

Developing a knowledge map at a South African electricity utility

by

Kgofu Noge

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Supervisor: Mr Cor Niemand

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DECLARATION

I certify that the *minor dissertation/dissertation/thesis* submitted by me for the degree *Master's of Commerce (Business Management)* at the University of Johannesburg is my independent work and has not been submitted by me for a degree at another university

Kgofu Noge

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“Bophelo ke Mpho ya Bokamoso”

Executive Summary

The knowledge that people create, possess and share can easily go unnoticed in organisations that do not put effort in identifying it. Knowledge, among other factors, is what people in organisations use to make decisions that can possibly give organisations a competitive advantage. Knowledge, as with other traditionally recognised resources, is a strategic resource that organisations can use to bring about positive change in business. Knowledge can be tacit or explicit and both types need to be managed strategically. Explicit knowledge tends to be easily accessible if it is stored in places such as databases where people can locate it, however, tacit knowledge can be slightly more challenging to access as it lies in the minds of people.

Eskom's Project Development Department (PDD) has 32 project developers who actively develop projects that the organisation will invest in. These projects include electricity generation stations, transmission lines or even pollution mitigating technologies. The project developers work with various stakeholders in and outside of the organisation to ensure that the projects are aligned with the strategic objectives of the organisation. This study aimed to identify the knowledge that the project developers possess and a knowledge audit was conducted on the project developers.

The results show that the project developers possess vast amounts of knowledge, skills and are subject matter experts in various fields. The project developers also communicate with various other departments within Eskom when developing projects. A contributing fact to the varying knowledge and skills that the project developers possess is the different projects that each project developer develops. These projects can take up to three years to develop and this can enable a person to acquire knowledge in a specific field of operation. The majority of the project developers also stated that they preferred one on one physical conversations to acquire and share knowledge.

Knowledge is gaining recognition as a strategic resource within organisations and strategic management of the knowledge is necessary as it can provide benefits for people and organisations as a whole.

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Chapter 1

Introduction to the study

1.1 Introduction

South African state-owned electricity utility Eskom, generates, transmits and distributes electricity in South Africa. As at September 2013, Eskom had 46 624 employees in all of its offices, power stations and distribution centres across the country (Eskom, 2013). Some employees have been working for Eskom for over 30 years and have acquired knowledge, skills and understanding of all the various subject matter and skills in the electricity industry. With so much knowledge within Eskom stored in people's minds, it is critical to be able to locate, identify and use the knowledge.

Project Development Intelligence (PDI) is a business unit that resides in the Project Development Department (PDD) within Eskom. PDI writes business cases and makes recommendations to the various Eskom committees and the Board of Directors on future power stations and other key electricity related projects that may benefit Eskom and South Africa at large. PDI is the research unit in PDD where information is gathered and presented to executives in the form of reports or presentations. Primary and secondary sources of information are used to compile these reports that have varying topics. Once a report has been initiated, secondary sources are used to compile it. However, primary sources within PDD are usually not consulted because they are not known, based on the knowledge they possess. People and their knowledge on specific topics cannot be identified due to the fact that there are limited ways to identify them. Failure to identify people and the knowledge they possess is not progressive for any organisation as according to Lazzolino and Pietrantonio (2005), an organisation's performance in an industry is increasingly becoming more dependent on intangible assets such as knowledge and skills of employees.

It is for this reason that conducting a knowledge audit to identify the knowledge possessed by project developers in PDD is important. If the knowledge people possess is identified in the beginning of the compilation of reports or presentations, the time spent on these reports would be minimised as subject matter experts would be identified and consulted accordingly.

During the process of compiling reports, a project team is assembled, consisting mostly of researchers, senior advisors and a middle manager. The team would get a request

from clients to conduct a market study on a particular component or topic of a power station or a topic in the electricity industry. The team would then get detailed requirements from the client and commence with preliminary research on the topic to get a deeper understanding of the request. After the preliminary research has been completed, the team would gather to share their findings before continuing with the specific detailed requirements as outlined by the client. At this stage, the team would gather more information and complete compiling the report, with some questions more challenging than others.

Eskom has knowledgeable employees that are experts in subject matters within different departments. By the time all of these knowledgeable subject matter experts have been identified, the due date for the project is nearing and there is little room for negotiation with clients as a due date for the study/report has already been agreed upon. If people who are knowledgeable about specific subject matters could be identified in parallel with the initiating of requests, PDI reports would be more accurate and have more insight from good primary sources. Identifying knowledge experts within PDD is often challenging as these knowledgeable people are usually not known. Managing the knowledge held by knowledgeable people is necessary as it will allow for the knowledge to be tapped into by other employees who could benefit from accessing the knowledge.

1.2 Literature supporting the study

Knowledge in organisations can be part of an organisation's human capital, which according to Van der Westhuizen and Kok (2006:3) is the value that employees provide through their application of skills, expertise and know how. Davis, Subrahmanian and Westerberg (2005:102) emphasise that an organisation's competence to create, identify and disseminate knowledge in its processes and outputs is critical as the markets in which organisations operate are dynamic. Project Developers in PDD generate ideas, follow procedures and rules and take action on the information that they have access to.

The knowledge is, however, often lost as employees leave organisations and this can also occur in Eskom. Eskom employees with specialised skills often get head hunted by other organisations and the employees leave with a pool of accumulated knowledge that was not identified and transferred to ensure that it is used effectively and remains within the organisation.

According to Tagger (2005:3), organisations often experience the departure of experienced and knowledge rich employees and the knowledge these employees have acquired is seldom identified and shared with other employees. Employees take the knowledge that they possess when they leave the organisations and Eskom is not an exception. This research study was aimed at identifying and mapping the knowledge that project developers in PDD possess, with the aim of tapping into the knowledge when the need arises.

Perez-Soltero, Barcelo-Valenzuela, Sanchez-Schmitz, Martin-Rubio, Palma-Mendez and Vanti (2007:9) state that conducting a knowledge audit is an important step in any initiative carried out by an organisation related to knowledge management. The knowledge audit was used to identify the knowledge possessed by project developers in PDD. Serrat (2008:1) emphasises that knowledge must not be seen as something that moves in a single direction but rather something that can be moved back and forth and improved and adapted through proper management.

According to Martensson (2000:205), knowledge management in organisations is a critical management tool. Organisations have recognised that the knowledge that people possess provides a better competitive advantage than what technologies such as collaboration tools and document storage systems provide. To remain leaders in respective fields of operation, organisations have realised the need to develop capacities that will enable them to retain, develop, organise and use their employees effectively. Gourova, Antonova and Todorova (2009:606) state that knowledge management in any organisation should be based on strategy and an action plan. The authors further explain that in order to prepare the strategy and action plan, it is critical to identify knowledge assets and work in organisations so that they are visible for any knowledge management related initiative.

Chueng, Li, Shek and Lee (2007:140) further emphasise that a knowledge audit is a knowledge management tool that can lead to organisations discovering what they know and what they do not know. In large organisations such as Eskom, the knowledge that people possess can easily go unnoticed and this could be detrimental when such knowledge is needed but is not known.

1.3 Research problem

The research problem emanates from the fact that what employees at Eskom know and have experienced has not yet been identified and stored. The knowledge that people

possess has to be identified and shared to empower other employees, as the literature discussed in the previous section suggests. Eskom has had limited initiatives that are aimed at identifying the knowledge that its employees possess and this needs to happen as the electricity industry has vast specialised fields of study within it.

1.4 Aim of study

The aim of the study was to assist Project Development Intelligence (PDI) in identifying the knowledge that Project Development Department (PDD) project developers possess. The knowledge will be used towards effectively compiling PDI reports.

1.5 Objectives of study

The study had two objectives, namely to identify and map the knowledge that project developers in PDD possess and to manage this knowledge.

1.6 Research questions

The research questions that emanated from the objectives of the study are “What knowledge do project developers in PDD possess?” and “How can this knowledge be managed to the benefit of attaining the business objectives in the PDI business unit?”

1.7 Research methodology

The analysis of the data collected was qualitative in nature. Qualitative researchers, according to Outhwaite and Turner (2007:4), study things in their natural settings and interpret these things in terms of the meanings people bring to them. The author understands that qualitative research, among other things, studies personal experiences, life stories and historical, routine and problematic moments in people’s lives. The research took a pragmatic approach and view of the world. O’Learly (2007:2) states that pragmatism is based on the belief that truth and value can only be determined through practical application and consequences.

This research is descriptive and portrays the knowledge profiles of project developers within PDD. Saunders, Lewis and Thornhill (2009:140) state that the objective of descriptive research is to portray accurate profiles of people, situations and even events.

The purposive sampling method was used as Eskom’s PDD has 32 project developers and all of them were given a questionnaire during the knowledge audit. Oliver (2006:2) defines purposive sampling as a form of non-probability sampling in which decisions regarding the choice of individuals to gather data from are made by the researcher, based on specific criteria and reasons.

Self-administered questionnaires were the data collection instrument that was used to collect data for the knowledge audit. Bourque (2003:2) defines self-administered questionnaires as instruments that are used to get information from people by having them filling in the questionnaires themselves.

The findings of the knowledge audit were mapped for ease of use by the end users; the end users for this specific study are the PDI employees. Choy, Lee and Chueng (2004:70) state that a knowledge inventory, knowledge map and a social network analysis are the analysis techniques that can be used to analyse findings of a knowledge audit.

1.8 Benefits of the study

The research study intended to provide the following benefits to PDI:

- To have a knowledge map of all the project developers within PDD so that PDI employees know who to speak to regarding specific topics.
- To know the projects that the project developers are developing in order to be able to identify who to include in the process of compiling reports.
- To save PDI time when compiling reports as they will be able to identify relevant project developers during the early stages of compiling reports.

1.9 Chapter outline and time frame

The study, following the introduction of the research (Chapter One), is outlined in the following way: Chapter Two is a literature review which covers the topics that are important to the successful completion of the study. Literature was consulted to contextualise the study in terms of topics critical to the study. Chapter Three of the study includes the research methodology and design of the study, which is made up of the nature of the research, sampling method used, data collection instruments and how the data gathered was analysed. Chapter Four consists of the presentation of the analysed data and the interpretation of the findings/results. It is in this chapter that the results of this study are mapped. Chapter Five details the conclusions and recommendations that were derived from the research process. Chapter Five also includes proposals for future research that can be drawn out of the study once completed.

Chapter 2

Literature Review

2.1 Introduction

Davis, Subrahmanian and Westerberg (2005:102) emphasise that an organisation's capability to create, identify and disseminate knowledge in its processes and outputs is critical when the markets in which the organisation operates, changes. This knowledge in organisations can be part of an organisation's human capital, which according to Van der Westhuizen and Kok (2006:3) is the value that employees provide through their application of skills, expertise and know-how. From this point of view, the adoption of a knowledge theory that best explains the importance of knowledge in organisations is important.

Gorga and Halberstan (2007:1139) state that the knowledge-based theory of the firm, as developed by Mr Robert M Grant, is constructed on the element that knowledge is a strategic resource which can be entrenched in assets such as technologies, in the organisation itself and in individuals. Sveiby (2001:345) further emphasises that the knowledge-based theory of the firm confirms the fact that people are the only true agents within organisations as all assets, tangible and intangible, are as a result of human action and depend on humans for continued existence. Grant (1996:110) firmly explains that the knowledge-based theory of the firm is based on the construct that knowledge within organisations is a critical resource. The theory acknowledges the knowledge possessed by individuals in organisations as a resource that can lead to the creation and improvement of goods and services. The theory further identifies the primary role of organisations as integrating specialist knowledge into goods and services. Grant (1996:111) further states that the theory suggests that the primary task of management in organisations is to establish the coordination that is necessary for integration of knowledge to occur. As explained in the theory, knowledge is an important resource that can be used by organisations to gain a competitive advantage and realise excellent corporate performance.

Knowledge Management is important not only on the global scale, but also on an organisational scale. Steyn (2007:346) argued that the need for the implementation of a Just-In-Time (JIT) knowledge management model exists in Eskom. Steyn (2007:324) alluded to the need of a JIT knowledge management model by asking employees

whether they believe that technology must be employed with the aim of mapping the experts within the organisation. The results are seen in Figure 1 below.

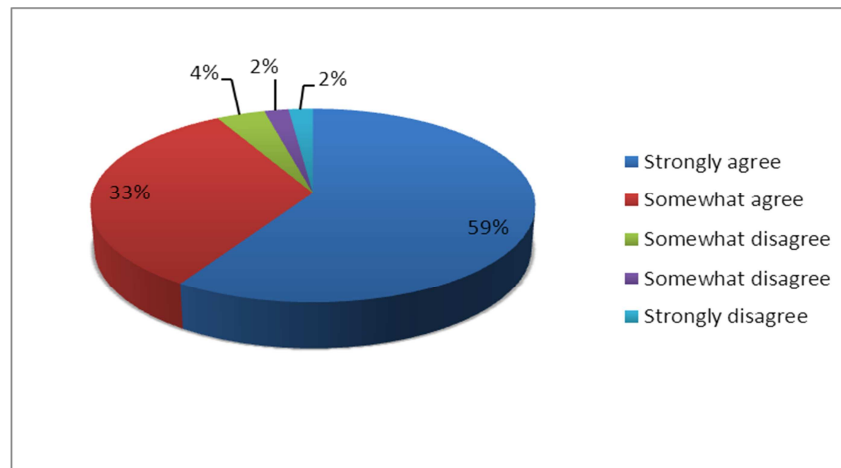


Figure 1: A view of the deployment of an enterprise Yellow Pages application – percentage distribution (Steyn, 2007:324)

As illustrated in Figure 1 above, 59% of the respondents strongly agreed with the fact that there is a need for an expert map in Eskom. The results raise the question of whether this has happened in Eskom and it has in fact not yet happened. The knowledge audit and map proposed for the study will see Project Development Intelligence (PDI) employees being able to identify experts in the Project Development Department (PDD).

Based on the above theory, the assumption that knowledge within organisations needs to be identified is justified. If indeed knowledge is a truly important resource, it needs to be identified within organisations. Knowledge, however, does not simply generate itself within organisations. Knowledge is generated by individuals who apply experience and meaning to data and information which is then transformed into knowledge. Relevant literature will be used to explain that knowledge is firstly an important resource within organisations and that it needs to be identified, managed and used in manners that will benefit organisations. If employees are expected to maintain or improve the levels of success that organisations experience, it is only fair to highlight a resource that employees use often and this resource is knowledge. One can argue that the knowledge possessed by Eskom, which is a 90 year old organisation and one of the largest employers in South Africa, is vast. The Project Development Department within Eskom is comprised of engineers who are actively developing and managing Eskom projects. It is vital to be able to identify the knowledge that is possessed by these project

developers so that it can be shared and used within the organisation. The origins of knowledge can be traced back to data and information. For the purpose of this study, it is important to discuss the differences and relationship between data, information and knowledge.

2.2 Data, information and knowledge

Berankova and Houska (2011:74) state that it is critical to be able to differentiate between data, information and knowledge in business as these are three elements that have different meanings. Singh (2007:177) emphasises that knowledge is more challenging to identify than data and information within organisations. Berankova and Houska (2011:75) state that data can be characterised as a set of facts, statistics and measures about real entities that can be named. Hess and Mehta (2013:71) state that data exposes inequalities, creates transparency and helps drive organisational improvement. Hess and Mehta (2013:71) further argue that data provides organisations with a roadmap to reform by telling the organisation where it is and where it needs to go. Data can be used to see the current or past state of an organisation and its activities. Melkas and Harmaakopi (2008:108) define data as factual content which can only become information when placed in context and processed. From the above reviewed definitions, the author defines data as raw content such as numbers, symbols and facts that can be taken further for the purpose of decision making. Taking data further for the purpose of decision making will lead one to information.

Information can be characterised as data that has been placed in context and processed for the purpose of decision making. Fricke (2009:133) defines information as data that is usable, relevant and has meaning to people. Melkas and Harmaakopi (2008:109) state that combining pieces of information allows people to understand how the world operates. An example that can be used to differentiate between data and information would be the reports that are generated at Eskom power stations that show the amount of greenhouse gasses that the coal fired power stations emit. Rowley (2007:171) states that information is data that has value and can assist in the understanding of a topic or subject. The individual unit figures on an hourly basis would be data and the consolidated emissions of the power stations over a period of three months is information. One can state that not much decision making can be done in organisations based on data alone, the data needs to be processed into information for it to make sense. The information can be taken a step further when there is a need to understand why the emission figures reflect the way they do. Understanding why would

require an individual to apply experience and ideas to the problem, question or issue. The application of experience and ideas may be referred to as knowledge.

Fricke (2009:133) emphasises that knowledge is the “know-how” which is possessed by humans and enables information to be promoted to a more controlling role that can guide humans in progressing through life. Rowley (2007:182) states that knowledge is the result of adding skills, experience and expert opinion to the combination of data and information. Bhatt (2000:16) further defines knowledge as “*an organised combination of ideas, events, procedures, actions, rules and information*”. The author defines knowledge as the applied meaning which gets created by the mind. Employees in organisations use their minds to understand the meaning of what is happening in an effort to constructively contribute to an organisation’s objectives and goals. Project developers in Eskom’s Project Development Department (PDD) generate ideas, follow procedures and rules and take action on the information that they have access to. Bhatt (2000:16) further states that information in organisations becomes knowledge through meaning. It is clear that information can be transformed into knowledge when it is taken through processes of meaning. Burnett (2012:145) argues that there are three important factors that are needed to succeed in the new economy, namely knowledge, innovation and collaboration. Literature has, over the years, identified two types of knowledge, specifically tacit and explicit knowledge.

The difference between explicit and tacit knowledge needs to be highlighted, Jacobs and Roodt (2011:2) state that explicit knowledge is documented while tacit knowledge lies within the minds of people and further acknowledge that most organisations have more tacit knowledge than they do explicit knowledge. According to Tagger (2005:3), organisations often experience the departure of experienced and knowledge-rich employees and the knowledge the employees have acquired seldom gets transferred to their colleagues. The employees depart with the knowledge that they possess when they leave the organisations and Eskom is not an exception. For this research study, the knowledge that project developers possess is expected to be used for improving the quality of Project Development Intelligence (PDI) reports as the compilers of these reports often require expert knowledge on matters discussed in the reports. Distinguishing between tacit and explicit knowledge is important for the sake of this study as tacit knowledge is often the type of knowledge that is identified during interaction with relevant project developers within PDD.

According to Kothari, Rudman, Dobbins, Rouse, Sibbald, Edwards (2012:2), tacit knowledge is acquired through practise and experience from doing certain things within a particular space. Based on the above explanation of tacit knowledge, the author recognises that the “certain things” that can be linked to a subject matter are topics such as environmental impact assessments for power plant construction or even wind power station financing. Tacit knowledge possessed by persons who work on environmental impact assessments is that which is not documented but lies within their minds. Kothari *et al.* (2012:2) further state that tacit knowledge is not codified in the same detail as explicit knowledge and that the best way to describe tacit knowledge would be to state that it is knowledge in practice that has been developed from actions and experiences of a person.

Kothari, Bickford, Edwards, Dobbins and Meyer (2011:6) state that tacit knowledge held by people in organisations needs to be identified and known in order for the knowledge to be used by others. Kothari *et al.* (2011:6) further state that in a study that was done in the health sector in Ontario, Canada, it was noted that people appreciated knowing who the knowledge experts are as they were able to contact the respective knowledge experts. The study was based on the role that tacit knowledge plays in the planning process of projects within the health sector. The participants of the study found it valuable to be able to contact knowledge experts directly. The knowledge experts in the study were believed to have vast amounts of tacit knowledge.

Having briefly described tacit and explicit knowledge, it is important to understand that all of this knowledge is created within organisations and the creation of this knowledge needs to be properly managed. Karim, Razi and Mohamed (2012:780) explain that Nonaka’s Socialisation, Externalisation, Combination and Internalisation (SECI) model is instrumental in understanding the process of knowledge creation within organisations. Rasanen (2012:23) also emphasises that Nonaka’s SECI model is a good model for explaining and understanding the creation of knowledge within organisations. Karim *et al.* (2012:780) state that knowledge creation within organisations occurs when all four elements of the SECI model of knowledge creation are managed to create a continuous cycle. As shown in Figure 2 below, the SECI model propositions four different approaches of knowledge conversion, namely:

- Tacit knowledge to tacit knowledge (Socialisation)
- Tacit knowledge to explicit knowledge (Externalisation)

- Explicit knowledge to explicit knowledge (Combination)
- Explicit knowledge to tacit knowledge (Internalisation)

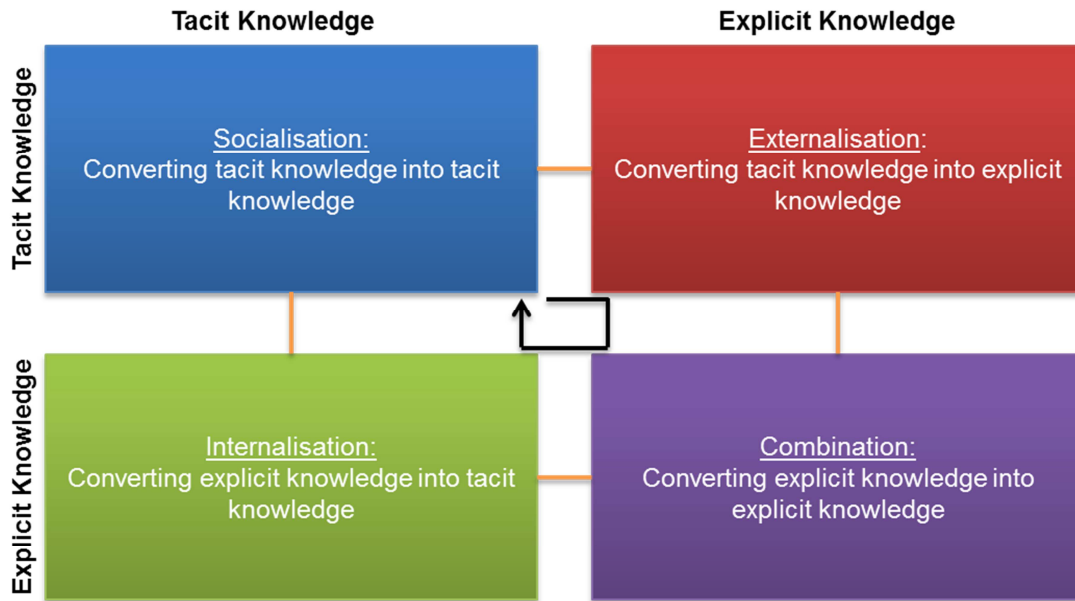


Figure 2: Nonaka's SECI Model (Karim *et al.* 2012:780)

The socialisation process transforms tacit knowledge into tacit knowledge through social engagements between people. The engagements are enabled by people spending time with one another or even coexisting in the same environment. Experience is important in knowledge acquisition and it is difficult for people to share their personal experiences without having some form of social interaction.

The externalisation process converts tacit knowledge into explicit knowledge by using codifying processes such as concepts, metaphors, illustrations and similarities. These codifying processes are expressed on documents, files and any platform that can be moved from one place to another without its contributor being present.

The combination process transforms explicit knowledge into new explicit knowledge by using systematic exchange instruments. It is the combination and exchange of knowledge that occurs amongst individuals through communication and integration. The combination of explicit knowledge results in the creation of new knowledge, which is then disseminated in the organisation using electronic communication networks.

The internalisation process converts explicit knowledge into tacit knowledge by practically applying knowledge in situations and leads to creation of new routines. The internalisation process represents the traditional concept of learning, which is characterised by individuals acquiring knowledge and using it to re-experience what has been experienced in the past.

As illustrated in the Figure 3 below, knowledge is generated from the transformation of data to information and then from information to knowledge. The transformation of data into information is characterised by contextualisation and processing while the transformation of information into knowledge is characterised by meaning. As a practical example, data would be the number of employees that use an enterprise management system for putting in leave every month. Information would be the fact that a particular department utilises the system less than the other ones and knowledge would be knowing that the department utilises the system less due to the fact that the employees in that system usually work offsite.

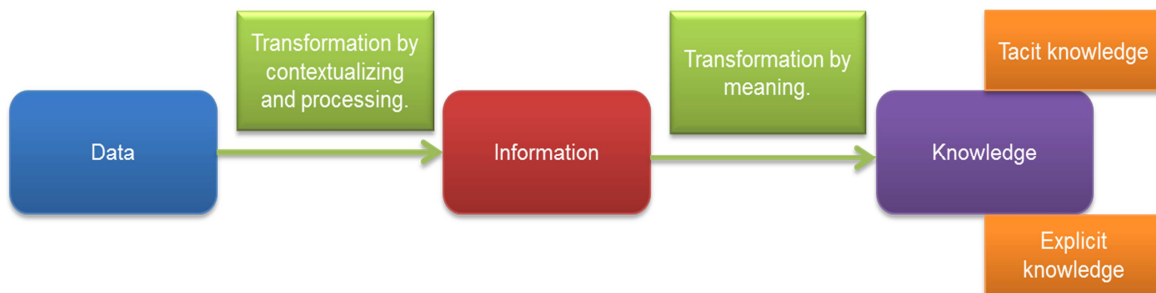


Figure 3: Data, information, knowledge transformation process (author-derived)

Seidler-de Alwis and Hartmann (2008:134) state that managers have recognised the knowledge people have as an important basis of a competitive advantage in organisations. Seidler-de Alwis and Hartmann (2008:133) also state that researchers admit that tacit knowledge forms the foundation for constructing a competitive advantage for organisations. Based on the above reviewed literature that acknowledges that knowledge is a strategic resource, the modern economy is greatly influenced by the knowledge that workers possess.

2.3 Knowledge workers in the knowledge economy

The fact that managers in organisations have begun recognising that knowledge is an important source of gaining a competitive advantage clearly shows a shift towards an

appreciation for people. According to Hashim and Taib (2012:138) people in organisations are knowledge workers and organisations have to focus on developing and managing human capital in organisations. Hashim and Taib (2012:140) further state that knowledge workers are professionals in organisations that can have formal education qualifications. To argue that knowledge workers are only people who possess formal education qualifications would be incorrect. One can argue that those without formal education qualifications can also acquire information and transform the information at their disposal by transforming it into knowledge by applying meaning and experience to the information. Frick (2011:375) defines a knowledge worker as a person who works with information or develops and uses knowledge in the workplace. Gurteen (2006) defines a knowledge worker as individuals who take responsibility for their own work lives and ensure that steps are taken to better understand the world around them so that they meet their personal and organisational objectives. Considering the above definition of a knowledge worker, the author proposes that a knowledge worker is someone who uses information and develops and uses knowledge in organisations across various levels with the aim of achieving goals and objectives. Steyn and Du Toit (2009:5) state that the following factors influence the productivity of a knowledge worker:

- The tasks that are given to the knowledge worker are just as important as the space given to the knowledge worker to be innovative in coming up with ways of doing things in more efficient manners.
- Knowledge workers, to a certain extent, should be allowed to manage themselves and be enabled to place themselves in functions where they feel they can contribute optimally.
- The productivity of a knowledge worker needs to be evaluated in terms of it being an asset to organisations and not as an expense or cost.
- Knowledge workers are required to continuously learn and teach others within organisations.

Based on the last factor listed above, the author acknowledges that for knowledge workers to continue learning and teaching, they need to know where lessons are required and where learning can be obtained. This factor further motivates the study, as knowing what knowledge Project Development Department (PDD) project developers possess will allow for employees seeking knowledge to know where to go in order to tap into that knowledge.

Within PDD, project developers are often placed in projects with consultants that have vast amounts of skill and knowledge in certain topics within the energy and power sector. These consultants work closely with the project developers and knowledge is transferred. Some of these consultants are from consulting agencies that are based in other countries. Colic-Peisker (2010:467) refers to these consultants as “transnational knowledge workers”. Colic-Peisker (2010:468) further states that such knowledge workers are entrepreneurial and live off selling their labour to organisations. For the knowledge workers to be identifiable, the knowledge they possess needs to be known. It is without a doubt that what man knows that has allowed for adaptation to changing global environments throughout the years and this is no different in organisations such as Eskom.

Du Toit, Van Staden and Steyn (2011:87) state that organisations realise a competitive advantage in the market by using knowledge and innovation that is stored in the minds of people. Organisations need to know what knowledge lies in the minds of its employees in order for the knowledge to be used in a way that will assist the organisation in performing more efficiently. If knowledge is an enabler of organisations gaining a competitive advantage, then it needs to be identified, stored, mapped and shared with other people. Du Toit *et al.* (2011:88) further state that knowledge workers are the people who carry societies into economically progressive conditions and that for organisations and countries to be more successful, knowledge workers need to be more productive and effective in the ways they do their jobs. Knowledge workers can be directly linked to execution of activities within organisations due to their involvement and contributions in reaching objectives.

Nishikawa (2011:113) states that it was found that knowledge required to understand activities or situations better is best learnt through collective work, dialogue and sharing with fellow workers instead of gaining a formal education. Nishikawa (2011:114) further states that knowledge workers are always engaged in acquiring new knowledge from sources and that their productivity depends mostly on what they know. For knowledge workers to be able to gain more knowledge from other people, they need to know that those people are knowledgeable in specific areas. If the knowledge is not known, it will not be identified and gained. Knowledge is a resource, a form of capital that people and organisations can use to progress through time and activities.

Ramirez and Nembhard (2004:602) state that organisations operating in the global economy frequently find it challenging to recover the increasing costs of labour, material and other resources by merely raising prices and that increasing the productivity of knowledge workers provides opportunities to improve products and services. The improvement of products and services will enable organisations to attract more customers which will lead to higher profits. Increasing the productivity of knowledge workers can be interpreted as enabling the knowledge workers to do what they do to the best of their knowledge and using their knowledge to improve business operations. Ramirez and Nembhard (2004:604) further state that it is important to be able to measure the productivity of knowledge workers which is impossible if their knowledge is not known. Adelstein (2007:855) emphasises the fact that the work of knowledge workers differentiates organisations and countries on the world stage of competition. Knowledge workers are the most important resource in organisations, what they know enables them to perform accordingly and assist organisations in reaching their objectives.

From the above explanation on knowledge workers, one can state that knowledge workers operate within a knowledge economy. The knowledge economy is a space where knowledge is a resource that can be used for strategic purposes within organisations.

2.4 The knowledge economy

Based on the above mentioned explanations of knowledge and knowledge workers, it is clear that there are close links between the two. A key link is that knowledge and knowledge workers exist in the knowledge economy. Hendarman and Tjakraatmadja (2012:35) acknowledge the fact that the knowledge economy is founded on the creation, evaluation and trading of knowledge. Tongo (2012:381) states that while the global economies before the knowledge economy were focused on tangible resources, the knowledge economy is based on an intangible resource, which is knowledge. Affortunato, Bucciarelli, Ciommi and Guilioni (2010:177) further emphasise that the knowledge economy's existence relies on social and cultural systems, within organisations that are engaged in the generation of new ideas and innovation. The above stated explanations of the knowledge economy have led the author to acknowledge that the trading of knowledge can only happen once the knowledge has been identified along with its source, which is another motivating factor for conducting a knowledge audit at the Project Development Department (PDD). Based on the above

explanations of what a knowledge economy is, the author defines the knowledge economy as an era of human activity that is characterised by the production and consumption of information and knowledge for survival, development and innovation creation. The knowledge economy is preceded by historic economies that were suitable in the past. Table 1 below summarises the different global economies that organisations have had to travel through in the past.

Table 1: Characteristics of the global economy during different periods of management history (Tongo, 2012:372)

Conceptualisation of human nature	Characteristics of global economy	Time period
Primitive man	Pre-industrial economy	Medieval
Rational man	Industrial revolution	Late 18 th century to early 20 th century
Social man	Economic recession	Early 20 th century to mid-20 th century
Complex man	Post-industrial economy	Mid-20 th century to late 20 th century
Knowledge man	Knowledge economy	Late 20 th century to no definite future end

It is clear from Table 1 above that there have been shifts in how people and organisations have understood the world over the years. Eras of economic recessions forced organisations to limit the number of risks they took as there was little financial room to do so. Tongo (2012:381) states that the post-industrial economy saw the rise of the complex human being who was characterised by continuously changing needs. Changes in the human will certainly lead to changes in the environment and vice-versa. Organisations selling products or services to humans will have to acknowledge the dynamic nature of the world and make efforts to adjust. Identifying and using knowledge is a good way for organisations to adjust well in any setting and this use of knowledge will ensure optimal performance in the knowledge economy era.

Du Toit *et al.* (2011:88) state that knowledge workers can meaningfully contribute to an organisation's sustainability by interacting with all participants that exist in the knowledge economy. Considering the fact that the other parties are knowledge workers, it is safe to make the assumption that interacting will include tapping into the knowledge that the other parties possess. Du Toit *et al.* (2011:88) further state that the value of knowledge workers originates from their capability to use, share and adapt the knowledge into ideas, products or services.

McPhail (2009:813) states that the knowledge economy has brought about a change in the nature of work performed in organisations and the impact the environment has on people is stronger. With access to information and communications tools through social media, it is safe to assume that people today have access to more information than people in the past had. When a person does not know about something that others know about, the impact is surely more felt as access to what is known is more available.

Knowledge-based economies are characterised by the management of knowledge for wealth, opportunities and ideas creation. A skilled and constantly learning workforce is also visible in knowledge economies and one has to highlight again that learning comes from sources that need to be known and in PDD the sources are the project developers.

Mortazavi and Bahrami (2012:285) developed the conceptual model of knowledge-based entrepreneurship below and one can assert that the model is applicable to most organisations operating in modern times. The link between a knowledge-based economy and entrepreneurship within organisations is the fact that knowledge is a resource that is seen as a strategic enabler in organisations. No person can practice entrepreneurship without the knowledge that will enable progression in any activity undertaken. Figure 4 below shows that in a knowledge economy, knowledge is created and shared just as innovative initiatives are created by entrepreneurial activities within organisations.

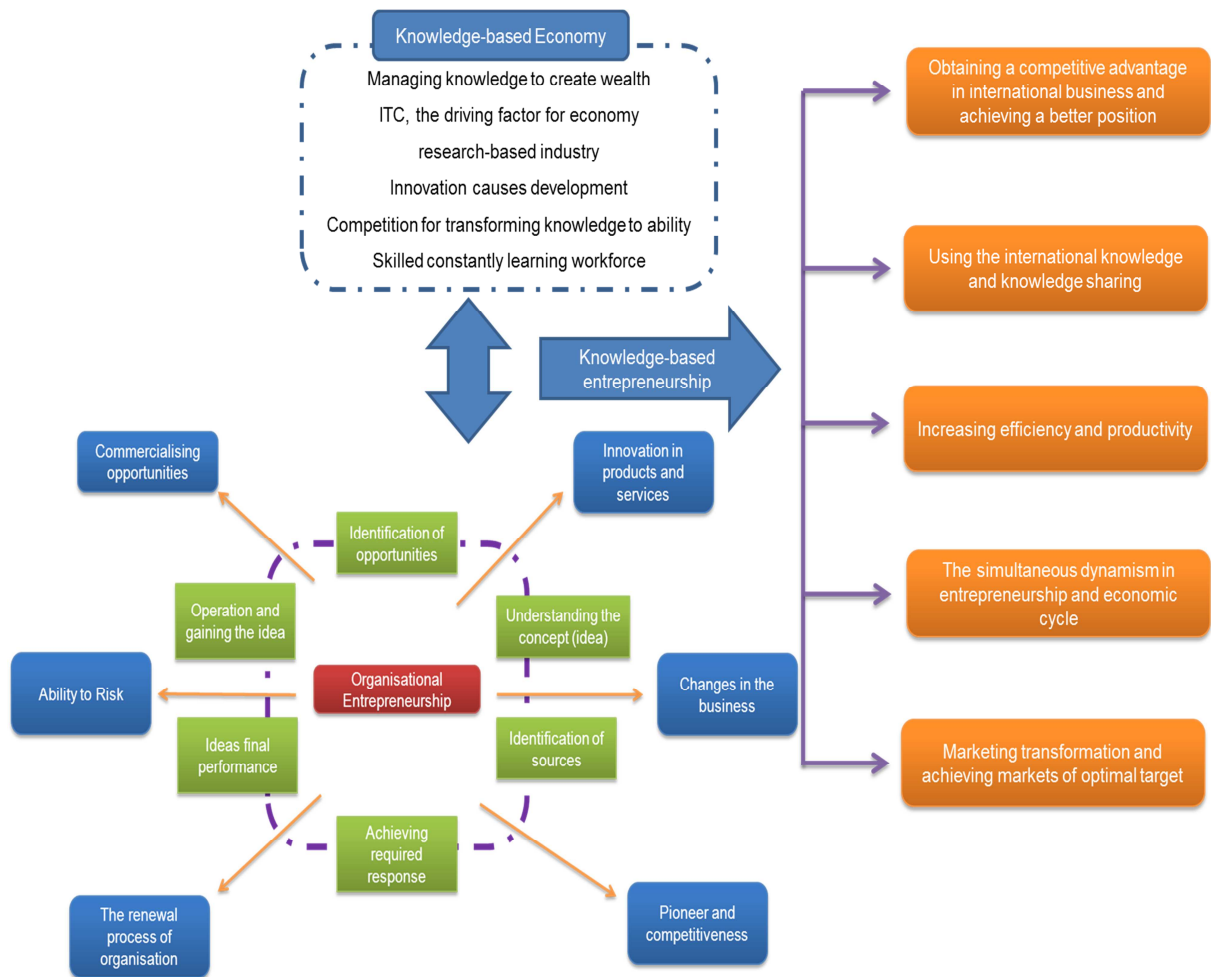


Figure 4: Model for knowledge-based organisational entrepreneurship (Mortazavi & Bahrami, 2012:285)

The knowledge economy clearly has its own set of characteristics that sets it apart from any other type of economy. At the core of these characteristics is knowledge being a driver of economic activity, development and growth. Roberts (2009:289) states that the following features are key characteristics of a knowledge economy:

- Knowledge is acknowledged as a strategic resource within an economy,
- Information and communication technologies are credited as pivotal in organisations and economies,
- The commercialisation of knowledge through intellectual property rights is constantly growing,
- The growing impact that knowledge has in different sectors within economies is visible and
- The practices related to the management of knowledge are on the rise

Knowledge is not just a buzzword in business anymore, it is a resource on which knowledge economies are built and development is steered, both for organisations and countries. When organisations place advertisements for positions in the public, they tend to state that the person must have numerous skills and experience. Skills and experience are parts of knowledge. The above explanation of knowledge leads the author to emphasise that organisations need to make efforts to identify the knowledge that employees possess and ensure that the knowledge is shared within the organisations.

2.5 Knowledge sharing

Acquiring, applying and leveraging of knowledge is one of the ways for business success to be realised. In organisations such as Eskom, where the generation of electricity is such a complex activity that is made up of more activities, it is essential for people to work together. Working together will ensure that people understand the goals of the organisation and work from a single point of reference, which can be the strategic objectives on an organisation. Eskom generates, transmits and distributes electricity and the organisation is made up of different divisions of which generation, transmission and distribution are only a few. The activities that occur within these divisions are related and project developers within the Project Development Department (PDD) use some of the knowledge that is gained from interacting with people from those divisions. It is a form of knowledge sharing that needs to be promoted within the organisation as it will lead to an improved performance.

Olatokun and Nneamaka (2012:2) state that brainstorming sessions, storytelling and PowerPoint presentations are some of the methods used in organisations to share knowledge. Olatokun and Nneamaka (2012:2) define knowledge sharing as a process that sees people collectively enhancing and exchanging thoughts, ideas or suggestions in light of their experiences. Based on the above definition of knowledge sharing, the author can take the definition a step further and state that the sharing of knowledge will enable the creation, dissemination and management of knowledge across different levels in an organisation. Cao and Xiang (2012:592) explain knowledge sharing to be the bridge between the knowledge possessed by individuals and the knowledge held within an organisation. Olatokun and Nneamaka (2012:3) interpret knowledge sharing as the capturing, storing and dissemination of knowledge by using relevant media. This accelerates the development of people and enhance work processes. The author defines knowledge sharing as the process of making others aware of the tacit and

explicit knowledge that one possesses and transferring that knowledge to others using different media.

For the knowledge to be captured, stored and disseminated, it will need to be identified first. The capturing, storing and dissemination of knowledge within PDD can occur once the knowledge possessed by different project developers is identified. The identification of the knowledge will enable those who need it to engage with the specific project developer, acquire knowledge, store it and then disseminate it in a manner that will effectively see that knowledge getting transferred. Olatokun and Nneamaka (2012:3) support the knowledge sharing notion as the author's state that the ability of departments within organisations to share knowledge contributes greatly to the performance of organisations. Geiger and Schreyogg (2011:97) state that the amounts of knowledge work in organisations have led to an increase in efforts to push knowledge sharing within organisations.

Olatokun and Nneamaka (2012:3) emphasise the importance of knowledge sharing because the authors acknowledge that knowledge is usually in the possession of employees and employees can leave the organisation without the knowledge having been shared. Based on the above explanations of knowledge sharing, the author acknowledges the fact that organisations need to facilitate knowledge sharing within organisations to attempt to eliminate the loss of knowledge when employees leave organisations.

One can assume that knowledge sharing can occur in different ways within organisations, whether emails, meetings or even through documented explicit knowledge. Mustapha (2012:207) states that there are generally four types of knowledge sharing activities that occur in organisations, as shown in Figure 5 below. The author themes the activities into four groups, namely:

- Audio or video conferencing and instant messaging,
- Emails, blogs, technical forums and writing manuals,
- Reports or papers on certain subjects,
- General searches of news and documents on the internet.

The above listed knowledge sharing activities which have also been illustrated in Figure 5 below can only happen once the people that possess the knowledge are known,

further emphasising the importance of finding out what the project developers within PDD know.



Figure 5: Four types of knowledge sharing activities (Mustapha, 2012:207)

Mustapha (2012:207) is correct in the four knowledge sharing activities but did not include direct physical interactions which could occur in the form of meetings or even communities of practice (CoP). Chetty and Mearns (2012:1) define CoP as a knowledge-management tool that can be used to capture and share tacit knowledge. CoPs are made up of people from different levels within an organisation who meet and discuss topics in which they have an interest in. It is clear that knowledge can be shared through CoP engagements, however, knowing who to invite to CoPs can be a problem if the knowledge of the people is not known. Physical or human interaction when sharing knowledge allows for even facial reactions to be noted, which assists in putting knowledge being shared into context.

The knowledge sharing term can be easily understood and explained, however in practice, sharing the knowledge in organisations can often be a challenge. Wu (2013:48) highlights the fact that people are the most important factor during knowledge sharing implementation. Wu (2013:48) further states that people tend to react differently to the notion of knowledge sharing based on their past experiences of knowledge

sharing as factors such as trust, norms and attitude are influential. Employees might have been individuals who exploited knowledge sharing activities for personal gain or career improvements and this could easily tarnish one's idea of the value of knowledge sharing. Wu (2013:49) emphasises that in social exchange theories, knowledge sharing behaviour is seen by people as an activity that will produce returns from others in future and the motivation theories can be used to explain knowledge sharing behaviour based on the needs of people.

The above two described theories are based on what people believe the value of sharing knowledge will generate within specific spaces. The environment in which knowledge sharing is expected or proposed to take place also has an influencing factor on whether knowledge sharing will occur successfully. As shown in Figure 6 below, Wu (2013:49) states that environmental and individual factors directly influence the knowledge sharing behaviours of people in organisations. Individual factors can be intrinsic motivation which originates from within an individual, extrinsic motivation that originates from outside the individual and altruistic motivation that originates from individuals showing that they care about the collective group more than they do about themselves.

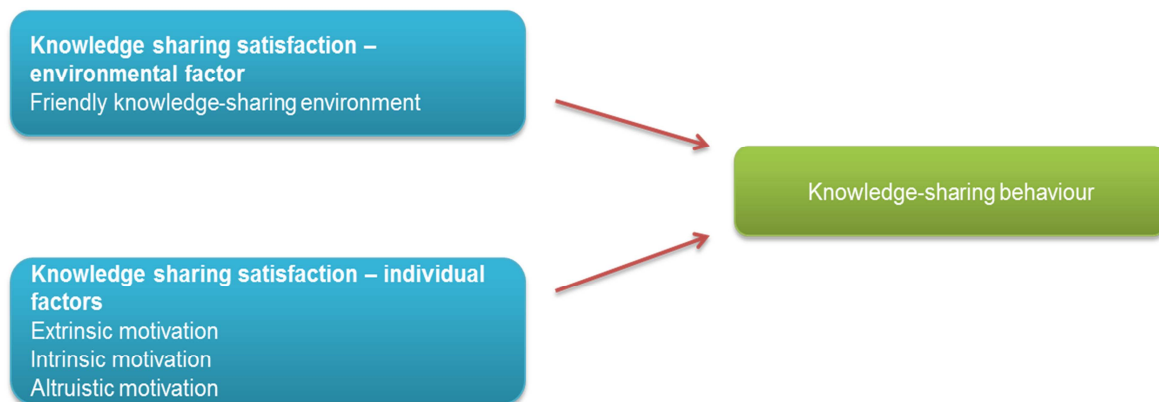


Figure 6: Knowledge sharing influencing factors (Wu, 2013:49)

In a study by Jacobs and Roodt (2011:4) on knowledge sharing among professional staff, it was concluded that professional staff members often utilised knowledge they acquired to deliver excellent services to clients. The knowledge is, however, often lost as employees change jobs and leave organisations, this case is similar to that of Eskom. Eskom employees with specialised skills such as engineers often get head hunted by other organisations and the employees leave with a pool of knowledge that was not identified and transferred to ensure that it stays within the organisation.

Knowledge does not only have to be identified when there is a threat of it leaving, it needs to be acknowledged, appreciated and used while it is still in the organisation, but identifying it is the initial point of departure.

Salim, Javed, Sharif and Riaz (2011:44-49) conducted a study in which knowledge sharing behaviour, attitudes and intentions were discovered at two private organisations in Pakistan. Employees of different ages and from various management levels were included in the study and the following general findings were discovered:

- Employees considered the knowledge sharing process as an additional activity and felt the need for rewards to be provided for engaging in knowledge sharing activities.
- Employees who are familiar with knowledge sharing activities and processes should be identified and invited to champion knowledge sharing.
- Organisations should encourage skilled workers to engage in knowledge sharing activities regularly.
- Top management needs to be involved in the promotion of knowledge sharing within organisations.

The last point stating the importance of top management involvement relates directly to culture. Tohidinia and Mosakhani (2010:612) acknowledged the fact that creating a knowledge sharing culture is a serious concern within organisations attempting to harness the knowledge their people possess. Tohidinia and Mosakhani (2010:612) further note that the absence of the proper atmosphere within organisations will lead to knowledge sharing efforts proving to be useless.

The sharing of knowledge boils down to empowering one another within organisations and sharing a resource that literature views as important to organisations gaining a competitive advantage. Organisations have employees that are all supposed to be performing with the aim of assisting in the achievement of goals and objectives and sharing what is known, will make goals and objectives to be reached. In current competitive times, organisations benefit greatly from innovative initiatives that are generated by employees. Innovation in different industries can only occur when individuals possess knowledge about that industry.

2.6 Knowledge sharing and innovation

Having discussed knowledge sharing and its importance in business, it is important to touch on an important result of the process of knowledge sharing. Knowledge is possessed by different people who view the world differently and have different perspectives on how things should be. New ways of doing things, methods, processes and completing tasks is a natural part of human progression. Advances in economic structures and technological developments are all the result of numerous factors, but an important factor, namely innovation, is closely linked to knowledge sharing. Inauen and Schenker-Wicki (2011:496) state that innovation in business began as early as during the years of the settlers and has been influencing cultures ever since. They further state that different groups of people across the globe have been using innovative methods of production to ensure survival.

Ramadani and Gerguri (2011:269) define innovation as the process of transforming new knowledge and ideas into new products and services. New ways of designing a product, extra features and new ways of allowing customers to help themselves in a faster way over the web is innovation at its best and companies often strive to be more innovative than their competitors. Based on the above explanation of innovation, one can argue that those that do not have the knowledge that is possessed by others are less likely to innovate from shared knowledge. If people are not conscious of the knowledge that other people possess, then the knowledge will not be shared and innovation within organisations becomes limited.

Serrat (2008:1) states that knowledge should not be seen as a one way road, but rather a force that can move in multiple directions within companies so that it can constantly be improved and adapted. Serrat (2008:1) makes a strong case regarding knowledge remaining in one place and clearly suggests that stagnant knowledge is worth less than shared knowledge, which has a higher probability of sparking innovation within organisations. It is clear that innovation and knowledge are related as the various authors consulted suggest. For one to innovate, a base of knowledge needs to be present. People within organisations do not simply innovate without previous experience and knowledge.

When organisations know what they know, it already is the first step for improvement and this is the relationship between knowledge and innovation. Knowledge that is used to come up with innovative products, services and processes gives organisations a competitive advantage in the market in which they operate. It is important to

acknowledge the relationship between knowledge and innovation and how the proper management of knowledge can allow for innovation to occur within organisations. Innovation needs to be continuous in organisations as new products, ideas and processes are what give organisations their competitive advantage. Activities such as knowledge sharing within companies allow for knowledge to reach new people and allow new people to take the knowledge a step further and come up with innovative ideas.

All solutions within businesses are generated by people and the challenge in large organisations such as Eskom is the fact that these people are usually not known, which translates into the fact that what these people know is also not known. If the people that know within a company are not known, confusion will settle in decision making processes posing as the truth and this can be detrimental for a company. Identifying the knowledge that people possess within organisations can be achieved by conducting what is known as a knowledge audit.

2.7 Knowledge audits

Tacit knowledge within organisations can be identified by conducting knowledge audits, as argued by Perez-Soltero, Barcelo-Valenzuela, Sanchez-Schmitz, Martin-Rubio, Palma-Mendez and Vanti (2007:9). Perez-Soltero, *et al* (2007:9) further state that conducting a knowledge audit is a critical step in any initiative carried out by an organisation connected to knowledge management. The audit is used to provide an examination into an organisation's health. The knowledge audit is essentially a discovery tool that examines knowledge sources within an organisation. Mearns and Du Toit (2008:164) state that a knowledge audit is a tool that enables the mapping of knowledge that exists within organisations. Mearns and Du Toit (2008:164) further state that there are two elements of knowledge audits, the first one is the examination of the data, information and knowledge that exists and the second one is the identification of perceptions of unmet needs.

According to Perez-Soltero *et al* (2007:11) one of the focuses of knowledge audits is on the development of a knowledge inventory with emphasis on types of knowledge available and this would be movement in the correct direction if the knowledge were identified and stored amongst project developers in the Project Development Department (PDD). The author defines a knowledge audit as a tool that people in organisations can use to identify what information and knowledge, both tacit and explicit, exist and where they are located in organisations. Based on the establishment

of the fact that knowledge audits are tools of discovery, among other things, Figure 7 below provides a visual description of knowledge audits.

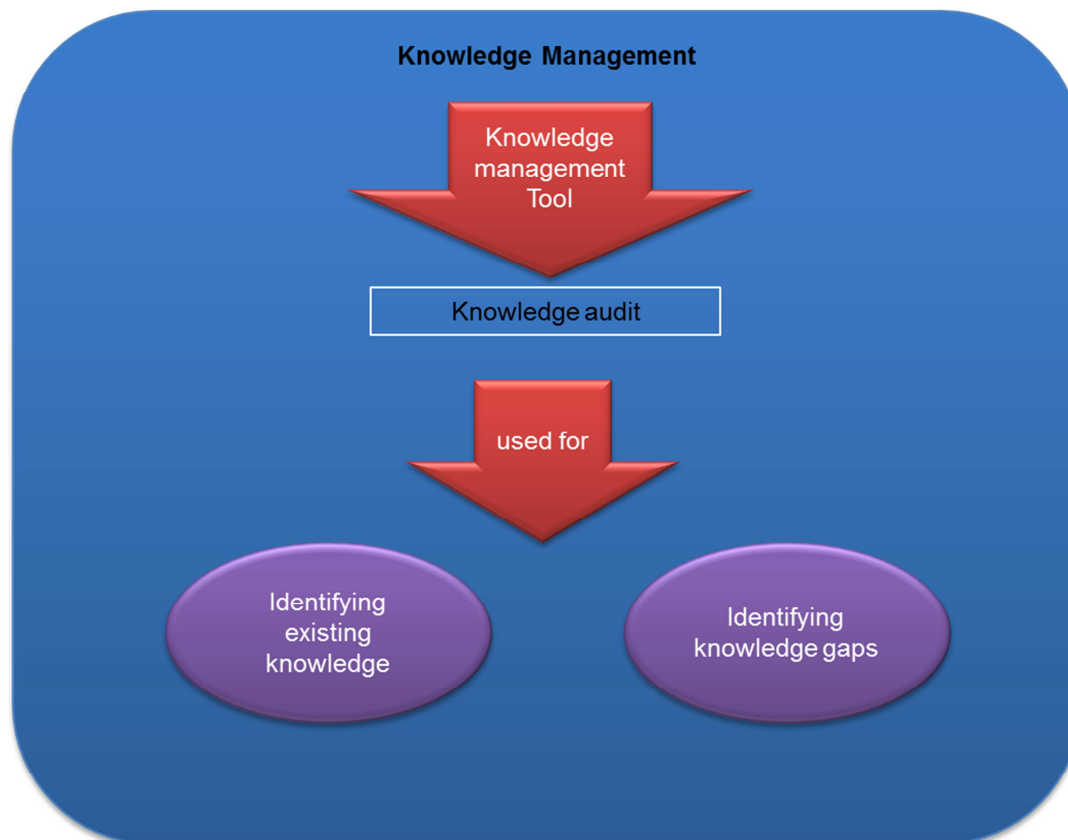


Figure 7: Knowledge audit function within knowledge management (author-derived)

In a medical study conducted by Robson, Beavis and Spittle (2007:86), a knowledge audit was used to identify the knowledge gaps that exist between the nurses that take care of patients with sepsis. The purpose of the knowledge study was to find out what the nurses do not know about the disease called sepsis so that further training can be facilitated to ensure that knowledge gaps can be filled. The nurses were sent a questionnaire which was in the form of a test and the results of the findings were that there were areas of treating patients with sepsis that the nurses were not aware of. The value of knowledge audits is made clear by such studies in which a management discipline is used to assist in the medical discipline. Wiener and Mulvaney (2008:20) also used a knowledge audit to identify the operational knowledge of children's services staff about safeguarding. The aims of the study were:

- Identifying knowledge of key legal matters surrounding the caring for children,
- Highlighting knowledge gaps and

- Identifying training needs.

The results of the study showed that there were areas that the staff needed to improve upon and measures were suggested going forward.

These two studies are examples of studies that used knowledge audits as a tool to identify gaps and address them. The purpose of the studies may have not been to identify experts but chances are that the results also showed which staff members knew more about certain topics. For the purpose of this Eskom study, knowledge auditing for identifying existing knowledge is relevant.

The results of this study will eventually see project developers within PDD sharing their knowledge with Project Development Intelligence (PDI) employees so that the reports compiled by PDI include some of the knowledge gained from the project developers. Taminiu, Smit and De Lange (2009:44) state that the lack of knowledge sharing has financial risk implications as employees can decide to leave Eskom and so does the knowledge they possess.

Serrat (2008:1) emphasises that knowledge must not be seen as something that moves in a single direction but rather something that can be moved back and forth and can be improved and adapted. As PDI is customer focused, it is important to note that Ndlela and Du Toit (2001:152) stated that customer focus within organisations is a drive of knowledge management. Ndlela and Du Toit (2001:160) further state that for organisations aiming to successfully meet their strategic objectives and goals, a plan to establish how to best approach a knowledge management programme needs to be developed. Based on the literature that has been reviewed on knowledge auditing, the author further emphasises that knowledge auditing is a tool for knowledge management.

2.8 Knowledge management

Tools such as knowledge audits assist in the proper establishments of initiatives that will lead organisations to better manage the knowledge possessed by their employees. Mavodza and Ngulube (2012:1) emphasise the importance of knowledge by acknowledging that society has become knowledge-based and that organisations that are able to identify, treasure, create and grow their knowledge assets are likely to be more successful in industries. Identification of knowledge is critical for this particular study and a knowledge audit is the knowledge management tool that enables knowledge to be identified. Lottering and Dick (2012:7) further emphasised that

knowledge management practices should take into consideration that knowledge seekers in organisations usually prefer human-centric contact and social interaction.

Kebede (2010:421) broadly defines knowledge management as the systematic and purpose driven management of knowledge, its associated procedures and tools with the aim of fully realising the potential that knowledge has to solve problems, assist in decision making and facilitate innovation. The definition clearly links knowledge management and competitive advantage as problem solving, decision making and innovation are some crucial factors needed for organisations to gain a competitive advantage. The author defined knowledge management as the practices that enable knowledge to be used as a strategic resource as it will be managed in a way that is easy to identify, share and use.

According to Martensson (2000:205), the management of knowledge in organisations is a critical management tool. Over the past decade, organisations have grown to acknowledge that the knowledge that people possess provides a better competitive advantage than what technologies such as collaboration tools and document storage systems provide. Tools and storage systems are simply platforms used to store and share content. In order to remain leaders in respective fields of operation, organisations have realised the need to develop capacities that will enable them to retain, develop, organise and use their employees effectively. Knowledge management is about managing the intellectual capital within organisations and ensuring that the knowledge is strategically utilised within the business for enhanced performance.

Gourova, et al. (2009:606) state that knowledge management in any organisation should be based on strategy and action plan. The authors further explain that in order to prepare the strategy and action plan, it is critical to identify knowledge assets and knowledge work in organisations so that they are visible for any knowledge management related initiative.

Chueng, Li, Shek and Lee (2007:140) emphasise that knowledge management can lead to organisations knowing what they know and also discovering what they do not know. In large organisations such as Eskom, the knowledge that people possess can easily go unnoticed and may be lost when an employee leaves the organisation.

According to Schiuma (2012:520) knowledge management is relevant as it impacts an organisation's business performance improvement (for the proposed research the

organisation is the Project Development Intelligence (PDI) business unit). Schiuma (2012:520) states that organisations have to be able to transform knowledge into profitable products or services, however, identifying the knowledge needs to happen first. Schiuma (2012:521) further states that organisations need to continuously endeavour on journeys of knowledge identification, acquisition, sharing and application.

Du Plessis (2007:26) further explains that knowledge management provides value on the creation of knowledge in the following ways:

- Knowledge management facilitates the sharing of tacit knowledge, which can be used to come up with innovative and improved ways of doing things,
- Knowledge management allows for the provision of tools and processes to ensure that a company's knowledge base is strategically utilised and that more efficient ways of doing things are developed and
- Knowledge management allows for the building of competencies that are required to be innovative.

The various authors consulted clearly show one common factor in their respective literature and this factor is that knowledge management is important for harnessing knowledge with the aim of organisations benefiting. Masa and Testa (2009:130) state that knowledge management is broad in nature and organisations should understand that managing knowledge involves people, processes, technology and culture.

2.9 Conclusion

The above literature that has been consulted motivates the need for the knowledge held by individuals within organisations to be identified. Identification of this knowledge is the first step that needs to be taken in order for the knowledge to be used in future for various reasons. Literature has indicated that knowledge is a resource within organisations that has gained respect from industry over the course of history and this has driven knowledge management initiatives within organisations to take shape. An organisation that knows what it knows is already taking a step in the right direction if the goal is to achieve performance excellence. All organisations strive for performance excellence and gaining a competitive advantage. Efforts related to knowledge identification and management should be carried out with precision to ensure that the highest amount of value is extracted from individuals and the knowledge that they possess. Knowledge is the livelihood of organisations and ensuring that it is identified, strategically used and managed is critical.

The above reviewed literature motivates the value of identifying the knowledge that project developers in PDD possess. The reviewed literature has led to the development of key research questions that will have to be guided by a research methodology that will sufficiently support the process of data collection and analysis. The following chapter outlines the research methodology that was used to collect and analyse the data.

Chapter 3

Research Methodology

3.1 Introduction

In Chapter Two, a literature review highlighting prominent knowledge auditing and management concepts was compiled. Chapter Three discusses the research methodology that was used to collect data for this study. The researcher also states the research aim, objective, questions and sub-questions which the study was based on. This chapter includes a discussion of the nature of the research, the research design, sampling methodology used, the data collection instrument used, the data analysis method used, ways of realising validity and reliability as well the considerations regarding ethics. The following are the research aim, objectives, question and sub-questions of the study:

3.2 Research aim

The aim of the study was to assist Project Development Intelligence (PDI) in identifying the knowledge that PDD project developers possess. The knowledge will be used towards effectively compiling PDI reports.

3.3 Objectives of study

The study had two objectives, namely to identify then map the knowledge that project developers in the Project Development Department (PDD) possess and to manage the knowledge that the project developers possess.

3.4 Research questions

The research questions that emanated from the objectives of the study were “What knowledge do project developers in PDD possess?” and “How can this knowledge be managed to the benefit of attaining the business objectives in the PDI business unit?”.

The aim, objectives, questions and sub-questions of this study are important to highlight before explaining the research methodology that was used in this study. The research methodology includes the nature of the study, the sampling methodology used, the data collection instrument that was used, the data analysis method and the ethical considerations of this study.

3.5 Philosophical paradigm of the study

The research took a pragmatic approach and view of the world. O'Learly (2007:2) indicates that pragmatism is based on the conviction that truth and value can only be determined through practical application and consequences. Lewis-Beck, Bryman and Liao (n.d:2) state that the core idea of pragmatism is that the meanings of concepts are determined by the concepts' practical implications, meaning that truths or any judgments are determined in and through practical activity. Based on O'Learly's (2007:2) definition of pragmatism, one can argue that truth and value of the knowledge held by individuals can only be known and used if a knowledge audit is conducted. The practical application of the known knowledge will only happen once the knowledge has been identified.

3.6 Nature of research

Bernard (2013:22) states that research is two-fold, on one side research is based on characteristics, attributes and descriptions while on the other side it is based on the amounts and measurements of the attributes. Bernard (2013:23) further emphasises the fact that with the maturity of science over the centuries, there has been a strong dependence on quantitative research, however, this has not made qualitative research less important as all numbers have a story supporting them.

Hughes (2012:12) acknowledges that social science research is based on understanding the way that societies are organised and can be studied using either qualitative or quantitative research. Tewksbury (2009:38) also states that the two primary approaches that can be followed when conducting social science research are qualitative and quantitative. Tewksbury (2009:39) further indicates that qualitative research is focused on the quality of subjects while quantitative research is focused on the quantity of subjects. Eriksson and Kovalainen (2008:3) emphasise that comparing qualitative and quantitative research is as important as defining the approaches.

Khonjelwayo (2012:43) states that qualitative and quantitative research studies have different purposes as they are meant to discovering different phenomena. Flick, Von Kardorff and Steinke (2004:3) understand qualitative research to be a way of describing life's worlds from the point of view of the individuals that are actively participating in it. Khonjelwayo (2012:43) further explains that the purpose of qualitative research is to discover characteristics and hidden motivations while the purpose of quantitative research is for testing.

Greener (2008:80) emphasises that due to the differences of studies, classifying a research study as either qualitative or quantitative is one of the foundations of research and that one must keep in mind that a study can be both quantitative and qualitative. Greener (2008:81) continues to show the difference between qualitative and quantitative research using a table and these differences are illustrated in table 2 below.

Table 2: Key differences between qualitative and quantitative research (Greener, 2008:81)

Qualitative	Quantitative
Focused on words	Focused on numbers
Theory is emergent	Theory testing
Rich and deep data	Hard and reliable data
Based on natural settings	Based on artificial settings

Pierce (2008:4) states that both qualitative and quantitative researches have strengths and weaknesses, which have to be listed in order to better understand their differences. Anderson (2010) also acknowledges qualitative research to have the following strengths and weaknesses:

Strengths

- Qualitative research is best suited to explore, study and understand the complexities of social life. This is due to the fact that respondents are not limited in terms of providing feedback and are allowed to detail issues in ways they find suitable.
- Matters can be examined in detail and depth. The detailed examination of issues enables the researcher to gain a deeper understanding of the topic(s) covered.
- Each individual respondent's feedback is usually specific and this allows for researchers to go deeper into understanding more, if required.

Weaknesses

- Findings from qualitative studies tend to be taken less seriously than quantitative study findings within scientific communities.
- Findings can be high in volume and make analysis take long to conduct. Respondents in qualitative studies may not be guided in providing feedback

which may result in individually unique feedback. The individual feedbacks would require more time to analyse and make sense of.

- Data collected can be unreliable due to the researcher's authority to manipulate the findings. The manipulation of the findings can occur during the analysis of the findings when researchers interpret responses differently.

Velez (2006) highlights the following strengths of quantitative research:

Strengths

- The topic or subject under investigation in quantitative studies seldom gets affected by the researcher due to the lack of interaction between the researcher and the respondents. This has led to the belief that there is minimal researcher interference in quantitative studies.
- Quantitative studies test and validate theories about phenomena, which makes data collection simple and identification of answers easier, unlike identifying answers from opinions or suggestions.
- Abawi (2008) further states that findings of quantitative studies are generally and usually perceived to be credible because of the fact that numbers are used to measure variables and statistical techniques to analyse the data. (Abawi, 2008)

Bryman (2004:75) further discusses the following weaknesses of quantitative research:

- Reliance on the data collection instrument and procedures hinders the connection between research and everyday life. Data collection instruments can easily lead to failure to determine whether or not respondents understand the question. Quantitative researchers will never fully know if respondents understand a question in the same way as options to be selected as answers are not a true reflection of understanding.
- Quantitative researchers often fail to differentiate people and social institutions from the world of nature. Failing to differentiate people and social institutions from the world of nature suggests that the principle of a scientific method can and must be applied to all phenomena under investigation. This is criticised as

researchers should not ignore the fact that a difference between the social and natural world exists.

- Abawi (2008) further states that a weakness of quantitative studies is that reasons and explanations lack depth. Quantitative studies are often able to state how many respondents can be characterised in a certain way but fail to explain why.

The above cited authors highlight strengths and weaknesses of qualitative and quantitative research which show that the two research methods are suitable for different types of research. The authors acknowledged that one would use qualitative research if the aim of the research is based on understanding how and why certain variables are related, emphasising the importance of people as subjects and not objects. Quantitative research may be used in studies that aim to establish what variables are out there and how many variables are similar or different, emphasising the importance of people as objects and not subjects. In qualitative research numerical descriptions of subjects are not as important as factors such as people, events, interactions, meaning, thoughts and characteristics.

Thomas (2003:1) states that a simple way in which qualitative and quantitative research can be distinguished is by stating that qualitative methods involve researchers describing the attributes or features of people and events without making comparisons in terms of quantities or measurement. The author understands that quantitative research is deeply focused on amounts and quantities of attributes and characteristics that are displayed by people and events.

Qualitative Research

This research is qualitative in nature as it is focused on the knowledge that project developers in the project development department possess. According to Edmonds and Kennedy (2013:112), qualitative research represents a type of data collection and analysis that is characterised by meaning and aims to explain why and how people behave or how and why events happen. Edmonds and Kennedy (2013:112) further explain that qualitative research is usually based within natural settings and should not be interrupted by any external force as the natural setting is what makes the findings of the research rich in explanation.

The experiences, skills and knowledge that the project developers possess were gathered and this further supported the qualitative nature of this research as Zikmund, Babin, Carr and Griffin (2013:132) state that research aimed at understanding, describing or explaining phenomena is qualitative. Rohilla (2010:51) further emphasises that qualitative research approaches investigation in a natural way and can be described as a process that sees researchers enter real world settings with the aim of understanding phenomena.

Quinlan (2011:13) states that qualitative research is often associated with social research and can provide explanations for people's experiences, expressions and meaning. Experiences, expressions and meaning would be difficult to explain using quantitative research because the way in which people's experiences, expressions and meaning can be described is by going deeper than numbers during enquiry.

Bricki (2007) states that although qualitative research has been extensively used by sociologists and anthropologists, it has not been used as much as quantitative research in business. Bricki (2007) further states that qualitative research plays an important role in business research as it has great potential to better explain the behaviours of employees in organisations.

The analysis of the data collected was qualitative and qualitative researchers, according to Outhwaite and Turner (2007:4), study subject in their natural settings and interpret them in terms of the meanings people bring to them. They further state that qualitative researchers study personal experiences, life stories and historical, routine and problematic moments in people's lives. The author defines qualitative research as research that aims to contribute to social realities and activities being better understood by studying meaning, processes and structures within society. The author acknowledges that understanding social realities and activities better can enable organisations such as Eskom to draw opportunities from that better understanding. Flick, Von Kardorff and Steinke (2004:9) state that orientation to daily events or knowledge is a characteristic of qualitative research. The everyday events that project developers within PDD experience broaden their knowledge, which should be fruitfully utilised by the organisation.

Khonjelwayo (2012:10) states that researchers have to decide between exploratory, casual or descriptive research designs. This research is descriptive as it studied and portrayed the knowledge profiles of project developers within PDD. Saunders, Lewis

and Thornhill (2009:140) state that the objective of descriptive research is to depict accurate profiles of people, situations and even events. Thyer (2001:2) states that descriptive research provides rich information about people, their conditions and environments. Grimes and Schulz (2002:148) state that descriptive research is usually the first approach to new events or conditions, as in the case of PDD, where a knowledge audit had never been conducted. Thyer (2001:2) further explains that descriptive research provides the examination of people's experiences and the knowledge audit retrieved information from project developers on their experiences, amongst other factors. This qualitative and descriptive study was aimed at project developers as the population of and the sampling methodology used is described below.

3.7 Sampling methodology

Rohilla (2010:114) defines sampling as the process or technique that is used to select a suitable group of respondents during an enquiry. Samples are obtained for specific reasons and in this study, the project developers were selected as the sample because of the value that they provide to PDI and the foreseen potential thereof.

Hesse-Biber and Leavy (2006:109) acknowledge that there are many forms of sampling that are congregated into two main categories, namely probability and non-probability sampling. Kirian (2008:2) defines a probability sample as a sample where members are chosen from a targeted population by utilising techniques or methods that rely on chance as all members chosen in probability samples have a non-zero probability of getting chosen. Bloor and Wood (2006:2) state that probability sampling is used when a selective representative group of a larger population will allow for one to understand the characteristics of the larger population. Saumure and Given (2008:2) define non-probability sampling as a technique that is used when a researcher has a specific population targeted which is based on a specific criteria. Schwandt (2007:2) states that non-probability sampling is used when one wants to discover facts about a discrete phenomenon amongst specific cases (individuals, countries or objects) which in this study were the project developers within PDD.

Since PDD only has 32 project developers, all of them were respondents in this study based on the fact that the project developers are the active employees within PDD that usually communicate with a wide variety of stakeholders when developing their respective projects. The project developers have also in the past assisted PDI with

some reports as they compile business cases on their respective projects and present the business cases to the various committees within Eskom for approval. Simply stating it, the project developers possess vast amounts of knowledge in PDD. Non-probability purposive sampling is the sampling method that was used during the knowledge audit.

Oliver (2006:2) defines purposive sampling as a type of non-probability sampling in which choices regarding which individuals to gather data from are made by the researcher based on specific criteria and motives. The researcher's reason for selecting the project developers is that the project developers are the engine of PDD as they are the core of why the department exists. Project developers develop projects that will in future get implemented and enable Eskom to generate, transmit and distribute electricity. Tongco (2007:147) states that purposive sampling is a good sampling methodology that can be used when one aims to study knowledgeable experts within cultural domains. Teddlie and Yu (2007:77) state that the main consideration in selective purposive sampling should be based on the researcher's judgement about the respondents who will provide data that will achieve the objectives of a study. The author understands purposive sampling to be suitable for qualitative studies and it is useful when one aims to describe a phenomenon about which very little is known. Oliver (2006:4) further states that an advantage of purposive sampling is that a researcher is able to identify participants who are more likely to provide significant and thorough data. One must understand that the researcher should provide details as to the criteria used to select that specific sample. The researcher's criteria and reasons for selecting the project developers are as follows:

- Project Developers are active in the power sector and usually have access to other industry players and relevant stakeholders.
- Project Developers draw up business cases for potential future power stations that Eskom should build and this further emphasises their knowledge of the energy industry.
- Project Developers engage numerous people in other departments within Eskom and can also be good connections between other departments.

Oliver (2006:3) also acknowledges that a principal disadvantage of purposive sampling is that researchers can be biased in selecting a sample. This disadvantage had zero effect on the research as all the project developers have been selected for the knowledge audit. Battaglia (n.d:2) states that purposive sampling entails the researcher

using the knowledge possessed to select a sample and the researcher in this study research knew and understood the importance of project developers for the PDI business unit. Saunders et al. (2009:237) state that purposive sampling is often used when working with a small sample and wishing to select specific cases that are informative. Once the correct sampling methodology had been selected, a data collection instrument had to be decided upon and constructed in a way that would retrieve the required data for the study to meet its objectives.

3.8 Data collection instrument

Project developers in PDD are the people who compile business cases for future projects that Eskom engages in and they are knowledgeable in their areas of expertise and have in the past assisted PDI in sharing some knowledge. The knowledge that they shared with PDI occurred and can be attributed to luck because there was no formal way of identifying that the project developers can possess specific knowledge. Eskom's PDD has 32 project developers and all of them were given self-administered questionnaires during the knowledge audit. Considering the fact that the problem is that the knowledge that project developers in PDD possess is not known, the need for a Knowledge Audit and the drawing up of a Knowledge Map is critical at Eskom's PDD as coordination and involvement of knowledge experts can improve the quality of PDI reports. The knowledge audit can also assist in unlocking knowledge and allow for the knowledge to be shared, only if people are willing. Neuman (2011:48) states that researchers use questionnaires or interviews to learn about people's beliefs, experiences and opinions. Vogt (2010:15) states that researchers should consider the type of data they aim to be collecting when they select a data collection instrument.

Brace (2004:4) states that gathering data from a population can occur in various ways such as questionnaires, interviews and observations and must be done based on the type of data that is required. Van der Velde, Jansen and Anderson (2004:106) emphasise that some authors believe that self-administered questionnaires are effective data collection tools in facilitating people to explain their situations, thoughts or experiences. The questions asked in questionnaires can either be closed ended, open ended or multiple-choice. Wilkinson and Birmingham (2003:10) emphasise that open ended questions are applicable if one aims to get respondents to explain without restrictions in their responses, which is ideal when a person is required to outline what they know, their experiences and skills. For this study, open ended and closed ended questions were used in the questionnaire. Frazer and Lawley (2000:3) state that

selecting a questionnaire type depends on the researcher's personal preference, time constraints, costs, potential response rate and other criteria as summarised in table 3 below.

Table 3: Comparison of questionnaire types (Frazer & Lawley, 2000:3)

Criteria	Self-administered/mail questionnaire	Interviewer administered questionnaire	Telephone questionnaire	Internet questionnaire
Cost	Low	High	Moderate	Very low
Speed of data collection	Slow	Immediate	Immediate	Fast
Ability to reach geographically dispersed segments	High	Very low	Medium	Very high
Length of questionnaire	Long (4-12 pages)	Long (30-60 minutes)	Medium (10-30 minutes)	Long (4-12 pages)
Questionnaire complexity	Simple only	Simple to complex	Simple only	Simple only
Question complexity	Simple to moderate	Simple to complex	Simple only	Simple to moderate
Interviewer bias	None	High	Medium	None
Need for interviewer supervision	No	Yes	Yes	No
Response rate	Low	Very high	Moderate	Moderate

The knowledge audit for the study used self-administered questionnaires as a data collection instrument. The self-administered questionnaire was selected as the project developers often work away from the office and can be difficult to contact in person. Self-administered questionnaires, according to table 3 above, have very little interviewer

bias as the interviewer is not present. The fact that the project developers were made aware of the audit prior to receiving the questionnaires did not have negative impacts on the data collected.

Thomas (2004:1) emphasises that questionnaires are data collection tools that can be used for, amongst other things, identifying interests and experiences. Bourque (2003:2) defines self-administered questionnaires as an instrument that is used to get information from people by having them filling in the questionnaire themselves. Eiselen and Uys (2005:2) state that questionnaires form an important part of descriptive studies and further state that self-administered questionnaires have the following advantages:

- Cost less than face to face or telephonic questionnaires
- Sensibly simpler to manage and analyse
- The possibilities of interviewer bias are low
- They are convenient as respondents have adequate time to complete them.

Eiselen and Uys (2005:2), however, also state that the response rates of self-administered questionnaires tend to be lower when the questionnaire is lengthy.

Lewis-Beck, Bryman and Liao (n.d:5) state that a common error that is made by researchers while developing questionnaires is to reduce the length of the questionnaires with the idea that the response rate will be higher. Bourque and Fielder (2003:27) state that questionnaires can be used to collect data on people's knowledge and attributes, provided that the questions in the questionnaires are properly constructed. Self-administered questionnaires complemented the study as the project developers had to check some of their credentials such as trainings, qualifications and past projects, as these were all be part of the self-administered questionnaire.

The project developers were given ample time to comprehensively fill in the self-administered questionnaires and had a chance to re-visit their past activities that they have taken part in while in Eskom and in previous places of employment. The questionnaires were distributed to the project developers over a period of four days (22 October 2013 – 25 October 2013). The questionnaires were then collected from the project developers on the 15th of November 2013. Self-administered questionnaires eliminated the need to make individual appointments with the project developers as conflicting schedules were a serious obstacle. The data collected during the knowledge

audit was made sense of by means of analysis that assisted in presenting the data collected in an appropriate manner in line with the objectives of the study.

3.9 Data analysis

The findings of the knowledge audit were mapped for ease of use for end users of the findings of the audit. The end users for this specific study are the PDI employees. Choy, Lee and Chueng (2004:70) state that knowledge inventories or knowledge maps are the analysis techniques that can be used to analyse findings of the knowledge audit. The knowledge map connects all related topics using the owners of the knowledge across different business units as points of connection. The project developers were mapped in their business units as this assisted in organising the findings.

3.10 Reliability and validity

Smith (2004:3) describes reliability as the extent to which findings of a study can be obtained repeatedly if the research was conducted again. Smith (2004:4) also states that validity refers to the extent to which the findings of the study accurately reflect the objective(s) of a study. The reliability and validity of this study was always considered throughout the study and this is supported by the fact that the data collection instrument was designed in conjunction with Statcon (University of Johannesburg Statistical Consulting Service).

3.11 Ethical considerations

The respondents in this study were all provided with a background and purpose of the study and were told that the findings would be made available to them upon completion of the study. The participants were notified of the fact that the findings of the study would be used to enable knowledge sharing and no respondent would be discriminated against based on the findings of the knowledge audit. Transparency and ethical considerations were vital to the success of this study as the sensitivity of divulging one's knowledge can be viewed by some as extreme openness that can be used against a person. Approval to conduct the study was provided by Eskom, as shown in the appendix. Welland and Pugsley (2002:1) state that the degree of intimacy associated with qualitative research can generate ethical matters that need to be addressed accordingly.

3.12 Limitations of the study

The limitations of this study are the fact that people often feel that knowledge is power and might be reluctant to honestly divulge the knowledge they possess. The project

developers were, however, notified that the findings of this knowledge audit would not be sensitive information intended for PDI employees only, and the project developers could also view the findings. The project developers were assured that the findings of the study would be made available to them and that no unauthorised individual would use it to evaluate the respondents in any way. It is important that the project developers were told that the study adhered to ethical and transparency principles.

3.13 Conclusion

In this chapter, the researcher discussed the research methodology used for this study. As shown in Figure 8 below, the study was qualitative and descriptive in nature as it is explained within the chapter. The sampling methodology used is non-probability purposive sampling as the study included all of the 32 project developers within the Project Development Department. Self-administered questionnaires were the data collection instrument used and the analysis and findings were defined.

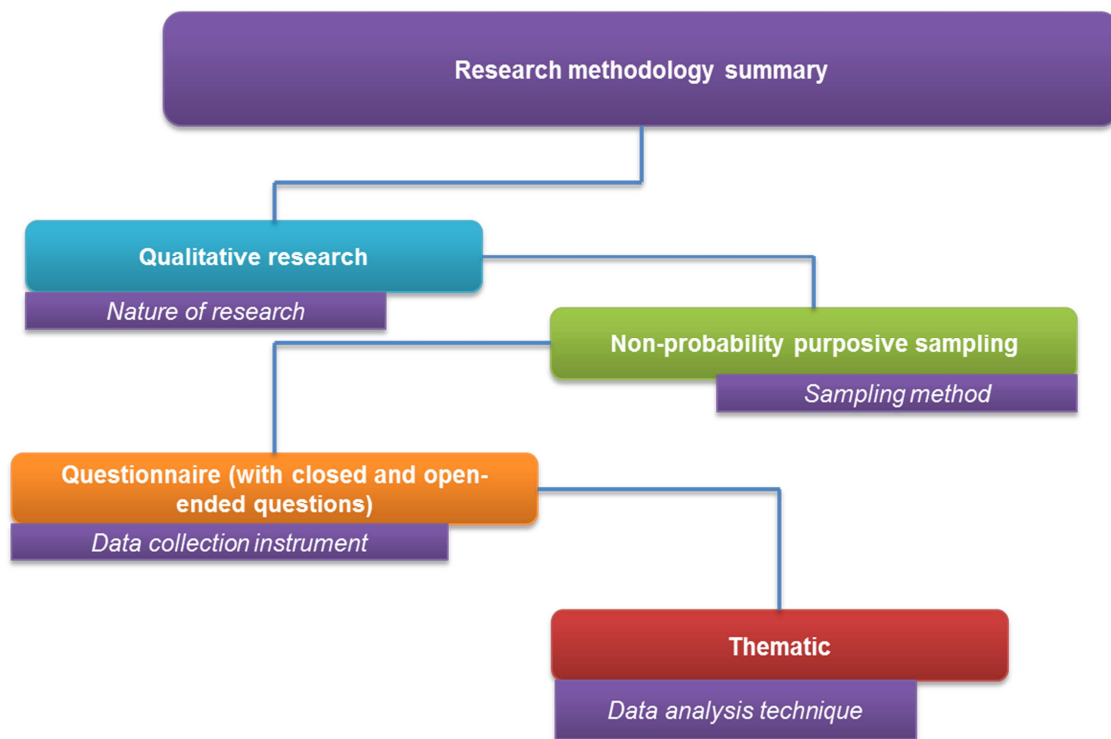


Figure 8: Research methodology summary of the study (author-derived)

Chapter Four will present the findings of the study by analysing the data that was collected using self-administered questionnaires.

Chapter 4

Research Findings

4. Introduction

Chapter Three provided a framework of the research methodology that was used to collect the data. Self-administered questionnaires were the data collection instrument that was handed to the respondents to conduct the knowledge audit. Chapter four presents the findings of the data collected from the project developers in PDD.

The researcher intended to discover the knowledge that is possessed by the project developers in PDD and the research methodology adopted contributed to the discovery. The questionnaire included questions about the qualifications, work experience, subject matter and skills possessed by the project developers. The frequency of methods used to share and acquire knowledge was also explored. The findings of the knowledge audit will be shared with the respective business units where the project developers are employed. The questionnaires were satisfactorily filled in by all the respondents, realising a 100% response rate. PDD has a total of 32 project developers who are from four different units, as illustrated in Figure 9 below.

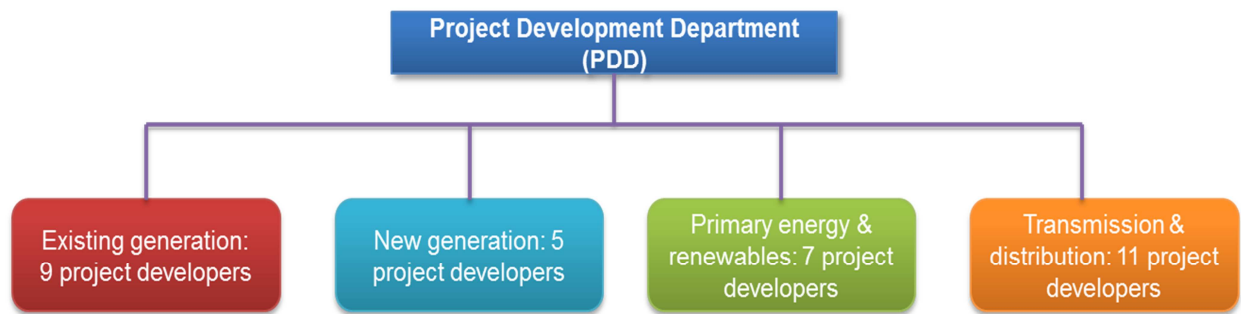


Figure 9: PDD Units with Project Developers (author-derived)

The four business units all have different types of projects that they develop in Eskom, which means that project developers have different types of skills, are aware of varying subject matter and possess different types of knowledge. The existing generation is focused on Eskom's existing infrastructure, which includes power stations and other supporting assets. The project developers in the Existing generation unit are focused on improving or enhancing existing infrastructure. New generation is focused on developing projects that will in future see Eskom constructing new electricity

infrastructure. The Primary Energy and Renewables unit develops projects that are based on coal, water, natural gas supply and renewable energy technologies such as wind and concentrated solar power. The Transmission and Distribution unit's core function is to develop and upgrade Eskom's electricity transmission and distribution infrastructure. The project developers in these four units all possess different knowledge which they have acquired and generated over the years of working in the electricity industry. Constant interaction and communication with other Eskom divisions such as Generation, Sustainability and Transmission also contributes to the knowledge that the project developers acquire. The findings of the knowledge audit will be disclosed per business unit. The 32 project developers have a combined average age of 39 years, represented by eight females and 24 males.

4.1. Primary Energy and Renewables

The Primary Energy and Renewables unit is made up of seven project developers that have a combined 44 years' experience working for Eskom. The seven respondents all have a tertiary education with the majority holding engineering degrees and some even Masters Degrees. The respondents are currently employed by Eskom as registered professionals, who are registered with and are acknowledged by professional bodies in the engineering industry. The respondents that were employed by other companies before joining Eskom were employed by private companies and by government.

The respondents stated that they communicate mostly with three departments within Eskom, namely Generation, Sustainability and Corporate Affairs. The project developers also communicate with other departments as the projects they develop are part of the larger value chain of electricity generation and need to co-exist with current systems. Information and knowledge sharing is another reason why project developers communicate with other departments. None of the respondents indicated having poor communication with any of the three departments as the majority of the respondents stated that the communication interactions that they have with the departments are either good or excellent. This can be attributed to the fact that project developers work on projects for long periods of time and become members of committees or working groups, which include employees from other departments.

Table 4: Summary of Primary Energy and Renewables project developers

Number of project developers	Seven
Highest education qualification level	Three have degrees, two have honours

obtained	degrees, one has a master's degree and one has a post graduate diploma.
Combined years working at Eskom	44 years
Current designation	Four are registered professionals, two are managers and one is not a registered professional.

4.1.1 Findings on subject matters and skills

Two of the questions in the questionnaire requested project developers to state the subject matters or skills that they possess or are familiar with. For the case of the Primary Energy and Renewables unit, a list of 13 subject matters and three skills were identified. The subject matters all differed from one respondent to another, however, the skills that the respondents indicated often overlapped. Figure 10 below illustrates the subject matters and skills that the respondents stated that they possessed.

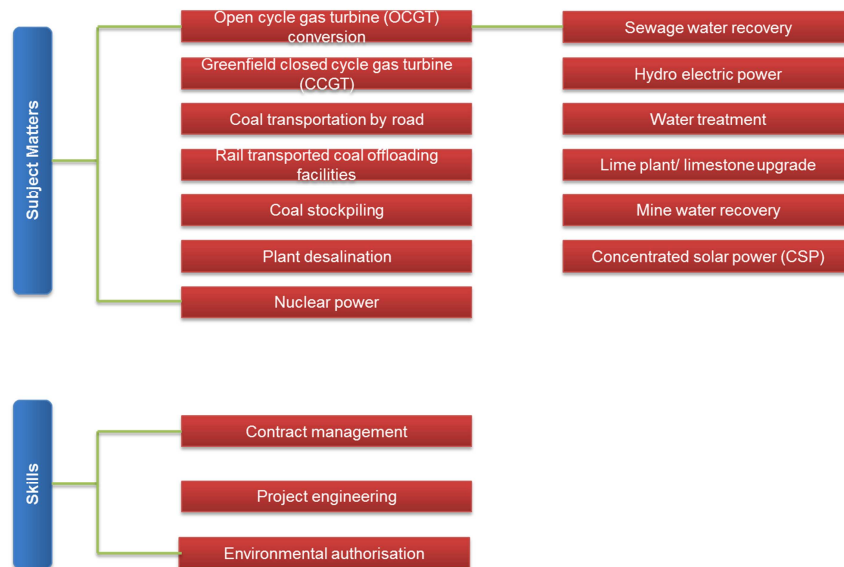


Figure 10: Primary Energy and Renewables project developers' subject matters and skills map (author-derived)

The above subject matters and skills were evident in the projects that the project developers are currently developing. The project developers have been working on their current projects from between five months to as long as three years, showing that some project developers have acquired a great deal of knowledge, which can be shared with other employees.

4.1.2 Findings on sharing and acquiring knowledge

All seven respondents stated that one on one physical conversation and, meetings/workshops are the knowledge sharing and acquisition methods that they frequently use and rated the methods to be either very good or excellent. The respondents indicated that reports were also frequently used to acquire knowledge but the quality of the method was not as high as one on one physical conversation or meetings/workshops.

4.2. New Generation

The New Generation unit is made up of five project developers that have a combined 31 years' experience working for Eskom. This is 31 years of knowledge and skills acquired while working for Eskom that have not been fully explored. The knowledge and skills have not been fully explored because they have not yet been identified within the organisation. Four of the project developers are registered professionals and one is not registered. One of the respondents used to be employed at an education institute and one at a private company before joining Eskom, with the rest having only worked for Eskom.

All five respondents stated that they communicate mostly with Generation, Sustainability, Transmission and Group Capital when developing projects. The respondents rated the quality of communication with the above listed departments as very good and excellent. Four of the respondents stated that the quality of communication with Generation is excellent, with one respondent stating good.

Table 5: Summary of Existing Generation project developers

Number of project developers	Five
Highest education qualification level obtained	Three masters degrees, one honours degree and one degree.
Combined years working at Eskom	31 years
Current designation	One managerial, three registered professionals and one non-registered professional.

4.2.1 Findings on subject matters and skills

The project developers in the New Generation unit completed the questionnaires, resulting in the identification of eight subject matters and three skills. The respondents

all stated different subject matters, which indicate the varying subject matters that the project developers are familiar with.

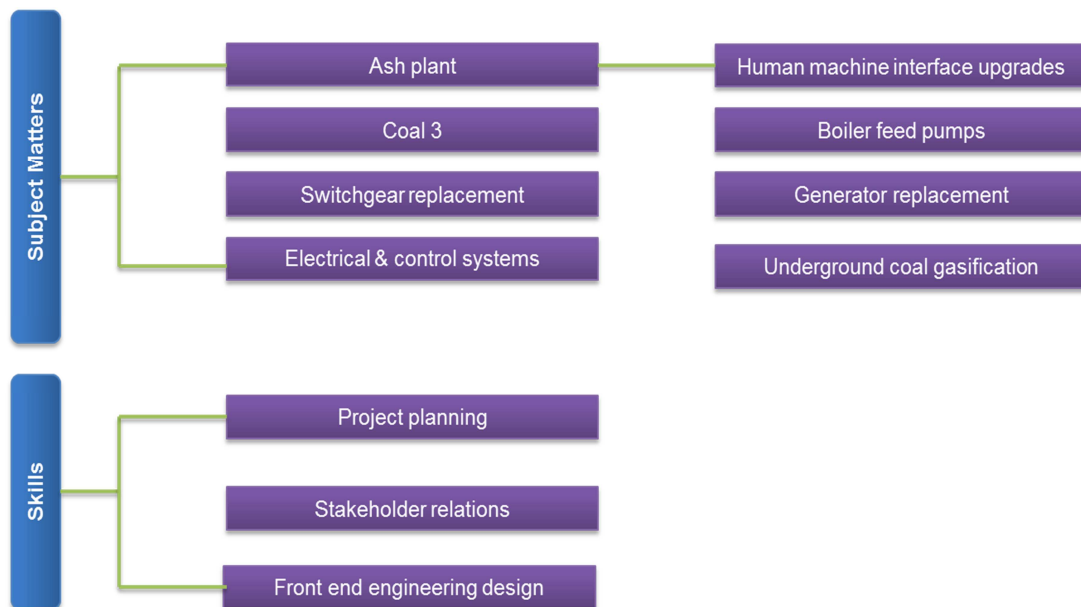


Figure 11: New Generation project developers’ subject matters and skills map (author-derived)

The subject matters listed by the project developers are linked to the projects that the project developers are currently engaged in. Time spent on developing current projects ranges from three months to four years.

4.2.2 Findings on sharing and acquiring knowledge

All of the project developers stated that one on one physical conversation is the knowledge sharing and acquiring method that they utilise the most. The second most used method is meetings/workshops, followed by reports. One on one physical conversation received excellent quality ratings for both knowledge sharing and acquiring. The project developers indicated that quality of sharing and acquiring knowledge in meetings/workshops and reports are very good.

4.3. Transmission and Distribution

The Transmission and Distribution unit is made up of 11 project developers with a combined 105 years’ experience working for Eskom. These 105 years in Eskom are characterised by the project developers having worked for Generation, Distribution, Transmission, Customer Services and Group Capital and Finance. Out of the 11 project developers, only two of them have only worked for Eskom, with the rest having worked

for different types of companies such as educational institutions, private companies, other state owned companies and even public companies.

The 11 project developers stated that they communicate frequently with the Generation, Transmission, and Distribution and Group Capital divisions when developing their projects. Nine of the project developers stated that the quality of communication with above four stated divisions is generally very good. The remaining two project developers stated that the quality of the communication is good.

Table 6: Summary of Transmission and Distribution Project Developers

Number of project developers	11
Highest education qualification level obtained	Five degrees, two honours degrees, two master's degrees and two diplomas.
Combined years working at Eskom	105 years
Current designation	Seven managerial, three registered professionals and one specialist.

4.3.1 Findings on subject matters and skills

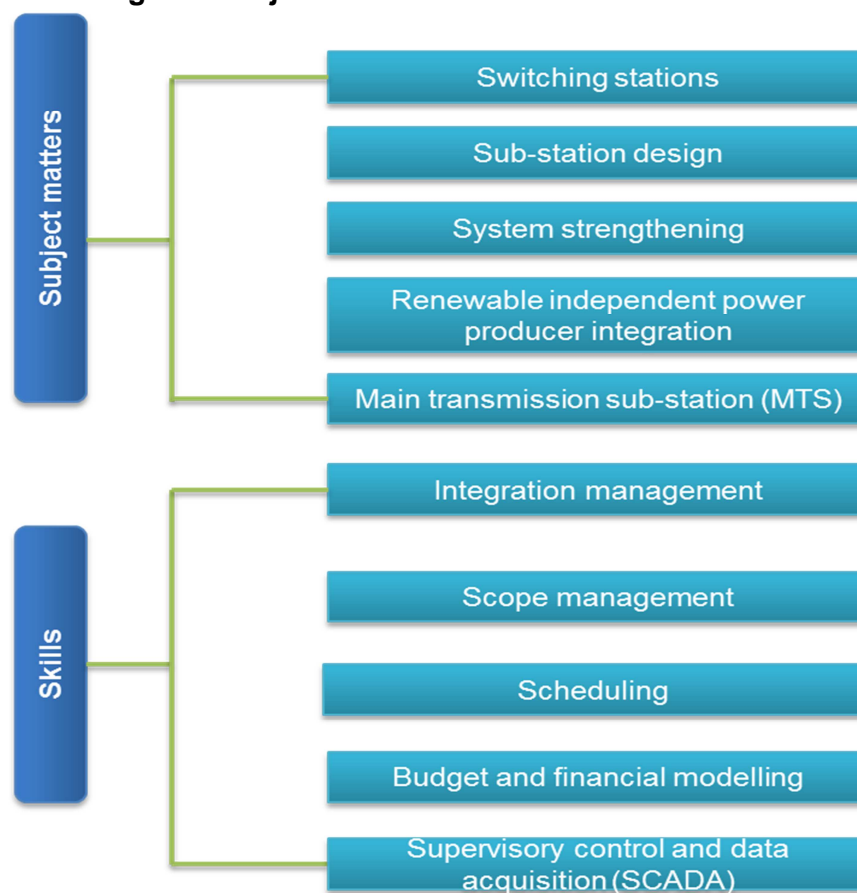


Figure 12: Transmission and Distribution project developers' subject matters and skills map (author-derived)

The Transmission and Distribution project developers stated that the subject matters with which they are familiar with are, as would have been expected, closely related to matters of electricity transmission and distribution, as shown in Figure 12 above.

4.3.2 Findings on sharing and acquiring knowledge

The Transmission and Distribution unit showed varying responses to the methods they frequently use to share and acquire knowledge, and the quality of the methods. Five of the project developers stated that they use one on one physical conversation to both share and acquire knowledge, stating that the quality of the method is good and excellent. Four project developers stated that they use emails to share knowledge and use one on one physical conversation to acquire knowledge. The remaining two project developers stated that meetings and workshops, and reports are the methods they frequently use to share and acquire knowledge.

4.4. Existing Generation

The existing generation unit is made up of nine project developers who have a combined total of 74 years' experience working for Eskom. The nine project developers have previously worked for other divisions within Eskom, Generation, Transmission and Technology and Commercial appearing more frequently than the other divisions. Only one of the project developers has only been employed by Eskom, with other respondents having worked for other state owned companies, private companies and even an educational institution.

Table 7: Summary of Existing Generation project developers

Number of project developers	Nine
Highest education qualification level obtained	Three masters degrees, three honours degrees, two degrees and one diploma.
Combined years working at Eskom	74 years
Current designation	Four managerial, four registered professionals and one non-registered professional.

4.4.1 Findings on subject matters and skills

The subject matters stated by the nine project developers were 13 in number and the skills three. The subject matters are evident of the fact that these project developers work on existing Eskom infrastructure, as shown in Figure 13 below.

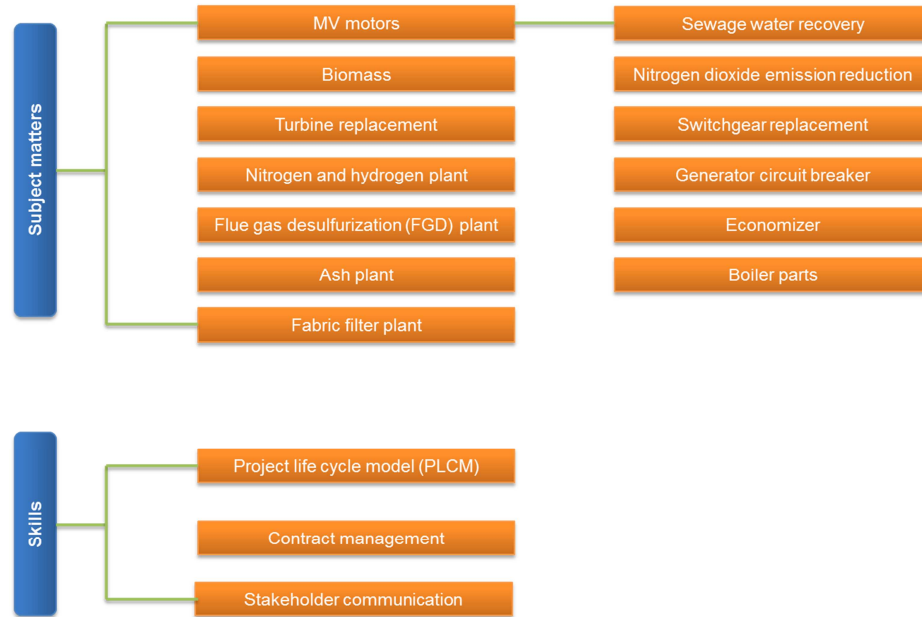


Figure 13: Existing Generation project developers' subject matters and skills map (author-derived)

4.4.2 Findings on sharing and acquiring knowledge

Five of the project developers indicated the one on one physical conversation method to share knowledge, with four of them stating the same method for acquiring knowledge and one stating reports as a frequently used method to acquire knowledge. Three of the respondents stated that meetings and workshops are the method they frequently use to share knowledge. Two of the three respondents stated that they use meetings and workshops to acquire knowledge, with one stating telephone conversations. The remaining respondent indicated frequent use of emails to share knowledge and reports to acquire knowledge.

4.5. Consolidated findings

The results shared above are reported per business unit to highlight specific respondents from the project developers, however, a broader view of the results can show a general view of the findings. The 32 respondents have a combined 254 years' experience of working for Eskom, which can be equated to 254 years of knowledge acquired or created/generated.

The project developers have diverse employment histories as some have been working for Eskom their entire careers while others have worked for educational institutions, private companies, government departments and public companies.

Eskom's Generation, Group Capital, Transmission and Sustainability are the divisions that the majority of the project developers stated to have communications with during their process of developing projects.

Table 8: Summary of all 32 project developers

Number of project developers	32
Highest education qualification level obtained	Nine masters degrees, eight honours degrees, one post-graduate diploma, 11 degrees and three diplomas.
Combined years working at Eskom	254 years
Current designation	14 managers, one specialist, 14 registered professionals and three non-registered professionals.

4.5.1 Consolidated findings on subject matters and skills

All 32 project developers possess skills and are subject matter experts on different topics which make them knowledgeable. The project developers are experts in 40 various subject matters and possess various skills. The fact that the subject matters that the project developers are experts in have not been documented formally is a knowledge management concern. Figure 14 below shows the consolidated skills that PDD project developers have.

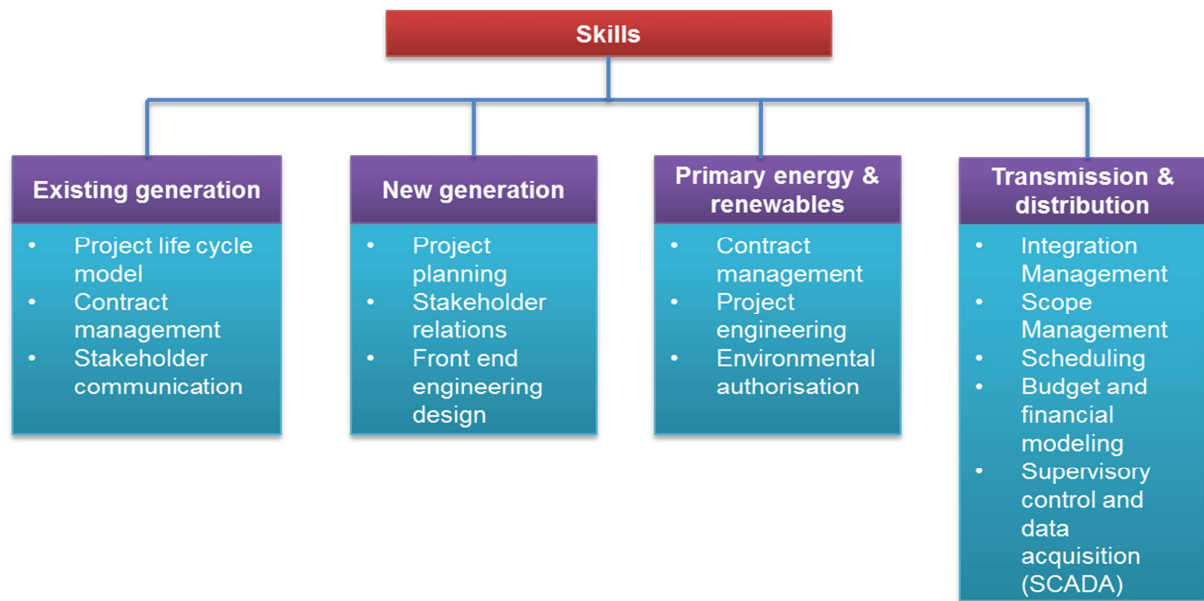


Figure 14: Consolidated skills (author-derived)

4.5.2 Consolidated findings on sharing and acquiring knowledge

The majority of the 32 project developers stated that one on one physical conversation is their preferred method of acquiring and sharing knowledge.

4.5.3 Knowledge Map

The knowledge map below shows that the project developers interact with people internal and external to Eskom. The project developers acquire knowledge and the knowledge audit conducted identified the knowledge the project developers possess, enabling the PDI business unit to acquire knowledge possessed by the project developers.

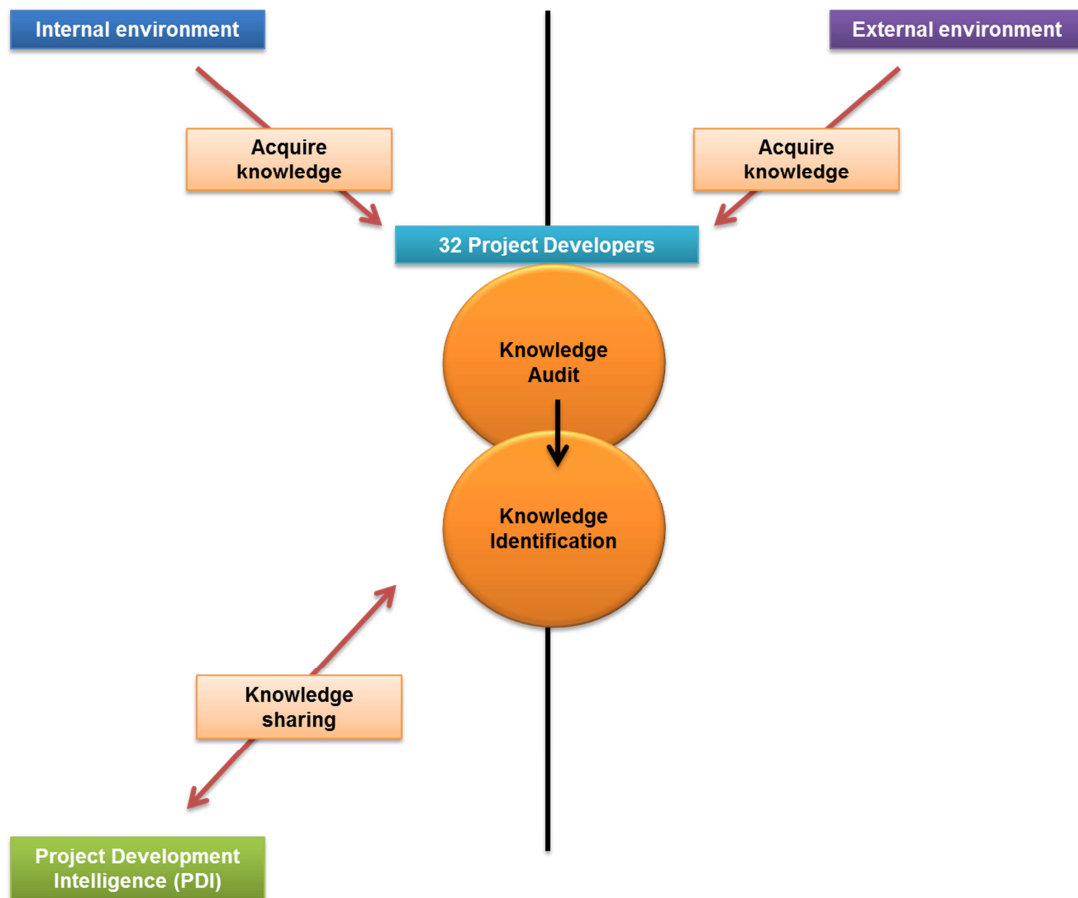


Figure 15: Knowledge Map (author-derived)

4.6. Alignment between the literature review and the findings of the research

Chapter two discussed various topics related to knowledge management that highlighted the importance of knowledge in organisations. Literature highlighted the importance of identifying the knowledge that is possessed by people in an organisation, which is what the knowledge audit conducted with the project developers in PDD has done. Seidler-de Alwis and Hartmann (2008:134) stated that knowledge possessed by people is a source of competitive advantage in industry. The knowledge that the respondents have indicated they possess is a source of competitive advantage which needs to be identifiable so it may be used to benefit Eskom. Hashim and Taib (2012:138) acknowledge that people in organisations are knowledge workers and the knowledge they possess needs to be managed accordingly. Effectively managing the knowledge possessed by people is an organisation's attempt at adapting to the current knowledge economy. Hendarman and Tjakraatmadja (2012:35) indicated that the knowledge economy is characterised by the creation, evaluation and trading of knowledge. The project developers have acquired and generated knowledge while

carrying out the duties required of them and this is at the core of their existence and participation in the knowledge economy.

Considering that Martensson (2000:205) acknowledges that knowledge management is an important management tool in organisations, then the notion of Perez-Soltero *et al.* (2007:9) that knowledge audits are an important step in any knowledge management activity, support the importance of identifying the knowledge possessed by project developers. The knowledge that has been identified can be better managed and most importantly be tapped into by other employees that would find the knowledge valuable. Tapping into a knowledge source fosters knowledge sharing, which according to Olatokun and Nneamaka (2012:3) can assist organisations in improving their performance.

The findings show that all project developers have different sets of skills and are familiar with varying subject matters, which makes the knowledge they possess rich and diverse. Eskom could benefit from conducting exercises similar to that of knowledge audits as the results are descriptive findings of what people know. The knowledge can now be tapped into and used by those who were never aware that it existed in the first place. The discovered knowledge could lead to the creation of new knowledge, which could contribute immensely to the solving of organisational problems and achieving objectives.

4.7. Conclusions

The aim of this study was to assist the PDI unit in identifying the knowledge that the project developers in PDD possess and the findings of the study are a step in the correct direction to achieving the aim. The knowledge audit conducted on the project developers has exposed the knowledge possessed by the project developers, subject matters they are familiar with and the skills they possess. The subject matters and skills section of the findings will be the most useful for the PDI unit when developing projects as the knowledge and skills possessed by the project developers have been identified. Chapter Five will detail the conclusions and recommendations derived from the research process. Chapter Five will also include proposals for future research that can be derived from the study once completed.

Chapter 5

Conclusions and recommendations

5.1 Introduction

The previous Chapter was utilised to set out the results and findings of the study. In Chapter Five, the author draws conclusions from Chapter Four, generates recommendations from the conclusions and states further possible areas of research that can emanate from this study.

To review, the aim and research objectives of this study were as follows:

The aim of the study was to assist Project Development Intelligence (PDI) in identifying the knowledge that PDD project developers possess. The knowledge will be used towards effectively compiling PDI reports. The study had two objectives, namely to identify then map the knowledge that project developers in the Project Development Department (PDD) possess and to manage the knowledge that the project developers possess.

5.2 Conclusions

The conclusions below are drawn by the researcher:

- a) The respondents clearly indicated that they preferred one on one physical conversation as a method of acquiring and sharing knowledge. The sharing of knowledge can be further enabled by establishing platforms that will enable the sharing and acquiring of knowledge. These platforms can be facilitated by establishing communities of practice or setting up knowledge sharing sessions throughout the organisation.
- b) The knowledge audit conducted in PDD will allow other employees to be able to identify project developers that are knowledgeable in specific subject matters. PDI is the intended client for the knowledge audit and the business unit can now go through the subject matters and skills when receiving a request to compile a report.

5.3 Recommendations

Based on the conclusions stated above, the researcher recommends that Eskom start investigating ways of making subject matter experts in the organisation easily

identifiable. The knowledge that the subject matter experts possess needs to be tapped into, shared and used strategically.

Eskom should look into conducting a knowledge audit on its employees and update the findings of the audit regularly. With collaboration and knowledge sharing platforms available in the market, identification of subject matter experts can be enabled so that the knowledge they possess can be identified. Knowledge audit findings can be implemented by having employees' profiles on collaboration platforms which will reflect the subject matters in which they are experts. Collaboration platforms are suggested due to the fact that they can be utilised by employees to work collaboratively and also identify other knowledgeable employees. An example of a collaboration and knowledge sharing platform is Microsoft's SharePoint.

Physical conversation is the method that the project developers most preferred when it came to acquiring and sharing knowledge. The researcher recommends that formal and structured knowledge sharing interactions be organised.

Another recommendation is for Eskom to start building a culture of knowledge sharing. This can be initiated by having communities of practice or meetings set up for the specific purpose of knowledge sharing. These initiatives will see employees networking amongst one another and identifying the knowledge possessed by others within the organisation.

Eskom's large workforce is responsible for generating electricity used to power South Africa's economy and knowledge is what it uses to perform in the various positions held by employees. The knowledge is currently in isolated pockets within the organisation and the possibility of identifying the knowledge, putting names to it and making it available to the entire organisation can be beneficial

5.4 Possible areas for further research

Future research can see knowledge audits getting conducted at a larger scale within Eskom. The knowledge audits can have broader objectives such as to identify knowledge gaps that exist within the organisation. The findings can then be taken further and used as a base to train employees in areas where knowledge gaps were identified.

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7. Appendix

28 October 2013

Dear Sir/Madam

A part of my studies, I, Kgofu Noge, am undertaking a research study which requires me to conduct a knowledge audit of the project developers in the project development department. I therefore kindly request that you complete the following questionnaire.

Your response will be crucial to the study and it should not take more than 30 minutes to complete this questionnaire. Your participation remains anonymous so you are not required or expected to state your name or contact details.

Any queries or questions regarding the questionnaire can be referred to me. You can reach me on 076 48 12 785 or 011 800 5473.

I truly appreciate the time you are taking to complete this questionnaire as your response is crucial to the success of the study.

Thank you/ Ke leboga go menagane.

Regards

Kgofu Noge

076 48 12 785/ 011 800 5473

Section A: Demographics

1. Title (mark with X):

Dr	
Mr	
Mrs	
Ms	

2. Please write your age:

3. Highest Education Qualification Level obtained (mark with X):

Matric	
Diploma	
Degree	
Post graduate diploma	
Honours	
Master's Degree	
PhD	

Name of qualification: _____

Section B: Employment Information

4. In which business unit within the Project Development Department are you employed (mark with X):

Existing Generation	
New Generation	
Primary Energy & Renewable	
Transmission & Distribution	

5. Please indicate the category you currently fall under in terms of your current designation (mark with x):

Managerial	
Specialist	
Professional (registered)	
Professional (No registration)	
Graduate in training/Learner	

6. How many years have you been working for Eskom?

7. Please state the divisions you have worked for within Eskom. Also include the man grade you held during employment in the division and write the number of years working in the division (mark with X):

Division	Man grade					Number of years
	Managerial	Specialist	Professional (registered)	Professional (No registration)	Graduate in training/Learner	
Office of the Chief Executive						
Internal Audit						
Generation						
Transmission						
Distribution						
Human Resources						
Customer Services						
Human Resources						
Finance & Group capital						
Technology & commercial						
Enterprise Development						
Sustainability						

8. Below is a list of the different types of companies. Indicate (mark with X) the type of company(s) you have worked for before working for Eskom, state the level you were employed in and write the number of years working in that type of company:

Type of company	Level of employment				Number of year
	Senior Management	Middle Management	Operations	Trainee/Learner	
State-owned company					
Public company					
Private company					
External company					
Personal liability company					
Non-profit company					
Municipalities					
Government department					
Education Institutions					

Section C: Knowledge Profile

9. Please list the current project(s) which you are currently developing, indicate the duration you have been working on the project and the stage (mark with X) in the PLCM the project currently is:

	Project Name	Duration spent developing the project (in years)	Current stage the project is at on the PLCM		
			CRA	DRA	ERA
1					
2					
3					
4					
5					

10. Please list past projects you have developed in the past three years, select (mark with X) the duration you worked on the project for and the last stage in the PLCM the project was at when you stopped working on it:

	Project Name	Duration spent developing the project (in years)	Last stage the project was at on the PLCM		
			CRA	DRA	ERA
1					
2					
3					
4					
5					

11. A. Please indicate the frequency of communication with the divisions listed when you are developing projects (mark with X):

Division	Frequency				
	Never	Rarely	Sometimes	Often	Always
Generation					
Transmission					
Distribution					
Human Resources					
Corporate Affairs					
Sustainability					
Group Capital					

B. Please indicate the quality of communication with the divisions listed when you are developing projects (mark with X):

Division	Quality of communication				
	Poor	Fair	Good	Very Good	Excellent
Generation					
Transmission					
Distribution					
Human Resources					
Corporate Affairs					
Sustainability					
Group Capital					

Section D: Subject matter(s) and skills

12. Please list and rate subject matters with which you are familiar with, then please select (mark with X) your level of familiarity with the subject matter listed:

	Subject Matter	Moderate	Good	Excellent
1.				
2.				
3.				
4.				

13. Please rank the following knowledge sharing methods that you use to share knowledge (please use the scale below to rank the frequency of use). Also indicate the quality of the knowledge sharing method (mark with X):

Frequency ranking scale: 1 – Never, 2 – Rarely, 3 – Sometimes, 4 – Moderately, 5 – A great deal

Methods	Rank frequency of use	Quality of Knowledge Sharing Method				
		Poor	Fair	Good	Very Good	Excellent
One on one physical conversations						
Telephonic conversations						
Emails						
Meetings and workshops						
Reports						

14. Please rank the following knowledge sharing methods that you use to acquire knowledge (please use the scale below to rank the frequency of use). Also indicate the quality of the knowledge acquiring method (mark with X):

Ranking scale: 1 – Never, 2 – Rarely, 3 – Sometimes, 4 – Moderately, 5 – A great deal

Methods	Rank frequency of use	Quality of Knowledge acquisition Method				
		Poor	Fair	Good	Very Good	Excellent
One on one physical conversations						
Telephonic conversations						
Emails						
Meetings and workshops						
Reports						

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