge base. It is about enhancing the use of organisational knowledge through sound practices of information management and organisational learning.”

Of course, before knowledge management interventions can be undertaken or knowledge management systems can be designed, an organisation needs to take stock of the already available knowledge and information assets in the organisation. This stock take process that is an important initial step to knowledge management is called a knowledge audit.

Generally, such a knowledge audit proceeds from an intimate understanding of the organisation's mission and goals to determine the knowledge required to reach those organisational goals. Thereafter the available knowledge in the organisation is inventoried and compared to the required knowledge to determine the knowledge gap or shortfall. At this point of the audit, an organisation has to determine how the shortfall can and should be made up: either by acquiring or developing the missing knowledge.

Knowledge management is also known by related terms such as organisational learning, organisational memory, competitive intelligence, and expertise management. Frequently mentioned in the literature is the requirement for knowledge audits before any knowledge management projects are initiated. However, the focus is almost solely on the need for knowledge audits, rather than on what their scope should be and exactly how they should be conducted. This means that in contrast to a plethora of research on knowledge management, comparatively little exists on actual knowledge audit methodologies.

However, regardless of the few published accounts that precisely declare how to execute a standard knowledge management audit, insight can be derived from the existing literature.

1.2 What is knowledge audit?

According to Schwikkard and Du Toit (2004, 106), a knowledge audit should be undertaken before a knowledge management strategy is decided upon. For a knowledge management audit to be a true reflection of the organisation's knowledge status, a holistic approach must be utilised, instead of solely focusing on content identification and document repositories. The argument in this thesis is that knowledge audits should also consider knowledge management infrastructure elements factors. Becerra-Fernandez and Sabherwal (2010, chapter 3) identify organisational culture, organisational structure, information technology infrastructure, common knowledge, and the physical environment as infrastructure elements that matter for knowledge management. A successful knowledge audit should be conducted holistically by involving the entire organisation in the process.

Dante (2008, 11) argues that there are two types of knowledge audits, namely k-audits (knowledge audit) and km-audits (knowledge management audit). The first is focused on identifying knowledge assets, whilst the second looks at the efficacy of the systems and techniques for leveraging those assets. However, in most of the literature the terms knowledge audit is used interchangeably with knowledge management audit.

Organisations undertaking knowledge management programs without first establishing the knowledge resources and knowledge needs risk failure. However, deciding on what knowledge to manage should be based on the usefulness of that the knowledge. It does not make any business sense to manage knowledge that is not useful for the organisation just because there is knowledge Management program and platforms in place.

Therefore, to succeed in implementing knowledge management, organisations have to start with knowledge audits and even undertake them periodically after the knowledge management programs are established to ensure that it delivers on its promise.

Success in knowledge management also depends on an enabling environment, because knowledge cannot be conscripted and requires various enabling conditions to support the

conversion of individual tacit knowledge to explicit organisational knowledge (Nonaka 1991).

Leibowitz *et al.* (2000,6) argues that knowledge audits “assess potential stores of knowledge i.e. finding out where knowledge is created, where it is already existing, and where it is needed to support decisions and actions”. By discovering these aspects, it becomes possible to decide on the most effective systems and workflows for storing, sharing, and applying knowledge in an organisation.

In summary, knowledge audits form the basis for preliminary investigations into outlining an organisation wide knowledge strategy and ascertaining relevant solutions to the organisational personnel.

1.3 Research problem

Knowledge audits aim to address the discovery and inventorying of organisational knowledge. To perform these two activities effectively, there are number of factors to consider when conducting the audit (the knowledge audit methodology) apart from the purpose of conducting an audit. Whilst there is consensus on the need for audits and its purpose, there is some debate regarding the methodology to be followed. This thesis is concerned with a comparison of various knowledge audit methodologies in the light of knowledge management infrastructure factors. The lack of comprehensive approach to conducting knowledge has various implications to the outcome of the audit. These implications include, ineffective and unreliable knowledge audit outcome, poor knowledge discovery and management, and a calamitous knowledge management strategy. Therefore, the research project tried to answer the following research questions:

- What knowledge management infrastructure enablers are critical to knowledge audits methodologies?
- To what extent do knowledge management infrastructure enablers influence the effectiveness knowledge audit methodologies?

1.4 Aim of the study

Knowledge audits identify what the organisation currently knows and determining where and in what form knowledge is available in the organisation, so that this knowledge can be leveraged and utilised. For this reason most knowledge audit methodologies focus on identifying existing, and in principle available, organisational knowledge content.

However, knowing what knowledge is available and where in an organisation is not a sufficient condition for knowledge management success. In other words, performing a knowledge audit focused on identifying knowledge content, is not sufficient to ensure knowledge management success, even though it might improve the chances that an organisation is addressing the correct problems and deploying the rightful resources to address them.

Becerra-Fernandez and Sabherwal (2004 and 2010) stress the importance of infrastructural elements for knowledge management systems success. This thesis take their view seriously and argues that infrastructure elements are as important as knowledge content for organisations.

For that reason, the aim of the study was to critically analyse and compare selected knowledge audit methodologies against the background of Becerra-Fernandez and Sabherwal's (2010) framework for knowledge management to indicate the limitations of the selected knowledge audit methodologies, and further propose enhancements for how knowledge audits should be conducted for their reports to be a true reflection of the organisation's knowledge health status by including an audit of infrastructural elements as suggested by Becerra-Fernandez and Sabherwal (2004 and 2010).

1.5 Objective of the study

The objectives of the study were as follows:

- To argue that knowledge audits are not just about capturing knowledge content.
- To explain the importance of knowledge management infrastructure elements when conducting knowledge audits.

1.6 Definition of terms

Knowledge

Davenport and Prusak (1998, 5) define knowledge as, "a fluid mix of framed experience, contextual information, values and expert insight that provides a framework for evaluating and incorporating new experiences and information."

The first part of their definition is focused on content: "a fluid mix of framed experience, contextual information, values and expert insight." In other words, both explicit and tacit knowledge content found in databases, organisational routines, or in the skills and professional knowledge of the employees.

This content is then useful for evaluating and incorporating whatever new information organisational members come across. According to this definition, existing knowledge content influences the absorptive capacity for taking on new knowledge content and for making information useful.

Types of knowledge

Explicit knowledge is content that can be stored and communicated as information without too much difficulty, because it is easily codifiable (Brown and Duguid 1998, 5). Since this type of knowledge can easily be converted to information, most knowledge management systems finds it easy to process. In fact, explicit knowledge can probably be dealt with quite easily with information management techniques that are already well established and which provides for the required activities of storage, retrieval, and dissemination of information content.

Far more difficult for knowledge management systems to deal with, is tacit knowledge. This refers to knowledge possessed by people in the organisation, best referred to as know-how or skill (Frost 2013, 1) and is acquired through experience and socialisation, rather than through study (Nonaka, 1991). This knowledge is hard to specify also for the people that hold it and often those that hold it do not realise that they have it until they are required to use it in a particular context. For these reasons tacit knowledge is not easily codifiable and even if it could be codified, it won't be immediately useful, because it has to be internalised again by someone before it can be used in action. Knowledge management initiatives that try to support tacit knowledge, usually relies on IT in a supporting role, placing more

emphasis on bringing people together in face-to-face interactions to enhance socialisation and tacit-to-tacit knowledge transfer.

Further distinctions include embodied and embedded knowledge (Horvath 2000; Blackler 1995). Both embodied and embedded knowledge are tacit forms of knowledge. What is embodied is found in individual people (individual tacit knowledge) and what is embedded is found organisational routines, processes and culture (social tacit knowledge). Knowledge embedded in organisational routines and processes is tacit because it is held among many participants in these processes and it is hard for any one person to specify the entire process.

Frost (2013, 2) says that "embedded knowledge refers to the knowledge that is locked in processes, products, culture, routines, artifacts, or structures". Knowledge can be embedded through formal management intervention, but embedding can also happen informally as ways of doing becomes established through normal social interaction.

Finally there is a distinction between individual and collective knowledge. What matters most for knowledge management is that collective knowledge that can be called organisational knowledge. It is easy to see that explicit knowledge captured in organisational documents, policies, patents, and so forth are instances of organisational knowledge, because these things also legally belong to the organisation. However, also embedded (tacit) knowledge is organisational knowledge, because even if the individual participants are replaced, the embedded routine or process lives on in the organisational culture. Organisations function by using the organisational knowledge, which gives them the ability to accomplish collective tasks that create value for its stakeholders.

What must be clear, is that the type of knowledge matters a great deal for the kind of knowledge Management activities that will be useful to manage that particular type of knowledge. Whilst explicit knowledge can be easily dealt with in IT systems, tacit knowledge requires different techniques. Similarly, embodied knowledge can be managed by managing the individuals within whom it is contained, whilst embedded knowledge is clearly far harder to manage, because the processes can be hard to understand and even harder to improve or change deliberately.

Knowledge management

Knowledge management is the application of management techniques in conjunction with technological systems to make both individual and organisational knowledge productive in the organisation. According to Broadbent (1997, 8), it "is understanding the organisation's information flows and implementing organisational learning practices which make explicit key aspects of its knowledge base. It is about enhancing the use of organisational knowledge through sound practices of information management and organisational learning".

Part of the mandate of knowledge management is to make the right knowledge available to a decision-maker at the time that it is needed. This logistical aspect of knowledge Management can only be achieved if the organisation knows where and in what format the required knowledge is available in the organisation. It is often the case that knowledge is available elsewhere in the organisation, but the part of the organisation that requires that knowledge at a particular moment is unaware that the knowledge already exists in the organisation. This leads to a situation that in knowledge management is labelled as "reinventing the wheel" many times over.

Sarrafzadeh (2005, 3) defined knowledge management as "a discipline that promotes an integrated approach to identifying managing and sharing of all of an enterprise's information assets." The information assets referred to are instances of explicit knowledge that can be stored as information, but also tacit knowledge that is either not yet codifiable, or is useful for evaluating and applying the explicit knowledge.

Lastly Broadbent (1997, 9) provides a definition that "knowledge management is about enhancing the use of organisational knowledge through sound practices of information management and organisational learning."

What can be seen from all these definitions is that knowledge management is a fairly wide category that includes both the management of existing knowledge and the development of new knowledge through innovation or learning. Furthermore, knowledge management is not only a management activity, it is also an organisational design issue since it involves the establishment of knowledge management systems.

According to Becerra-Fernandez and Sabherwal (2010, 42) knowledge management solutions depend on solid knowledge management foundations. Most authors only focus on the knowledge management solutions part, which consists of knowledge processes driven

and enabled by knowledge management systems. However, these systems depend on foundations that consist of a combination of knowledge management mechanisms (management techniques) and appropriate knowledge management technologies (usually supplied by IT-vendors). Both the mechanisms and technologies depend in turn on that foundation of knowledge management infrastructure (Becerra-Fernandez and Sabherwal (2010, 42-43).

Knowledge audit

Knowledge audit is an in-depth analysis of an organisations information and knowledge requirements and delivery modes. It is a way for organisations to determine its information and knowledge needs, by comparing what it needs to know with what it in fact knows. A typical knowledge audit consists of three major tasks, namely knowledge inventory, knowledge flows and knowledge mapping.

Stanley (2008, 4) calls a knowledge audit "a systematic and scientific examination and evaluation of the explicit and tacit knowledge resources in the company".

A knowledge audit is conducted to determine what is known in the organisation, where that knowledge is found, and in what format the knowledge is available. In addition a knowledge audit depends on establishing what knowledge is required to deliver on the business goals of the organisation, since the whole point of auditing is to determine what new knowledge needs to be acquired or developed to compensate for the gap between knowledge required and knowledge available.

Knowledge audit methodology

Knowledge audit methodology is the recipe for conducting an adequate knowledge audit. Whilst all methodologies share the overall goals of knowledge audits, they might differ in the order and nature of the steps they propose for conducting an audit. These differences are not surprising given the wide range of activities that count as knowledge management. It is thus to be expected that there will be differences how an audit is conducted in an organisation

focused on codification and an organisation focused on personalisation as knowledge management strategy.

1.7 Overview of research design and method

The research method was conducted by reviewing literature of various sources as a point of departure. A lot research has been conducted on knowledge audits and knowledge management frameworks, however very little has been written on knowledge audits infrastructure enablers. Where there is literature available on knowledge audit methodologies, it is either very outdated, only focuses on one infrastructure enabler/does not consider any infrastructure enabler that allow knowledge audit to be conducted accurately and comprehensively. Therefore, the research focused on literature review on knowledge audits, knowledge management framework and knowledge management infrastructure enablers.

The selection of the scholars was informed by their contribution to knowledge audits methodologies. Understanding that there is not much recent research published on knowledge audit methodologies, we had to look at knowledge audit methodologies published between year 2002 and 2015. Although some of the knowledge audit methodologies considered for inclusion in this project were published in the past eight years, they however provided good basis as to what knowledge audit should look like. Therefore, we hope to contribute more recent work on how knowledge audits should look like and hopefully be as comprehensive as possible. In addition to the knowledge audit methodologies selection for analysis in this project, we conducted a literature search on knowledge audit literature published within 2002 and 2015. The aim of conducting broader search was to ensure that the subject being investigated is covered as broadly as possible and ensure that all literature and methods pertaining to knowledge audits published within specified period are considered as summarised in chapter 2, section 2.7. It has been noted that literature discussed in chapter two, section 2.7, do not necessary propose new knowledge audit methodologies but rather make use of knowledge audit methodologies discussed in chapter two, section 2.6 to 2.6.9 and other additional knowledge audit methodologies which were published pre-2002. The aim of the research project was to investigate different knowledge audit methodologies and determine if they considered infrastructure enablers when conducting knowledge audits. The non-selected literature as discussed in chapter two section 2.7 do not propose knowledge audit models rather make

use of existing knowledge audit methodologies as frameworks to solve for research being conducted.

To explain the gap that exist currently in knowledge audits, the researcher identified a knowledge management framework that considered knowledge management infrastructure elements in the implementation of knowledge management programmes.

Using Becerra-Fernandez framework for knowledge management and supported by selective knowledge management frameworks published between 2001 and 2014 discussed basis to marry knowledge audit with what an ideal knowledge management programme should look like.

The project focused on the following key knowledge audit infrastructure aspects:

- Reviewed current knowledge audit processes as proposed by various methodologies.
- Critically analysed selected knowledge audit processes by using the Becerra-Fernandez framework for knowledge management as a guideline tool, since it contains most of the relevant infrastructure factors that might impact Knowledge audits.
- Provided recommendations on improving knowledge audits methodologies
- Proposed a knowledge audit methodology that incorporate knowledge management infrastructure enablers.

1.8 Overview of chapters

This thesis contains five chapters, chapter one provided an insight in terms of the meaning of knowledge management and knowledge audits. It further introduced the research problem, rationale of the study by providing the purpose, aim and objectives of the study.

Chapter two provided a review of literature critical to knowledge audits. It is evident that there is no standard way in which knowledge audits should be conducted.

However, based on knowledge audit literature there is several methodologies that are being proposed as frameworks to follow when conducting knowledge audits in organisations.

Some of these knowledge audit methodologies are very close to each other in terms of the stages they follow.

Further to the similarities in steps followed by knowledge audits, the focus point of most methodologies is more on content capturing, i.e. identification of knowledge repositories, data repositories, etc. However, knowledge audits are not merely about content discovery, but rather about looking at the organisation in its entirety and trying to understand factors that influence knowledge sharing initiatives in the organisation before the actual content audit can be conducted.

Chapter three provided an overview of knowledge management frameworks. It further introduced knowledge management enablers as factors critical to knowledge audit implementation. Chapter three also explains in detail the Becerra-Fernandez framework for knowledge management infrastructures, with emphasis on knowledge management infrastructure factors.

Chapters four provided an analysis of chapter two's knowledge audit methodologies and compared them to what chapter three's knowledge management frameworks and enablers required for successful knowledge audit implementation.

Chapter five provided a recommendation of the ideal scope of a knowledge audit methodology. Chapter five further emphasised the significance of knowledge management infrastructure factors when conducting knowledge audits. It also provided recommendations on how to tie knowledge management frameworks with knowledge audit methodologies to certify a holistic methodology to knowledge audit execution and concluded by describing how knowledge audits should be viewed going forward. It proposed a holistic approach to knowledge audits, which incorporated knowledge management infrastructure elements as enablers to knowledge audits methodologies.

1.9 Limitations of the study

Since there is a limited time to carry out the study, the thesis limits itself to selected instances of knowledge audit methods and knowledge management infrastructure factors. The processes and steps followed by nine selected knowledge audit methodologies will be compared. This list is of course not exhaustive, but it is sufficient to show that most knowledge audits are concerned primarily with content, rather than with infrastructure elements. The infrastructure factors mentioned by Becerra-Fernandez and Sabherwal (2004 and 2010) in their framework for knowledge management are used. There might be other infrastructure factors, but the chosen ones were sufficient for illustrating the importance of

including infrastructure factors in knowledge audits in addition to identifying knowledge content.

1.10 Summary

Chapter one introduced the problem statement, the purpose and objectives of the study and further defined concepts pertaining to knowledge management in order give an overview of what knowledge management and knowledge auditing is about. It further introduced the research method and an overview of the thesis chapter outline to give an indication what each chapter will incorporate. Lastly chapter one explained the limitations of the thesis.

CHAPTER TWO: LITERATURE REVIEW ON KNOWLEDGE AUDITS

2. Introduction

This chapter introduced literature relevant to knowledge audits and further gives a more detailed overview of what knowledge management entails, i.e. the knowledge management processes. The objective therefore of literature review was to introduce the concept of knowledge audits, and further understand what work has been conducted in the discipline of knowledge audits, which can be adopted by the thesis to respond to the research question that the thesis was trying to solve for. Of necessity this chapter had to briefly introduce knowledge management infrastructure factors, which enable effective knowledge management and knowledge audit implementation. However, these infrastructure enablers were discussed in more detail only in chapter three. Lastly, this chapter discussed the knowledge audit process and further introduced existing knowledge audit methodologies, which were analysed in detail in chapter four.

2.1 Knowledge audits and knowledge management

For any knowledge management program to be a success, a knowledge management framework must be formulated. It must clearly state what it aims to accomplish, as well as outline the elements required to achieve the overall purpose. Knowledge management audit exercises is one of the key elements that need to form part of any knowledge management project implementation.

Hylton (2004, 1) defined the knowledge audit as “an exam and systematic evaluations, but scientific, of the explicit and tacit resources including the knowledge which exists, where it is, when and how they were created and who has it in the organisation.”

Hylton (2002, 1) alludes that, knowledge management initiative is unlikely to succeed without a knowledge audit. Debenham and Clark give a detailed description of this standard view:

"Knowledge auditing is a planning document which provides a structural overview of a designated section of an organisation's knowledge, as well as details of the qualitative and

quantitative characteristics of the individual chunks of knowledge within that designated section. The document also identifies the knowledge repositories in which those chunks reside" Debenham and Clark (1994, 3).

As can be seen above, the usefulness of the knowledge audit is in part seen as a tool for data gathering about the state of organisational knowledge.

Choy *et al.* (2004, 70) sees a knowledge audit as something undertaken at the start of a knowledge management project, in other words as a first step of doing knowledge management by taking stock of the knowledge assets of the organisation.

In contrast a knowledge management audit, is a review of the efficacy of the knowledge management initiative itself and casts a wider net than just the available knowledge content. In other words, the knowledge management audit does not seek to just determine what knowledge is available where, and as such is not something undertaken at the start of a knowledge management initiative. Rather a knowledge management audit is a monitoring and evaluation step in an ongoing initiative that seeks to determine the health of the various knowledge processes in the organisation and the appropriateness of the management measures aimed at managing those processes.

It is clear that the knowledge management audit encompasses the knowledge audit and can consider wider aspects. In principle anything from the organisational strategy to its culture can be considered relevant for a Knowledge management audit, although it is in practice limited to very definite knowledge management procedures and systems.

Pa *et al.*, (2012, 2221) emphasise the importance of knowledge auditing as the first step of the knowledge Management processes. Knowledge auditing can identify and assess both the tacit and explicit knowledge and knowledge networks inside the organisation.

Knowledge auditing gives an understanding of the knowledge creation process, furthermore, it aids the organisation's readiness for knowledge management execution and detecting challenges and glitches of knowledge management implementation before walking into them without preparation. Therefore, the examination of knowledge enabling factors play a critical function in knowledge audits because part of the assessment of knowledge audits should be to assess and analyse the infrastructure factors that facilitate knowledge audits during and post knowledge management implementation.

The knowledge management auditing exercise is an important tool for monitoring knowledge management efficiency and demonstrating its ability to top management for support purposes.

One of the objectives of this research study was to explain that knowledge audits are more than just gathering data. Data gathering is just an aspect of the knowledge management audit process; however, there are other vital factors that need to be taken into consideration when conducting knowledge management audits.

Since knowledge management is more than just the management of knowledge content (in contrast to the way information management is mostly focused on documents and data), it will be argued that rather than initial knowledge audits focused only on knowledge content, methodologies that are on the knowledge management audit side of the spectrum will be more useful and should be expanded even further than is currently the case to include also various infrastructural and organisational elements that are not normally included when doing audits. In short, the argument here is for an audit method that tries to be even more inclusive than what the widest ranging current knowledge audit methodologies suggest.

2.2 Views on knowledge audits

Makambe (2015, 98-103), conducted a literature review on the knowledge audits views, and these are summarised below:

Debenham and Clark (1994, 3) sees it as a planning document. They state that a "knowledge audit is a planning document which provides a structural overview of a designated section of an organisation's knowledge as well as details of the qualitative and quantitative characteristics of the individual chunks of knowledge within the designated section knowledge audit methodologies."

Skyrme (1998) argues that a knowledge audit aims to "identify core information and knowledge needs", so that knowledge gaps can be revealed and efficient flows can be designed. Finally, the ultimate reason for conducting a knowledge audit is to be able to evaluate the knowledge contribution to the organisation's operational objectives.

Liebowitz *et al.* (2000) sees the knowledge audit as essential to good knowledge management practice. For them a knowledge audit is about the systematic examination of

the alignment of organisational knowledge available inside and the needs of customers that must be served by that knowledge outside the organisation.

According to Lauer and Tanniru (2001), a knowledge audit comprises of an alignment of knowledge objectives with knowledge processes in the organisation. This requires an initial analysis, before the project is undertaken.

Hylton (2002) stresses the fact that a knowledge audit is about being systematic and scientific when collecting data about the organisational knowledge resources and their context. He likens the knowledge audit to a diagnosis of an organisation's "knowledge health".

Paramasivan (2003) describes knowledge audits as primarily reporting tools aimed at the organisation's information orientation and its policies regarding knowledge and the systems that facilitate the knowledge flows in the organisation.

One thing that is common with these views is that they are in agreement with auditing knowledge effectively and to the benefit of a healthy knowledge audit state, however not a single view took into account the criticality of including knowledge management infrastructure enablers when conducting knowledge audits. The key issue with these views is that they are very generic and not practical. They look for what should be audited but they do not explain as to how to implement the audit. Again the focus is on capturing content and not necessarily the application of knowledge audits.

2.3 Purpose of knowledge audits

There are various reasons why organizations undertake knowledge audits. Among these reasons are:

- To determine the knowledge needs given the organisation's mission and goals.
- To identify and determine the value of the knowledge developed in the organisation.
- To locate the experts holding strategically valuable knowledge.
- To create a register of knowledge assets or intellectual capital.
- To generate an action list of "quick wins" that can be prioritised for implementation.

Makambe (2015, 98) argues that knowledge auditing is about a fact-finding process that includes aspects of analysis, interpretation and reporting on an organisation's policies and regulations regarding information and knowledge.

He also lists a number of knowledge audit objectives as follows:

- To give view and structure of knowledge in a specific area, i.e. operations unit within an organisation.
- To identify where knowledge is located within the organisation, i.e., databases, intranet sites or any other repositories.
- To locate critical knowledge for organisational performance that need to be managed effectively.
- To identify knowledge management gaps within the organisation.
- To eliminate repetition of work by identifying one area that has all knowledge required by the organisation and used that as a central repository for all knowledge needs.
- To create a high-level dashboard, which can be used as an indication of where particular knowledge is located in an organisation as well as where that knowledge is needed.
- To determine and fix choke points in knowledge flows across the organisation.
- To identify those people who are holders of knowledge critical for the organisation.
- To provide input data for the knowledge strategy of the organisation.
- To identify the relevant repositories of knowledge already existing in the organisation.
- Describing the nature and types of knowledge identified above.
- Estimating the value of the knowledge assets.

Taking into account the main objective of the study, which was to explain that knowledge audits should not be just about data discovery and should also include an estimate of knowledge management infrastructure elements that are not normally considered part of knowledge management solution, it seems that the knowledge audit descriptions of Debenham and Clark (1994), Chong (2004), and Paramasivan (2000) are more tailored to data gathering and that they do not take into consideration factors that can influence gathering that particular data during knowledge audit exercises in an organisation. Therefore, if the focus is merely on gathering data, one will require infrastructure to aid in

collecting the data. With the aforementioned knowledge audit objectives, there is no single infrastructure that is mentioned as a requirement to collect data. The challenge with knowledge management audits in most organisations is that they are mostly superficial in scope, since they focus on monitoring rather than thoroughgoing auditing. A further reason being that when knowledge management audits are conducted, mostly they are executed by consultants who do not really comprehend the business or had little time to get to understand the business processes, hence they overlook crucial properties that might influence knowledge audits.

2.3.1 When to conduct a knowledge audit

Olivier (2008, 9) argues that it is only necessary to carry out a knowledge audit when:

- Information overload is indicated in the organisation.
- Important knowledge cannot be located timeously.
- When strategic knowledge cannot be identified across different business functions.

For the insurances of this study, it is significant to highlight the aim of conducting knowledge audits and further explain questions that lead to the implementation of a knowledge audit exercise, to understand possible factors that might hinder the implementation of a knowledge audit project. Audit methodologies refer to the steps or processes followed when conducting knowledge audits.

Knowledge management scholars propose different methods or processes to conduct knowledge audits. However, they all differ depending on the organisation's knowledge management requirements, as well, as how knowledge management is defined in that certain organisation. Some are too narrow in scope and are limited to only knowledge discovery systems. They do not consider other factors like organisational culture, structure, environment, and existing policies within the organisation.

Henczel (2000, 213) states that there is no single methodology for knowledge audit process due to different structures, state and circumstance of organisations in which they are performed. Any organisation used a knowledge audit methodology that fit in with organisation's fundamental strategic drivers.

As argued by Henczel (2000), knowledge audits should be holistic in nature, and acknowledge the fact that knowledge management audits are not merely about capturing or

locating data. Knowledge management should be people centered; capturing data alone will not provide a true reflection on the knowledge management status of the organisation.

2.3.2 Components of a knowledge audit methodology

Part of why organisations carry out knowledge management audits, as opposed to mere knowledge audits, is to improve their self-understanding of the knowledge management processes that they instituted and to better understand the barriers to their knowledge management success. In this perspective the knowledge audit is a tool for discovering the critical success factors of knowledge management implementation projects and for revealing knowledge needs that might require development or acquisition.

Identifying knowledge needs is the starting point for most knowledge audits. Unfortunately this is also the most difficult step, since it demands an intimate understanding of what knowledge is required by employees in order to do their work. Often outsiders do not properly understand the true knowledge needs of teams in order for them to deliver on their targets.

For this reason, the determination of knowledge needs requires an elicitation process from the people actually involved. Surveys, interviews, or focus groups can be used to identify the knowledge needs of employees. Of course, this means that a knowledge auditor must have the required research skills to surface the hidden needs of people in an organisation and to interpret the results correctly.

2.3.3 Constructing an inventory of knowledge

After knowledge needs have been determined, the next step is to inventorise the available or existing knowledge in the organisation. This can be likened to a knowledge stock-take, since the inventory must not only list the existing organisational knowledge, but also indicate where it is stored and in what form it can be made available and along which channel.

Therefore, knowledge inventory aims to determine the following:

- Knowledge content available in the organisation in various repositories such in databases, libraries, on the intranet or sharepoint, and so forth.

- The exact location of that knowledge and how it can be accessed through the knowledge management system
- Access and retrieval channels of knowledge and information assets, and
- The relevance of knowledge management sources, i.e. for what purposes are the knowledge resources kept for.

2.3.4 Analysing knowledge flows

Olivier (2008,3) argues that an analysis of the various knowledge flows takes into account how the stock of knowledge is connected from where it is stored to the sites and situations where it is eventually needed.

Before the efficiency of the flows can be analysed, the pathways need to be discovered. This requires insight in the ways in which people search for required knowledge as well as their knowledge sharing behaviour in general.

The knowledge flow analysis must take the various types of knowledge into account, the conversion of knowledge from one type to another, and the systems and processes through which the knowledge content is transferred from one location to another.

Aspects of the knowledge flow analysis include:

- attitudes towards knowledge sharing and use
- processes of everyday work activities and how knowledge is conscripted or sought during problem solving.
- diagnosis of the processes by which knowledge is hoarded, protected, an NOT shared.
- a description of the technological systems that make the management of content possible as well as the sharing of knowledge.
- a consideration of the extent of use of knowledge management tools by the employees.

Analysing knowledge flows therefore entail understanding as to what extent the firm's systems effectively facilitate knowledge flows and link people with information needed.

2.3.5 Knowledge mapping

Paramasivan (2003, 506) advocates the creation of a knowledge map to visually represent the location of organisational knowledge. It consists of mapping the knowledge resources and where they are to be found in the organisation. The mapping can also include data on knowledge flows, indicating the pathways along which knowledge moves around the organisation.

If done properly the knowledge map should make which knowledge exists, where it is located, how it flows and where it is required for application.

2.3.6 Knowledge audit tools

In summary, knowledge audit tools can include the following:

- Questionnaires for collecting large amounts of data.
- Interviews for in-depth analyses of problems.
- Focus groups for investigating issues and understanding relations.
- Narration techniques for in-depth analysis of knowledge and the extent to which it is context related.

2.4 Knowledge audit methodologies

2.4.1 A systematic approach for knowledge auditing:

Jafari and Payani (2013, 3161-3163) proposed a systematic approach for knowledge auditing that follows the various stages outlined below:

Stage 1: Identifying an organisation's knowledge objectives

Identifying an organisation's knowledge objectives knowledge auditing and helps to prevent a focus on irrelevancies or peripheral aspects. Once the knowledge purposes or objectives are established it becomes possible to deduce the knowledge required for meeting those objectives and the level of knowledge that may be necessary for reaching the objectives easily.

Stage 2: Identifying an organisation's experts

Once the requisite knowledge is determined, attention can shift to the most likely location of the required knowledge. Most likely this knowledge would be found embodied in the organisation's experts or embedded in their routines of working together.

The target for this step is in other words the tacit knowledge in the minds of the organisation's experts and specialists. In addition these individuals can help auditors to judge the knowledge situation of the organisation, since they are the ones faced with the consequences of a knowledge shortfall or gap.

Stage 3: Identifying an organisation's knowledge documents

This step focuses on the identification of explicit knowledge found in the information resources of the organisation. It is easier to locate these since they are documents usually stored in an existing information management or knowledge management system. However, it is harder to determine the value of these and the extent to which they are useful to the experts in the organisation when conducting their everyday duties.

Stage 4: Determining an organisation's enjoyment of knowledge

With this stage, Jafari and Payani (2013) want to determine the interaction of the content identified in the second and third stage of the knowledge audit. The question is to what extent the tacit knowledge held by the experts are used in conjunction with the explicit knowledge available in the various repositories and information assets in the service of the organisations knowledge purpose (identified in the first stage).

To determine the enjoyment of knowledge, this stage looks specifically at opportunities for sharing, either in person or via repositories, and at the extent to which more junior members of the organisation can learn from the experts.

Stage 5: Determining knowledge importance

Since not all knowledge is equally important in terms of the knowledge purpose of the organisation, this stage is required to determine the relative importance of the available knowledge in the organisation. Once this valuation has been done, it will be possible to

prioritise what is considered as knowledge strengths or to compensate for what is considered to be potential knowledge weaknesses.

Successfully completing this stage depends on a clear identification of the knowledge purpose in the first step. Furthermore, an auditor won't be in a position to do this without the necessary context and therefore has to rely on the expert's assessment of the relative importance of the knowledge fields in the organisation.

Stage 6: Auditing an organisation's knowledge situation

This stage completes the audit for each of the important knowledge fields in the organisation. It uses a matrix with which to assess the organisational knowledge situation which considers on the one axis a score for each knowledge field indicating enjoyment level and on the other axis the importance of the particular knowledge block.

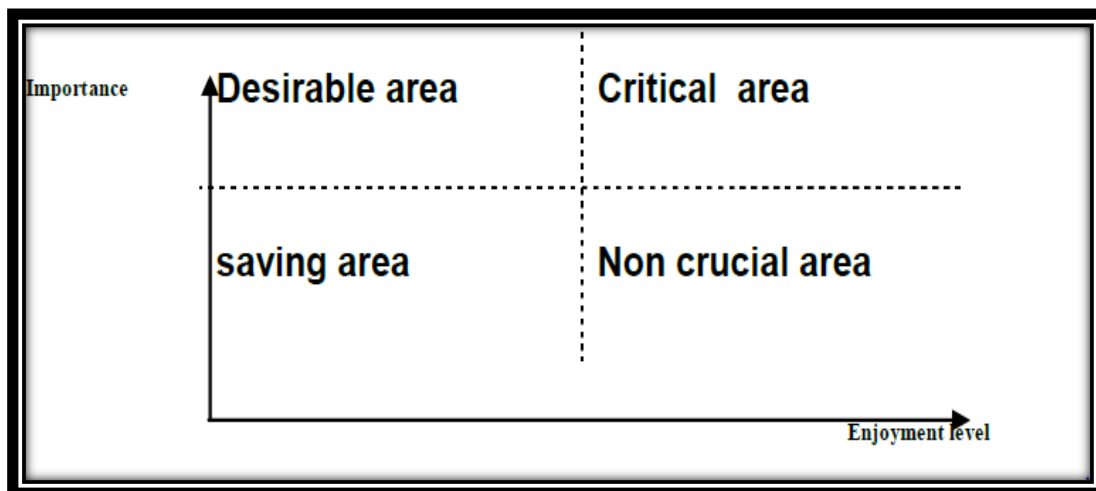


Figure 1: Systematic approach for knowledge auditing

Source: Jafari and Payani (2013)

This matrix makes a quick overview of the knowledge situation of an organisation possible. It works by highlighting which knowledge should be prioritised and which contains risk for the organisation.

The critical area is where the knowledge is considered important, but the fulfilment score is low. This is the area in need of knowledge development where the organisation needs to improve.

The desirable area is where both importance and fulfilment scores are high. This is the quadrant representing the ideal situation from a Knowledge Management perspective, hence it is called desirable.

The saving area is one where the importance or weight is low, but the fulfilment or enjoyment scores are nonetheless high. If the right strategies are followed it might be possible to migrate the knowledge from these fields to the desirable quadrant.

The non-crucial quadrant contains that which scores low on both axes. In other words the knowledge is not important to the organisation and the enjoyment level is also low. In other words, the knowledge in this quadrant can be safely ignored and need not be taken into account in planning for knowledge management.

2.4.2 Skyrme (2002, 1-2) knowledge audit methodology: A six step knowledge audit methodology

Skyrme's knowledge audit methodology is represented in figure 2 and consist of the following steps:

1. Scoping and planning. This determines the scope and depth of the audit, in other words what to include in the audit and how much effort to apply to it.
2. Fact-finding. This is the data collection to elicit the knowledge needs, the availability and accessibility of knowledge, its quality and usefulness, and the flows and constraints.
3. Analysis and interpretation. This step involves the identification of that knowledge that is critical, important, or useful for the organisation either now or in future.
4. Deliverables. These are included in a report aimed to be useful as input for the knowledge management strategy of the organisation.
5. Stimulating action. Reporting is often not enough. In order to improve knowledge resources, this step outlines possible follow-ups and recommendations for knowledge development and knowledge application.

6. Review. Since an audit should be periodically repeated it is necessary to revisit the findings of the audit in future rounds of review.

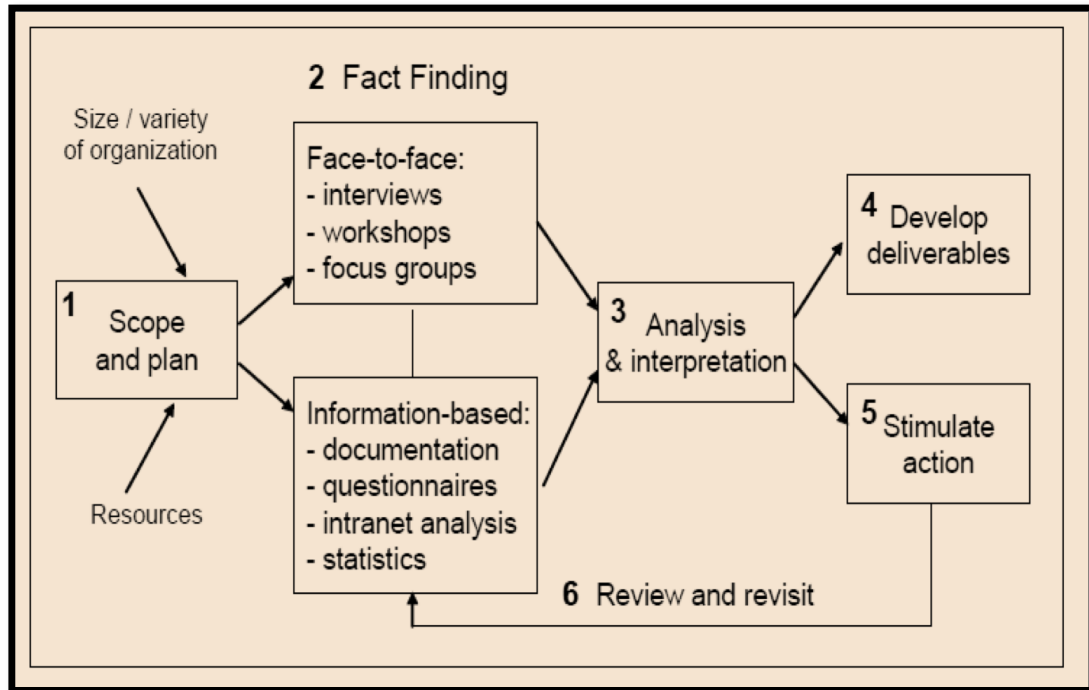


Figure 2: A six step knowledge audit methodology

Source: Skyrme (2002)

2.4.3 Perez-Soltero and Barcelo-Varenuela (2007, 4-8): A knowledge audit methodology with emphasis on core processes

Perez-Soltero and Barcelo-Varenuela (2007, 4-8) proposed a methodology for auditing knowledge assets with the aim to address core processes when conducting knowledge audits. As indicated on figure 3, the methodology presents ten-stage phase knowledge audit methodology, highlighting ten fundamental processes critical to knowledge audits. In addressing issues faced with knowledge audit methodologies, the aim of this particular approach presented here was to suggest enhancements to knowledge audits by introducing what is called “core processes” to knowledge auditing literature.

Stage 1: Identification of strategic core objectives

The main purpose of identifying organisational strategic objectives is to align the knowledge audit methodology to organisational objectives. This is done by, firstly, holding an initial meeting with the organisational managers. Knowledge management and knowledge audit concepts must be explained. It is an important emphasis on the knowledge auditing process that allows the identification of knowledge assets and the flow of the knowledge within the organisation.

Stage 2: Identification of organisation's core processes and establish measurement criteria

The objective of this layer is to identify main business processes that consume useful knowledge. Additionally develop a measurement criteria to measure and evaluate, knowledge processes performance. The overall aim then of this later is to ensure that only key knowledge is prioritised and ensuring that there is a process in place to measure knowledge processes performance.

Stage 3: Prioritising core processes

At this particular phase core processes would have been identified and now the requirement would be to prioritise each process according to it critically to business operations. Just like any other process, some process will take priority in any business.

Stage 4: Identify key people

Just like any project, key role players need to be identifies and selected. Therefore selection of key stakeholders takes places in this phase. Logically stakeholders are likely to be business, function or processes owners as defined on phase 3 above. Key stakeholders can further be identified by using additional methodologies such as interviews, review of firms' records, as well as interaction with business leaders can be used to gather information about key people in the business.

Stage 5: Meeting with key people.

At stage five of the knowledge audit methodology, the purpose is to introduce, brief identified key stakeholders to what the audit is about and what it aim to achieve and further explain how this exercise will benefit each area within the business and or organisational

wide. The key message at this stage is to ensure that stakeholders are enlightened stakeholders as to what the program aims to accomplish and their involvement in attaining the required strategic objectives of the program.

Stage 6: Obtaining knowledge inventory

The deliverable at this phase identify and obtain current knowledge assets within the organisation. Tools such as questionnaires, interviews and meetings with relevant stakeholders can be used to gather required outcome.

Stage 7: Determine how knowledge cascade within the business

The deliverable here will be to peruse the flow of knowledge within the organisation. Stage seven however has a very close interlink with stage six, because the very tools that are used on stage six to obtain knowledge inventory are also implemented on stage seven to analyse knowledge flow within the organisation.

Stage 8: Knowledge mapping

The intent at this phase is to conduct knowledge mapping exercise. Conducting such activity will allow knowledge audit team to determine the chunks of relevant knowledge the organisation has, and where it is located. Most importantly at the mapping process aim to determine how accessible the knowledge is to the stakeholders as well as whom this knowledge is often shared with. This particular exercise will give an idea as to how much resources, time and budget is required to conduct knowledge audit because this phase will determine the scope of the work that lies ahead of the audit. Therefore this in one of the most critical steps in any knowledge audit exercise.

Stage 9: knowledge audit reporting

The strategic objective on phase nine is to report to the organisational leadership the findings of the knowledge audit exercise. The reporting will incorporate long and short-term deliverables which will be drawn from recommendations from the report.

The report is on conclusion the focus of the audit methodology is on core processes of the organisation, therefore reporting on these findings should be done in a very strategic manner by ensuring that the business understands the implications of ignoring issues identified in all selected business core processes.

Stage 10: knowledge re-auditing

Knowledge management is an ongoing program, it is never static. Organisations create knowledge on an ongoing basis especially knowledge intensive firms. Therefore, continuous knowledge re-auditing is necessary in all knowledge audit programmes and methodologies to ensure that the firm update knowledge management processes. Knowledge re-auditing will therefore allow the firm to review and update knowledge inventory, knowledge flow and knowledge processes where necessary. Because organisations evolve now and again, taking new direction in terms of strategies, mission and vision, it becomes very crucial that knowledge audit is continuously conducted to ensure that it is always relevant to the strategic objects of the business and in-touch with knowledge management activities happening on the ground.

Hylton (2002, 2) accentuated that, the most imperative and inimitable knowledge resides with the organisation's people, both internal and external. People, and not documents, information or systems, are the central focus in every stage of a knowledge audit.

As pointed out by Hylton , most knowledge audit that have been discussed are more about finding ways to discover content, information and knowledge that is hosted in various repositories within the organisation. The human element tend to be neglected by most knowledge auditing methodologies however employees are the rich source of company knowledge and for a compressive knowledge audit one need to consider that employees still remain the golden source of knowledge and should be treated in the same manner as other knowledge repositories.

Knowledge audits should consider factors like culture, organisational structures, environment etc., before conducting knowledge audits. Knowledge audits should be people centered instead of merely focusing on knowledge discovery systems. IT systems are platforms that enable knowledge sharing and management, they should not be the principal consideration when exercising knowledge audits. People generate knowledge and use IT infrastructure to enable the storage and dissemination of knowledge.

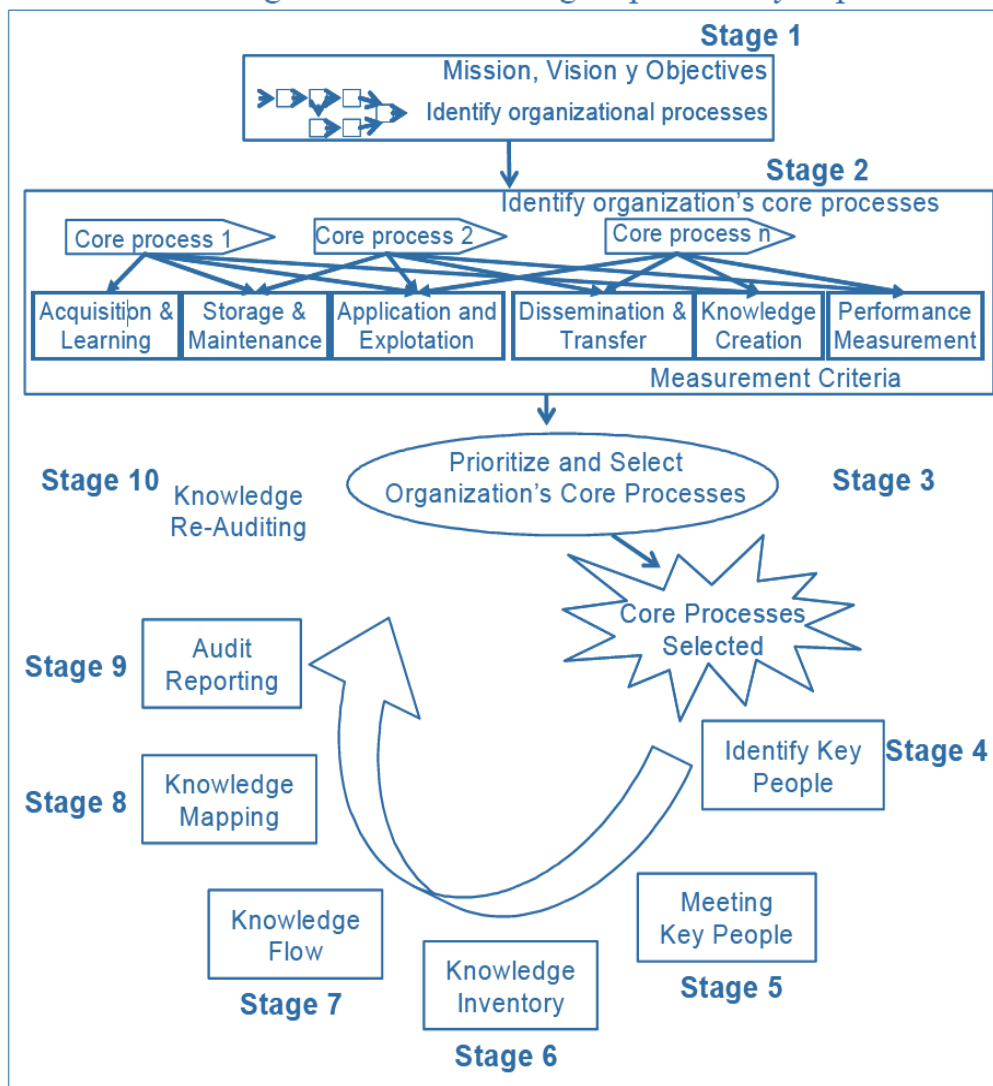


Figure 3: Knowledge audit methodology considering organisational core processes
 Source: Perez-Soltero and Barcelo-Varenuela (2007)

2.4.4 Knowledge audit – People centered methodology

Hylton (2002, 7-8) further proposed a three-phase knowledge audit methodology with emphasis on a people - centered methodology. Hylton argues that people are the drivers of knowledge within the firm, therefore they are the most critical elements to knowledge audits. Without proper engagement with employees in an organization knowledge audits will be an unnerving process and possibly result into inaccurate outcomes.

The steps in Hylton's methodology are as follows

Knowledge audit level 1: (KAL – 1)

Knowledge audit level one comprises of a questionnaire survey. The population of the participants are the employees in the company. To get a holistic view of the knowledge audit status of the firm, it is critical that the survey comprises of many people as much as it can. This allows for a holistic participation and comprehensive view of the knowledge audit status of the organisation when analysing and presenting knowledge audit findings.

Knowledge audit level 2: (KAL-2)

Phase two of the knowledge audit framework focus point is around consultation with stakeholders who participated on the initial phase one of the knowledge audit methodology. The consulting process can be executed by means of face to face interviews with participants, most especially those who had participated in the questionnaire – survey. The report will therefore determine the key priority areas to be attended to as quickly as possible based on recommendations of the knowledge audit and the impact of the identified areas of knowledge Management to the organisation if not given first priority.

Knowledge audit level 3: (KAL-3)

Here the purpose is to determine as to how knowledge is being generated, where it is located and the sources in which the organisation generate knowledge from (internal or external sources). Knowledge inventory, knowledge process flow and knowledge mapping play a crucial part to ensure successful implementation of this phase. Once this activity is complete, the organisation is in a better position to determine knowledge gaps and recommend ways to remediate those gaps to eliminate possible knowledge threats to the organisation.

2.4.5 Knowledge audit methodology: A hybrid methodology

Ganesan and Dhanapal (2012, 17) developed a hybrid methodology.

Comparable to Perez-Soltero and Barcelo-Varenuela (2007) above mentioned knowledge auditing method took the direction of core process approach, with culture being identified as the main core process. The six-stage methodology is listed below:

Information and culture assessment

Here the purpose is to initially identify organisational strategy objectives as well as knowledge strategic resources. The next activity will then be to examine organisational culture in line with knowledge audit and knowledge management requirements.

It is therefore crucial that organisation evaluate the status of their culture to ensure that they organisational culture does not hinder knowledge management implementation as well as knowledge audit. On the other hand, organisation culture assessment will ensure that the organisation is culture fit to engage and implement knowledge management initiatives. Some of the tools that can be used to examine if the organisation is culture-fit to implement knowledge audits are as follows:

- Interviews with key strategy leaders
- Interviews with business transformation leaders
- Interviews with HR personnel responsible for organisational culture
- Review existing organisational official records
- Observations etc.

Core process prioritisation

Every business has key core functions, it cannot sustain itself without. Therefore, purpose at this point is to establish key main processes associated with business. Therefore, to effectively determine and manage key knowledge related to the processes, key processes must be determined within the organisation.

Knowledge health measurement

The purpose here is to evaluate how well knowledge is being used to achieve organisational strategic objectives. The key objective of knowledge health measurement is to establish the manner in which knowledge cascade across different areas of the business, determine key sources of knowledge and possible identify knowledge gaps. This is the phase in which knowledge mapping exercise is executed, so as to determine the overall picture of knowledge flow and the quantity that the organisation need to prepare when initiating the actual knowledge audit program.

Knowledge audit reporting

At this phase the main outcome is to report on the finding of the audit that has been concluded. Just like many other knowledge audit this is a common activity that most knowledge audit methodologies propose. As to what should be reported on and in what order content should be presented remains questionable in most knowledge audit methodologies.

Knowledge Management strategies recommendation

Once the knowledge audit has been conducted, reporting with recommendation is presented to the leadership of the organisation for implementation and further actions.

Continuous knowledge re-auditing

The remainder of the other main processes are then considered and analysed, to complete overall cycle of selected knowledge audit core processes.

At this point knowledge audit team is in a position to evaluate and measure the success of the knowledge management implementation.

2.4.6 Knowledge management enabled audit methodology

Handzic's (2008, 92) proposed methodology extends the core knowledge-process-enabler elements by incorporating additional driver and outcome elements, as well as contextual contingencies. The methodology is shown below:

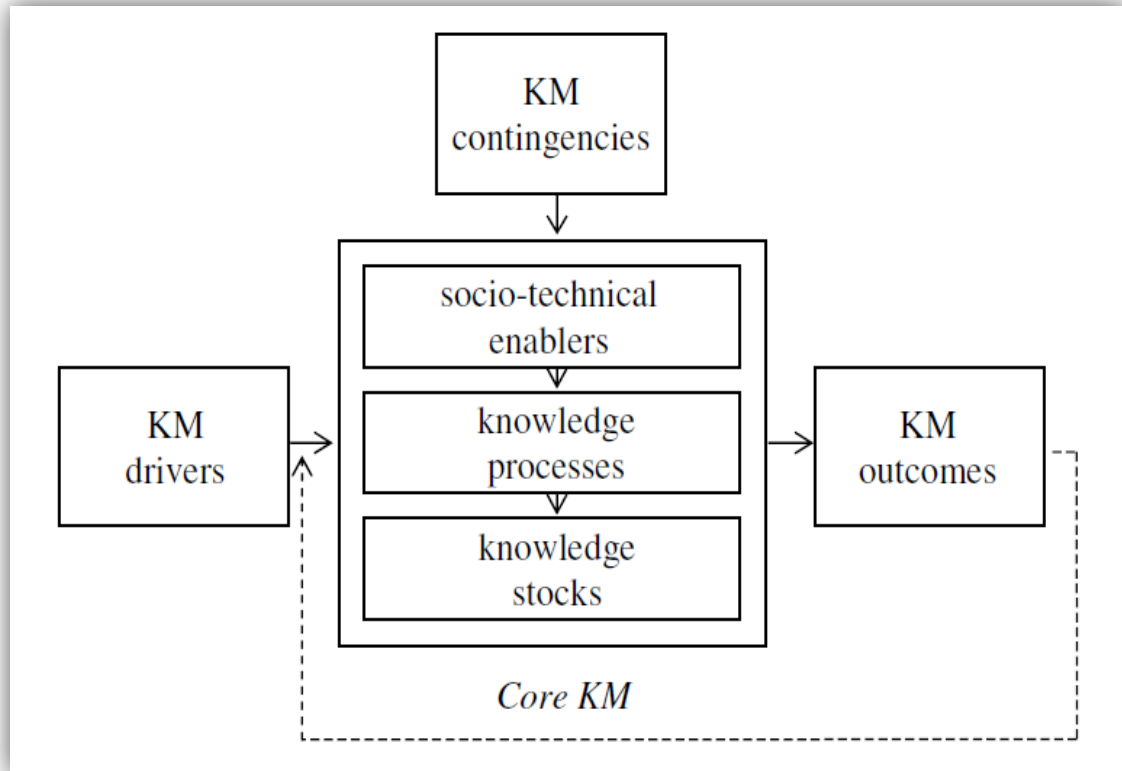


Figure 4: Knowledge management enabled audit methodology

Source: Handzic (2008)

This methodology recognize explicitly that drivers to knowledge management are crucial elements to knowledge audits. Distinguishable from previous methodologies, socio – technical enabler is one of the top infrastructure enablers for this methodology. Knowledge management drivers such as knowledge process are key consideration in any knowledge audit process as these processes will aid knowledge audit team to have a clear view of knowledge stock across each business area and the entire entity.

To make an informed decision in terms of how the audit will be scoped, one need to engage the knowledge audit process fully so as to determine the amount of content needed to be evaluated to determine if it knowledge that is still relevant to business. Engaging in the knowledge process not only allow KM team to determine volumes of knowledge across the business but also allow more informed planning in terms of what knowledge is of priority business and prioritise activities accordingly.

2.4.7 Burnett: reconsidering the knowledge audit process

Burnet *et al.* (2013, 144) called for the standard knowledge audit process to be reconsidered, because in their view the main knowledge process deliverables should assess how employees perceive existing knowledge-based practices within the organization. Therefore they propose a knowledge audit methodology centred on identifying and measuring knowledge-based processes at an individual and organizational level.

The initial phase of this specific methodology, includes the identification of possible enablers of the knowledge component of business processes. Once those knowledge processes are identified, it becomes much easier to implement the rest of the knowledge audit activities, because then the knowledge management team has an idea of where critical knowledge is possibly located.

With this as background they propose a more comprehensive knowledge audit that leads to a knowledge inventory and mapping on the way to a knowledge needs analysis that can inform the eventual knowledge management strategy. The entire process looks as follows:

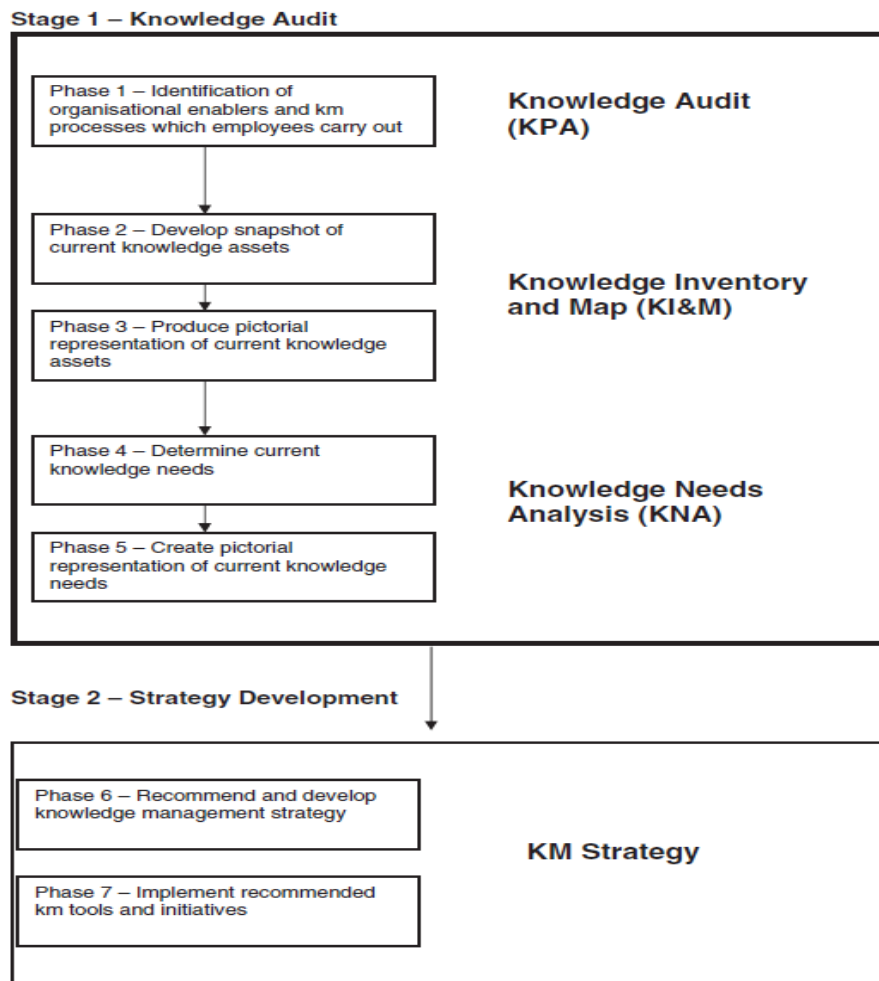


Figure 5: Reconsidering the knowledge audit process

Source: Burnett *et al* (2013)

(Burnet, *et al.*, 2013, 144), further looked at organisational enablers for managing knowledge, i.e.; what the organisation does to support knowledge management, where strategic vision, structure and culture were identified as possible enablers to knowledge to enabling knowledge management implementation. Burnet is the only knowledge audit writer that gives consideration to infrastructure aspects related to knowledge management success. However, Burnet's enablers are very vague and does not consider infrastructure enablers in full. Burnet speaks to knowledge audits infrastructure enablers in general and does not consider it in terms of specific knowledge audit methodologies.

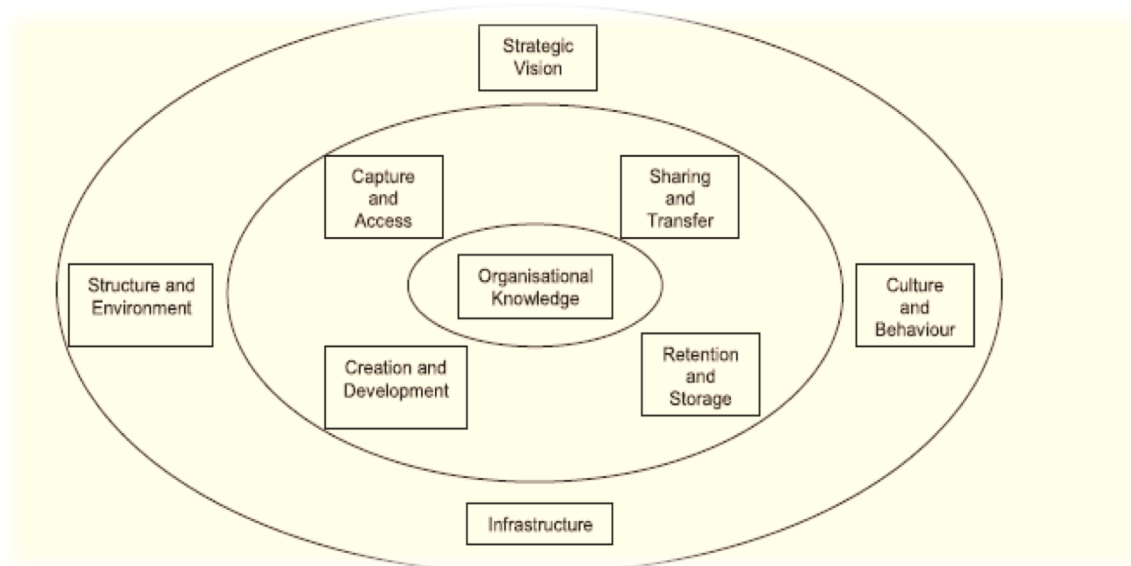


Figure 6: Reconsidering the knowledge audit process with infrastructure enablers

Knowledge audits discussed above are very selective in scope, unlike Burnet, this methodology considers infrastructure enablers but does not associate those enablers with a practical knowledge audit method. The writer does not solve the current gap where infrastructure enablers are not included as part of a knowledge audit method in order to paint a holistic view of how a comprehensive knowledge audit should look like.

Therefore as discussed on chapter three, the thesis will use Becerra Fernandez knowledge management framework and infrastructure enablers as basis to explain how knowledge audits should be conducted, expand on infrastructure elements, Fernandez infrastructure enablers consider a broader coverage of enablers such as organisational culture, structure, technology, common knowledge, and environment infrastructure elements, to be considered when designing knowledge audit enablers and further expand on the gap that currently exist in knowledge audit models and how infrastructure enablers can address some of those gaps and lastly provide a holistic approach to designing and implementing knowledge audits to organisations, in order to reap meaningful outcomes of a knowledge audit post implementation and possible measure the success of the implementation.

2.4.8 Systematic Approach knowledge audit

Cheung *et.al.* (2007, 147) proposed systematic approach knowledge audit with emphasis on culture assessment as shown below

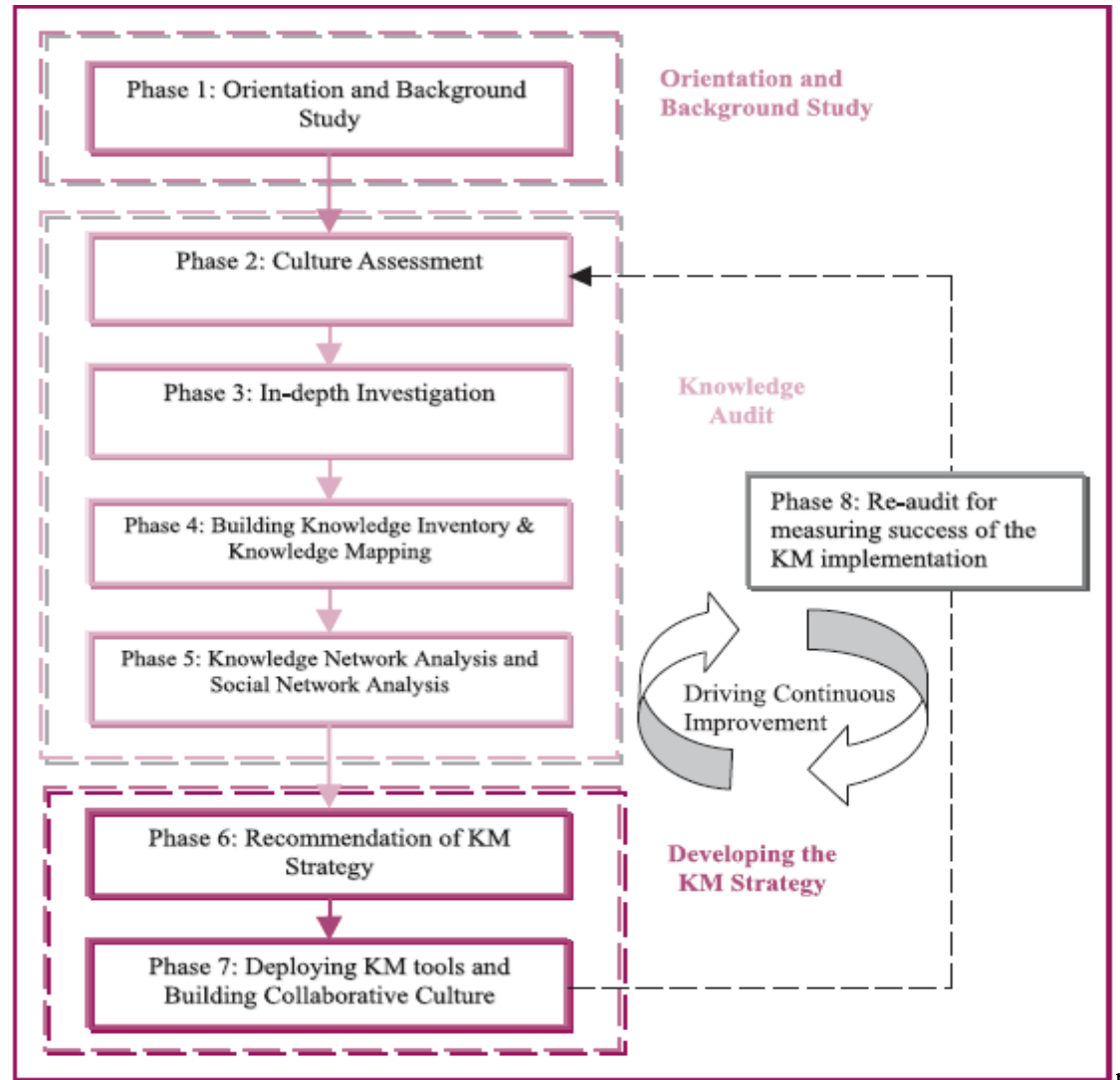


Figure7: Knowledge audit methodology –with emphasis on culture assessment

Source: Cheung, et.al. (2007)

This method looks at culture as an enabler to knowledge auditing. The focus is merely on assessing the readiness of culture within the organisation prior to conducting a knowledge audit.

The focus in this methodology, unlike other methodologies, is extended to the deployment of knowledge management tools and building collaborative culture.

According to Yip *et.al.* (2015, 518) states that, placing the entire reliance on professional expertise to run with knowledge audit on behalf of the organisation can somehow make employees feel sidelined in the process.

Identifying key stakeholders is key to getting direction as to what processes are critical to business and what knowledge they process. Therefore it is imperative the right people are identified and included to be part of the knowledge audit team so as to ensure that the audit is as comprehensive as possible.

2.4.9 A comprehensive methodology for executing knowledge management audits in organisations

Shahmoradi *et al.* (2015, 28) argued that knowledge audit is the initial processes in execution of a knowledge management program. As a result incomplete execution of the knowledge audit has caused many knowledge management programs to fail. In trying to understand and why knowledge audits fail, the researcher undertook a project was to investigate how knowledge audits are conducted systematically in organisations. The researcher then proposed the following comprehensive methodology for executing knowledge audit:

This knowledge management audit methodology highlight knowledge management infrastructure factors such as IT and organisational culture in the knowledge audit methodology.

It is argued that knowledge management infrastructure remains the key element to pay undivided attention to when conducting knowledge audit process Shahmoradi, *et al.* (2015, 37). However, with Perez-Soltero and Barcelo-Varenuela's methodology, the focus is not merely on data or content discovery alone, but rather on core business processes.

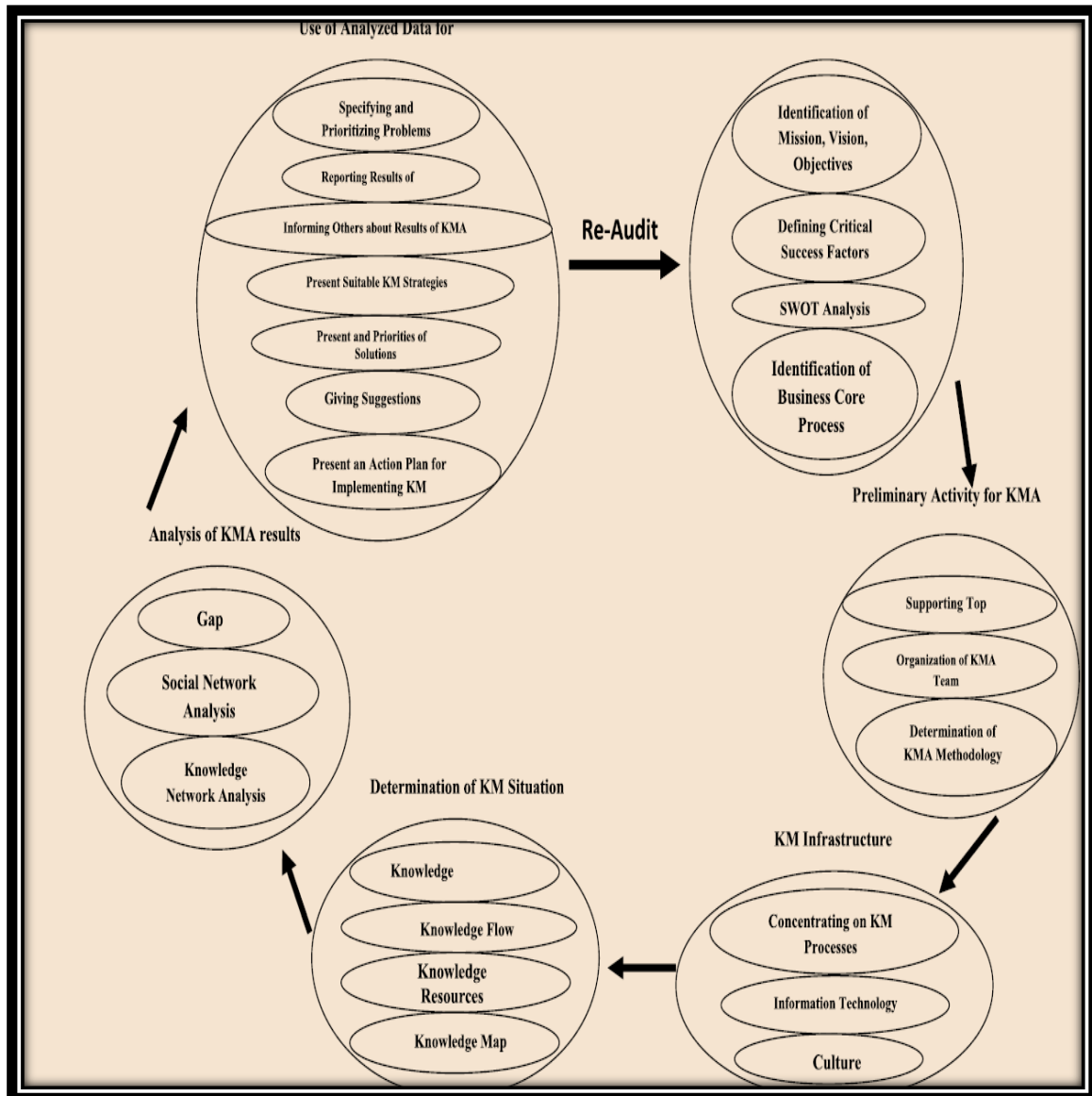


Figure 8: A comprehensive methodology for executing knowledge audit

Source: Shahmoradi *et.al.* (2015)

This methodology is merely more about understanding the business, before implementing a knowledge audit. Becerra-Fernandez's framework for knowledge management framework refers to culture, common knowledge and environment as some of the key factors to take into consideration when implementing knowledge management. Perez-Soltero and Barcelo-Varenuela's methodology take into consideration that people are the main factors to prioritise on in a knowledge audit process.

This is indicated in his first step of knowledge audit methodology, whereby by he points out that one need to identify organisational strategic objectives, and further taking into consideration infrastructure elements and how they can facilitate process of achieving

organisational objectives. However, to effectively identify the objectives and infrastructure enablers, an initial meeting need to happen with the right stakeholders, who in this case will be the leaders of the organisation, stakeholders have a better views and insight in terms of what the organisation strategic objectives aim to attain and what need to happen in order to achieve desired objectives.

Knowledge audit methodology reference number 2.6.7, looked at a wider scope of the scope of the knowledge audit by taking into consideration one of the infrastructure factors identified by Becerra Fernandez's knowledge management infrastructure factors for knowledge management. Environment should therefore be conducive for the organisation to conduct knowledge audits. Cheung *et.al.* (2007, 147) proposed a culture assessment orientated knowledge audit.

Cheung's methodology to knowledge audits is more tailored towards assessing organisational culture, prior to knowledge audit implementation. Compared to the rest of knowledge audits identified previously.

Cheung *et al.* took a different approach from the rest. The focus on Cheung's methodology is on three main elements which are culture, knowledge audit and developing knowledge management strategy based on organisational culture assessment and knowledge audit findings.

It is therefore no doubt that culture is one of the critical enablers when preparing knowledge audits programs, as it provides a background in terms of the nature of how adaptable the organisation is to change. To eliminate possible resistance from employees' knowledge audit team need to ensure that they take every possible participant with throughout the knowledge audit journey so that all participants bring their best and ensure effective participation.

Most literature pointed out few aspects that need to be considered in a knowledge audit exercise, however little or nothing has been considered when conducting the actual Knowledge audit exercise.

As soon as the knowledge audit exercise begins, the focus becomes discovering data and data repositories and neglecting factors that influence people from accessing, updating, distributing and sharing that data. With all, knowledge audit methodologies (end up being very narrow in scope due to the above-mentioned concerns.

Makambe (2015, 98-103) argued that components of knowledge audit methodologies involve taking some factors into consideration, for an example, the people, process and systems focus. This study used the Becerra Fernandez framework for knowledge management as a guide to conducting this study. The framework has the IT infrastructure, which Paramasivan (2003, 501) refers to as systems. Paramasivan (2003, 502) further looked at people as an infrastructure, where aspects like knowledge sharing behavior, culture norms and values are evaluated. The author lastly looked at the process components where aspects like existing policies, process, and so forth are examined to see if they hinder or promote knowledge sharing in the wider spectrum of the organisation. Therefore, there are similarities between Fernandez and Paramasivan's framework; however, Fernandez's framework is more comprehensive compared to Paramasivan's.

2.5 Knowledge audit literature not selected for analysis

As indicated on the methodology, the research project looked at a comprehensive list of published knowledge audit methodologies and tried to analyse each methodology based on its 'comprehensiveness' in terms of covering the process and aspects of what need be considered when conducting knowledge audits, taking into account the infrastructure enabling factors when conducting knowledge audits. The following knowledge methodologies were published between 2005 and 2015. Just like the knowledge audit methodologies discussed on chapter two, methodologies selected on section 2.5 will be discussed in terms of their scope and why they are limited or weak in terms of what a good knowledge audit methodology should cover in scope:

Loxton, 2014, 236-238, argued that knowledge audits are either very broad or narrow in scope, and that they seek to discover knowledge already existing and utilised. The researcher further suggest that there is a need for a narrowly focused knowledge that aim to discover knowledge needed rather than held.

Below activities were then proposed by this methodology:

- Identify organisational goals and critical measure – this possible refer to mission , vision and strategic objectives
- Secondly–identify critical process leading to attaining organisational strategic objectives–this becomes very crucial when trying to implement knowledge

management related programs because a clear understanding of how the organisation plan to achieve it short and long term objectives will definitely give direction as to how knowledge management strategy should be developed and what short and long term deliverables should be included to support the overall group-wide organisational strategy. Therefore KM team need to very close to the organisational strategy so as to support the organisation with relevant knowledge to achieve group wide strategic goals.

- Discover what knowledge is required by and employee to carryout day to day work activities. One must note that this is a much individualised approach to knowledge auditing. The researcher here is more concerned about how an individual employee interact with knowledge within the business to execute tasks, rather than other knowledge audits methodologies which look at employees as a collective. This approach has disadvantages and advantages in a sense that due to the time factor individual attention might drastically delay the implementation of the program, on the positive side however individual attention will mean that information gathered through auditing will be more accurate and subject, activity and job specific.

The template lastly recommend the use Pareto's knowledge audit Process which focuses on critical knowledge in order to aid organisations to successfully audit what need to be audited. Therefore the proposed template does not really provide much guidance in terms of what the steps that need to be considered when conduction knowledge audit however it only highlight the need to only focus of critical activities rather than looking at knowledge audit process as holistic as possible.

Perez-Soltero *et al.*, 2009, 147-150 proposed what is referred to as an ontology to support to the knowledge audit process. The objective of this particular publication was to show an ontology that can be implemented and utilised as aiders to represent the results derived from the knowledge audit process. It is therefore not a knowledge audit methodology but rather a tool that can be used by knowledge auditors when they get to the stage where they need to analyse and represent knowledge audit results.

Marie-Christine, *et al.* 2014, 3-5, proposed a knowledge audit approach for large scale government knowledge management strategy. This approach had 5 stages which all were adopted from all the research methodologies selected and discussed on 2.6 of the research

project. Each phase of this approach adopted a different author and combined all phases from different authors to come up with one consolidated approach. Therefore the methodology uses existing knowledge audit methods.

Huck, 2011 adopted Liebowitz *et al.*, 2000, knowledge audit methodology to investigate knowledge audit requirements for a small organisation. It is quite evidence that some knowledge audit are derived from existing published methodologies. This is seen by how similar they are in terms common phases utilised. Therefore the publication adopted existing knowledge audit methodology as a framework to execute the investigation.

Gourova. 2009, 605-619, special focus is made on knowledge audit concept and the approaches and processes proposed and used in practice. These approaches are knowledge audits that have been developed and published by other researchers. The paper further highlights some tools utilized in knowledge audit and the metrics used for knowledge measurement and evaluation of knowledge management benefits for organizations.

Ragsdell (2013), used various knowledge audit methodologies to audit and analyse findings of a knowledge audit case study in the energy sector. The key design principles around the analysis of the findings were to:

- mapping of critical knowledge – to allow prioritisation based on critical processes and attain better understand of how knowledge cascade across the business
- Establish key knowledge assets that are critical to specific activities and processes
- Identify any gaps and bottlenecks that might hinder implementation

The above mentioned principles are not new to the knowledge audit discipline, due the fact that this approach is more tailored towards adopting critical business aspects and not just everything, referring back to knowledge audit methodologies discussed on 2.6 there are several methodologies that emphasise on auditing core processes of the organisation, therefore the principles of this model are not unique to any of the existing knowledge audit methodologies.

Choy, 2004, 1-3, systematic approach for knowledge audit systematically integrated a number of knowledge audits into pre, during and post audit analysis. However the methodology only used culture audit as a pre-audit preparation therefore culture audit cannot be considered as the only element that is critical to knowledge audit which therefore

make Choy's approach to knowledge audit not holistic to be considered as a knowledge audit rather only knowledge culture audit.

Yip, *et al.*, 2015, 514-529, the authors assert that different knowledge audit methodologies are needed in structured and unstructured business processes, however the sole purpose of the methodology is to and capture procedural knowledge. It further make use of published methodologies to identify and capture this procedural knowledge. It is therefore data capture tailored model more than a tool for auditing knowledge.

In their work, Shukor, *et al.*, 2013, 256, reviewed literatures on knowledge audit process including the output and technique used to gather knowledge.

Therefore approach used in this publication make use of existing knowledge audit, and it did not propose a new way of conducting knowledge audit except using existing knowledge audit to execute the review of literature relating to knowledge audit.

In addition to the above literature searches on knowledge audit methodologies published between year 2002 and 2015, in their work Leung, *et al.*, 2010 conducted research on assessing knowledge assets. Levy, *et al.*, 2010 further conducted research on uncovering cultural perspectives and barriers to during Knowledge audit. In this research various knowledge audit methodologies which are culture audit orientated were adopted for obvious reasons that the research that Levy conducted was based on knowledge audit and cultural barriers during knowledge audit. On the other hand Mearns and Du Toit 2008, conducted an investigation on cultural villages as custodians of indigenous knowledge.

However these researchers did not propose any new knowledge audit tool, instead they adopted a number of existing knowledge audit methodologies to aid in conducting research.

2.6 Summary

Chapter two introduced literature review critical to knowledge audits, it was however noted that knowledge audits and knowledge management audits concepts are used interchangeably to refer to knowledge audits. Chapter two further discussed the purpose of knowledge audits and the views of different authors on knowledge audits. It was however noted that there is no standard way to define knowledge audits, however there are number of definitions as to what knowledge audit mean to different scholars.

Chapter two further discussed different knowledge audit methodologies, which were analysed and compared in chapter four, in order to evaluate if they are good enough to be used as tools to conduct knowledge audits in organisation, or if they require some sort of enhancements.

For knowledge audits to be successfully conducted, enabling components such as culture, structure, common knowledge, technology and the physical layout of the building need to be considered. Different authors touched on some aspects of this infrastructure enabling factors in their knowledge audit methodologies however, the question remains whether all these enabling factors are addressed in these methodologies or not. No matter how good and comprehensive a knowledge audit methodology is, a successful and in-depth knowledge audit depends on enabling conditions for knowledge audits.

If the enabling factors do not allow that specific knowledge audit methodology to function within the business, it is pointless to even implement knowledge audit.

This chapter provided an overview of literature critical to knowledge audits, views on knowledge audits by various researchers, and lastly discussed nine knowledge audit methodologies. Thereafter the chapter looked at literature pertaining to knowledge audits in general which was published between years 2002 and 2015. It is noted that a lot has been published on knowledge audit within specified timeframe. However, as indicated in chapter 2.6, not everything was about developing knowledge audit methodologies, what most scholars have done instead was to apply existing knowledge audit methodologies to specific cases. For this reason, the literature was separated to distinguish between knowledge audit methodologies that are used for analysis in this research project and the additional work that applied knowledge audits.

CHAPTER THREE: KNOWLEDGE MANAGEMENT FRAMEWORK

3.1 Introduction

This chapter introduces knowledge management frameworks that in various ways highlight the importance of enabling infrastructure for the success of knowledge management. The overall argument is that knowledge audits should take into consideration that, for knowledge management programs to be effective, enabling infrastructure elements that enable frameworks to function must be accounted for during such audits. Therefore this chapter introduced knowledge management frameworks and their infrastructure elements and further related these frameworks to knowledge audits methodologies.

The thesis selected eight knowledge management frameworks to show how widely infrastructure elements are considered across the range of knowledge management perspectives. The purpose of this chapter was to prepare for the comparison and analysis of various knowledge audit methodologies in terms of the extent to which they cater for the knowledge management infrastructure elements described in this chapter.

According to Becerra-Fernandez and Sabherwal (2010, 42) the successful implementation of knowledge management is immensely contingent on knowledge management foundations and solutions. Knowledge discovery, capture, sharing, and application are the key knowledge activities supported by knowledge management solutions based on various knowledge management subsystems for each of the knowledge activities. In turn, particular knowledge management subsystems consists of a combination of technologies and management techniques. However, these socio-technical systems (the combination of technologies and techniques) are based on much more than just information technology infrastructure. To indicate this, Becerra-Fernandez and Sabherwal (2010), refer to knowledge management foundations that are considered to be the infrastructural requirements for the successful implementation of knowledge management. These foundational infrastructure elements comprise of organizational culture, organizational structure, information technology, common knowledge, and the physical environment,

Taking Becerra-Fernandez and Sabherwal (2010) as inspiration, this chapter looks at how culture, technology, common language, environment and structure elements enable the successful implementation of knowledge management programs when all the above-

mentioned enablers are conducive. In addition to infrastructure enablers this chapter considered a variety of frameworks for knowledge management to see to what extent they cater for knowledge management infrastructure elements. Thereafter the implications for the scope of knowledge audits were considered.

3.2 Knowledge management framework, process, and infrastructure enablers

Throughout the process of knowledge audits, the focus is usually on the content of knowledge and the enablers for that content, namely the human, social, environmental and organisational elements receive no or very limited attention. Infrastructure is vital for knowledge management, if knowledge audits do not take into account infrastructure elements, the audit might not be an effective baseline for the implementation of knowledge management in the organisation. As discussed in chapter two, the methodologies discussed were criticized by Levy *et al.* (2009, 7) for their failure to include culture and IT issues that could identify opportunities and impacts of knowledge assets. Similarly, Kazi (2002, 131) state that information technology infrastructure is there to support knowledge repositories, enhance knowledge access, transfer, and facilitate knowledge environment. The knowledge management framework by APQC is a good example of one that takes these extra factors into account. It holds that organisational knowledge depend on two pillars:

- Knowledge management processes, such as knowledge creation, identification, collection, adaptation, organization, application, and sharing.
- Knowledge management enablers, namely technology, culture, leadership and measurement.

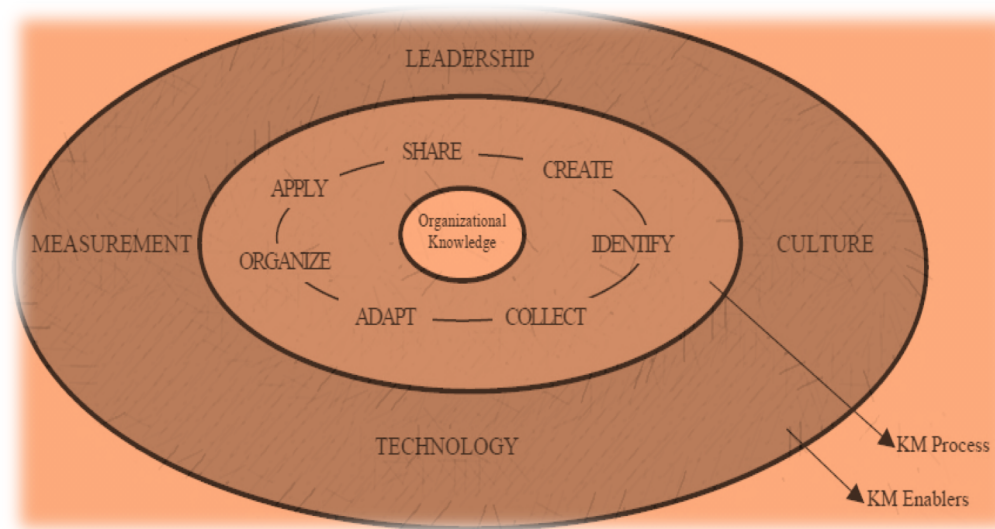


Figure 9: APQC knowledge management framework—knowledge management enablers

Source: <https://www.apqc.org/knowledge-base/collections/content-management-enablers-effectiveness> (2014)

The APQC knowledge management framework in figure 9, observes technology and culture infrastructures as substantial enablers for knowledge management. As highlighted in chapter two, the literature review about knowledge audits and knowledge audit methodologies, the focus of such audits is on the center of the APQC framework, organizational knowledge and the knowledge processes, and not on the outer rim of enabling infrastructure elements.

However, when one takes the APQC knowledge management framework seriously, then for knowledge auditing to be comprehensive, the audit should be wide in scope and include aspects like technology, culture, leadership and measurement.

3.2.1 Basic disciplines underlying knowledge management and its enabling factors

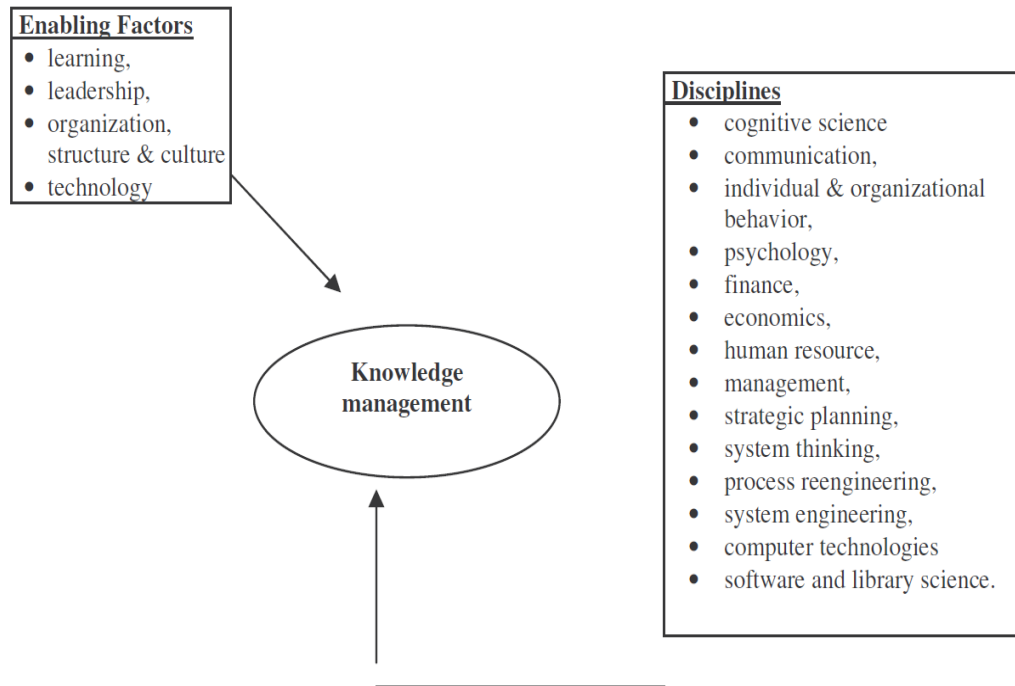


Figure 10: Stankosky and Baldanza's knowledge management framework

Source: Stankosky and Baldanza (2001)

Stankosky and Baldanza (2001, 93) also underlines the importance of enablers for knowledge management program and further identified a list of disciplines that speak to the central concerns in knowledge management such as organisational behavior, human resources, business process, communication, etc., that are central to successful implementation or adoption any knowledge management framework. The enablers in this case are learning, leadership, organisation, structure, and culture, and technology.

Of these enablers organisational structure, culture and technology are obviously infrastructural elements, however leadership and learning enablers can in principle be subsumed under organisational structure and culture, in the sense that leadership can be seen as an aspect of structure. Similarly, learning as an enabler in the above mentioned knowledge management framework can also be incorporated into the organisational culture and structure element, if for an example, organisational culture is not conducive for learning, the organisation will not be in good position to support learning. At the same time, learning can be considered as an organisational structure element, because if the organisational structure is not flexible enough to allow cross learning from different business units, teams and peer to peer, it becomes very difficult to for learning to take place in the organisation.

Therefore, both leadership and learning can be seen as infrastructure enablers to effectively achieve a more holistic outcome of knowledge infrastructure enabling environment. However, for knowledge enabling factors to function properly in organisation, leadership have a role to ensure that the organisational culture, structure and technology infrastructure are contributing to the knowledge management goals of the organisation.

3.2.2 Knowledge management framework: enabling factors

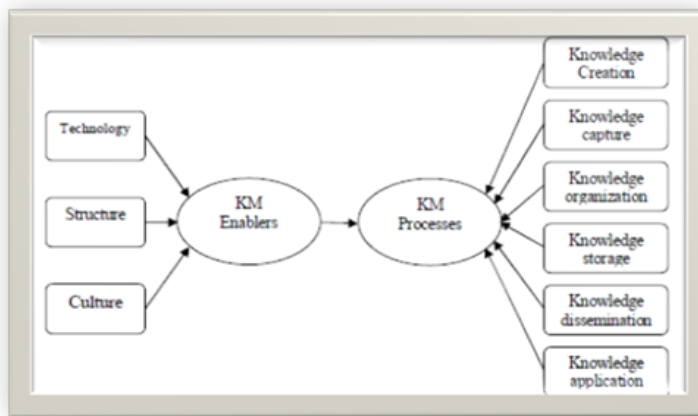


Figure 11: Knowledge management framework: enabling factor

Source: Allameh *et al.* (2011)

Allameh *et al.* (2011, 1216) emphasise that knowledge management frameworks should consider technology, structure and culture as key enablers to knowledge management. The physical environment and common knowledge have an inestimable impact on knowledge management activities and they require equal attention when implementing knowledge management. One must also take into account that knowledge management frameworks are largely designed to fit a certain requirement at that specific time. It is therefore crucial that a generic knowledge management framework is designed to accommodate a broader spectrum of knowledge strategy needs so as to enable knowledge audit infrastructure elements.

As highlighted in chapter one, knowledge audits should be more than just the gathering or capturing of content, hence this chapter discussed Becerra-Fernandez's framework for knowledge management, which included infrastructure as the base for various knowledge management systems, after her framework in the context of a few others also considering

enabling infrastructure. These infrastructure elements comprise organisational culture, structure, technology, common knowledge, and environment infrastructure elements. The fact that quite a number of knowledge management theorists argue that knowledge management rests upon these infrastructural foundations, strengthens the argument made in this thesis that knowledge audit methodologies should be much wider in scope than the mainstream currently are, to also include infrastructure elements.

3.2.4 Foundations of a knowledge management infrastructure

Sivan (2000, 13), as shown in Figure 12, proposes a knowledge management infrastructure that includes the knowledge process, information technology, and organisational culture. From Sivan (2000) one can learn much about a broad concern for enablers for knowledge management. However, if one take a closer look it is very coarse-grained with the only relevant infrastructure elements being information technology and culture of the organisation. The knowledge process component in Sivan's framework is part of the organisational knowledge infrastructure in the sense that organisational processes, division of labour, and channels for transmission constitute an organisational capability, but it blurs the distinction between knowledge infrastructure elements and the knowledge content mediated by that infrastructure.

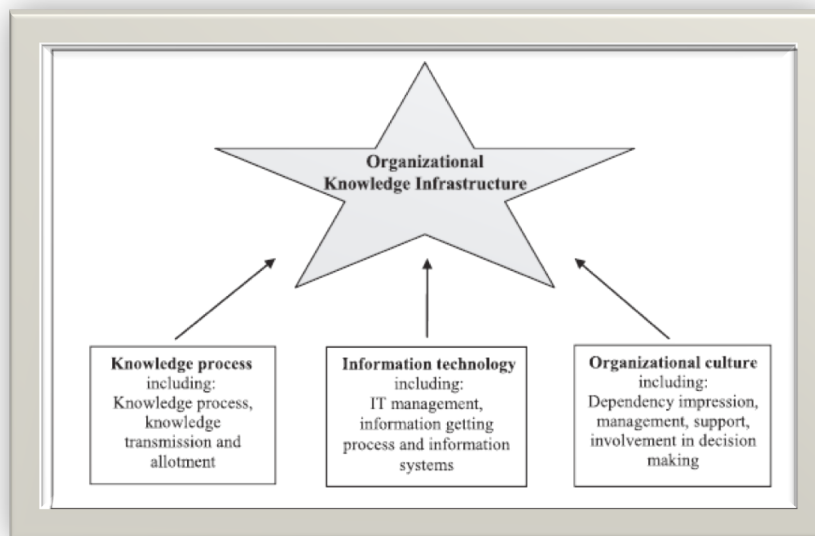


Figure 12: Foundations of a knowledge management infrastructure

Source: Sivan (2000)

3.2.5 The knowledge management methodology by Botha *et al.* (2008)

Botha *et al.* (2008) designed a knowledge management methodology catering for knowledge creation, organisation, capture, and dissemination. What makes the framework underlying their methodology interesting from the perspective of this thesis is their multiple focus points: two human foci and one technology focus. The first human focus is on knowledge creation and sensing, the second on knowledge organisation and capture, and the technology focus is on knowledge sharing and dissemination. One can interpret the technology focus as an information technology infrastructure enabler for knowledge management. However, one must bear in mind that knowledge management infrastructure enablers are not only about technology, since there are other enablers like culture, organisational structure, common knowledge, and the physical environment as well.

In the final analysis, the Botha *et al.* knowledge management does not cater for many of the enabling factors necessary for knowledge management. The only enabling factor that they highlight is technology as a tool to share and collaborate.

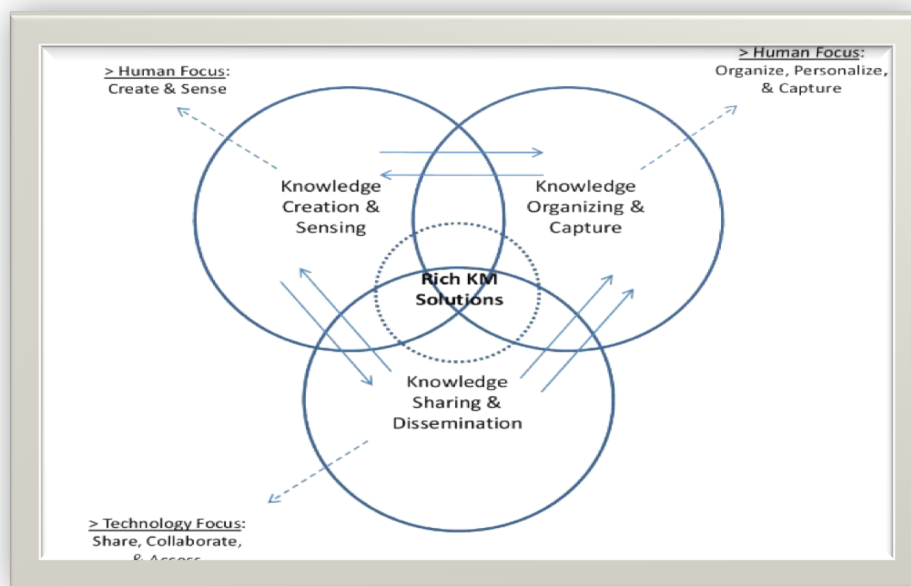


Figure 13: The knowledge management process

Source: Botha *et al.* (2008)

3.2.6 Framework for knowledge management process: Towards improving knowledge performance

Karadsheh *et al.* (2009, 75), proposed framework for the knowledge management process (figure 13) with the objective to improve knowledge management performance. The framework make mention of knowledge management infrastructure at the top of its representation of the framework, but it fails to go into specifics as to the elements that make up the infrastructure.

According to Karadsheh *et al.* (2009, 75), knowledge infrastructure has to do with knowledge discovery, knowledge capture and knowledge creation. The knowledge discovery phase encompasses discovering existing content and information within the organisation or available from external sources. What the knowledge audit methodologies discussed in Chapter 2 viewed as the knowledge application processes, this framework views as infrastructure enablers. It must be noted that the framework was developed with the intent to improve knowledge performance, therefore the framework had to address core activities within knowledge performance, namely knowledge discovery, capture and creation.

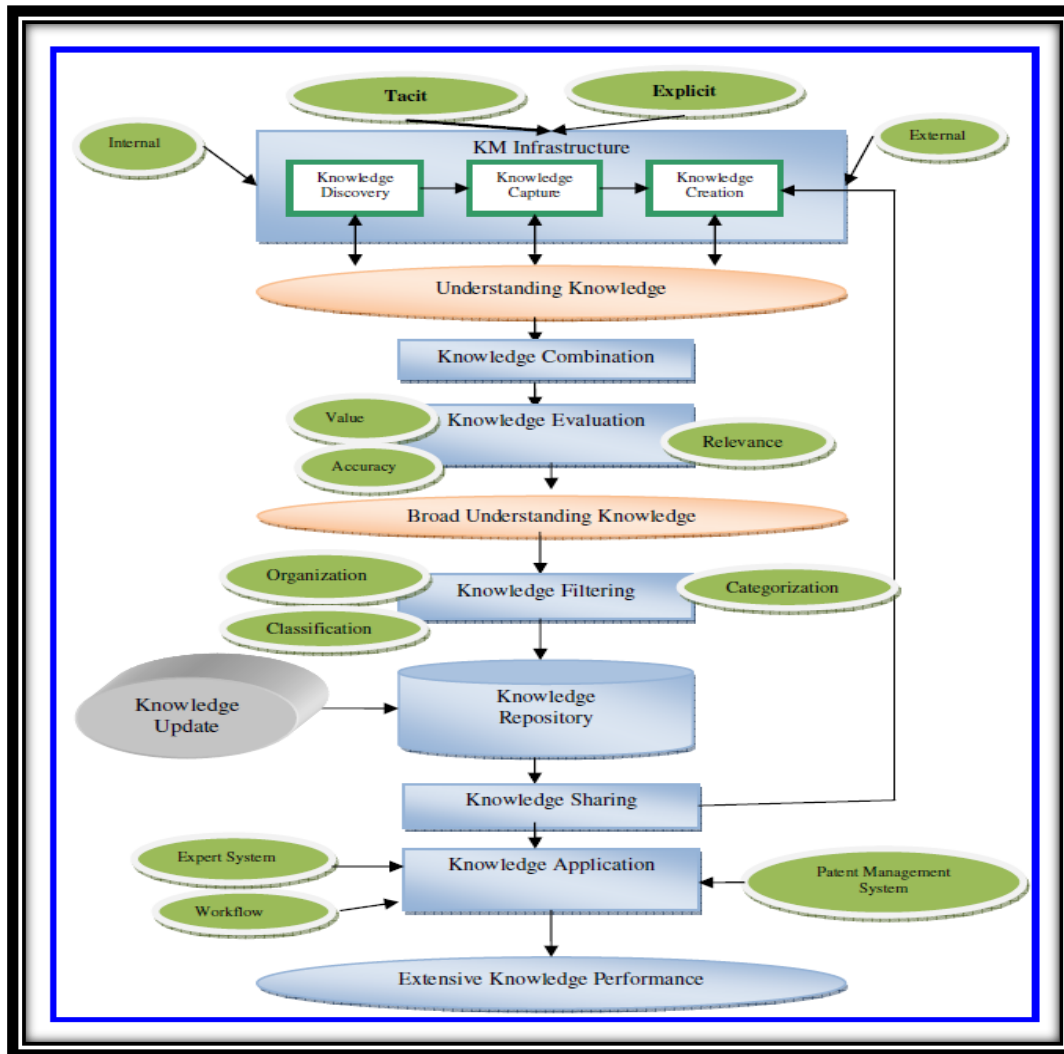


Figure 13: framework for knowledge management process: towards improving knowledge performance

Source: Karadsheh *et al.* (2009)

3.2.7 Framework for knowledge management framework with emphasis on knowledge management performance

Kashif (2014,87) emphasises knowledge management performance and identifies infrastructure elements namely culture and technology as the basis for knowledge management performance in an organisation, with technology being the main consideration.

It is significant that this framework perceives technology and culture as the only enablers for knowledge management performance. One can assume that technology infrastructure is

broader than simply IT tools to include aspects of implementation success as well. Based on knowledge management frameworks already discussed, it can be noted that they are broad in infrastructure elements however when knowledge audit methodologies are designed, they tend to be quite selective with infrastructure enablers as seen in the analysis.

Technology and culture are not the only enablers to improve knowledge management performance, there are a number of infrastructure factors that were ignored by Kashif (2014, 87) and that is what this thesis intends to reveal by looking at infrastructures with a broader scope.

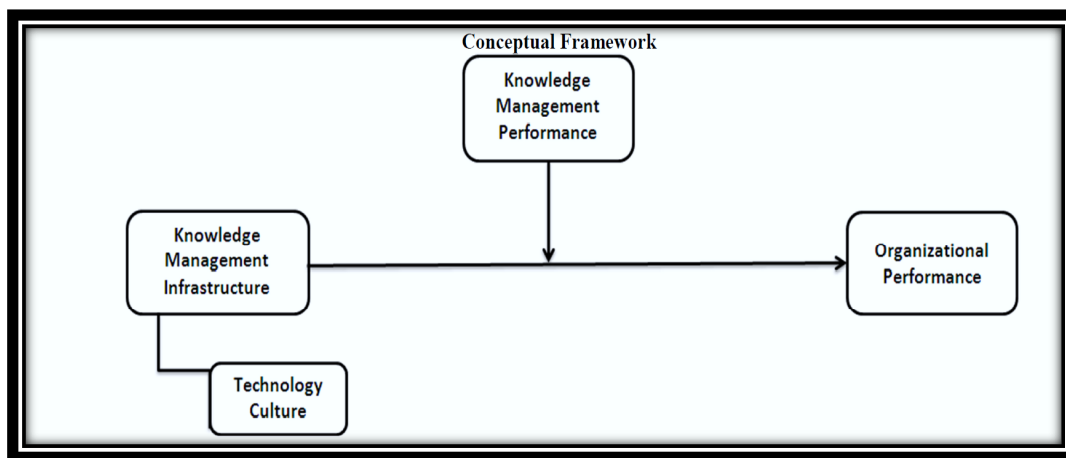


Figure 14: Knowledge management framework with emphasis on knowledge management performance

Source: (Kashif, 2014)

3.2.8 Knowledge management framework with emphasis on knowledge management process and infrastructure enablers

Becerra-Fernandez and Sabherwal (2010, 56) that state that knowledge management depend on four main components, discovery, capture, sharing, and application (as shown in figure 15).

3.2.8.1 Knowledge discovery

According to Soundarajan (2015, 142), knowledge discovery "is an activity that produces knowledge by discovering it or deriving it from existing information". Knowledge can be discovered either by formal processes like data mining, or through informal processes like learning. According to Becerra-Fernandez and Sabherwal (2010, chapter 9) in the case of

tacit knowledge, discovery happens through the socialisation process, and in the case of explicit knowledge it happens through the combination process as theorised by Nonaka (1995). Whereas socialisation happens naturally in face-to-face interaction, combination involves the intentional re-contextualisation of knowledge so that it can be made useful in another domain (Becerra-Fernandez and Sabherwal 2010, 194).

Knowledge discovery may be simplified as the development of new tacit or explicit knowledge from data and information. The discovery of new explicit knowledge relies most directly on combination, whereas the discovery of new tacit knowledge relies most directly on socialisation (Becerra-Fernandez and Sabherwal 2010, 57). In a certain sense, any knowledge audit also involves knowledge discovery, since it is one way for the organisation to formally point to the existence and location of various knowledge assets.

3.2.8.2 Knowledge capture

Organisations use various methodologies such as knowledge cafés, storytelling, workshops, conferences, and so forth to capture knowledge. One of the most common tools used in most organisations is intranet, where there are various repositories in which knowledge can be captured (or more cynically seen "dumped") by employees to make it accessible to the wider organisation or community.

Becerra-Fernandez and Sabherwal (2010, 57) point out that the knowledge capture process benefits most directly from two knowledge management sub-processes already identified by Nonaka (1995), namely externalisation and internalisation. Externalisation involves converting tacit knowledge into explicit forms, while internalisation helps capture the tacit knowledge from explicit knowledge.

According to Hegazy *et al.* (2014, 158) externalisation through knowledge engineering is necessary for the implementation of intelligent technologies such as expert systems and case-based reasoning systems internalisation.

3.2.8.3 Knowledge sharing

Fernandez and Sabherwal (2010, 58) state that knowledge sharing is the process through which knowledge (tacit or explicit) is communicated to other individuals.

Knowledge sharing platforms or solutions are therefore consumed as mechanisms and technologies to facilitate sharing and exchange of knowledge. However, knowledge sharing

does not merely happen using technical tools only, memos, manuals, reports and presentations are some other forms of knowledge sharing tools.

In facilitating socialisation in knowledge management programs, organisations can make use of methods like apprenticeships programs, employee rotation across different functions of the business, brainstorming sessions, and similar ways of sharing knowledge through interaction. Therefore, it is critical to take into consideration the way in which people interact within the organisation in order to get an idea what methodology will be effective during a knowledge audit implementation.

3.2.8.4 Knowledge application

Becerra-Fernandez and Sabherwal (2010, 57) refers to knowledge application as the use of knowledge in specific situations to make decisions and perform tasks, thereby contributing to organisational performance.

Application of knowledge depends on the existing knowledge which in turn relies on the discovery, capture and storage processes that precede its application. In this scheme it is easy to see that technology acts as an enabler to knowledge application by being the platform through which explicit knowledge is directed, or the channel through which tacit routines are coordinated.

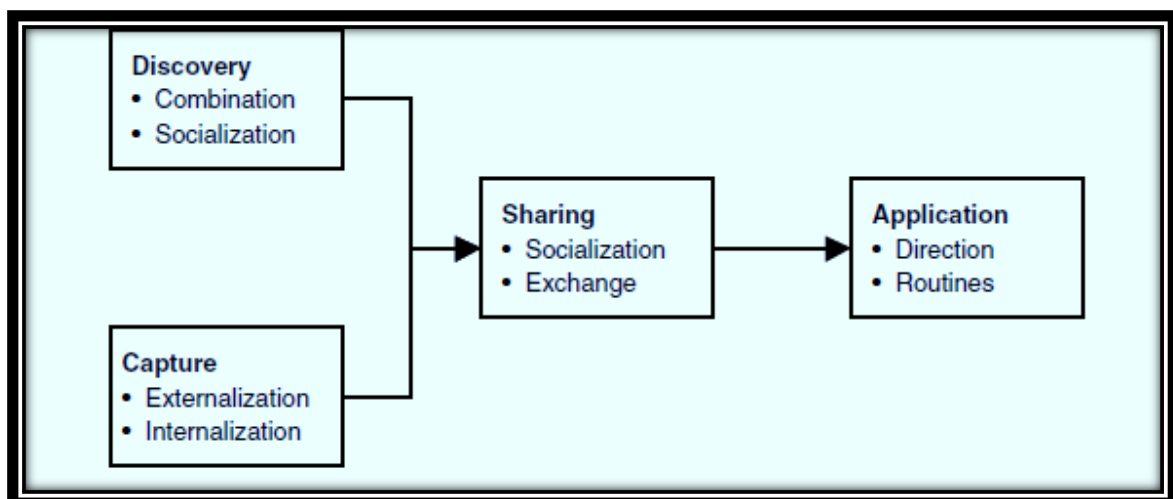


Figure 15: Becerra-Fernandez and Sabherwal (2010) Knowledge management process

Source: Becerra-Fernandez and Sabherwal (2010)

3.3 Becerra-Fernandez and Sabherwal: knowledge management infrastructures

Becerra-Fernandez and Sabherwal (2010: 41) ascertain that knowledge management depends on two broad aspects: knowledge management solutions, which are specific in nature; and knowledge management foundations, which are broader and more long-term. Knowledge management solutions refer to the ways in which specific aspects of knowledge management (discovery, capture, sharing, and application of knowledge) can be accomplished. Knowledge management solutions include knowledge management processes and knowledge management systems. Knowledge management foundations are the broad organizational aspects that support knowledge management in the short- and long-term. They include knowledge management infrastructure, knowledge management mechanisms, and knowledge management technologies. (Becerra-Fernandez and Sabherwal, 2010, 41) point out that knowledge management infrastructure play a key role in setting a solid foundation for knowledge management programs. A solid knowledge management program must evaluate and ensure that the infrastructure is fit to sustain knowledge management program.

Knowledge management infrastructure reflects the long-term foundation for knowledge management. In an organisational context, knowledge management infrastructure includes five major components: organization culture, organization structure, information technology infrastructure, common knowledge, and the physical environment.

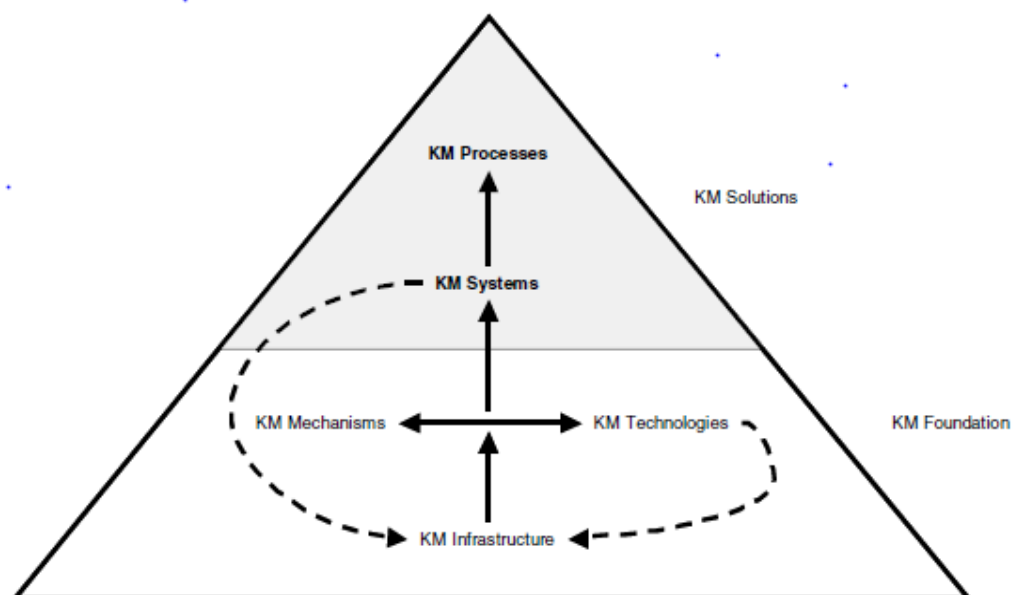


Figure 16 Knowledge management solutions and foundation

As illustrated above, the knowledge management process help discover, capture, share, and apply knowledge. The knowledge management systems are the integration of various (information) technologies and (social) mechanisms that support the knowledge management processes as outlined on figure 16 (Becerra-Fernandez and Sabherwal, 2010: 41).

Becerra-Fernandez and Sabherwal (2010:41) further maintain that the knowledge management infrastructure is what maintains the knowledge management mechanisms and technologies at the organisational level. Knowledge management mechanisms and technologies are utilised in knowledge management systems, with each knowledge management system utilising a combination of multiple mechanisms and multiple technologies. Moreover, the same knowledge management mechanism or technology could support multiple knowledge management systems as outlined on figure 17.

Knowledge management systems facilitate knowledge management processes, with a knowledge management system focusing on one precise knowledge management process. Therefore, knowledge management processes and knowledge management systems are specific solutions for knowledge management needs whereas knowledge management infrastructure, mechanisms, and technologies are wide. Knowledge management mechanisms and technologies support several knowledge management solutions, and the knowledge management infrastructure supports (through knowledge management mechanisms and technologies) all knowledge management solutions. However, over time, knowledge management infrastructure itself profits from knowledge management mechanisms and technologies as well as knowledge management processes, as shown by the rounded arrows in Figure 17.

Looking back at the discussions around knowledge audit methods on chapter two not much work has been done on knowledge audit enablers for knowledge management. Knowledge audit writers have been very vague in terms of infrastructure enablers for knowledge audits methods. Many knowledge management theorists, and Becerra-Fernandez and Sabherwal (2010) foremost among them, consider knowledge enablers in a much broader sense than the way knowledge audits do, if at all. What one can appreciate about Becerra-Fernandez and Sabherwal's approach to knowledge management and what knowledge audits could learn from them is that the entire knowledge management process rests upon foundations that go beyond mere knowledge content. This thesis relies on Becerra-Fernandez and

Sabherwal's (2010) framework to provide a way to consider various infrastructure enablers, knowledge management mechanisms, and knowledge management solutions and to judge current knowledge audit methodologies against their comprehensive account of knowledge management.

As will be seen, they appreciate that knowledge management enablers are broader than just organisational culture and structure, hence they broadened the scope to include elements such as common language, physical environment, information technology in addition to structure and culture enablers. One can further see that unlike knowledge audit writers discussed in chapter two, Becerra-Fernandez and Sabherwal's (2010) knowledge management framework is able to demonstrate how knowledge management tie back to the overall knowledge management systems and process and solutions that make up those systems rely heavily on knowledge management foundations such as knowledge management mechanisms, technologies and infrastructure.

3.3.1 Organisational culture enabler

Organisational culture produce standards and beliefs that shape the behavior of the organisation's members. This makes it a critical element shaping the context of knowledge management, because employees are probable to respond positively to knowledge management programs where the organisational culture is conducive to the knowledge processes served by that program.

3.3.2 The impact of culture on knowledge management

There is not much written on the role of culture as a consideration for knowledge audits, but culture is generally accepted as a crucial enabler in the broader scheme of knowledge management. To get to the right knowledge attitude amongst organisational members is notoriously difficult and cultural change is very hard to achieve. For this reason, it is reasonable to think that the organisational culture should be considered during the knowledge audit exercise, i.e. it should be one of the things that count. Organisational culture reflects the norms and beliefs that guide the behavior of the organisation's members and therefore also their knowledge behaviors. A knowledge audit that considers the knowledge, but not the behavior by which it is improved, shared, and applied is per definition much shallower.

One possibility is to conduct an organisational culture audit prior to a traditional type knowledge audit. The findings of such an organisational culture audit will give an indication as to how to approach a knowledge audit. Ahmadi, *et al.* (2005, 62) claim that “an effective organisational culture can have a stimulating role by providing a suitable environment for knowledge exchange and supporting the knowledge activities”. Culture can thus be seen as part of the knowledge infrastructure of the organisation and a knowledge audit that checks whether it is a culture of knowledge sharing or hoarding will indicate not only the stock of knowledge in the organisation, but also how well it flows.

With the absence of culture that is conducive and supportive of sharing, the knowledge management implementation is already on the backfoot. At the same time a knowledge conducive culture alone will not make knowledge management a success in the organisation, because there are also other knowledge management infrastructure factors that are needed in conjunction with culture. However, culture is clearly an important element, because a resistant knowledge culture cannot be overcome by other enabling infrastructure like technology or excellent knowledge content.

The knowledge aspects of culture are not the only ones that are important. For instance, an organisational culture that is open to change and adaptation will be more welcoming to a knowledge management, or any other, implementation. Parhizgar (2015, 670) says that if organisational culture is not suitable for the implementation of knowledge management, and there is no essential readiness for the cultural change in the organisation, the implementation of knowledge management program will face possible failure. He calls organisational culture readiness the key to any knowledge management implementation (Parhizgar 2015, 670).

The lesson for knowledge audits that can be drawn from the above is that some sort of assessment of the organisational culture is a good idea, either as part of or prior to conducting the knowledge audit. Conducting culture assessment will assist the organisation to take implement the correct approach when that will suit the known state of the current organisational structure.

3.3.3 Organisation structure enabler

Organisations with a highly formalised and hierarchic structures with its strict and explicit rules and procedures are not conducive for knowledge creation and learning. Nonaka (1995)

says these organisations have a top-down management style conducive only to internalisation and combination. Knowledge management is very difficult to implement in such environments, since these are likely more suited to traditional information management. In fact, knowledge management is a management response to bureaucracies.

In some instances, organisations are not able to integrate are not able to communicate between internal business units because of certain boundaries caused by organisational structures. Therefore, the flow of information and knowledge because difficult. Furthermore, knowledge management roles and responsibilities are tied to the organisational structure as well.

Based on the enabling function of organisational structure for knowledge management, a case can be made that the evaluation of structure should be part of the knowledge audit to establish the organisational knowledge management baseline. The assessment of organisational structure therefore find ways to remedy organisational structure before implementing knowledge management program.

3.3.4 The impact of organisational structure on knowledge management

Zheng and McLean (2010, 763) states that, a suitable organisational structure must encourage team effort at work and stimulate sharing of the ideas with low degree of formalisation. From this follows that prior to instigating a knowledge audit exercise, the nature in which an organisational structure is designed, must be evaluated thoroughly in order to certify that it is flexible enough to permit a knowledge audit process to take place. If the knowledge audit planning process does not contemplate the prominence of organisational structure in knowledge audit process, the exercise could result in catastrophe.

3.3.5 Organisation's information technology infrastructure enabler

Many knowledge management frameworks identify information technology infrastructure as the main enabler to knowledge management. However, with Becerra-Fernandez and Sabherwal's (2010) knowledge management framework that is not the case. Information technology is but one of the five enablers identified by them. However, information technology infrastructure is the infrastructure that make knowledge to work for the

organisation, by means of making sure that knowledge is in platforms that can be accessed by authorised people, and ensuring that knowledge is easy to update when necessary. Information technology infrastructure is thus clearly amongst some of the critical enablers to knowledge management.

3.3.6 The impact of information technology on knowledge management

According to Ahmadi *et al.* (2013, 62): “Information technology as the major factor responsible for maintaining knowledge management efforts is one of the most important knowledge management enablers within every organisation knowledge management is a method used for working activities rather than a technology or product. This occurs while knowledge management is vital for success of knowledge management systems”.

Ahmadi *et al.* (2013, 62) describe how information technology supports individual, collective and organisational interaction. Without suitable information technology tools, knowledge management cannot be implemented because information technology is a foremost enabler for knowledge management implementation.

Ruddy (2000, 38) state that enhancing knowledge sharing requires a combination of technology with a keen sense of cultural and behavioral awareness. Most organisations however find it difficult to create an environment in which people want to share what they know and make use of what others know. This point is echoed by Becerra-Fernandez and Sabherwal (2010) with their description of knowledge management systems being a combination of information technology and social mechanisms. Technology has the capability to provide quick and instant access to large volumes of knowledge and further facilitate collaboration within teams, but what counts is how that technology is tied to the organisational practices.

Technology is the one infrastructural enabler that is usually considered during traditional knowledge audits. This is perhaps the case because technology is seen as a knowledge asset (i.e. some frozen knowledge content) or perhaps seen as closely tied to the content that is found in the system. The question is whether knowledge audits are not paying too much attention to technology to a point that it becomes the focal point of knowledge audit process at the cost of neglecting other enabling factors. As shown technology is an enabler for knowledge management, but one should not confuse knowledge management and information technology. These are two different aspects, which require each other to fulfill

the objective of knowledge management, which is capturing and sharing, and management of knowledge assets.

3.3.7 Common knowledge infrastructure enabler

Common knowledge infrastructure refers to the use of common language and vocabulary within the firm. In many instances specialised subgroups in organisations have certain terminology that is common to their business practices. Language is also generated from the nature of service the organisation render to its clients, i.e. in the financial sector there is terminology used to communicate amongst staff and that is mostly understood by people who work in that space. Such common knowledge and language speeds up transfer between insiders and slows it down between insiders and outsiders. The use of common language and the existence of knowledge held in common therefore impact on the ease of a knowledge management program.

Large international firms have a variety of cultures and languages being used in within the firm. Perfect examples of such firms will be consulting firms like KPMG, PWC, Delloitte, Ernest & Young, etc., because these firms have a broad market both local and international, it is very crucial to understand the language used in each country where they have clients. This allows for proper planning in terms of what language barriers and common language issues to look out for when rolling out knowledge management and knowledge audit programs to these countries. Therefore, common language infrastructure is one of the key elements that need to be considered in any knowledge audit exercise, so as in knowledge audit methodologies.

3.3.8 The impact of common knowledge and language on knowledge management

As discussed on previous chapters, the use of common language is key to knowledge management. Taking into consideration , a group of organisations working in one business area however using different language, it become a bit of an issue to effectively share knowledge because language becomes a key barrier to knowledge sharing.

Similarly, with knowledge held in common. Obviously, knowledge that is held in common makes sharing superfluous and the more knowledge is held in common, the less the demand for knowledge management. Less obviously, the more knowledge held in common the less there is to learn from colleagues, but paradoxically, the common knowledge makes the absorption of new knowledge from colleagues easier.

3.3.9 Physical environment infrastructure enabler

Conducting knowledge audits effectively and implementing knowledge management programs depend largely on the environment that is conducive for such. More organisations are slowly moving away from closed office and moving to open plan environment. One of the key reasons behind opting for open plan offices is allow active interaction between staff at all levels to effectively stimulate knowledge flow and sharing.

3.3.10 Impact of physical environment on knowledge management

As part of the knowledge audit, one could also assess if the environment is conducive to allow dissemination and sharing of information. Since socialisation is increased in certain physical layouts, the environment can impact healthy knowledge sharing significantly.

As stated by Becerra-Fernandez and Sabherwal (2010), the physical environment within the organisation is often taken for granted, but it is another important foundation upon which knowledge management rests. Key aspects of the physical environment include:

- The design of buildings and the separation between them.
- The location, size, and type of offices.
- The type, number, and nature of meeting rooms.

There is no reason why these things cannot be scored during an audit if suitable metrics can be agreed upon.

Kemp (2004) further put emphasis on the criticality of taking into consideration the physical environment when implementing knowledge management, stating that “the physical layout of a company can also impede the success of knowledge management. Offices with multiple locations pose special challenges. In addition, the layout of the space within each office can have an effect because office layout affects how people interact” (Kemp, 2004: 12-13). The stock knowledge management examples always involve the water-cooler and making available platforms like coffee stations, cafeteria, pause areas where people can gather and share ideas during breaks is one way to improve the physical environment from a knowledge perspective.

The level of trust amongst the team is healthier and the interaction is even better between teams. Open plan offices encourage sharing knowledge rapidly without having to rely on

platforms like IT systems, meetings of workshops, which might take time to organise while there is a pressing need to share knowledge.

Bumbo and Coleman (2000: 3) used Viant as an example of one company that places high value on the impact of open space in their knowledge management programs. The office buildings include meeting rooms with windows on several sides, cubicle spaces with low walls, and many wide-open walkways and work spaces to encourage collaboration. Riege (2005, 25-26) studied potential organisational barriers to knowledge management. And identified some of the key factors that negatively influence knowledge management implementation in organisations as follows:

- Shortage of formal and informal spaces to share, reflect and generate (new) knowledge,
- Existing corporate culture does not provide enough support for knowledge sharing practices,
- Shortage of appropriate infrastructure supporting knowledge sharing practices,
- Physical work environment and layout of work areas restrict effective sharing practices,
- Organisational structure inhibit knowledge sharing, and lastly
- Office layout and seating arrangement is not conducive for knowledge sharing.

Kastelein (2009, 1) studied the impact of workplace on knowledge sharing and confirms that, “there is a conspicuous knowledge gap in this respect as an in-depth examination is largely missing in terms of the role that the physical workplace plays in creating barriers and opportunities for knowledge sharing”.

Sedighi (2015, 2) state that there isn't sufficient research to measure and evaluate the impact of environmental factors on the knowledge management performance. As part of this study, the researcher highlights environment factors that affect knowledge audits and knowledge management in general. To close this knowledge gap more research still need to be conducted in this particular area, which is being neglected, yet very critical in any knowledge management project.

3.4 Knowledge audit and its link to knowledge management implementation in an organisation

This brings us to the place of the knowledge audit in the knowledge management implementation. The organisational knowledge strategy must be delivered on by its knowledge management framework and the knowledge audit, which should establish the baseline of what is available for executing that strategy and what needs to be developed, should align with the strategy and framework KMICe (2014, 15).

Figure 17 illustrates the relationship between knowledge audit, knowledge strategy, knowledge management and the overall business strategy. As can be seen, the knowledge audit is not a standalone project, but is a step in a much bigger process of achieving alignment between the knowledge management plan and the overall business strategy.

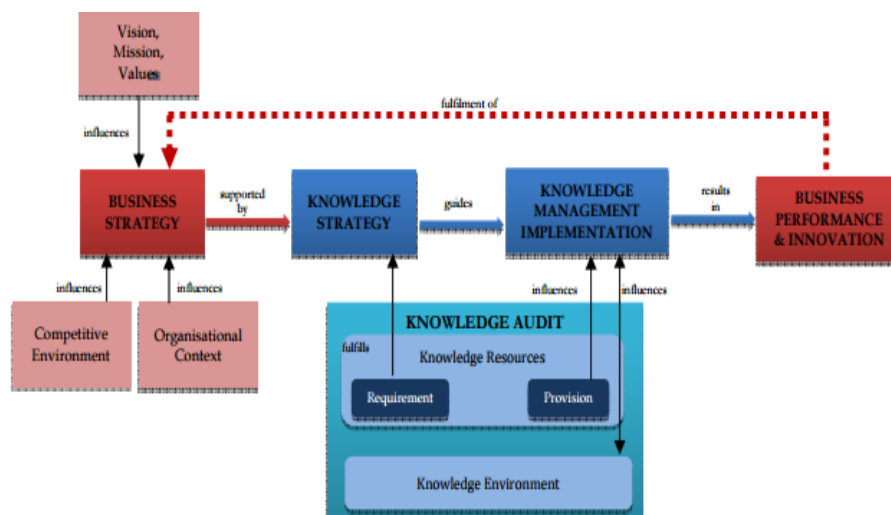


Figure 17 Knowledge audit and business strategy

Source: (KMICe) (2014)

3.5 Summary

This chapter introduced, discussed and compared frameworks for knowledge management to show that they are much wider in scope than just focusing on the organisational knowledge content. Additionally a specific framework by Becerra-Fernandez and Sabherwal (2010) was chosen to highlight the importance of several infrastructural elements that enable knowledge management in organisations. Their ideas were taken as the

fundamental guideline for this thesis. Knowledge management infrastructure elements are what make knowledge management function, and the argument in this chapter was therefore that as far as possible these enabling infrastructure elements should be part of the scope of knowledge audit programs. Most knowledge management frameworks do consider inclusion of knowledge of knowledge management infrastructure enablers in knowledge audit methodologies, however very few frameworks provide a comprehensive inclusion of these enablers. Therefore, knowledge management infrastructure enablers were briefly discussed however, more discussion on infrastructure enablers will be discussed in more detail on chapter four.

Lastly, the impact of different infrastructure elements on knowledge management was illustrated on the basis of Becerra-Fernandez and Sabherwal's framework. The reasoning behind discussing such impact was to highlight the values that knowledge management enablers add to knowledge audit methodologies as well as knowledge management and how critical they are to the broader spectrum of knowledge management. To summarise, organisational culture, structure, information technology, common knowledge, and the physical environment are the main infrastructure upon which knowledge management systems rest. Information technology is critical to knowledge management on a large scale; it permits the transfer of knowledge and information. The organisational structure, whether it is centralised or decentralised have an influence on knowledge management and it can enhance or hamper knowledge sharing. Another essential tool for knowledge management is cultural infrastructure, without building a culture of common trust and collaboration among the employees; organisations will find it testing to yield advantage of their employees' expertise.

Infrastructure elements should not be ignored when conducting knowledge audits, because all infrastructure factors discussed in this chapter are critical to effective knowledge management implementation in the organisation. Having however discussed a number of frameworks for knowledge management, knowledge audit methodologies success put reliance of explicitly defined frameworks for knowledge management. In order for knowledge audit be designed appropriately a good understanding of the group wide business strategy will assist the drafting of a good knowledge management strategy, which will in turn determine and give indication as how knowledge audit should be approached.

CHAPTER FOUR: KNOWLEDGE AND INFORMATION IN AUDITS

4.1 Introduction

Having now established that the scope of knowledge audits should be much wider than the stock of knowledge to also include the infrastructure that enable the flows of knowledge, the purpose of this chapter was to compare various extant knowledge audit methodologies (as introduced in chapter two) in terms of their scope to see to what extent they cover some of these infrastructural elements. The aim was to compare the selected methodologies in a table to illustrate similarities and differences. This chapter further discussed knowledge and knowledge audits in organisations with a view to consider how knowledge audit methodologies might look when they are implemented to organisations when they include flow alongside stock considerations. This prepared for the conclusion in chapter five. In addition, this chapter considered whether the selected knowledge audit methodologies took into consideration the enabling infrastructure by taking all knowledge management infrastructure enablers discussed in chapter three and checking each enabler against each knowledge audit methodology to see if it has been accommodated or not. The chapter lastly analysed the gap between knowledge audit methodologies and knowledge management infrastructure and framework enablers discussed in chapter three.

4.2 Knowledge management infrastructures

Knowledge management infrastructure is the foundation upon which knowledge management activities are constructed. The successful implementation of knowledge management requires adequate infrastructure in the organization.

See this quote by Lambe (2011) regarding infrastructure:

“Knowledge and information infrastructure mean all the things that combine to facilitate the flow of information and knowledge in facilitation of the myriad tasks, actions and decisions that comprise organisational activity. Hence, information infrastructure does not just mean the technical IT infrastructure, although it includes that. It also encompasses human, social and organisational elements. Within your information infrastructure you will normally find information management policies, process and practice routines, standards, arrays of tools and resources that are visible

to their users, conventions and assumptions, shared vocabulary, and categories”
Lambe (2011, 2).

A more succinct definition of knowledge infrastructures is “robust networks of people, artifacts, and institutions that generate, share, and maintain specific knowledge about the human and natural worlds” (Edwards, 2013, 1).

In the previous chapter, it is noted that that Becerra-Fernandez and Sabherwal (2010) consider five major components to knowledge management infrastructure:

- Organisation culture,
- Organisation structure,
- Organisation's information technology infrastructure
- Common knowledge, and
- Physical environment.

A knowledge audit is the initial stage for implementing a knowledge management program and consists of taking stock of the available knowledge that the knowledge management program is supposed to manage and develop. Therefore, developing effective knowledge management strategies depend largely on successful knowledge audits.

The previous chapter argued that it is important that a knowledge audit methodology consider organisational culture, structure, information technology, common knowledge, and the physical environment.

4.3 The difference between knowledge audit and knowledge audit methodologies

People use the labels knowledge audits and knowledge management interchangeably to define auditing of knowledge but is there really no difference between them? On the face of it, it seems that knowledge audits only concern knowledge assets and that knowledge management audits perhaps cast the net wider, perhaps also including infrastructural elements necessary for knowledge management the way this thesis suggests is a good idea. However, when looking at the literature this difference is not discernable, both serve the same purpose which is to audit knowledge content as shown in chapter two. Whilst knowledge management appear to be broader in scope however knowledge audits are more

specific as to which elements to priorities when auditing knowledge, and further provide a detail step by step methodology of auditing organisational knowledge.

4.4 Knowledge audits and knowledge management audits in organisations

Effectively managing knowledge management programs in any organisation is fundamental to the success of an organisation. Any organisation of any size must have knowledge management program in place in order to manage it IP and evolve with innovations so as to produce products that respond positively to the market. However the success of any KM programme is solely depended on a cutting edge knowledge management strategy, with clearly defined objectives and activities that will be performed in order to get the organisation to be a knowledge driven organisation.

Hence the following knowledge audit methodologies are critically analysed so as to assist knowledge auditors to select a knowledge audit methodology that shows the most promise for including also knowledge management infrastructure elements for their respective organisations. The comparison and evaluation of the different knowledge methodologies will make it easier to see whether a particular methodology is in line with the knowledge management needs and goals and will meet the business requirements.

Research done by Jafari and Payani (2013, 3161-3163), looks at the following components of knowledge audits: knowledge documents, determining organisational enjoyment, identifying organisational knowledge objectives, identifying organisational experts, identifying organisational knowledge, determining knowledge importance, and auditing the organisational knowledge situation. They also consider the project management aspects of conducting an audit. As can be seen those components are mainly concerned with determining the size and location of knowledge stocks. It seems that the audits completely neglect the infrastructural aspects necessary for the flows of knowledge, apart from perhaps the vague reference to "determining the organisational enjoyment". The rest is all about identifying containers of knowledge such as documents for explicit knowledge and organisational experts for tacit knowledge. However, without taking the relevant knowledge enablers taken into account the knowledge audit will offer only a partial view of what they call the "organisational knowledge situation".

The methodology is more concerned with how knowledge is managed and transferred to the rest of the organisation by subject matter experts or via documents. It is therefore noted that this particular methodology is more tailored to knowledge capture, determining knowledge content and assets and neglecting the enablers which will make knowledge work. It assumes that the flows will come naturally once the stocks are taken care of.

The knowledge audit reference methodology developed by Skyrme (2007) looks at ten elements, which include:

- Scoping and planning
- fact finding
- analysis and interpretation
- developing deliverables
- stimulating action, and review and lastly,
- and review and revisit

Skyrme offers a recipe of steps followed, but just like Jafari and Payani (2013), when the fact finding step is closely examined it is clear that the concern is with which knowledge (content) should be audited and how deep the audit should be rather than considering the enablers to knowledge audits as well. Identification of critical knowledge is key in Skyrme's (2007) methodology and recommending how this knowledge should be captured. Whilst Skyrme (2007) offers the steps necessary for the how to project manage a knowledge audit, he neglects the wider view on knowledge management infrastructure elements.

However, step two of Skyrme's (2007) methodology look at discovering facts around the state of knowledge audits within the organisation. These facts are gathered by using tools such as questionnaires, workshops, face to face interviews, focus groups, etc. Of course, to successfully use these fact-finding tools in an organisation, one has to consider the nature of the participants in for instance the knowledge audit interviews. This means that one needs to understand the structure of the organisation, the culture, technology elements and enablers in order to get the right information and be able to interpret it correctly too. Conducting focus groups and workshops requires an understanding of the physical layout of the organisation. One needs to determine if the layout will be conducive to conduct workshops, interviews, focus group, etc. So even to conduct the knowledge audit, one has to rely on the infrastructural elements that make knowledge management possible in the organisation.

Perez-Soltero and Barcelo-Varenuela (2007) look at closely identifying knowledge assets as one of the core processes to knowledge audits, however identifying knowledge assets alone will not suffice the effectiveness of knowledge audits, i.e. knowledge assets may include, policies, procedures, knowledge repositories, etc., in order to enable knowledge assets to function effectively, they must be enabled to do so by means of introducing knowledge management enablers to knowledge audit processes. The rest of the audit include:

- identification and meeting with key people,
- obtaining knowledge inventory,
- analysing knowledge flows,
- knowledge mapping,
- knowledge audit reporting, and
- continuous re-auditing,

This is very similar to Skyrme's (2007) how-to steps for a knowledge audit. The main difference is that it includes a step for specifically analysing knowledge flows. Here seems to be scope for a consideration of infrastructure elements that support the flows of knowledge.

Hylton's (2002, 2004) methodology as discussed on chapter two of the thesis discussed a three stage knowledge audit questionnaire survey. The following elements make up the three-phases:

Knowledge audit Level 1: KAL -1

Phase one of the knowledge audit framework, required as many as possible employees to participate in the knowledge audit questionnaire survey.

Outcomes of the questionnaire survey are then analysed and a report is generated to present findings from phase one of the knowledge audit. In addition, recommendations are included in the report generated on phase one of the knowledge audit methodology.

Knowledge audit level 2: KAL-2

The outcome of the report generated during phase one of the knowledge audit set the direction as to what activities need to take place in phase two. Therefore, phase two of the Knowledge audit methodology focuses on addressing outcomes of the knowledge audit report. To attend comprehensively address the outcomes of phase, face to face interviews are used as a tool to confirm findings with those employees who had participated on phase one of the knowledge audit process.

Knowledge audit level 3: KAL-3

Based on activities of phase one and two of the knowledge audit, phase three therefore combine both outcomes from phase one and two to conclude the knowledge audit process. Depending on the outcome of phase one and two, the objective of phase three is to identify, locate, and map the core sources of knowledge within the audited unit.

Hylton's (2002) methodology is no different from other existing knowledge audit methodologies. It is the shortest methodology of knowledge auditing however it incorporates all elements that are proposed by other knowledge audit methodologies. It claims to be a people –centred methodology due to the nature of how it engages with participants during questionnaire and face to face interviews, however there is no clear indication as to how the engagement will be facilitated and possible inhibitors to the process. One cannot ignore that you can have the best methodology or tool to conduct Knowledge audits, however the environment is not conducive for the audit to take place, the questionnaire is likely not to give a true reflection knowledge management status in the organisation.

Just like Perez-Soltero and Barcelo-Varezuola (2007, 4-8) knowledge audit methodology, the proposed methodology of Ganesan and Dhanapal (2012) is centered on the main organisational processes such as leadership, culture and the core activities that determine knowledge critical to the organisation. It is quick scan phase is similar to that Hyton's knowledge audit methodology that does an environmental quick scan as a pre-assessment. There is definitely some scope for a consideration of infrastructure here, although it is not explicit.

The knowledge health stage of this methodology look at how effectively knowledge is being utilised to achieve firm's strategic objectives. This steps seems to hold promise as a place to consider the infrastructure, but it is actually about strategic alignment. Therefore, just like

the other knowledge audit methodologies, this phase is more about discovering knowledge assets and identification of knowledge sources.

In terms of knowledge management enablers, culture is the only enabler that is explicitly recognised by this methodology. Even with culture being identified as an enabler, there is still no clear direction as to how this methodology will go about analysing organisational culture to see if it is in a good state to accommodate knowledge audits to be conducted.

Handzic (2008) introduced the concept of a knowledge management enabled knowledge audit methodology. This methodology aimed at determining an exact view of the institution's knowledge assets and strategies, and further identify infrastructure elements such as social and technical enablers. The proposed knowledge audit methodology extends the core knowledge-process-enabler by introducing knowledge management contingencies and socio-technical enablers as additions to knowledge management core processes. The methodology recognises the need to take into consideration the social issues and environment factors that might influence knowledge audits, however the rest of the stages are the same as the other knowledge audit methodologies.

The knowledge audit reference methodology of Burnett *et al.* (2013, 144), focused on knowledge audit enablers as key elements in conducting knowledge audit and implementing knowledge management strategy. The organisational enablers are as follows:

- Strategic vision,
- Structure and environment and,
- Culture and behaviour.

This knowledge audit framework took into consideration the environment factors that can influence knowledge audit in the organisation. However, the methodology is no different from other methodologies, because the nature of it is to determine as to what knowledge exist and what knowledge is missing, and further look at different knowledge assets in organisation and how they can be used as sources of critical and core knowledge. However in terms of the infrastructure enablers, this methodology is much broader in that aspect. The issue with burnet's model is that it is very vague in scope and the infrastructure enablers proposed by the writer are limited as a result, cannot give a holistic view of how knowledge audits should be conducted comprehensively if infrastructure elements are limited in scope.

Cheung *et.al.* (2007, 147) proposed a culture assessment orientated knowledge audit methodology. The knowledge audit reference methodology is made up for the seven phases which are:

- Phase 1: Background of the study,
- Phase 2: Culture assessment,
- Phase 3: In-depth investigation,
- Phase 4: Building inventory and mapping knowledge,
- Phase 5: Analysis of knowledge network,
- Phase 6: Recommendations and lastly,
- Phase 7: Deploying tools and building collaborative culture.

The one infrastructure element that is clearly represented here is that of the culture assessment prior to inventorising the knowledge and mapping it. Most of the phases are common to other knowledge audit methodologies; however, they have been named differently in this particular methodology. The gist of the methodology is to however to build a collaborative culture.

According to Yip *et.al.* (2015, 518) the current knowledge audit methodologies place reliance on auditors to execute and analyse knowledge audit results, and eventually propose and enact knowledge management recommendations. It is evident that most decisions in terms of how knowledge audits will or should be conducted are merely at the discretion of the knowledge audit team and not considering that interaction with participants is the basis of success of any audit. Therefore, assessment of culture is an important element to knowledge audits, because it gives an indication of whether employees are willing to share knowledge or not.

Lastly, the knowledge audit reference methodology of Shahmoradi *et.al.* (2015, 28) look at incomplete or incomprehensive execution of knowledge audits which were factors in most knowledge management programs failing. Shahmoradi *et.al.* (2015) undertook their research to probe how knowledge audits are actually executed in the work place and furnished an all-inclusive methodology for conducting knowledge audits based on their review of best practices.

The seven-phase methodology is as follows:

Phase 1: Identification of mission, vision and objectives, under this phase the following activities are conducted:

- Defining critical success factors.
- SWOT analysis.
- Identification of business core processes.

Phase 2: Preliminary activity for, which is made up of the following activities:

- Organisation of knowledge audit tasks.
- Determining knowledge audit methodology.

Phase 3: Looks at knowledge management infrastructure elements, which are as follows:

- Concentrating on knowledge management processes.
- Information technology.
- Culture.

Phase 4: Determination of knowledge management situation, incorporates the following sub phases:

- Knowledge flow.
- Knowledge resources.
- Knowledge mapping.

Phase 5: Analysis of knowledge management audit results, sub phases incorporates:

- Knowledge gap analysis.
- Social network analysis.
- Knowledge network analysis.

Phase 6: Using analysed data for:

- Specifying problems.
- Informing others about knowledge management audit.
- Present suitable knowledge management strategies.
- Present and prioritise of knowledge management audit solutions.
- Present an action plan for implementing knowledge management.

Phase 7: Knowledge management re-audit.

At this point it can be noted that this is the only methodology presented in this thesis which refers to knowledge *management* auditing instead of just knowledge auditing. However, as discussed in sub-section 4.3, and as can be seen from their methodology, knowledge management audits and knowledge audits mean the same thing; whilst with knowledge management audits there seem to be more details added to this particular reference methodology.

Phase three of this methodology is the only part that look at knowledge management infrastructure elements considering how they are linked to knowledge, management processes, however the methodology is still not comprehensive enough in this respect. For knowledge management audits to be comprehensive in scope, audit methodologies should take a holistic view of all enablers and infrastructural elements for knowledge management and not just culture, technology and environment.

4.5 The gap between knowledge audits methodologies and knowledge audit enabling infrastructure factors

Chapter three of the thesis discussed in detail, a variety of knowledge management strategies and infrastructure factors that enable knowledge management. Research shows that there is still a huge gap between aligning existing knowledge management strategies or framework to an ideal knowledge audit methodology.

There are further gaps in knowledge management infrastructure factors/enablers in a sense that according to most literature on knowledge management framework and infrastructure, the common infrastructure enabling factors is culture and information technology. Conversely Becerra-Fernandez and Sabherwal's (2010) knowledge management infrastructure factors took a broader view of possible infrastructure that requires careful consideration during the knowledge audit process and planning.

On the other hand, knowledge audit methodologies discussed in chapter two and summarised in chapter four highlighted some of the knowledge management infrastructure factors critical to knowledge audits and knowledge management implementation. The methodologies to some extent do involve some element of infrastructure consideration but

when they are being implemented, the infrastructure falls away or it is not being considered at all during the implementation phase. Taking into consideration the importance of enabling infrastructure factors in knowledge management, there is a vent in terms of the process in which knowledge audits are being implemented and in terms of what and ideal knowledge management framework elements should look like. In eleven knowledge audit methodologies discussed only few that comprehensively looked at knowledge audit enabling factors comprehensively. However, the focuses have been on very limited scope pertaining to knowledge audit enabling factors. As discussed in the preceding chapter, information technology and organisational culture were the two knowledge enabling elements that did receive some consideration in most of the knowledge audit methodologies.

It must be noted however that knowledge audits are designed for a specific purpose and they serve to gather certain type of data or content, i.e. Skyrme's (2002) six steps knowledge audit methodology's focus is more on data collection, it disregards that factors that might influence data collection process. If, for example technology is not taken into consideration by this methodology, data collection will be affected, because one will require some sort of an enabling technological tool to collect and analyse data. On the other hand, Debenham and Clark's (1994) knowledge audit methodology took into consideration the physical environment enabling element to a successful knowledge management. Debenham and Clark (1994) considered the evaluation of the physical environment to access if it is conducive for knowledge auditing and management implementation.

Burnett *et al.*'s (2013, 144), knowledge audit process, is the first highlight the importance of infrastructure enablers, specifically environmental assessment just like Debenham and Clark's methodology to knowledge audits. Burnett's methodology further looks at other possible inhibitors to knowledge audit that might influence knowledge management. However, Burnett's knowledge audit methodology places more emphasis on data discovery and collection and the thesis suggests that a fuller consideration of the various infrastructure elements could add to Burnett's initial insight that audits cannot only look at content.

Wu and Li (2011, 178) proposed knowledge audit methodology, which is made up of two core elements which are as follows:

- Knowledge capital-where the focuses is merely on identifying knowledge management assets, as well as human assets, and
- Organisational structure

This methodology is fairly restricted in scope since it does not cover most of the possible key enablers to knowledge audits such as organisational culture, physical environment, and common language. The framework points out what it will do, however the how-to element cannot be traced. Therefore, this framework has no practical implementation processed as result it is very risky to adopt it to a knowledge management program.

An enabling culture, information technology, structure, and common knowledge require equal consideration. However, Hylton, Henczel and Cheung's knowledge audit methodologies focused mostly on people and culture as the key knowledge management infrastructure. According to these methodologies, knowledge sharing culture is the key enabler to any successful knowledge audit implementation. However, all three knowledge methodologies do not begin with a knowledge culture as the first phase to carry out assessment into the preparedness of the organisation to entwine on a knowledge management strategy or framework. Ganesan and Dhanapal's (2012, 17) hybrid methodology focused on core processes. It is an extension of Perez-Soltero and Barcelo-Varenuela's (2007) knowledge audit methodology where core processes are assessed as the main drivers of effective knowledge audits. Both these methodologies consider the importance of culture audit as part of the knowledge audit.

Shahmoradi, *et.al.* (2015, 37) covers two knowledge management enablers, namely culture and information technology (yet they claim their methodology to be a comprehensive methodology). However, they do not take into consideration other critical infrastructure elements such as organisational structure, common knowledge, etc.

Handzic's (2008, 92) proposed methodology, seen in figure 4, took a broader scope by focusing on three knowledge audit enabling factors, which are social and technical factors, organisational structure, culture and information technology. Handzic's knowledge audit methodology covers most of enabling factors discussed in chapter three and comes closest to an ideal comprehensive knowledge audit methodology that incorporates all enablers mentioned by Becerra-Fernandez and Sabherwal (2010) as knowledge management infrastructure elements.

Knowledge audit enabling factors are not just information technology and culture. They go as far as enabling technology, an organisational structure conducive to knowledge sharing, office layout (physical environment) and common knowledge, i.e. beliefs and norms within employees. These enablers are critical to any knowledge audit implementation.

Although knowledge audit methodologies provide a solid platform to conduct knowledge audits, the main issue is the implementation purpose and unclear definition of what need to be achieved at the end of the knowledge audit exercise. However, existing knowledge audits focus mostly on data discovery and capture. Knowledge audits should however take a holistic view of the situation in the organisation, similar to how Becerra-Fernandez and Sabherwal treat knowledge management infrastructure factors.

Out of nine (9) knowledge audit methodologies discussed only one methodology looked at auditing organisational culture in detail. Organisational culture is the sole driver of a prosperous knowledge audit. If organisational culture is not considered when implementing knowledge audit program, chances of a true reflection of what the organisation perceive or consume knowledge management initiatives are very slim.

The success of any knowledge management program is depended on careful consideration of these enabling elements. Some knowledge audit methodologies do make provision for assessing knowledge management enablers during knowledge audits, however when the actual knowledge audits are conducted, knowledge management enablers are neglected. While the purpose of knowledge audits is understood when the exercise is being implemented, the focus changes in the process and becomes more about knowledge discovery and capture. The main reason for such, could be that knowledge audits are not designed to ensure that they focus on the main purpose and deliver on expected outcomes once complete.

However, a huge gap exist between knowledge management frameworks and infrastructure elements. Considering knowledge management frameworks discussed in chapter three, most frameworks focus on selective enablers, i.e. culture, technology and leadership. However, these enablers are not enough to allow a comprehensive knowledge audit methodology. For knowledge audits to be comprehensive in scope, they require a comprehensive knowledge management framework that will consider the enablers that are required to make the implementation of knowledge management framework successful and effective. Therefore, the gap between knowledge audit methodologies will only be accomplished and their lack of inclusion of knowledge management enablers are merely caused by the gap between knowledge management frameworks.

It must also be noted that as knowledge management become more and more popular, knowledge audits are slowly increasing their scope of knowledge audits methodologies to

include more enablers on their methodologies. i.e., initially knowledge audits were only concerned about culture enabler, however there has been growth in a sense that, most methodologies now look at not only culture, but structure, environment and technology enablers are part of the scope of some knowledge audit methodologies. However, the pace in which knowledge audit methodologies incorporate these enablers is concerning, and the outcome of knowledge audit implementation remains very concerning in a sense that one cannot be sure that the outcomes of the audit are really the true reflection of the knowledge health in the organisation.

All knowledge audit enablers are equally important to the knowledge audit process, i.e. most knowledge audit methodologies discussed in chapter two of the thesis took into consideration, culture, information technology and leadership. However, the flow of knowledge also depend on how the organisational structure is designed, whether the structure allows information to be shared across the business. The environmental element is also equally important, in a sense that the organisational layout must be designed in a manner that is conducive for knowledge sharing, so as common language and knowledge held in common (such as shared mental models).

Knowledge management processes however, are more concerned with how knowledge is to be discovered, captured disseminated and used. For the knowledge management processes to completely support knowledge management, program which incorporated knowledge audits. As it is, the process is more on data discovery and application. Whether there are any inhibitors to knowledge management process, those aspects are not catered for. In order to address existing issues around knowledge audits there is requirement for more studies to be executed on the current effectiveness of knowledge management processes to determine if they are comprehensive enough to capture fit in in the knowledge audit programs. Taking also into consideration the issue of knowledge management enablers on the knowledge audit process, for this process to work effectively, there must be enablers which will facilitate the process.

Therefore, knowledge management enablers cut across knowledge management frameworks, knowledge audit and knowledge management processes. Just like any other program, knowledge audit implementation needs to be evaluated to check if the implementation was a success, however all knowledge audit frameworks discussed on this chapter do not do a post implementation test to confirm if the project was successfully

implemented. However, it would also be very difficult for these methodologies to measure that aspect of the program because they lack infrastructure elements that can be used as a guideline to evaluate the success of implementation.

One of the issues with knowledge audit is that they lack focus and can be misleading. Some knowledge audit methodologies discussed on chapter four are very specific as to what they are auditing for, however when one goes to the audit stages of the methodology, they do not talk to what the title of the knowledge audit methodology, i.e., one of the methodologies was focusing on culture assessment of the organisation but the knowledge audit step said very little about culture assessment.

The thesis further picked up that most knowledge audit methodologies are designed to collect data, once that data has been collected; knowledge audit is then deemed as complete. This view of the knowledge audit as about collecting data, and storing it in repositories, can lose sight of the higher goal that the knowledge audit is about assessing the knowledge status of the organisation. To effectively assess the knowledge status, one needs to have a knowledge audit framework that is comprehensive enough to do a broad assessment instead of just a data collecting tool about knowledge content.

Out of nine knowledge audit frameworks discussed in this chapter of the thesis, only one methodology took into consideration the importance of environment when conducting knowledge audits. Not a single knowledge audit made mention of the importance of common language as an enabler to knowledge audits, however common language should be the key enabler to any knowledge management program.

Chapter three of the thesis discussed knowledge management process and how socialisation and common language is critical in knowledge management projects, chapter three further emphasised the importance of knowledge management infrastructure enablers when conducting knowledge audits, however there seem to be a disconnection when knowledge audit framework is developed. Most knowledge audit frameworks do not seem to take into consideration the knowledge management process, and knowledge management framework. Very little attention is given to organisational structure enabler; however, organisational structure is a very critical element to knowledge audits. The type of the organisational structure can either can break the knowledge sharing of the firm; therefore, knowledge audit methodologies need to pay careful attention to organisational structures.

Table 1: Knowledge audit methodologies summary

Author	Reference methodology	Focus Area/activities	Enablers
Jafari & Payani (2013)	Systematic approach to knowledge audit	Identify core and none core factors, identify key SME's, knowledge assets and documentation, determine how knowledge is managed and transferred to the rest of the organisation.	None
Skyrme (2002)	Six step knowledge audit	Data discovery, by means of face to face interviews, workshops and focus groups.	None
Perez-Soltero & Barcelo-Varezuella (2007)	Framework for knowledge audit – focusing on core processes	Ten phase methodology, core process prioritisation, leadership and organisational processes, and introduces support tools for each stage to assist implementation.	Environment and culture
Hylton (2002)	Knowledge audit methodology with emphasis on people-centered approach	Questionnaire survey, interviews and provide commendations	None
Ganesan & Dhanapal (2012)	Knowledge audit methodology: A hybrid methodology	Information culture assessment, core process prioritisation, and KM health measurement.	Culture
Handzic (2008)	Auditing knowledge management practices: model and application	Social and technical enablers and KM contingencies are focal points.	Socio-technical
Burnett <i>et al.</i> (2013)	Knowledge audit process: revised approach in conducting Knowledge audits	Data discovery, identification of what knowledge exist and infrastructure enablers	Structure, culture, environment, behaviors and technology
Cheung <i>et al.</i> (2007)	Systematic approach for knowledge auditing	This methodology addressed the limitations of existing knowledge audit methodologies and their lack of real-life implementation.	Culture: building collaborative culture
Shahmoradi <i>et al.</i> (2015)	A comprehensive methodology for executing knowledge management audits in organisations	Look at conducting knowledge audit by means of systematic review.	Information technology and culture

4.6 Summary

Most knowledge management frameworks emphasised the importance of knowledge management infrastructure enablers for the success of any knowledge management project implementation. However, when knowledge audits are designed, the phases or audit stages become very selective of infrastructure to include in a knowledge audit methodology. What then the knowledge audits methodologies start to lack is the true view of the status of knowledge sharing or acceptance behavior within organisations. It then leaves a gap in terms of the findings of knowledge audits results not being a true reflection of the knowledge status in an organisation. Because the methodology only selected specific aspects of the knowledge audit enablers, instead of making provisions for all possible knowledge audit infrastructure factors that might influence knowledge audit and knowledge management implementation. Knowledge audit is therefore not project that should be treated in isolation to the knowledge audit program. It is however, the initial phase to knowledge management. Chapter four then discussed knowledge management infrastructure in more detail compared to chapter three. Chapter four further looked at how knowledge audits fit into organisations, and lastly this chapter discussed the gap between knowledge audits methodologies and knowledge audit enabling infrastructure factors.

Chapter four revealed that there is a huge gap between knowledge audit methodologies, and knowledge management infrastructure enablers. Knowledge audits methodologies are developed and rolled out to the organisation to solve for a knowledge audit need, however there are very limited or not consideration of infrastructure elements that will make those knowledge audit methodologies work for each specific organisation.

Chapter four further revealed that most existing knowledge audit methodologies are project orientated, they provide knowledge auditors with what to do, however the how to do it element is missing from most knowledge audit frameworks. One of the issues with current knowledge audit methodologies is that, they hardly consider other knowledge management infrastructure enablers besides information technology and organisational culture. Knowledge management framework probably has a role to play in the preference of technology and culture selection of infrastructure factors. It has been noted that knowledge management frameworks discussed on chapter three of the thesis also tend to consider technology and culture for inclusion in knowledge management frameworks. However, Becerra-Fernandez and Sabherwal's (2010) knowledge management framework has six

knowledge management infrastructure elements that should be considered in any knowledge audit program.

Throughout the analysis of knowledge audit methodologies among the issue the exclusion of critical infrastructure enablers to knowledge audit methodologies, the researcher has also determined that knowledge audit methodologies are more directed towards establishing knowledge repositories and where they are located within the business rather than focusing on designing effective knowledge audit methodologies which are comprehensive in scope.

The researcher has further established that most of the discussed knowledge audit methodologies do not consider how employees will consume knowledge audit programs. They just outline how knowledge audit should be conducted not neglect the manner in which knowledge audits should be rolled out in various institutions. Neglecting such crucial aspects of implementation pose many challenges in terms of employees adopting and supporting such initiatives. Therefore, implementing knowledge audits is way more than just prescribing a knowledge audit for the business to follow, the people aspect is just as important.

Just like any other program being implemented in the organisation, the change management plan needs to be developed in order to effectively deal with change issues. However existing knowledge audit methodologies neglect this crucial aspect when it comes to managing knowledge, yet most knowledge audit methodologies are project driven. It is the sole responsibility of the knowledge management project team to ensure that knowledge management programs are well executed in order to realise the return on investment, therefore selecting the best possible approach to conduct knowledge audit is just as imperative.

Knowledge audits should however take a full circle knowledge auditing by means of establishing the following:

- What knowledge exist and where it is located
- What knowledge is lacking
- And how to develop or create lacking knowledge in order to close the knowledge gap

As is it currently knowledge audits are mainly focusing on what's available and, where is it located. There is very little attention in establishing what knowledge is missing and how to attain that close to close the gap.

CHAPTER FIVE: CONCLUSION AND RECOMMENDATIONS

5.1 Summary of findings and recommendations

The research shows that differences in the existing audit approaches may be explained by the different knowledge audit methodologies, because these methodologies propose sometime more than just the steps for conducting an audit, they typically also prescribe what to look for. After the analysis of these different foci about what to look for proposed by various knowledge audit methodologies, the manner of division of knowledge, the manner of conducting audits, tools that are used, and the group over which they are implemented, it is further noted that each methodology is designed to solve a specific problem, which is discovering knowledge and knowledge repositories. Hence, methodologies differ when implemented in the business and that is what made this comparison in this thesis necessary.

There is no standard framework for conducting knowledge audit, however the common method seems to be that the process of auditing is initiated by determining the gap between what knowledge exists and what knowledge is missing and needed by the organisation to deliver on its business strategy.

Several challenges pertaining to knowledge audit methodologies were identified. Some of the key challenges identified were as follows:

- Most knowledge audit framework neglect the impact of culture when conducting knowledge audits—organisational culture form foundation for any project, if therefore organisational culture does not get attention that it should be getting, organisations might implement projects in areas where the culture of the organization is not flexible to accommodate those projects.
- The lack of understanding that knowledge is not merely about data discovery.
- The extent to which knowledge audit methodologies overlook the importance of knowledge management infrastructure factors during knowledge audit implementation.
- The gap between existing knowledge management frameworks and knowledge audit methodologies.

Pa (2015, 5) states that the involvement of team members in knowledge audit programs increases the chances knowledge audit outcome to be positive. However, it must also be considered that knowledge audit program should be conducted in a more focused fashion and include relevant stakeholder and not just everyone within the firm. The main purpose is to audit only relevant knowledge, rather than try to be complete and audit everything, therefore in contrast with Pa (2015: 5) the knowledge audit team should be very careful when selecting stakeholders who will participate in an audit, the key approach should be to get the right people with the right attitude to be part of the knowledge audit program.

Organisations do not approach knowledge audits as a strategic program, instead they see it as a necessary step to get out of the way, as a result the organisation end up having irrelevant people making decision about what the knowledge management program should look like, without understanding the strategic direction the organisation is taking. Moreover when working on knowledge management programs, one needs a team of strategic thinkers, because knowledge management is a very dynamic discipline, it is ever changing, and require a team of innovators who are always able to think for the future and not for the current state only. Hence, most organisations are even struggling to find the perfect home for knowledge management unit/department within the organisation. Most institutions view knowledge management as an information technology function, some organisations place knowledge management in the Corporate Services department, but when knowledge management is considered a strategic function, its placement within the organisation has a huge impact on how its programs will be rolled out and received by the entire organisation.

Throughout the discussion from chapter one of the thesis, it was clear that auditing knowledge is not just a process that involves the auditor and the knowledge team or KM department in an organisation. Instead, knowledge auditing is a collective effort that should involve the members throughout the organisation, because this is the only way to ensure that all possible inhibitors to the knowledge flow are identified.

A successful knowledge audit in turn depends on several factors determined by the knowledge management and organisational strategies in general. For example, if the knowledge management strategy is not well crafted, knowing what knowledge is available through an audit comes to nothing. As could be observed in the overview of various knowledge management frameworks, some of them included various knowledge management enablers, but ignore the foundational infrastructure enablers when it is time to

conduct or develop knowledge audit methodologies. Therefore, comprehensive knowledge audit depends on a well-considered knowledge management framework which embraces a holistic knowledge audit methodology; namely one that takes into consideration also the infrastructure elements that are considered the foundation for knowledge management success.

The argument has been that the extant knowledge audit methodologies are too narrow in scope, because they primarily want to determine what knowledge is available in the organisation and where it is to be found, with the aim to identify the gap between the knowledge needed by the organisation and the knowledge available in it. Whilst this is a good starting point, it does not tell the organisation enough about their needed knowledge management plan. For planning, knowledge audit should also seek to identify gaps in the infrastructure. In the comparison of selected knowledge audit methods to determine which ones offer also scope for a consideration of infrastructure factors, it was demonstrated that none of them comprehensively consider such factors. It has however been discovered that some of these methodologies include one or two infrastructure elements, mostly technology or culture related.

Of the various competing knowledge audit methodologies, some were seen to be mere project management steps of how-to's, whilst others were too theoretical with shortcomings in practical value. As a result, when they get to the implementation phase they raise a lot of concerns in terms of practicality around implementation and whether they will produce a true reflection of the knowledge health of the organisation. In addition, those knowledge audit methods that do include infrastructure factors required for knowledge management, mostly consider information technology and culture as the only enablers. Also, closer inspection revealed that these two enablers are not considered on the infrastructural level the way that knowledge management theories (such as Becerra-Fernandez and Sabherwal) do. The discussion of knowledge management frameworks in chapter three of the thesis, confirmed that knowledge management enablers are more than just technology and culture. Becerra-Fernandez and Sabherwal's (2010) knowledge management infrastructure framework offer a comprehensive overview of the place of infrastructure in knowledge management systems and from them one could learn about the diversity knowledge management enablers in organisations.

In addition to culture and technology enablers, Becerra-Fernandez and Sabherwal (2010) argue that knowledge management infrastructure includes also the organisational structure, the physical environment, and common knowledge as enablers to effective knowledge management.

What is left out by Becerra-Fernandez and Sabherwal (and also others), is the importance of policies impacting knowledge management. With information becoming more complex to manage, organisations are implementing strict policies that guide employees as to which information can be shared internal and external with stakeholder or competitors, and who has the authority to share such information. As a result, one cannot deny that such conditions influence how employees behave around the issue of knowledge sharing if there are strict policies pertaining to how information is handled in the organisation. It is therefore recommended for the knowledge audit team to take into consideration policies like data classification, information classification, and records management policies to ensure that they do not hinder knowledge audit implementation.

Some knowledge audits are designed to audit knowledge gaps within organisations. Other knowledge audit methodologies are designed to collect data, to identify data available, data needed and where available data is located. It is therefore evident that knowledge audits are very narrow in scope. However, it must be emphasised that knowledge audits are not just about identifying, collecting, and collecting data.

The challenge with the implementation of knowledge audits start with the lack of understanding about the purpose of the audit. Traditional audits think of the purpose as accounting for stocks of knowledge, whilst a holistic approach includes flows as well as stocks of knowledge. The issue is of course that flows are not directly auditable, and the thesis argues that accounting for the infrastructure through which knowledge flows as a way around this auditing issue.

Before the data can be collected there has to be an assessment to determine if the environment, the design of the organisational structure, the culture of the organisation as well as common knowledge and language used the organisation are conducive for knowledge to thrive. This can be done by knowledge audits methodologies taking a wider view and also assessing knowledge management enabling infrastructures broadly to get a holistic reflection of the knowledge health in organisations.

5.2 Knowledge audit methodology with emphasis on knowledge management infrastructure enablers:

In response to the current gap in knowledge audit, methodologies discussed in chapter two and knowledge management framework and processes discussed in chapter four, the thesis proposed the following knowledge auditing reference methodology focusing on knowledge management infrastructures as main enablers to knowledge auditing. The methodology was adapted from Perez-Soltero and Barcelo-Varezuella (2007) an audit methodology with the aim to address core processes. Knowledge audit methodologies tend to audit anything and everything including knowledge that is not critical to the business, but this focus on core processes avoids this error.

As shown before, they presented a ten-stage phase knowledge audit methodology, highlighting ten fundamental processes to include in knowledge audits. By way of conclusion, the researcher wanted to present ways of expanding their framework so as to also include the infrastructural elements that were discussed in the preceding chapters. This is to show that it is indeed feasible to extend existing knowledge audit methods, since the argument here is not to do away with auditing, but to broaden its scope.

The purpose of framework is to propose enhancements to knowledge audits methodologies by means of introducing a broader range of knowledge management enablers to knowledge audits. The proposed adaptation will start from the selection of core-processed methodology when conducting knowledge audits. At the appropriate steps, the infrastructure elements that could potentially be considered will be added to Perez-Soltero & Barcelo-Varezuella's (2007) stages, just as an illustration of the adjustments desirable. Of course, in principle this could be done to the audit methodology of one's choice, but their focus on core processes is deemed desirable for our purposes here.

Stage 1: Study the background of the organisation

Objective: To understand mission, vision, and objectives of the entity

The How-To Process: knowledge auditor is required to hold an initial meeting with key stakeholders within the organisation or the business area or function where knowledge audit need to be conducted. The initial meeting is necessary because, it gives knowledge audit team an opportunity to introduce knowledge management program to the rest of key stakeholders and further iron key requirements from the team and address expectations from

the program going forward. At this phase of the initial meeting, the knowledge audit team get to unpack knowledge management and knowledge audit concepts. While knowledge management team unpack key concepts, organisation leadership get an opportunity to present firms expectations out of the knowledge management program. It is very critical that top management is involved in the decision making because knowledge management is a strategic initiative, therefore it must implement and driven in line with strategic objectives of the business. And the people who are at the best position to align knowledge management to strategic objectives of the organisation are business leaders and strategy leadership personnel.

Tools to achieve phase one deliverables: The use of interviews, focus groups, workshops, and organisation's strategic plans, are key tools that can be utilised to deliver on deliverable discussed on phase one of the knowledge audit methodology.

Stage 2: Core processes selection

Objective: The purpose of phase two knowledge audit step is to understand main business functions and how they support the rest of the business. As discussed in chapter four, the purpose of knowledge auditing is not about auditing all content held by the organisation, but to prioritise on knowledge that is critical and key to the organisation. At this stage the focus of knowledge audit team must be about selecting business core processes that will be key to the knowledge audit process.

How To Process: Business methodology and business process across will give a clear insight as to what are the key core processes within the firm. In addition, business processes will further give knowledge auditors and indication as to where critical knowledge is being generated stored within the firm. There is however, a requirement to investigate the impact of knowledge if not shared on these processes, what is the impact on the business and how critical is the impact.

Tools to achieve phase one deliverables: Business methodology, divisional business processes, and knowledge management processes can be depending on the suitability of them to knowledge audits.

Stage 3: Prioritising core processes

At this particular phase core processes would have been identified and now the requirement would be to prioritise each process according to it critically to business operations. Just like any other process, some process will take priority in any business.

Stage 4: Assess knowledge management infrastructure

Objective: To understand, organisational culture, structure, organisational Information Technology infrastructure, common knowledge within the organisation and with clients the organisation is serving as well as physical environment factors, which might have influenced the implementation of knowledge management related programs.

How To Process: knowledge management team together with leadership including key stakeholders from HR, IT and Facilities management personnel is necessary must organise a session where knowledge management infrastructure will be unpacked in more detail.

The objective of this stage is to ensure that prior to conducting knowledge audit, knowledge management infrastructure enablers are understood to see for an example if the organisational culture is ready to accommodate knowledge audit, if not then suggest possible alternatives to deal with organisation culture issues prior to implementation.

Support tools: Organogram of the organisation, will address the organisational structure element, face-to-face interviews, questionnaires, workshops with relevant stakeholders are used to better understand knowledge management infrastructure elements of the organisation.

Stage 5 Identify and meet with key stakeholders

Objective: To establish the stakeholders who will take part in the chosen knowledge audit main processes.

How To Process: knowledge audit team will need to use tools such as existing organisational records, interview top management as well as personnel responsible for the selected core processes, in order to get a better view of who are other possible stakeholders that can be invited to participate in the selected core processes.

Tools to achieve phase one deliverables: The use of organisational structure and department business unit structures will be the key sources to identifying key stakeholders for inclusion in the knowledge audit program.

Meeting with Key People

Objective: To execute information to key persona concerning knowledge audit and knowledge management processes.

How To Process: It is pivotal to comprehend the language used in the organisation, i.e., common language, and physical layout of the organisation in order to have these conversations where participants are free to share information and moreover the layout of the office must be conducive to hold such meetings.

Infrastructure Enablers: Organisational culture, structure and common knowledge .

Stage 6: Obtain knowledge inventory to identify organisational knowledge assets

Objective: The objective of phase five is to obtain and use knowledge inventory to identify knowledge existence and where it is situated within the in the organisation, including identification of knowledge repositories

How To Process: knowledge management team will need to leverage on product specific processes, business processes and organisational-wide business plans in order to effectively identify knowledge assets.

Tools to achieve phase one deliverables: Intranet sites, interviews and other existing knowledge repositories will be ideal to gather required information.

Infrastructure Enablers: Information Technology, common knowledge, and culture.

Stage 7: Analysing flow of knowledge

Objective: To study and analyse how knowledge within the organisation flows.

How To Process: Analysing knowledge flow will help the organisation determine who uses what knowledge and how that knowledge reach those specific users. At this particular stage knowledge management team, will also be able to identify areas where knowledge does not flow and further determine possible inhibitors of knowledge flow in those areas.

Tools to achieve phase one deliverables: interview with relevant knowledge users will be the best tool to get an insight as to how knowledge flow in the organisation.

Infrastructure Enablers: Organisational culture, business process mapping, common knowledge, Information Technology, and organisational structure.

Stage 8: Creating knowledge map

Objective: As discussed on stage seven, knowledge flow gives an insight as to where knowledge reside within the organisation, however at stage seven the objective is to visually represent knowledge identified on phase six. Therefore, knowledge map will derive it visual data from knowledge flow process discussed on phase six.

Infrastructure Enablers : Information technology, organisational culture, organisational structure and common knowledge.

Stage 9: Reporting on knowledge audit findings

Objective: The objective is to a report on the findings of all activities conducted by knowledge audit team. The report ideally issued to key stakeholders who have participated in the knowledge audit and planning process. This report gives a view of the knowledge health of the organisation and justification for the short, medium and long-term knowledge management investment.

How To Process: A initial audit report based on the first core process examined. The final knowledge audit report is produced on the basis of the findings from the previous stages when all core processes have been analysed. The provide a pictorial view of the current status of knowledge assets, the knowledge maps, the effectiveness of the enterprise in achieving business processes, the knowledge gaps as well as the proposal for the organisation to drive continuous improvement.

Support. Tool: knowledge map.

Infrastructure Enablers: Information Technology infrastructure, common knowledge infrastructure.

Stage 10: Knowledge re-auditing

Objective: The two objectives of knowledge re-auditing phase are to analyse and audit the remaining sole processes, and further review and update any changes to the audit process that might have occurred during knowledge auditing.

How To Process: The proposed knowledge audit framework aim to conduct knowledge re-auditing on quarterly basis. This will allow organisations to update any knowledge related changes and further identify knowledge management inhibitors as early as possible. The quarterly knowledge re-auditing is very critical more especially to knowledge intensive firms. Because organisations generate knowledge every day, it then becomes necessary that that knowledge is effectively managed by means ongoing knowledge auditing to make sure that, knowledge remains relevant to the organisation, and that flows in a manner effective to the knowledge users. Knowledge re-auditing further allow knowledge management team to update knowledge management processes and, knowledge inventory and knowledge map.

Therefore if knowledge re-auditing is not part of the knowledge audit methodology steps, the organisation expose itself to a risk of operation knowledge audit process with an outdated knowledge audit methodology, which no longer speaks to the real issues around knowledge health of the organisation.

Support Tools: The framework under discussion will therefore make use the very same knowledge audit methodology to initiate knowledge re-auditing for the firm, knowledge map, knowledge inventory and knowledge process flow diagram will be additional tools that will be utilised by knowledge audit team to conduct knowledge re-auditing.

Infrastructure Enablers: Information technology tools, organisational culture, common language, physical environment and organisational structure.

Figure 18 below show a pictorial view of how the flow of knowledge audit steps will look like in a process flow diagram. Where they suggested to prioritise and select the core processes, we add the assessment of the knowledge management infrastructure and as the steps above showed, at each of the stages included the relevant infrastructure elements that are in play.

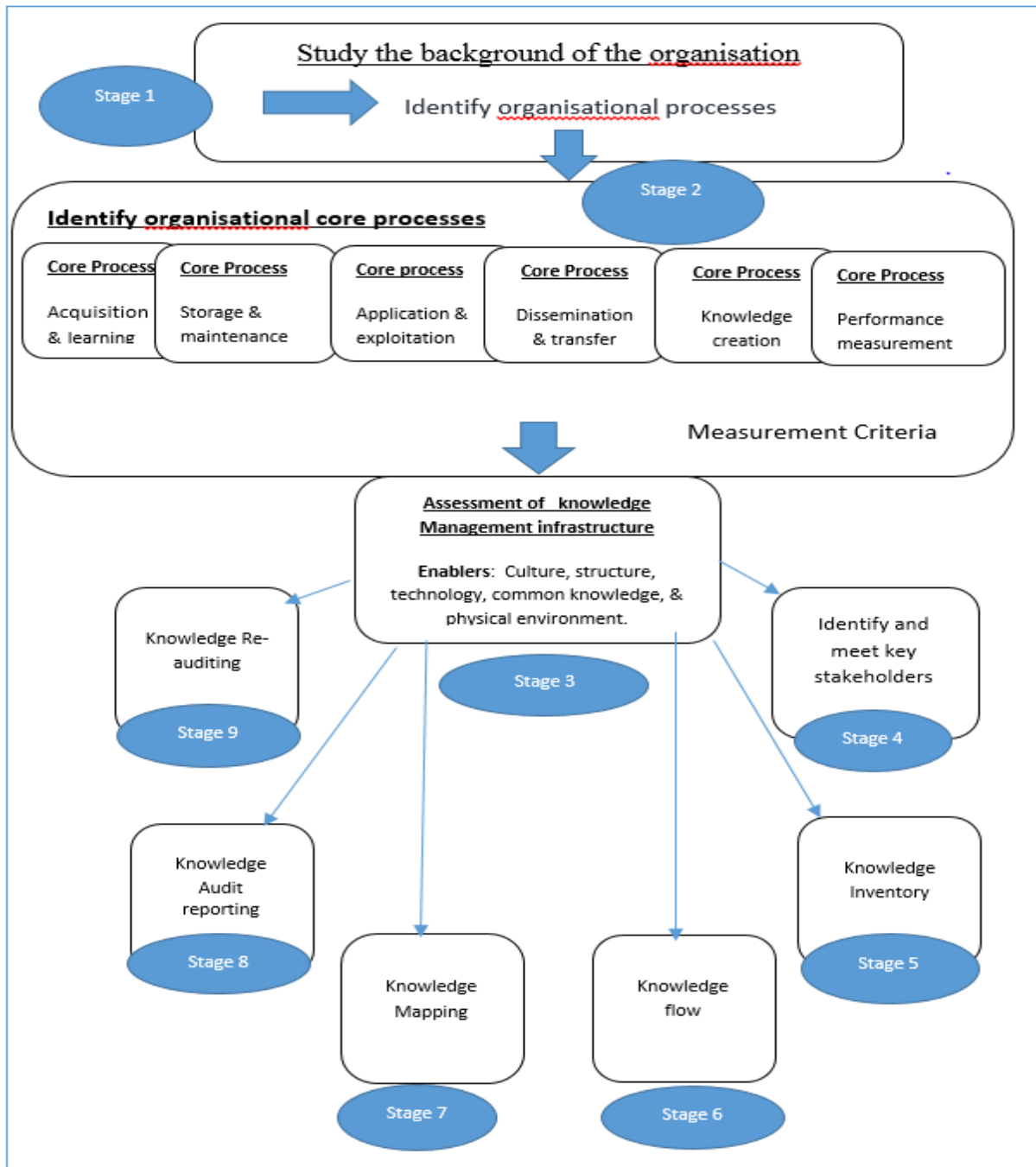


Figure 18: Knowledge audit methodology with emphasis on knowledge management infrastructure enablers.

Source: Adapted from Perez-Soltero and Barcelo-Varenuela (2007)

Knowledge audit methodology proposed in figure 18 prioritise the main functions of knowledge auditing. This methodology is focused on auditing knowledge relevant to the firm and not everything for the sake of being complete. Organisational and knowledge management criteria are considered to select core processes to be audited.

To this we added the assessment of knowledge management infrastructure elements at the relevant stages of the knowledge audit method. Unlike the methodologies discussed in chapter two of the thesis, this adapted knowledge audit methodology proposed here looks at six knowledge infrastructures enablers that make effective knowledge management possible, in contrast to the extant methodologies that do not consider these at all or only consider information technology and organisational culture.

This knowledge audit method also provides steps addressing the how-to aspect of knowledge auditing and thus represents a middle way between the practical and theoretical. The framework act as a guide to knowledge auditors as to what knowledge audit tools can be used in order to deliver each phase of the knowledge audit step. Knowledge audit methodologies discussed on chapter two of the thesis do not have an option of the “how to” tools discussed on chapter five knowledge audit methodologies, hence they are not fully effective as they should be.

Stage nine addresses the need to re-audit knowledge. Most organisations hardly consider knowledge re-auditing in their knowledge management programs. Knowledge auditing is however not a once-off exercise, for knowledge to be relevant to it consumers, knowledge auditing must be a continuous exercise.

Most of knowledge audit frameworks discussed in chapter two are more project management kind of knowledge audit processes, lacking guidelines as to how to practically implement knowledge audit framework to the organisation. Having knowledge audit methodology of that kind of nature does not really help knowledge audit team with implementation.

Knowledge audit framework should provide implementation guidelines to make the knowledge audit framework much more user friendly and practical, and that is what the knowledge audit methodology discussed on chapter five of the thesis is trying to achieve. Because of the enabling infrastructure elements for knowledge management discussed and included in the adapted knowledge audit framework presented in figure 18, knowledge auditing will become more comprehensive and practical.

The methodology presented in this chapter provided guidelines in terms of what knowledge management infrastructure elements are deemed critical for consideration in knowledge management framework and knowledge auditing methodologies. The proposed knowledge audit methodology in chapter five of the thesis may however not cover all possible

knowledge audit infrastructure enablers; however, it is the most comprehensive knowledge audit methodology thus far when it comes to knowledge audit infrastructure enablers for knowledge audit in organisations.

The methodology presented by Perez-Soltero and Barcelo-Varenuela (2007, 4-8) originally lacked knowledge management infrastructure enablers, but what stood out from it amongst other methodologies discussed in chapter two of the thesis was the emphasis on auditing only the core processes. Adding a consideration of the knowledge management infrastructure makes their method much more comprehensive and it illustrates that broadening the scope of knowledge audits is not only desirable, but also feasible.

Because our intention was to address the gap of infrastructure enablers in knowledge audit methodologies, incorporating core knowledge management infrastructure elements such as, culture, structure, information technology, common knowledge and physical infrastructure enablers enhanced the proposed knowledge audit methodology. With the proposed amendment to an existing knowledge audit methodology (as illustrated in figure 18 and discussed step-wise), the researcher hoped to include infrastructure enablers which most knowledge audit methodologies tend to neglect.

It is important that the focus is more on what knowledge is critical to the organisation and ensure that knowledge audits are enabled with right infrastructure elements in order for core knowledge to be identifiable and auditable effectively. Taking into consideration that knowledge audits discussed on chapter two vaguely discussed knowledge audit enablers, and did provide context as to how should knowledge audits methodologies make use of infrastructure enablers to make auditing of knowledge more effective in organisation, the proposed model tried to provide a holistic view of how knowledge audits methodologies should be approached. It proposed to look at different knowledge audit methodologies discussed in chapter two with the view to adopt a method that is unique in terms of what aspects should be audited and also in terms of the scope of the model.

5.3. Conclusion

Chapter one introduced the thesis, problem statement, objectives of the study and research questions to be answered by the thesis and lastly limitations to the study. Chapter two-reviewed literature critical to knowledge audits.

The literature review section in chapter two of the thesis gave a broader view of research that has been conducted in the knowledge audit space showing that audits mostly focus on content rather than on flows.

The researcher further discussed various knowledge audit methodologies, to see what current knowledge audit methodologies look like, in terms of their scope, infrastructure enablers and implementation guidelines. The literature review showed that there are different views when it comes to knowledge audits. Some scholars refer to knowledge audits as knowledge management audits; however, in practice they all refer to the same thing.

It was further noted that knowledge audits vary in scope and their consideration of infrastructure enablers. Some knowledge audit frameworks have from one to ten knowledge audit phases while others have only three phases. Although some knowledge audit methodologies are very specific in terms of what they aim to achieve, i.e., some knowledge audit frameworks aim to audit for organisational performance improvement, some knowledge audit frameworks selected only selected core functions of the business and some knowledge audit frameworks, audit for the purposes of organisational culture assessment. However, all knowledge audit methodologies share a focus on identifying and locating knowledge content as a core purpose.

Chapter three discussed various knowledge management frameworks to see what factors they deem important for knowledge management success and to check how they align with the mainstream knowledge audit methodologies. It was seen that many knowledge management frameworks consider factors other than just the stock of knowledge and this makes sense since knowledge management is about leveraging the available knowledge.

Whilst many of the knowledge management frameworks were not comprehensive in their treatment of enablers, Becerra-Fernandez and Sabherwal (2010), was selected because of it offered an integration of enablers with knowledge management systems, solutions, and processes. They also considered infrastructure in a very broad sense. Becerra-Fernandez and Sabherwal's framework included six knowledge management infrastructure enablers and these were utilised as the basis of the thesis' criticism of mainstream knowledge audit methodologies and to develop and guide the implementation of knowledge audits in organisations. Because knowledge audits lacked comprehensive inclusion of infrastructure elements, Becerra-Fernandez and Sabherwal's (2010) knowledge management framework

was the best framework to utilise to address the issue of infrastructure enablers on knowledge audits frameworks.

Using their list of infrastructure elements as a reference point, one could turn to a comparison of selected extant knowledge audit methodologies in chapter four, specifically with a view to see whether they offered scope for a consideration of infrastructure elements. This comparison revealed that some methodologies do consider one or two of the infrastructure elements in isolation, but that none of them consider them comprehensively. However, this indicated that there is indeed scope for broadening existing knowledge audit methods.

Chapter five proposed an amendment of one of the knowledge audit methods that compared favorably in chapter four in terms of its potential to include the elements that are deemed lacking. The researcher illustrated that at various stages of Perez-Soltero & Barcelo-Varenuela's (2007) knowledge audit methodology all six of Becerra-Fernandez and Sabherwal's (2010) knowledge management infrastructure elements could feasibly be considered.

Of course, the main point of the thesis was that knowledge audits should look at flows in addition to stocks of knowledge. Secondly, the researcher proposed that a consideration of infrastructure is one way to make this auditable. Thirdly, researcher provided an illustration of how with a little adaptation an existing knowledge audit method could include this broadening of scope without major disruption. Taken together, more comprehensive knowledge audits are not just desirable, but also feasible.

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