COPYRIGHT AND CITATION CONSIDERATIONS FOR THIS THESIS/ DISSERTATION

- Attribution — You must give appropriate credit, provide a link to the license, and indicate if changes were made. You may do so in any reasonable manner, but not in any way that suggests the licensor endorses you or your use.

- NonCommercial — You may not use the material for commercial purposes.

- ShareAlike — If you remix, transform, or build upon the material, you must distribute your contributions under the same license as the original.

**How to cite this thesis**

User perspectives on document management system efficiency at Eskom

by

MAMATSHETSHE MABITSELA

A dissertation submitted in fulfilment for the degree of

Magister Philosophiae

in

Information Management

Faculty of Management

UNIVERSITY OF JOHANNESBURG

Supervisor: Prof Martie Mearns

2013
Declaration

I Mamathetshe Mabitsela, hereby declare that this research study is my own original work and that all sources have been accurately reported and acknowledged. I further declare that this study has not been previously, in its entirety or in part, submitted at any University in order to obtain an academic qualification.

Mamatshetshe Mabitsela

October 2013
Acknowledgements

I would like to use this opportunity to thank first my heavenly Father Jehovah, for blessing me with life, and teaching me to “do all things for His glory” (1 Corinthians 10:31), today I have learnt to finish what I start and do everything to the best of my ability.

My supervisor, Professor Martie Mearns, thank you for your unending support, guidance and patience with me throughout my research journey, with you I have learnt the secret of reading and understanding the writer’s intended thoughts. It is a skill I will forever treasure.

Dr Tanya Du Plessis thank you so much for having helped me with the compilation of my questionnaire and Professor Chris Rensliegh, for your constant encouragement.

Lorna Ndlela, thank you for having granted permission to conduct my research in Eskom’s Document area and also for your support and encouragement.

A special thank you to all those who helped fill in my questionnaire, you all made this project possible.

To my Father William Pheyaga Mabitsela, for having paved the way to my education, your constant calls: “Just GOOI my baby maan”, were to me a pillar of strength.

Mon Meilleur ami, Marc-Cedric Bukasa Nkelega, je te remercie sincerement pour tes encouragements pendant mon voyage et de m’avoir aide a trouver la qualite de travailleur en ma person. Tu as ete incroyable.

Zwelakhe Mokatsane, thanks for your support, your efforts have not gone unnoticed.

My cousin Hendrick Tsiri, Cuz you have been really supportive to me from the time I walked in the gates of UJ till today, thank you so much for your care during my academic journey.

To all my brothers and sisters, Tumza, Sedi, Thapi, Can, Keo and Thogi, thanks for cheering me on during my journey and having reminded me never ever to give up, you are ALL the best.

Last but not least to my aunts, uncles, cousins and friends who continued to believe in me and give me the needed support to keep my head UP.

Merci beaucoup – Thank you very much
Dedication

This study is dedicated to: the world’s BIGGEST education fan I have come to know, my Father: Ntate William Pheyaga Mabitsela. This is a token of my appreciation to you. Your efforts were certainly not in vain, “Kelebogile thatha Pa” 😊
Abstract

An efficient document management system is one that considers the user’s needs for information and the ability of the system to provide valuable information that matches certain characteristics.

When users utilise a document management system (DMS) they require a system that they perceive will make their work easier. The efficient and effective use of a DMS depends on how receptive the users are to technology and their intention in using the system.

The documents in the document management system are corporate knowledge and should therefore be stored in a central repository such as the DMS, where the company’s corporate memory cannot be lost. The DMS has all the capabilities to keep documents safe where the documents can be accessed again.

To measure the technology acceptance of end users, research has identified the technology acceptance model (TAM) as the ideal method. TAM is tailored to elaborate on computer usage, perceived ease of use, attitudes toward using and usage behaviour. The research stream on technology acceptance and use has become one of the most prolific and is claimed to be the most mature research in the modern information system field.

The problem identified was to analyse the user’s behavioural intent towards effectively utilising the Eskom in-house document management system.

The purpose was to investigate the use of the document system that is currently in place at Eskom and determine user perspectives. Employees working in Eskom cannot afford to neglect using the document management system on a regular basis. Important documents relevant for everyday work are stored in the system, and all employees are granted access to these documents. Given these considerations, users’ perceptions of the in-house document system cannot be taken for granted, and these issues were researched.

The findings from the TAM variables showed that perceptions of users towards the DMS were divided, while half of the users were satisfied with the information, system, usefulness and ease of using the system the other half was not satisfied. A division in opinion emerged whether the system should be replaced or rather improved. Benefits of both options were weighed and the study suggested that the system be replaced.

**Key Words:** Technology Acceptance Model (TAM), Document Management System (DMS), document management, user perspectives, behavioural intent.
Table of Contents

1.1 Introduction................................................................................................................................. 1
1.2 Research problem and question(s)................................................................................................ 4
1.3 Benefits from the research study .................................................................................................. 6
  1.3.1 Benefits to scientific contribution...................................................................................... 6
  1.3.2 Limitation ............................................................................................................................. 6
1.4 Research design and Methodology ................................................................................................. 7
1.5 Chapter outline............................................................................................................................... 8

Chapter 2: ............................................................................................................................................ 10
  2.1 Introduction............................................................................................................................... 10
  2.2 Document Management .......................................................................................................... 10
    2.2.1 Steps followed to manage documents .......................................................................... 10
  2.3 Document Management System ............................................................................................ 11
    2.3.1 Importance of Document Management System .......................................................... 12
    2.3.2 Implementation process .................................................................................................. 12
  2.4 Technology Acceptance Models ............................................................................................... 13
    2.4.1 Theory of Reasoned Action ............................................................................................ 13
    2.4.2 Technology Acceptance Model ...................................................................................... 14
    2.4.3 The Technology Acceptance Model 2 ........................................................................... 15
  2.5 Different TAM factors .............................................................................................................. 16
    2.5.1 Information quality ............................................................................................................ 17
    2.5.2 Information satisfaction .................................................................................................. 18
    2.5.3 System quality ................................................................................................................... 18
    2.5.4 System satisfaction .......................................................................................................... 19
    2.5.5 Perceived ease of use ..................................................................................................... 21
    2.5.6 Perceived usefulness ....................................................................................................... 22
    2.5.7 Behavioural intention ...................................................................................................... 23
  2.6 Summary................................................................................................................................... 23

Chapter 3: ............................................................................................................................................ 25
  3.1 Introduction............................................................................................................................. 25
  3.2 Ontological assumptions ......................................................................................................... 25
  3.3 Research approach.................................................................................................................... 26
5.4 Information satisfaction................................................................. 61
5.5 Perceived usefulness........................................................................ 64
5.6 Perceived ease of use ...................................................................... 68
5.7 Behavioural intentions ................................................................. 72
  5.7.1 General attitudes towards Hyperwave .................................. 76
5.8 Open ended answers of possible adaptation for the DMS .......... 78
  5.8.1 Attitude .................................................................................. 81
  5.8.2 Duplication of systems .......................................................... 82
  5.8.3 Navigation process ............................................................... 82
  5.8.4 Implementation process ....................................................... 83
  5.8.5 Replacement of the DMS ...................................................... 84
  5.8.6 Training ................................................................................ 85
  5.8.7 Search facility .......................................................... 85
  5.8.8 Improvement of DMS ......................................................... 86
5.9 Discussion .............................................................................. 87
5.10 Summary .......................................................................... 89

Chapter 6:...................................................................................... 90

Synthesis, recommendations and conclusions.................................. 90
  6.1 Introduction ............................................................................. 90
  6.2 Synthesis ............................................................................ 90
  6.3 Recommendations .................................................................. 93
    6.3.1 Recommendations regarding Eskom .................................. 93
    6.3.2 Recommendations for future research ............................. 96
  6.4 Conclusion .......................................................................... 97

7. References ............................................................................ 98
List of figures

Chapter One
Figure 1.1: Methodological framework. (Source: Own research) .................................................. 7

Chapter Two
Figure 2.1: Technology Acceptance Model (TAM), (Wixom & Todd, 2005) ........................................... 17

Chapter Four
Figure 4.1: Document management Process .............................................................................. 37
Figure 4.2: Document management system process ............................................................... 38
Figure 4.3: Trained users core divisions .................................................................................. 42
Figure 4.4: Eskom core divisions DMS usage ......................................................................... 43
Figure 4.5: Generation Division DMS usage ......................................................................... 45
Figure 4.6: Transmission Division DMS usage ...................................................................... 45
Figure 4.7: Distribution Division DMS usage ......................................................................... 46

Chapter five
Figure 5.1: System Quality: Three core divisions ................................................................. 49
Figure 5.2: System Quality: Generation .............................................................................. 50
Figure 5.3: System Quality: Transmission ........................................................................... 51
Figure 5.4: System quality: Distribution ............................................................................... 51
Figure 5.5: System quality Divisions compared positive responses ........................................ 52
Figure 5.6: System Satisfaction Three core divisions ........................................................... 54
Figure 5.7: System Satisfaction Generations ....................................................................... 55
Figure 5.8: System Satisfaction Transmissions ..................................................................... 55
Figure 5.9: System Satisfaction Distributions ...................................................................... 56
Figure 5.10: System satisfaction Divisions compared positive responses ............................. 57
Figure 5.11: Information quality three core divisions ......................................................... 58
Figure 5.12 Information quality Generation ....................................................................... 59
Figure 5.13: Information quality Generation ...................................................................... 59
Figure 5.14: Information quality Distribution ..................................................................... 60
Figure 5.15: Information quality Divisions compared positive responses .......................... 60
Figure 5.16: Information satisfaction three core divisions .................................................... 62
Figure 5.17: Information satisfaction: Generation Division .................................................... 62
Figure 5.18: Information satisfaction Transmission ............................................................... 63
Chapter 1:

Introduction

1.1 Introduction

Eskom is one of the most crucial companies in South Africa as it provides the country with 95% of its electricity needs and an additional 45% is delivered to other parts of Africa (Eskom Yearbook: 2012). The main objective being to keep the lights on, Eskom’s core divisions are made up of the generation, transitions and distribution divisions.

Most of the duties performed by employees play an important role in ensuring successful delivery of electricity. To make this provision possible, different divisions are responsible for different tasks which include the compilation of important documents essential to meet Eskom’s goals and objectives. The work performed in the core divisions mentioned above is designed to meet Eskom’s overall goals and objectives.

Document management is the foundation of any organisation, as all business processes have documents and records as either an input or an output. Document management enables the company to manage documents in a manner which is planned, controlled, monitored, recorded and audited through the use of an authorised repository.

Several document repositories exist within the Eskom environment, such as Hyperwave, Achiever plus, SharePoint and smart plant foundation. Hyperwave is the main Eskom enterprise content management software application for all non-technical documents and record management purposes.

The different repositories are managed from within different functions and for various solutions within the Eskom landscape. In light of the organisation’s drive towards ISO 9001 certification, a need to have a single document management system (DMS) was expressed. Currently Hyperwave plays a major role in being the in-house DMS in Eskom. Hyperwave has both content management and collaboration capabilities and acts as a platform to share Eskom’s documented (explicit) and undocumented (tacit) knowledge, although the undocumented knowledge capabilities are not utilised.

Having one single DMS in a business is vital, as it creates order in the business. Hyperwave, as the incumbent DMS, ensures one common access point to business information. When employees know exactly where to find the necessary information, effective work can be produced. Hyperwave also ensures regulatory compliance across the business.
The DMS preserves corporate memory and acts as the company’s brain. Vital business information is therefore safeguarded in order to assist with business continuity and disaster recovery. In case of important document losses due to laptop theft, employees would be able to retrieve the information saved on Hyperwave. Also, if employees are to leave Eskom, the new employees can be better equipped to learn of the processes and procedures of various tasks through accessing the DMS. Further, the documents preserved in the DMS support improved management and operational decision making.

According to Al-adaileh (2009: 228) an efficient DMS can be defined as one which considers and addresses the user’s needs for information and the ability of the system to provide valuable information that matches certain characteristics unique to the specific search.

The in-house DMS is a platform that is used to store and share information which has various components to collaborate. There are different kinds of crucial documents that all employees need to be familiar with, in order to ensure that their work is of high quality for stakeholders, clients and fellow colleagues. The documents residing in the DMS include the following: topic specific documents, contracts, directives, forms, guidelines, procedures, plans, policies, reports, strategies, standards, templates and terms of reference.

An efficient document management system has an effective search facility. An effective search facility enables the user to at least search for documents according to title, key words, author and the unique number of the document. The search engine should then be able to extract the most likely documents where the user is able to select the most appropriate for the envisaged purpose.

When users utilise a document management system they require a system that they perceive will make their work easier. Users need to know that whatever document they are looking for is in the system and will be easy to retrieve. Navigating through the document system should not be a problem for the users, as this is a company approved DMS and an investment to satisfy users’ information needs and should therefore be inherently valuable.

Eskom purchased its information management system and uses it for organisational purposes. Al-adaileh and Makhadmeh (2008: 67) mention that information system initiatives are costly investments and accordingly failure of an information system is considered an expensive failure. According to Bhattacherjee (2001) users’ willingness to use an information system is mainly driven by a consideration of the benefits; that is whether the system provides useful, satisfactory functions. For Delone and MacLean (2002), the efficient and effective use of an information system depends on how receptive the users are to technology and their intention to use the system. Research needs to look into the process by
which end users endorse and adapt to technological change. According to Ouadahi (2008: 202) the adaptation of technological change could mobilise management practices into creating a work environment that is receptive to the effective use of a new information system.

End user satisfaction towards a document management system is of paramount importance, and a company can benefit greatly from understanding how its end users perceive the in-house DMS. Through the use of technology acceptance models, research has succeeded in deriving end users’ acceptance of a technological system.

The most cited model for information system success is the Technology Acceptance Model (TAM) which was developed by Delone and McLeon (2003). The TAM is tailored to elaborate on computer usage, perceived ease of use, attitudes toward using and usage behaviour. Authors such as Venkatesh et al. (2003), Behrens et al (2005), and Wixom and Todd (2005) have investigated the TAM, criticising and improving the model for better usage in research.

From the investigation of Wixom and Todd (2005) an integrated research model that distinguishes beliefs and attitudes about the system was developed. According to Al-adaileh (2009: 230) the integrated model developed by Wixom and Todd (2005) helps in bridging the gap between system characteristics (the core strength of the user satisfaction literature) and the prediction of usage (the core strength of technology acceptance literature). Furthermore, the Behrens et al. (2005) investigation found that the TAM measurement of the perceived usefulness and ease of use are effective predictors of information system success.

Van der Heijden (2004: 695) elaborates on the importance of considering the user acceptance of the information system. It does not make sense to develop a system for specific users without asking for their input during the developmental stage. Similarly, Fisher and Howell (2004) explains that the consideration of the reaction to system features early in the design process will help alleviate problems experienced later in implementation.

End users are in most cases neglected during the development and implementation stages of a company’s information systems. Zheng and Liu (2011) highlights the importance for developers to equally consider the security of document distribution in confidential document management systems in companies. The research stream on technology acceptance and use has become one of the most prolific and claimed to be the most mature research in the modern information system field (Venkatesh et al., 2003).
In Eskom a need to investigate the efficient usage of the current in-house document management system by users is vital. The majority of the employees working in Eskom cannot afford to neglect to efficiently use the in-house DMS. Important documents relevant for everyday work are stored in the system, and all employees are granted access.

Whether to move from Hyperwave, as the incumbent DMS, to SharePoint is the current dilemma in the organisation. Therefore, technology issues with Hyperwave are investigated in this study, to determine if the software is failing or the people aspect of introducing new software has been neglected. If so, care needs to be taken that the issue found is not transferred should the company choose to replace Hyperwave with another system.

To make this possible the Hyperwave system is analysed with the application of the technology acceptance model (TAM) in order to determine the user’s perceptions and the usage intention of the in-house document management system. A research problem and questions were developed to guide and provide focus during the study.

1.2 Research problem and question(s)

An organisation’s effectiveness relies heavily on the efficient use of documentation and the in-house DMS therefore comes under investigation. The in-house DMS in Eskom can be used to refer to documents such as guidelines, policies, contracts, standards, procedures, terms of reference and other important documentation to acquire access to the right information.

Al-adaileh (2009: 227) explains that the failure of information systems is a major concern for any organisation. However, the users and processes are additional major concerns that cannot be neglected in organisations. As all three (technology, users and processes) are interrelated, one cannot function without the others. Hence it is important to give each aspect the necessary attention.

According to the DMS roll-out requirements at Eskom 70% of the employees in Eskom ought to be using the in-house DMS. However, the DMS statistics show that only approximately 30% of users are using the DMS efficiently. The other 40% most probably have their own system of saving documents or are using other documents in their respective departments. The other 30%, making up the 100% of employees, are those working on site who do not necessarily have direct access to the Hyperwave system. The percentage of those currently using the DMS is relatively low, and therefore warrants thorough investigation.

Since Eskom delivers electricity as an essential resource and service to the country, the efficiency of the in-house document management system, the users of the system and the
processes have to be targeted. In doing this Al-adaileh (2009: 227) suggests that users’ perceptions should be considered as a major determinant for the success of the document management system, as the document management system is mainly intended to enhance users’ ability to perform better and produce more work. As for the processes and the DMS technology itself, they were analysed to discover the current usage patterns.

With the line of work being performed in Eskom, it would be almost unthinkable that employees are possibly not experts in navigating through the in-house DMS. Hence it is necessary to ensure that an analysis of the user perceptions towards the in-house DMS is undertaken and reasons for poor use are determined. The Technology Acceptance Model (TAM) forms the foundation to investigate the following research questions:

**Research Question:** What is the Eskom user’s behavioural intent towards using the in-house document management system effectively?

In order to address this main research question the following sub-questions are investigated:

**Sub Questions:**

1. What are the document management processes of the in-house document management system?
2. To what extent has the current document management system been used from January 2008 to July 2012, in terms of downloading, accessing and logins?
3. How many users have been trained on the DMS to further enhance their knowledge using the DMS effectively?
4. What are the perceptions of users in terms of system quality, system satisfaction, information quality and information satisfaction using the DMS?
5. What are the perceived usefulness and ease of use of the system?
6. What are the behavioural intention and the reasons for the usage patterns of the in-house document management system?
7. How can the DMS be adapted in order to meet the document management needs of the DMS users?
1.3 Benefits from the research study

Every individual research study uniquely executed for a specific company will produce different results beneficial for growth. This study is beneficial to Eskom in that it raises a crucial question regarding the perceptions of the end users towards the in-house DMS.

An analysis of the in-house DMS was done where the focus was only on the statistics of the users in the three core divisions. Downloading, access, login and training statistics from January 2008 – July 2012 were extracted from the system and analysed to access the fluctuation of the DMS usage over the period. This was compared to projected expected usage, offering an indication whether the system has been used in accordance with the designed specifications.

End users of any system make up the most important aspect, as it is the users that have to understand the processes needed to use the system efficiently. When the end users understand the processes correctly, and understand how to navigate through the document management system, efficient work is the result. When this happens, not only do the end users see the advantages in the work they perform, but also the entire company benefits.

In this study end users had the opportunity to voice the current challenges they are facing with the in-house DMS, potential changes and improvements which, according to the users, are needed.

The study is most importantly beneficial to Eskom in that it could enable the IT-experts to identify the necessary potential changes which are needed in the in-house document management system. If a decision is made to convert to a new system, the people aspect of system design has to be carefully included into the new system identification, planning, design and implementation phases.

1.3.1 Benefits to scientific contribution

The study has contributed towards applying TAM to DMS users in a South African power utility case study. The extraction and analysis of reliable data from users were the focus of the study. The study further provides interesting possible recommendations which other researchers can look into to further contribute towards the body of research knowledge.

1.3.2 Limitation

Univariate analysis is commonly used in the first descriptive stages of the research to describe the main features of the collected data (Bryman and Bell, 2008: 629). This was done in accordance with the purpose of the study to summarise the sample, rather than
using inferential statistics to learn about the causal relationships. Descriptive statistics were deemed satisfactory to address the user perceptions towards in-house DMS as these addressed the research questions satisfactorily. During the discussion of results though, the study shows possible common threads between each individual variable. The sample method that was applied in this study includes only three divisions from a total of ten possible divisions. Future investigations will have to expand across other divisions.

1.4 Research design and Methodology
This case study was approached from a subjective perspective. A questionnaire was used to collect the data from a cluster of samples of 150 DMS users in the generation, transmission and distribution divisions. Descriptive data analysis was used to interpret findings according to the factor of the TAM. A detailed motivation of research methods and choices follows in Chapter 3.
1.5 Chapter outline

The following chapter layout is used in this dissertation.

1.5.1 Chapter 2: Literature review

The management of documents and steps followed are discussed in Chapter 2. Document management systems, the importance thereof and the implementation process are also presented. A number of technology acceptance models are discussed, which is followed by a detailed discussion of the different factors that make up the TAM of the one chosen for this study.

1.6.2 Chapter 3: Research methods

Chapter 3 addresses the research methods that were used to successfully execute the research study. The motive for the topic chosen is discussed, including the mixed research method and case study approach. The chapter explains the sampling strategy followed and the analysis strategy to interpret the raw data from respondents.

1.6.3 Chapter 4: Document management and system analysis

This chapter addresses the first three sub-questions as indicated in the research problem and questions (paragraph 1.2). Chapter 4 starts off with a discussion of the document management process. The chapter describes the process applied to publish documents in the DMS. The DMS is then analysed in terms of its structure and user statistics.

The different types of users are also discussed and elaborated on more clearly, showing what it is that the different users can and cannot do. A section is then discussed on the different access rights that the users have depending on their work in the different divisions. The statistics of the DMS trained users, downloading, read and access statistics are presented accordingly.

1.6.4 Chapter 5: User perspectives of document management system

The empirical findings from the three core divisions are discussed in this chapter. This section of the study will flow in a patterned discussion of the TAM variables, where firstly, the three core divisions are discussed in totality and then individually according to the variables. Thereafter positive responses are tallied and presented on graphs for every individual TAM variable. The section commences with the discussion of the system quality and satisfaction, information quality and satisfaction, perceived ease of use and usefulness and the intention of the user to use the DMS. The statistics of the user’s thoughts on how the DMS can be adapted are discussed according to each division and theme. Verbatim responses are also
highlighted on a table according to theme. This chapter therefore addresses the last four research sub-questions posed in paragraph 1.2.

1.6.5 Chapter 6: Synthesis, recommendations and conclusions

In Chapter 6 the general overview of the study is discussed. Concluding arguments and comments with recommendation and possible research ideas make up the final part of this study.
Chapter 2: 

Literature review

2.1 Introduction
An organisation produces valuable documents which reside within a document management system, where appropriate users are given access rights to use the necessary documents in order to ensure efficient and productive work within the organisation. Research has identified that users have perceptions towards the technology system, and that it is these perceptions that will determine whether the technology system is used efficiently by its users (DeLone and McLean 2003, Porter and Donthu 2006, Bertrand and Bouchard 2008, Al-adaileh 2009, Koo et al. 2011).

Contributions from previous literature on document management, document management systems, technology acceptance models and the different variables within these models are discussed in this chapter.

2.2 Document Management
The more effectively an organisation is able to share its information, the more valuable that information becomes. The goal of document management is to share critical corporate information resources by making the documents secure, accessible, retrievable and interchangeable. Bredbenner (2003: 5) provides six steps which are commonly used in different companies to manage regulated documents. Although the specific methods vary from company to company, Bredbenner (2003) explains that the process involved can be broken down into six steps.

2.2.1 Steps followed to manage documents
Step 1 Create: First documents are produced by an author using a template. Each section of the template is then completed or deleted if not applicable. The document copy is then given to the receiver to make the necessary notes and comments on the draft.

Step 2 Review: In most instances the draft version is sent back to the author countless times to rework the document. The document will then circulate between the author and the receiver before an acceptable version is complete.

Step 3 Approval: The finalised version of the document is sent to the approver for final reviewing and authorisation. Depending on the approver, the document may be denied or approved. If the document is denied the document would have to be revised, up until the approver is satisfied with the document. Publishing of the document can then take place.
Step 4 Publish: Approved documents are placed and reserved mainly for production documents. Signed hard copies are safely kept in file cabinets and electronic versions are stored in file server directories, for easy access to the document.

Step 5 Distribute: Finalised and approved documents are distributed to the employees who, in most instances, use the documents to guide regulated processes. The constant track keeping of those needing specific documents and determining who has actually read the documents are in most cases a manual task.

Step 6 Archive: When documents have been published, distributed and revised, the previous version is stored in an archive. Included in this are the hard copy and the electronic copies of the document.

The above steps are followed to ensure the effective management of documents. It is when a document has gone through this very process that it can reside within the organisation’s document management system. Document management avoids chaos and ensures that users gain access and utilise the documents for referral purpose to produce efficient work. It is therefore important to understand that the efficient management of documents relies on a document management system which acts as a platform where relevant documents are made available to the users in an organisation. In the next section a thorough discussion of a document management system follows.

2.3 Document Management System

According to Al-adaileh (2009: 228) an efficient Document Management System (DMS) can be defined as one which considers the users’ needs for information and the ability of the system to provide valuable information that matches certain characteristics. These characteristics refer to the metadata on the document. It is these characteristics that enable the user to identify the relevant document in the DMS. DMS is a management control system which can be used to regulate the creation, use and maintenance of electronically created documents. A DMS is the central repository where employees in the organisation are able to access documents related to organisational goals and objectives.

Koo et al. (2011: 445) mentions that in many companies DMSs have been integrated into communication based organisational work activities in order to provide information services and products to its users. DMSs make up a crucial part within an organisation, it can therefore be said that the survival as well as organisational competitiveness rely heavily on the efficient use of a technological system (Al-adaileh 2009: 228). Indeed an organisation’s heavy reliance on a DMS emphasises the relevance of the DMS. It is necessary then, that the next discussion sets out the importance of a DMS and its implementation process.
2.3.1 Importance of Document Management System

DMS is important, as it supports cooperative preparation, exchange and distribution of documents within the organisation. The DMS is a central platform where all relevant documents reside and enable work in an organisation. In this day and age it is almost unthinkable that any large organisation operates without a central DMS.

Laudon and Laudon (2006: 4) discuss a number of factors that further have an influence on the DMS. These factors are the intense use of a technology system, communication technologies and the internet and the vast transformation of business enterprise due to upgrading technology forces. In order for an organisation to effectively utilise a DMS the implementation process would have to be critically reviewed, tested and analysed.

2.3.2 Implementation process

Some companies have had very successful implementation of a technology system while many others have struggled. Technology system implementation is the process that a business undertakes to diffuse a technology system within the organisation. When implementing a technology system in the organisation, the support team has to scan the environment for technology system opportunities or solutions, adopting the appropriate technology system, adapting the technology system for the specific organisation, accepting the technology system into daily business activities and finally institutionalising the use of technology system as a part of regular work behaviour.

From the above mentioned it can confidently be said that with implementing a technology system in an organisation, one size does not fit all. What was successfully implemented in one organisation does not necessarily guarantee success in the next. In order to successfully implement a technology system it needs to be uniquely planned and carried through for a specific organisation.

Amoako-Gyampah and Salam (2004: 732) discuss one of the measurements of system implementation success as being the achievement of the forecasted and intended level of usage of the technology system. In essence, when a company plans to implement a technology system they would in a way have a certain percentage of users who ought to use this system. If in any way the intended user number does not correlate with the level of usage after implementation, the system would be deemed as a failure. The opposite is then also true. When users effectively put to use the implemented system in the organisation, it is a reflection and perception of the technology by the users. Therefore, such reflections and perceptions are of paramount importance for the organisation and thus need to be dealt with.
as delicately as possible. To make this possible, certain factors within the organisation need to be considered closely.

Elpez and Fink (2006: 220) claim that the success of technology in organisations is directly related to environmental factors which in turn are related to the organisation. These factors include users, the technology project and external environment. Indeed the success of the technology heavily depends on other factors such as users that need to understand the processes which enable the technology itself.

Similarly, Al-aldaileh and Makhadmeh (2008: 366) highlight systematically selected organisational factors that may influence successful implementation of technology system projects and the information technology culture. The factors used to establish the above include: management support, user participation and information technology culture. Their study found that the investigated organisational factors have a significant effect on IT success and can explain 24% of the variance in IT success. Many studies have focused their attention on factors associated with user acceptance and measuring them on acceptance models in order to understand users’ intentions to use a technology system. More about these acceptance models follows.

2.4 Technology Acceptance Models
A number of technology acceptance models have been developed to measure the success rate and the acceptance level by the users of an implemented DMS in an organisation. Under discussion will be the Theory of Reasoned Action (TRA), Technology Acceptance Model (TAM) and the Technology Acceptance Model 2 (TAM2).

2.4.1 Theory of Reasoned Action
The Theory of Reasoned Action (TRA) provides a useful model that aims to predict the actual behaviour of an individual. The TRA elaborates on the fact that both the attitude towards an action and the subjective norm have a direct impact on behavioural intention. Behavioural intention and subjective norm can be explained respectively as the attitude that a person has towards the behaviour and in turn the subjective norm which is associated with the behaviour in question. The subjective norm, according to Schepers and Wetzels (2007: 90), is the perceived social pressure to partake or not to partake in a particular behaviour.

Similarly, Zhang (2007: 628) explains that the TRA stands to explain that behaviour is driven intention, in turn intention is a function of attitude towards acting on the behaviour. In essence attitude towards a particular behaviour is an individual’s positive or negative feelings about acting on the target behaviour. Porter and Donthu (2006: 1000) adds that attitude towards a technology system implementation is a critical intervening variable in the
technology adoption decision. Therefore, attitude towards a specific technology system is conceptualised as a user’s analysis of the desirability of using that technology system.

Despite the importance of attitude towards behaviour in the TRA the concept of attitude has not been the focal interest in technology system research on technology acceptance and use. Venkatesh et al. (2003) explains that attitude towards technology has been theorised to be a direct determinant of intention of use and thus excluded from the unified theory of acceptance and use of technology, hence, the development of the Technology Acceptance Model.

2.4.2 Technology Acceptance Model
According to Schepers and Wetzel (2007: 90) the Technology Acceptance Model (TAM) was inspired by the Theory of Reasoned Action (TRA), but two changes were made to the TRA. First, Venkatesh et al (2003) did not take the subjective norm from the TRA into account in predicting the actual norm of a person, as they found the subjective norm to be the least understood aspect of the TAM and thus had uncertain theoretical status. Only the attitude of the person towards a given behaviour was considered. Second, instead of considering several individual beliefs to determine the attitudes towards a given behaviour, they relied on several other related studies in order to identify two distinct beliefs: perceived usefulness and perceived ease of use. From existing literature on technology acceptance thus far, perceived usefulness and ease of use have been found to be sufficient to predict the attitude of a user towards the use of a system.

The most cited model for information system success is the Technology Acceptance Model (TAM) which was developed by Delone and McLean (2003). According to Bertrand and Bouchard (2008: 201) a number of meta-analyses based on the TAM have demonstrated that the model is robust, valid and powerful. Similarly, Amoako-Gyampah and Salam (2004: 732) mention that the TAM has served as a basis for past research in technology system studies dealing mostly with behavioural intentions and usage. Schepers and Wetzels (2007: 90) extend the explanation and mention that the TAM is one of the better known models in research for explaining intentions of users to use a technology system.

The TAM is tailored to elaborate on computer usage, perceived ease of use attitudes toward using and usage behaviour. There are a number of extensions to the original model of the TAM (King & He, 2006). Authors such as Venkatesh et al. (2003), Behrens et al. (2005) and Wixom and Todd (2005) have investigated the TAM, extending, criticising and improving the model for better usage in research.
The investigation of Wixom and Todd (2005) gives an integrated research model that differentiates beliefs and attitudes about the technology system from beliefs and attitudes about the utilisation of the technology system in order to build the theoretical logic that links the user satisfaction and technology acceptance literature. According to Al-adaileh (2009: 230) the integrated model (Figure 2.1, discussed in section 2.4) developed by Wixom and Todd (2005) helps in bridging the gap between system characteristics, that is to say the core strength of the user satisfaction literature and the prediction of usage which refers to the core strength of technology acceptance literature.

The investigation of Beherns et al., (2005) found that the TAM measurements of the perceived usefulness and ease of use are effective predictors of technology system success. It seems from the majority of past TAM literature that the core factors of the TAM are perceived usefulness and ease of use. Supporting this claim Wixom and Todd (2005: 85), Schepers and Wetzel (2007: 90), King and He (2006: 16), Venkatesh et al. (2003: 425) and Delone and McLean (2003) concur with the fact that the TAM assumes that the perceived usefulness and perceived ease of use play a major role in influencing a person’s attitude and behavioural intention towards using a technology system.

Despite the robustness of the TAM, from Delone and McLaen (2003) development of the TAM, Venkatesh et al. (2003: 425) performed further research and identified that the TAM has considerable limitations in explaining the reasons for which a person would perceive a given technology system as being useful. Thus Venkatesh et al. (2003: 425) proposed that additional variables be added as antecedents to the perceived usefulness variable in the TAM. The proposition was then acted upon where indeed the TAM was extended, which resulted in Venkatesh et al. (2003: 426) calling this model the Technology Acceptance Model 2 (TAM2). The TAM2 will be explained broadly in the next paragraphs.

2.4.3 The Technology Acceptance Model 2
The Technology Acceptance Model 2 (TAM2) was developed to test the performance of the TAM in a mandatory setting. The study collected user perceptions and self-reported use at three points in time. First was the test for the pre-implementation, the second test was for the one month post-implementation and the third was for the three month post-implementation.

Through the use of the TAM2, Venkatesh et al. (2003: 426) provided more thorough explanations for the reasons users perceived a given technology system to be useful. Results also showed that the TAM2 performed well in both voluntary and mandatory environments, with the exception of the subjective norm that had no effect in voluntary settings but did have an effect in mandatory settings.
Zhang (2007) argues that attitude has been one of the most important concepts in social psychological studies, as attitude plays an important role in people's judgement evaluation and behaviour.

With the extension of the TAM2 it has further been found that the TAM2 encompasses some social influence processes of subjective norms and cognitive instrumental processes such as job relevance, output quality and result demonstrability. Also, the TAM2 has shown that the acceptance of a technology is partly based on what consumers feel others expect from them. Similarly the findings of Wang and Wu (2005: 726) proposed a revised TAM that integrated cost and perceived risk with the TAM2 in order to investigate what determined user mobile commerce perception and acceptance. Despite the revised TAM into TAM2, many studies continue to use the original TAM, where the model is extended with various factors.

It is the above models that have made it possible for researchers to study the behaviour, attitude and intention of users of a technology system. Both the TRA and TAM have strong behavioural elements which assume that when a user of a technology system forms the intention to use it, that they will be free to use the system without limitation. Wixom and Todd (2005) further explain that attempts to extend the TAM have generally taken one of three approaches; through the introduction of factors from similar models, by introducing alternative belief factors and by examining antecedents and moderators of perceived usefulness and perceived ease of use. The following section aims to discuss the TAM factors in more detail.

2.5 Different TAM factors

Figure 2.1 is a representation of the TAM model, and is discussed from Section 2.5.1-2.5.7. Since its original version the TAM (Figure 2.1), depending on the context of the research, would be extended with factors relevant for each applied study. According to Al-adaileh (2009: 226) a huge debate continues concerning the appropriate set of factors that can be used to determine the user's perceptions of a technology system. The fact that there are so many factors affecting the user's perception towards a technology system, calls for further research in this field. Chae et al. (2002) explains that an important factor in the technology system itself is the quality of the information in the documents.
2.5.1 Information quality

According to Koivumaki et al. (2008: 376) one of the factors that affect perceived quality of a technology system is information quality. Measuring information quality on the TAM is very important to understand as the perception of information is a subjective matter and therefore will depend largely on the person who uses the technology system. Information quality cannot be assessed in isolation from the users of that information. This is to say that those eligible to comment on specific information are the specific users. Wang and Wu (2005) explain that before one attempts to measure information quality one has to first define the term. With the dependence of conventional wisdom many would attest that information is something akin to reliability and accuracy. More so, that information quality is a measurement of the value which the information provides to the user of that information. The quality of information is in most cases perceived as subjective and the information quality can then vary among users and its uses of the information.

Studies have emphasised the accuracy of what Wang and Wu (2005) mentioned about first defining information before it can be measured. For instance, information is multidimensional. Therefore, the multidimensional characteristics of information make the empirical evaluation of information quality rather a challenging task. Chae et al. (2002: 40) managed to tackle this challenge through their study on information quality for mobile internet services. They did this by identifying and defining four dimensions of information namely content, connection, context and interaction in order to reflect the characteristics of mobile services.

Similarly, to make the evaluation of information less of a challenge Wang and Wu (2005: 722) defined information by categorising it into two groups. First, information quality is intrinsic; by intrinsic they meant that the quality of information includes accuracy and
reputation. This implies that information has quality in its own right. Second, contextual information quality; this includes the dimension of value added, relevancy, timeliness, completeness and appropriate amount of information. In simple terms, Wang and Wu (2005: 25) were alluding to the fact that the definition given to information quality has to be considered within the context of the task at hand.

In her study of assessing the success of information systems Al-adailah (2009: 226) selects nine characteristics and defines information quality with these characteristics: simplicity, accuracy, relevancy, verifiability, timeliness, security, completeness, reliability and flexibility. Al-adailah (2009: 229) found that information quality has a significant direct impact on the user’s perception of a technology system. Among the individuals of the sample in her study a strong trend was found for the impact that information quality has on user’s perception of a technology system.

The quality of information in the system plays a massive role in how users will perceive the system. Therefore system developers need to make it a point that all the information going into the system is accurate, relevant, timely, reliable and verifiable. When the information in the system is made a priority, the users of the system will be more inclined to be satisfied with the information. Below is a discussion on information satisfaction.

2.5.2. Information satisfaction
Information satisfaction is the degree to which a user of the system finds the information contained within the documentation to be useful for and relevant to their work purposes. According to Velasquez et al. (2009) information satisfaction can be attributed to two characteristics: accuracy and verifiability. In their study they found that it was these two characteristics users found to be the determinants of information satisfaction. Accuracy is the user’s perception that the information in the technology system is correct and verifiability is information that echoes or repeats outcomes of previous actions taken (Haber & Bailey, 2007). When users are satisfied with the information they are receiving from the system they are more likely to refer their satisfaction to the quality of the system.

2.5.3 System quality
According to Lin (2006: 387) a technology system that fails to help people with their jobs is not likely to be received favourably, irrespective of careful implementation efforts. A system designed for specific users has to reflect the users’ needs and expectations. Vankatesh (2000: 342) explains that care is to be taken when putting a technology system in place, as system failure may result in undesirable consequences such as financial losses and dissatisfaction among employees.
It is evident that technology systems have moved from being business enablers to being business drivers. Therefore the quality of the system has to be measured accordingly in order for an organisation to reap the benefits of the technology system.

2.5.3.1 Measuring system quality

Similar to measuring information quality, where the concept has to be defined and given certain characteristics, the same is true with system quality. In Delone and McLean (2003) their study shows that system quality has three major dimensions including information quality, system quality and service quality. Delone and McLean (2003) further suggested that each factor be measured as the factors that will affect use and user satisfaction. Four characteristics define system quality: the effortlessness of navigating through the system, easy to remember steps, user friendliness and easy and understandable processes. An ideal technology system needs to follow high level requirements in order to manage documents in a regulated environment.

Similarly Al-Maskari and Sanderson (2010: 860) measure system quality in terms of how well the system achieves its objectives. Traditionally, system quality is measured in terms of precision, this is to say the number of documents retrieved by the technology system that are also relevant to the user’s query and recall, which is the fraction of the relevant documents present in the database that are retrieved by the technology system. Therefore it is these two parameters that characterise the ability of the system to retrieve relevant documents and avoid irrelevant ones. Accordingly it is this that qualifies the system as being of high quality.

Further, the technology system needs to control user access to documents in order that only authorised users are able to retrieve documents which they are associated with. It is also important for the system to control the actions that users can perform on a document. For instance it is possible that a user is able to only read a particular document and yet again be allowed to author another type of document. The importance of the system quality cannot be stressed further. With a high quality system follows the satisfaction of the user towards the system itself.

2.5.4 System satisfaction

System satisfaction according to Elpez and Fink (2006: 221) entails the degree to which a person believes that using a particular technology system would enhance the user’s job performance. Similarly, Legris et al. (2003: 192) defines satisfaction as the sum of one’s feelings or attitudes towards a variety of factors affecting the situation. In order for users to consider in their minds that they are satisfied with the system, they need to be able to
navigate through the system well and search and find relevant documents without much effort. Users of a technology system do not want to feel that they are unable to use the system as it can be frustrating on their part. Al-Maskari and Sanderson (2010) emphasised the fact that satisfaction is, in a nutshell, the state experienced inside the user’s head. It can be said then that system satisfaction is the extent to which the technology system satisfies the information needs of its users. In turn, the lack of system satisfaction will result in the neglect to use the system.

Jasperson et al. (2005: 526) discusses major reasons for a lack of system satisfaction which include inadequate system training and change management interventions. Users of a technology system need to be included in the commencement stages of system development and trained in the process of implementation. Targeting these major factors will help in mitigating system failure and a lack of user system satisfaction. Training and change management initiatives are crucial matters in the post-adoptive context of a technology system, as they allow the organisation to benefit from previous learning and adjust to ongoing changes in the work system (Jasperson et al. (2005: 526); Kien & Soh (2003)).

Change management in this context is standardised methods and procedures used for efficient prompt handling of technology related changes to control technology system infrastructure. Depending on how satisfied users are by the system and the information contained in the system, as well as how well they accept change and are trained to use the technology system, will in most cases have an effect on how they will perceive the technology system (in terms of the system’s usefulness and ease of use).

Through the use and extension of the TAM, authors have been able to find that the TAM stands to explain that perceived usefulness and ease of use of a technology system make up the main determinants of its usage in research thus far. The TAM posits that both perceived usefulness and ease of use are beliefs about a new technology that influence an individual’s attitude towards using the technology (Porter and Donthu, 2006: 1000). Because of their important reputation, both these factors make a big difference in the TAM. Despite the reputation that the TAM has established for itself, Al-adaileh (2009: 226) makes mention that the debate continues concerning the appropriate set of factors that can be included in the TAM to determine the user’s perception of a technology system success. Hence, today there are many studies which have used many other factors seen to be relevant for user technology acceptance research.
2.5.5 Perceived ease of use

According to research (Vankatesh et al. (2003), Porter & Donthu (2006: 999), Al-Adaileh (2009: 226)) perceived ease of use refers to the degree to which a person believes that using a particular system would be free of effort and easy to be understood and used. Venkatesh et al. (2003) developed a model and empirically tested the determinants of perceived ease of use and found that an individual's computer self-efficacy is a strong determinant of perceived ease of use. Also, it is only after a user has had direct experience with the technology system that the objective usability affects ease of use. The direct implication of these findings was that training mechanisms which are aimed at improving the computer self-efficacy of the user, is more likely to be effective in gaining user acceptance.

A similar study by Van der Heijden (2004) has found that perceived ease of use is an analysis of how far users have to stretch their minds in order to use the technology system. Depending on the users' beliefs and attitudes towards the technology system, it will determine the level of mental effort required to use the system as efficiently as possible. In their research, Porter and Donthu (2006: 999) bring this out clearly, making a comparison between Americans who are older, educated individuals having a lower income, with highly educated, wealthier individuals. Their research found that age, education, income and race are associated differently with beliefs about the technology system, and that beliefs influence a consumer's attitudes towards the use of the technology system. Similar to many other studies, Porter and Donthu's (2006) study found that the perceptions regarding ease of use and usefulness have a stronger effect.

Van der Heijden (2004: 697) suggests that when assessing perceived ease of use it should be noted that the users focus much of their attention on the interaction with the technology system itself as such, and not on objectives external to this interaction. The above mentioned has crucial ramifications on the role of ease of use in predicting user acceptance of a technology system. In essence, users of the technology system ought to be shown the benefits in order that users may gain inward motivation to utilise the technology system more effectively.

Venkatesh (2000: 342) extends the TAM to include control, intrinsic motivation and emotion. The study presents and tests an anchoring and adjustment based theoretical model of the determinants of system specific perceived ease of use. The model proposes control (internal and external conceptualised as a computer self-efficacy and facilitating conditions, respectively), intrinsic motivation (conceptualised as computer playfulness) and emotion (conceptualised as computer anxiety) as anchors that determine early perceptions about the
ease of use of a new system. It is very important that users perceive a technology system as easy to use. If this is the case, users will perceive the system as useful.

2.5.6 Perceived usefulness
Perceived usefulness is the extent to which using a technology system enhances the users’ effectiveness and is perceived by users as useful. With regard to perceived usefulness, Porter and Donthu (2006) discuss the manner in which attitudes determine technology system usage. They found that the more a user perceives the technology system as easy to use, the more the user will perceive the system as useful. Also, the more the user perceives a technology system as useful the more favourable the user’s attitude towards the system will be. According to Amoako-Gyampah and Salam (2004: 731) training and communication interventions were found to be factors which influence the shared beliefs that users form about the benefits of the technology and that the shared beliefs influence the perceived usefulness of the technology system. The confidence a user has, when having come to understand how to navigate through the technology system, will have a positive effect on the adoption behaviour.

When a company decides to put a technology system in place Koch et al. (2011: 1) explains that the user adoption behaviour needs to be considered, since in most cases the adoption behaviour is affected by the user acceptance of the information quality and the system quality. The user’s adoption behaviour of a technology system is rather an interesting case, as it is this behaviour that will drive the user to either accept or reject the adoption of the technology system. It is then of utmost importance that the same consideration given to user adoption behaviour of a technology system also be given to to post-adoption. Post-adoption behaviour to an extent is based on instrumental believes of usefulness and perceptions of image enhancements (Legris et al., 2003: 201).

According to Venkatesh et al. (2003: 430) the purpose of the TAM is to determine what is regarded as important by the users when they consider the technology to be useful and easy to use. Similarly, Behrens et al. (2005) explains that the TAM measures perceived usefulness and perceived ease of use and is an effective predictor of document system success. The concept of perceived usefulness refers to the degree to which one believes that using a particular system would enhance work performance. The concept of ease of use is the degree to which a person believes that using a particular system would be free of effort (Al-adaileh, 2009: 229).

The development of a model on post-technology adoption by Jasperson et al. (2005: 525), aims to target technology system use behaviours, and in turn directs future research on
factors which influence users to exploit and extend the functionality built into technology system applications. This kind of intervention will do well to contribute towards the intensity of the perception of users towards a technology system. Further, Koch et al. (2011) has established that the acceptance of adoption behaviour of users is not only shaped by perceived usefulness but also by perceived system characteristics. A technology system is deemed as being a success within the company when the intended percentage (70% in each division) of users have the intentions to utilise the system efficiently. In the next section the user behavioural intent to use the technology system is discussed.

2.5.7 Behavioural intention
According to DeLone and McLean (2003: 23) ‘intention to use’ a technology system refers to an attitude of the user whereas the use is the behaviour itself. The experience of using the technology system should then match the user’s needs enhancement of the work performance, achievement of job aims and improve prestige. The user’s needs can be met through the effectiveness of communication by considering the behaviour of the users and the success of the technology and the processes.

According to Amoako-Gyampah and Salam (2004: 735) communication provides the avenue through which employees from different functional areas share information critical to the successful benefits of a technology system. Considering the behavioural intention of users towards a technology system, effective communication is definitely crucial as it reduces uncertainty which is the absence of information and any existence of conflicting interpretation present in system development and implementation environment.

2.6 Summary
Users of a DMS need to be looking forward to using a system which they perceive will make their work easier. Bhattacherjee (2001) explains that users’ willingness to use a technology system is mainly driven by a consideration of the benefits; that is whether the system provides useful satisfactory functions. For Delone and MacLean (2002), the efficient and effective use of a technology system depends on how receptive the users are to technology and their intention to use the system. If users cannot utilise the system effectively and efficiently it cannot be deemed to be a success (Porter and Donthu, 2006: 1001). This behaviour is motivated by the fact that users are satisfied when the relevant document in the DMS is easily accessible and can be retrieved without much mental effort.

To gain a better understanding of the perceptions and the users’ behavioural intentions to use a technology system, it is necessary to use the factors discussed in the TAM, since the TAM makes up the conceptual framework of this study. The TAM is not tested as a model as
was the case in the research presented in this chapter, but rather applied to gain a
descriptive view of users’ perceptions towards the DMS in the case study. The TAM was
used as reference in preparing the interview schedule and to further inform the different
methods that were used in the study. The research methods which are used in this study are
discussed in the next chapter.
3.1 Introduction

The research methods chosen to answer research questions are very important as they form the foundation for the study. Each research method therefore needs to complement the others. The research philosophy, approach, methodological choice, strategy, time horizon, technique and procedure used in the study were chosen strategically with the aid of the “research onion” (Saunders et al., 2012: 128). The chapter will present the different research methods which have been used in this study according to the list above.

3.2 Ontological assumptions

According to Saunders et al. (2012: 128) careful consideration is needed when choosing the research philosophy as it is these assumptions that underpin the research strategy and the methods chosen as part of that strategy. The ontological assumptions of this study see subjectivism as most appropriate.

Subjectivism asserts that social phenomena are created from the perceptions and consequent actions of social actors. Since social interactions are a continual process, social phenomena are in a continual process. This philosophical lens emphasises the study of the details of a situation in order to understand the reality of what is actually happening (Bryman, 2008: 34). For these reasons subjectivism is the approach adopted for this study.

Social actors, for instance the users of the in-house document management system (DMS) in Eskom, place different interpretation to the usefulness, ease of use and satisfaction of the DMS. Perceiving different situations in varying ways as a consequence of their own view of the world, thus related to each user’s relationship with the DMS.

Depending on how users interpret their experience with the DMS can be connected to their interaction with the DMS and even to their interaction towards other users in the working environment. When it comes to the understanding of using the DMS, users can easily identify those users in the department who are most likely to assist with the DMS if help is ever needed.

In having a subjective lens, this study seeks to understand the subjective reality of the users in order to be able to make sense of and understand their motives, actions and intentions with the DMS in a way that is meaningful. It is the meanings that are attached to these
phenomena by social actors in the organisation that need to be understood in order to understand that which is really happening. In order to gain insight from the social actors in the case study an inductive approach was taken.

3.3 Research approach

There are three main research approaches that can be adopted in a study namely deduction, induction and abduction (Saunders et al. 2012: 146). In order to investigate the research problem the inductive approach to research has been adopted. With induction the purpose of collecting data in the form of a questionnaire in this study is to explore phenomena and identify themes and patterns that occur in the TAM model. According to Saunders et al. (2012: 145) when data is collected to generate or build theory and explore phenomena in a manner which is mentioned above, an inductive approach has been used.

According to Remler and Van Ryzin (2011: 28) theories come from a process of induction, which is the building up of theory from scattered pieces of empirical evidence and experience. Taking the induction definition into consideration, it is most relevant in this study since the topic is new and exciting and there is much debate on which there is little existing literature. Working inductively also allows for the generation of data, analysis and reflecting upon theoretical themes the data is suggesting.

In taking on an inductive approach the purpose would be to understand what has been happening in order to understand the nature of the problem better. In order to do this, making sense of the questionnaire data collected through analysis was imperative. The result of the analysis is the formulation of the theory.

According to the inductive approach, the behavioural intention to use the DMS is the consequence of the way in which users perceive their work experience. To attain answers to behavioural intent, mixed methods research was perceived to be an appropriate methodological choice.

3.4 Methodological choice

The mixing of qualitative and quantitate data occurs at particular stages in this study. The use of both methodologies at particular stages is indicated by Nastasi et al., (2010: 305) as a partially integrated mixed methods research study.

Qualitative and quantitative methods are used during the research study, however, only to a complementary manner in order that each set of data is collected, analysed and presented separately in order to support the interpretation and conclusions reached. The quantitative
data collected in this event is analysed quantitatively and the qualitative data collected is analysed qualitatively.

According to Creswell and Clark (2007: 90) a situation where one methodology, qualitative supports the other quantitative, such a method is referred to as embedded mixed methods research. During data collection the above mentioned can occur in a number of ways. In the event of this study one methodology was embedded within the other during a single means of data collection via a questionnaire.

Some of the qualitative questions required a quantitative response. In some instances both qualitative and quantitative methods were used concurrently, however, these where analysed separately. The analysis of the DMS in Chapter 4 had elements of the qualitative methods, and the empirical findings in Chapter 5 required the use of quantitative methods to thoroughly interpret the findings. Therefore, in this particular study both methods supported the other where the one could not do without it. The data collection instrument was therefore designed to fit with the coherence of the methodological choice.

The study assumes that the user’s acceptance of the in house DMS is largely influenced by how the system is perceived by its users. The technology acceptance model (TAM) of Wixom and Todd (2005: 86) is the theoretical foundation approach of this study as it examines the influence of the users’ perceived usefulness, ease of technology and self-efficacy in computing and on their acceptance of the technology (Lin, 2006: 387).

The mixed method associated with the Technology Acceptance Model (TAM) is suitable for this study. Creswell (2012) explains that the research question and the literature review help the researcher steer towards either the quantitative, qualitative or mixed method track. The study seeks to investigate the true feelings, perception and attitudes of employees towards the system. Hence, the mixed method was used as there will be numeric and descriptive discussions which will address the stated research questions.

3.5 Research strategy
The research strategy is the methodological link between the philosophy and subsequent choice of methods to collect and analyse data (Denzin & Lincoln 2005: 193). The research strategy employed in this study is a case study. According to Denscombe (2003: 33) a case study focuses on one instance or a few instances of a particular phenomenon with a view to providing an in depth account of events experiences or processes occurring in that particular instance.
In the case of this study the focus is to provide in-depth events of the usage, experiences and perceptions of the DMS users. Similarly Bryman (2012: 66) defines a case study as a detailed intensive analysis of a single case. The flexible character of a case study is particularly relevant for the study as flexibility allows responsiveness to the demands and circumstances of the research problem.

In the case where a study examines a number of logical sub-units within the organisation and therefore involves more than one unit of analysis, Yin (2009: 80) proposes that an embedded case study be employed. The embedded case study therefore suits this study well, as it enables the achievement of a reasonable level of coherence throughout the research design, setting the tone for important research questions as well as the goals and objectives to be answered and met accordingly.

A case study explores a research topic within its context. Within a case study the boundaries between a phenomenon that has been studied and the context within which it is being studied are not always apparent. Although the research is undertaken in context, the ability to explore and understand this context is limited by the number of variables for which data can be collected. Eisenhardt and Greabner (2007: 26) show that in a study the aim is to gain a rich understanding of the context of the research and the processes being enacted; a case study strategy would most likely bring out the best results.

The case study strategy is advantageous in that it has considerable ability to generate answers to the why, as well as what and who questions. According to Blaxter et al. (2010: 74) another advantage of a case study is that it is drawn from people’s experiences and practices and thus it is seen to be strong in reality, experiences and practices such as the perceptions of the user’s experience of the DMS.

This kind of strategy also provides data sources from which further analysis can be made. In the event of this study, the case study has been built on actual practices and experiences which can be linked to action where their insight can contribute to changing projects. The research study has been undertaken for academic purposes and therefore has a time constraint. For the purpose of this study the cross-sectional time horizon has been selected.

3.5.1 Time horizon

The cross-sectional time horizon type study is taken at a particular point in time. According to Saunders et al. (2012: 190) the cross-section time horizon, also known as snap shot studies, often employ survey or questionnaire data collection methods.
Bryman (2012: 58) defines the cross-sectional research as one which aims to collect data at a single point in time in order to collect a body of qualitative and quantitative data in connection with two or more variables which are then examined to detect patterns of association. Bryman’s definition is exactly what this study aims to achieve.

Cross-sectional studies, such as in the event of this study, seek to describe the incidences of phenomena. Other related studies explain how factors are related in different organisations. The data collected with this type of study is collected more or less simultaneously (Bryman, 2012: 59).

The cross-sectional time horizon is relevant for this study as it makes use of the mixed methods and a case study strategy based on real time data which is collected with the use of a questionnaire over a short period of time. The questionnaire used to collect the users’ actual practices and experiences with the DMS was developed in a unique manner to extract the most valuable information possible.

3.5.2 Development of the questionnaire
A well designed questionnaire ensures the elimination of errors (Hainbuchner, 2005: 115). The questionnaire was designed to collect data from the users of the DMS. It is important to understand that the content of this questionnaire is mainly based on the theoretical considerations suggested in the TAM literature. The questionnaire consists of thirty-five questions (Appendix A). The questionnaire was modified from that used by Van der Heijden (2004) and was adjusted accordingly to meet the goals of this study, with the standard language being English.

During the development of the questionnaire ease of reading and understanding the questionnaire were ensured through piloting five respondents. The questionnaire was then adjusted accordingly. The questionnaire was subsequently prepared for field work where data was collected from users.

3.5.3 Data collection
The choice of data collection method is influenced by the researcher’s theoretical lens, philosophical assumptions and the researcher’s skill and academic politics. Prior to choosing a data collection instrument Saunders et al. (2012: 419) advise the evaluation of all possible data collection methods and to choose those that are deemed to be the most appropriate for the research question(s) and objectives.
Data collection took place during August and September of 2012. The covering letter explaining the nature of the content of this study was the first page of the questionnaire. A covering letter and the questionnaire were given to all users who completed the questionnaire.

According to Saunders (2012: 419) it is important to understand that a questionnaire differs according to how it is delivered, returned or collected, and the amount of time spent with the respondents. In the event of this study the same questionnaire was used with a mixture of two methods, the delivery and collection method and the internet mediated questionnaires method.

The web based questionnaire method was used on respondents who were not personally available and yet where selected as per the sample. The delivery and collection questionnaire method was used on those respondents who were easily found in their work stations where a questionnaire was delivered by hand and collected later.

3.5.4 Sampling strategy
The researcher has to think critically about the parameters of the population and then choose the sample case accordingly. Clear identification and formulation of criteria for the selection of respondents are of cardinal importance. Hence in this study the sample procedure which was followed is the cluster sampling method.

According to Burns and Burns (2008: 403) cluster sampling involves entire natural groups rather than individuals. The groups in this study are the Generation, Transmission and Distribution Divisions. Similarly Creswell and Clark (2008: 202) indicate that the cluster sampling method occurs naturally in the population as in the case of this study with different divisions in the company. The cluster sampling method fits very well with this study, since all Eskom employees in the different departments are meant to be using the DMS. Participants were randomly chosen to represent a key decision point in a mixed method study.

Creswell and Clark (2008: 201) elaborate that cluster sampling is often used with research with data collection needs that require personal, at home or at work interviews.

The advantage of the cluster sampling method is that it retains the principle of randomness yet allows a research design that is feasible in terms of cost, time and other resources. The disadvantage is that chances of selection are unknown, biased and in some way with no probability of generalisation to a wider population. Also, there is no way of ensuring that the sample is in any way representative of the defined population.
The population of this study included users from three core divisions; Generation, Transmission, and Distribution. Fifty users from each division were targeted for the questionnaire. Sixty of the questionnaires were sent electronically and the other one-hundred-and-fifteen questionnaires were distributed by hand. Fifty-one questionnaires were received via email and one-hundred-and-nine were collected back from hand distributed questionnaires. This was followed up until 50 usable questionnaires had been returned per division.

From the 160 questionnaires that had been received, only 150 were selected since the sample of this study was 150 users, from the Generation (50), Transmission (50) and Distribution (50) Divisions. For one hundred and fifty respondents (60%) the credibility of the research was measured by the Cronbach Alpha coefficient and an overall coefficient of 95% was calculated for the results obtained. This is considered to be in the range of scores considered as being reliable. The data collected was descriptively analysed and interpreted accordingly.

### 3.5.5 Descriptive analysis

To reduce and convert data into more manageable proportions and to identify patterns and themes, descriptive data analysis was applied. According to Vanderstoep and Johnston (2009: 36) descriptive data analysis takes place in natural real life settings and works well usually in research where people are ordinarily found. Hainbuchner (2005: 124) mentions that descriptive analysis provides a very useful initial examination of the gathered data even when the ultimate concern of the investigator is inferential in nature. Hainbuchner (2005: 124) explains that the purpose of descriptive analysis is to;

- Provide preliminary insight as to the nature of responses obtained as reflected in the distribution of values for each variable of interest.
- Detect errors in the coding process.
- Present data in a professional manner through the use of tables and graphs.
- To provide an early opportunity to check whether the distributional assumptions of consequent statistical tests are likely to be satisfied.

To ensure order and consistency in this study, each TAM variable was descriptively analysed according to item where only the ‘positive perceptions’ were drawn out in order to identify the average of the core divisions’ responses and then also the total average of each TAM variable. From these results the different divisions were compared and discussed
accordingly. A presentation of the average percentage of each variable is presented and discussed in Chapter 5.

Results where users expressed their general perceptions towards the DMS in terms of frustration, user-friendliness and replacement of the system were also graphed and analysed accordingly. The qualitative data where users expressed ideas on how the DMS can be adopted, was grouped according to main ideas and presented on graphs with some of the respondents’ statements discussed.

Carcary (2009: 12) says that the principal issue in research is to maintain consistency and integrity in the study’s design. Therefore in this study much care was focused on the body of evidence, the ability to make critical assessments of informants’ statements and the importance of producing convincing arguments and descriptions (Mason, 2002: 18).

3.6 Ethical considerations
Ethical concerns emerged during the design and planning of the research study. Access into the company was obtained through the manager of the document management department in Eskom and permission was granted to collect data from respondents in the core divisions of Eskom.

Walliman (2011: 43) explains that there are two aspects of ethical issues in research. First, the individual values of the researcher relating to honesty, frankness and personal integrity. Second, the researcher’s treatment of other people involved with the research relating to informed consent, confidentiality, anonymity and courtesy.

This study has considered the above mentioned ethical issues through following clear guidelines of citation in order to prevent passing off other peoples work as one’s own. Also a letter of informed consent was given to each respondent, which explained the purpose and aim of the study clearly. The letter also provided a clear account of the requirements which enabled respondents to understand exactly that which was required of them.

According to Saunders et al. (2012: 226) the context of research ethics refers to the standard of behaviour that guides the researcher’s conduct in relation to the rights of those who become the subject of the study. All these ethical aspects were considered in this research.

3.7 Summary
The philosophical paradigm used in this study informed the strategy and approach which led to the development of the questionnaire and the appropriate sampling method used. Each method complements the other, and paved a solid foundation for the collection and analysis
of the data collected as presented in Chapters 4 and 5. All the ethical considerations were considered accordingly. The following chapter presents the analysis of the DMS with relevant statistics.
Chapter 4:

Document management and system analysis

4.1 Introduction
This chapter aims to discuss first, the document management process and will elaborate on the DMS process where important aspects of the Eskom DMS are explained. This provides the scope discussion for the Eskom case under investigation. A discussion of trained users and statistics make up the third part of this chapter. A thorough discussion of the DMS usage statistics at Eskom from the years 2008-July 2012 forms the final parts of this chapter.

4.2 Document management and system analysis
The DMS is based on a powerful server that allows organisations to make information accessible to a large number of people and effectively manage this information. The DMS has various inherent aspects which if understood, allow users to use the DMS effectively. One of the most important aspects is the DMS’s ability to store, maintain and retrieve documents. To maintain the documents involves updating the position of the document to its new place when it is moved, or removing a document from the DMS when the document is redundant or replaced.

In order to access the system a standard web browser, for example Microsoft Internet Explorer, can be used. The browser can be used to navigate through the information structure on the DMS and to open, upload and view documents. When the browser is closed the user will no longer be connected to the Eskom DMS. The DMS is also accessible through the Windows Explorer interface. And the activities which can be performed by the user on the DMS will be determined by the user’s job responsibilities.

The documents contained in Eskom’s DMS inform the core business objective which is to generate, transmit and distribute electricity. To successfully achieve the organisational set goals and objectives, users need to understand the processes and use the DMS effectively.

Before a document is made available on the in-house DMS it undergoes a document management process. In any DMS there is always room for improvement; there will be documents which have not been created or certain processes that have not been addressed. Tracking the use of documents gives an indication of the document’s usefulness. The DMS caters for the extraction of data in a form of DMS user statistics.
4.3 Document management process

Using the DMS involves important processes that need to be followed and understood. These processes form part of the most important aspects within the organisation. Processes link the people to the technology and they define the benefits of using the technology effectively. More so they give reason to why people cannot do without using the DMS. If the processes are poorly executed, defined and motivated the technology is bound to fail, and the potential users will in turn not be encouraged to use the DMS.

Documents play a very important role in maintaining corporate, individual and collective intellectual property. Documents enable an organization to meet legislative and regulatory requirements including archival, audit and oversight activities. Documents also have the function of providing protection and support in litigation. This includes the management of risks associated with the existence of evidence of organisational activities. The rights and interest of the organisation are equally protected and those of present clients and stakeholders. Henceforth documents are created and made available to employees and contractors working in the company.

Before a document is created, the information need is expressed in the department or division, usually by the manager. In order to make a document available, a document controller, compiler, functional responsible manager and the authoriser of the document are identified. This is to ensure that all procedures and processes are followed accordingly. To fully understand the document management process, it is necessary that all important role players and their tasks are discussed.

4.3.1 The document controller

The task of a document controller is important as it includes providing administrative support during the document’s life cycle. The life cycle of any document in Eskom undergoes registration, review and authorisation, publication, archiving and disposal. The life cycle also includes reporting on document controls, meaning draft document status, redundant documents, templates, adherence to procedure, training and other document related matters.

Of all the above mentioned tasks the most important is registering a form which acts as the record of the actual documents to be developed. The registration form is filled in and contains metadata about the document yet to be created. The metadata is made up of the title, type of document, compiler, authoriser and the functional responsible person.

The purpose of registering a document is to provide evidence that a document will be created. The register is then assigned a unique identifier number and this is done to
formalise the capture of the document into the Hyperwave system. The document is then classified to facilitate the description, control, link, the determination of disposition and access status.

Rights of the document are assigned to the relevant users. When a document is made available on the Hyperwave system, the document is accessible and managed. What is more, the electronic document is stored in ways that make retrieval easier and faster. Document controllers are trained to use the document management system and facilitate the administrative duties and responsibilities in registering and maintaining approved documents. The work performed by the document controller lays the foundation for the compiler.

4.3.2 The compiler
The compiler is in most cases identified by the functional responsible manager to compile the document. The identified compiler then has the responsibility of compiling the document using the latest authorised revision of the applicable template. The compiler also has to ensure that the minimum document requirements are adhered to and that there is no duplication with existing documentation regarding the document’s objectives and content.

Duties also include ensuring that the documents are reviewed, applying the voting process when changes are submitted when the document is due for review. The compiler also ensures that the document is technically accurate with integrity and pertinent to the subject matter. Proof reading is performed on the developed document, in order to identify and communicate the impact of implementing the document. The above mentioned are the core duties of the compiler and the responsible manager.

It is important to understand that any employee has the opportunity to be assigned the duty of compiling a document by the manager. However, this depends on the condition of having applicable knowledge and sufficient competency on the subject matter and being trained on this subject matter. When a document has been successfully compiled, it is submitted to the functional responsible manager.

4.3.3 Functional responsible manager
The functional responsible manager ensures that the compiler has executed all required tasks. When the compiler has completed the document, the compiler sits with the responsible manager and both go through the document. Thereafter the responsible manager fills in a voting form, in order to prepare the document and hand it over to the acceptance reviewer. 
4.3.4 Acceptance review
The acceptance reviewer reviews and comments on the document accordingly. The reviewer gives the necessary feedback in a form of voting forms which are captured in the DMS and returned to the compiler. The compiler consolidates all the comments, clarifies issues with the reviewer and further updates the document as required and returns the updated draft revision to the document controller.

4.3.5 Authorising the document
After the review period has passed successfully through all the possible review phases, the document controller facilitates the administration of the document authorisation process. The document controller obtains signatures from the document compiler, functional responsible manager and the authoriser on the final version of the document. Figure 4.1 is a representation of the document management process workflow.

Figure 4.1 Document management process

Once all signatures have been obtained the document is fully authorised and is ready to be published in accordance with the document publishing process on the DMS.
4.4 In-house DMS analysis

Eskom’s DMS ‘Hyperwave’ is the platform where a large portion of information is stored. The DMS represents the entire Eskom divisional and departmental documentation. In each divisional folder there are 36 document types in the form of electronic documents. Each document on the DMS has a title and a unique identifier number which employees can use to search for a document on the search facility. The DMS supports document management, which is a key building block for knowledge management and thus assists Eskom to achieve its organisational goals and objectives.

The DMS is arranged in a hierarchical structure which contains sub-collections or containers that hold various document types ranging from level one to six. For the purpose of this study, only level one and two documents in the Generation, Transmission and Distribution Divisions are presented in Figure 4.2.

The DMS has the ability to provide storage and retrieval capabilities of documents made readily available for users. When a document has been approved, it can be replaced with the registered record on the DMS.

![Figure 4.2 Document management system process](image)

When the document has been successfully published on the DMS, it is ready to be retrieved from the DMS by the users. The next section seeks to elaborate on the retrieval of documents.
4.4.1 Retrieval of documents

The search engine facilitates the extraction of documents from the DMS and provides a “read-only” version of the information stored. Document access levels controls are put in place in order that not everyone has access to confidential documents. Retrieval of documents is one of the most important functions in the DMS. The user of the DMS must be able to extract information and linked documents from the DMS. If retrieval of a document cannot be done or is not sufficient, then the entire DMS will not be effective.

The DMS caters for the retrieval of documents using the title, keyword and author or document number. The DMS provides document content and search capability. Users are able to search for current and archived documents. The DMS has a relevancy ranking system when a user searches for a specific document, where the current status of the document is shown. Once a document has been retrieved, users are able to view and print the document without changing or tampering with the content. In order to use the DMS effectively it is necessary for the user to understand important aspects within the DMS and these are discussed in the following paragraphs.

4.4.2 DMS regulatory aspects

The various aspects regulate each individual user’s roaming within the DMS and thus helps in maintaining a secure system.

- **Security system**: The security system within the DMS allows users to access only those documents which are relevant to the users. Accessing documents relevant only to the user, makes the security system successful through the use of access control rights, which are given only to relevant users.

- **Access rights**: Access rights distinguish those users who may see a document from those who may make changes to a document. To illustrate, a project leader may set access rights to a project plan that all members of the team are able to read the documents, however that only the leader and his assistant can make changes to the document. The information of this kind is stored in the ‘rights’ attribute of the document. The user categories are pre-defined by Eskom, and are discussed in the following paragraphs.
4.4.3 Rights attributes

Rights attributes give a brief description of user rights and those having rights to read, write, administer and take ownership of the documents.

- **Read access**: attribute allows a user to view these objects, including their attributes and to view document content. If a user does not have read access to a document, the user will not be able to view the document in the browser window.

- **Write access**: attribute allows the user to modify the document's attributes or even change its content. The write access attribute also allows the user to publish objects to that document. When a user has write access rights, they will automatically have the read access right.

- **Administrative access**: enables the user to change access rights and attributes of an object, however, not to modify the document in any way.

- **Take ownership access**: allows the user with access rights to assume ownership of a document.

- **Unlink access**: allows a user to remove objects from the collection.

The above rights attributes are necessary as they avoid chaos within the DMS, and allow for successful security measures. Therefore, all employees are monitored by the system itself as users can only go as far as their access rights allow.

The system recognises two different users, namely a guest and an identified user. The system monitors how deep each user can enter into the DMS. The following paragraphs highlight the difference between a guest user and an identified user.

4.4.4 Types of users

The user's understanding in navigating through the DMS is especially necessary. The search facility on the DMS does not provide information as a general search engine, like Google, would. When searching for a document on the DMS, a user has to know the document type, the full title or the unique identifier number of the specific document. This is bound to frustrate any user and lead them to seek information from other knowledge repositories. It is therefore not an easy task finding a specific document on the DMS, particularly when one is a guest user.
4.4.5 A guest user and an identified user

A user becomes a guest on the DMS when the user does not have login privileges. Login privileges are only attained when a user has attended training to use the DMS. It may also be that a user has login privileges but chooses to use the DMS as a guest. Such a user who decides to log in to the DMS, would be referred to as an identified user and would likely know how to operate certain functions of the DMS. What is more, this kind of user has certain rights granted, and would most likely be able to find what is needed.

On the other hand, a user who has not attended training has no choice but to use the DMS as a guest and such a user often takes much longer to find a specific document on the DMS than it would a user who has attended training.

It may be rather frustrating for a user to know that there is a DMS which holds all the necessary documents, but the user is unable to utilise the DMS to its full potential. In order to use the system to its full potential, DMS users would require prior training. Fortunately Eskom caters for those users needing training to use the DMS more effectively.

4.5 Document management system training

According to the Eskom document management department, an efficient user of the DMS can be defined as one that not only accesses the DMS, but especially logs in to the DMS. When users log in the DMS, they are able to perform more tasks which are not possible to perform when a user is simply using the DMS as a guest.

Tasks that can be performed when a user is logged in include saving of users' work in the departmental work space and publishing of important documents for the department. It is also much simpler to find a specific document as a logged in user since the specifications of the document are likely known by such user.

The advantage of attending DMS training is that users of the DMS will be able to use the DMS to its full potential through applying the processes which are necessary. Lack of training has been found to be one of the many other important reasons why employees are not using the DMS efficiently.

DMS training allows employees in a department, for example, to publish their own documents and gives only those in the departments the necessary rights. Attending training also means that users are given information on the DMS experts who can assist them where they need information on a specific procedure and are not able to find it in the DMS.

Trained users expose themselves to the efficient use of the DMS which Eskom has put in place. The users have the opportunity of attending training and using the DMS more
efficiently. This kind of training does not only add value to the individual’s efforts, but it extends to the efficient achievement of Eskom’s goals and objectives. Figure 4.3 is a representation of the approximate number of people that have attended training from the core divisions.

![Graph: TRAINEO USER STATISTICS](image)

**Figure 4.3: Core divisions: trained user statistics**

The reason that the DMS has been put in place is to make work easier for the user and will ideally thus result in efficient work which benefits the company as a whole. The statistics shown above are only of the three core divisions in Eskom. There are approximately 1000 employees in the different divisions of which some of the employees do not necessarily work with computers. It is important to note that the numbers used are only to show an understandable picture of the approximate employees trained to use the DMS, and are not exact numbers.

Approximately 700 employees from the 1000 in each division ought to be using the DMS efficiently since they are working in offices. From Figure 4.3 above, considering only statistics from 2008, 40 employees from the generation division where trained, 54 from transmission and only 48 from the distribution division. The number of forty employees from 700 means that the remainder of the 660 employees did not receive training. Bwalya (2011:144) has found that a lack of technological system training was one of the major reasons that led users to render the system as useless.

The question that arises is what the 660 non-trained employees are using instead of the DMS. And of the 40 employees who have attended training how many of these are actually using the DMS efficiently? Where was the corporate knowledge saved that was meant to be
saved in the common repository? Could it be that the different divisions are using other repositories than the DMS to find documents and save corporate knowledge?

To understand whether the processes to use the DMS are efficiently applied by their users the respective divisional and departmental work space. It is necessary to delve into the user statistics of the Eskom wide DMS usage, Generation Division DMS usage, Transmission Division DMS usage and Distribution Division DMS usage and finally the upload usage. The representation of the above mentioned statistics will be discussed in the next section on the user statistics.

4.6 User statistics
A large portion of the work employees perform on a daily basis needs a considerable reference to the level 1, 2 and 3 documents residing in the DMS. It is important that employees are efficient in using the DMS, in order to perform quality work. Previous research in Eskom has not been conducted on whether employees know where to find relevant documents and whether they understand how to navigate through and use the DMS efficiently.

A user is said to be efficient in using the Hyperwave system when the user can navigate through, search and download the relevant documents with ease. To add, it is when a user has recognised the importance of saving the company knowledge in the designated departmental work space on Hyperwave after every end of day. Figure 4.4 below, represents statistics of the core divisions combined of the DMS usage over a period of four and a half years, from January 2008 – July 2012.

![Figure 4.4: Eskom core divisions: DMS usage.](image)
According to Figure 4.4, the DMS was put to greater use in 2011 and in 2010 respectively. Compared to all other years, most users where accessing and logging into the DMS in 2008. Comparing Figure 4.3 the number of trained users, with Figure 4.4, it can be said that more trained users were actually using the DMS.

However, according to the definition of an efficient user, it is only when a user logs into the DMS that more efficient work can be performed as the user would be able to save corporate knowledge, publish important departmental documents and actually retrieve the work when needed again.

In the light of the above mentioned, Figure 4.4 shows that login is actually the least performed task over the years under discussion. In 2011, for instance, only 77 users logged in from all the core divisions. This number is not even a representation of the total number (104) of trained users in 2011 (Figure 4.3).

The statistics for 2012 are justifiable as the statistics were picked up from the system in July of 2012. The statistics are only a representation of half of the year. In 2011 more users downloaded documents from the DMS, which was followed by 2010. Fewer users downloaded documents in 2008 than in 2009 and only 92 users had used the DMS to download documents by the end of July 2012.

According to Figure 4.4 most of the activities performed by users on the DMS were in 2010, then 2011, 2008, 2009 and the least being in 2012. For the nature of work being performed in the core division many more users should be navigating through the DMS. The majority of logins are performed by the document controllers of the specific divisions as they work on the DMS on a daily basis.

The login statistics should at least represent the number of trained users mentioned in Figure 4.3, instead they are much less. In order to identify the extent to which each division is using the DMS. Figure 4.5 presents usage statistics for the Generation Division.
Figure 4.5: Generation DMS usage

Figure 4.5 shows the statistics from the Generation Division where in 2011 there were only 21 logged in users, 25 for Transmission (Figure 4.6) and the most being 31 in the Distribution Division (Figure 4.7). The most efficient use of the DMS in 2011 was from the Generation Division.

In 2010 efficient use from Distribution was 34, Generation 31 and Transmission 30 users. From January to July 2012, the Distribution Division showed to have used the DMS most efficiently than the other two Divisions. The activities performed over the years were the highest in 2010, 2008, 2011, 2009 and 2012 respectively.

Figure 4.6: Transmission DMS usage

According to Figure 4.6 Transmission users accessed the DMS more in 2010 than all the other divisions, and was the least in 2011. When a user accesses the DMS they are able to download documents and even read them on the DMS window. Some of the users
accessing the DMS may very well have logged in to the DMS which shows that there are activities that users are involved in.

![DISTRIBUTION DMS USAGE](image)

**Figure 4.7: Distribution DMS Usage**

Figure 4.7 shows statistics from the Distribution Division. Most of the users downloaded documents in 2010 in the Distribution Division which is more than the other divisions. One needs not be logged in to the DMS to download documents. A guest user is able to download as many documents as required.

The general activities performed by users over the years were the most in 2010, 2011, 2008, 2009 and 2012. Throughout the DMS divisional statistics, it is evident that not many users prefer to login to the DMS. The majority of the users prefer to access the DMS and read from it. However, a considerable number of users also prefer to download the documents and read them from their desktop computers, perhaps for future usage.

According to the statistics the division that seems to be making the most use of the DMS is Distribution, then Transmission and the Generation division respectively. The empirical findings of this study will further shed light on the extent of usage in the different divisions and perceptions towards the DMS of the various users in the core divisions.

**4.7 Summary**

The document management process is applied to every Eskom document registration and publication of that document, if approved. Security of the documents is ensured on the system by means of assigning rights to the relevant users. There are two types of users,
namely the guest user and the identified user. Training on the DMS is offered to all types of users, therefore the extent to which the user chooses to be effective with the DMS depends on the user. Statistics of trained users in the core divisions highlighted rather low averages throughout January 2008 – July 2012. This chapter has shown that not so many users are making use of the DMS and from those users using the DMS not many are efficient users of the DMS. The following section aims to highlight users’ perceptions towards the in-house DMS.
5.1 Introduction
This chapter presents graphs and discusses each individual TAM factor according to all divisions combined. This is to say that the system quality variable for the Generation, Transmission and Distribution Divisions together, will be discussed as a whole. Secondly, a brief discussion of each individual division for system quality responses will be presented. Lastly, a comparison of each division according to each individual TAM variable is discussed. The TAM factors are discussed in the following order:

- System quality
- System satisfaction
- Information quality
- Information satisfaction
- Perceived usefulness
- Perceived ease of use, and
- Behavioural intention

When the TAM variables have been discussed, the chapter discusses the general attitudes of the users towards the DMS. This information is briefly explained and presented in graphs according to each division. The final parts of this chapter present the users’ ideas, opinions and perceptions of how the DMS can be adapted to better reflect user’s needs.

In this instance users seek to be satisfied with the information contained in the one information repository the in-house DMS called Hyperwave. If at any point in time the user is to make a search and the system is slow, it is enough to cause frustration for the user. If at any time during the users’ search the system is to retrieve too many documents that are not completely relevant to the specified search, accuracy is compromised and the user’s integrity towards the information and DMS decreases. In essence every step that the user takes on the system to find the necessary information plays a role in whether the user will be satisfied with the DMS and the information residing in it.
5.2 System quality

The achievement of quality needs to be controlled as an end unto itself. There are various facets of quality within a document management system. According to the study, the DMS has quality when the user is able to understand the layout of the DMS with ease; this makes it easy for the user to navigate through the DMS with ease and without getting lost. The user always needs to be in control when using the DMS. The system therefore needs to be fast as the user expects requests to be responded to at the right time. System quality is finally reached when all the desired results have been achieved from the system by the user.

The following four graphs present the findings of system quality from users. The first graph represents the total responses from all three divisions. The next three graphs represent system quality for each division. The final graph is a representation of the positive responses from each division where statistics are compared and graphed accordingly. This layout will be the same for every TAM variable that will follow. Figure 5.1 is a representation of the system quality for all three divisions combined with a brief discussion that follows.

![Figure 5.1: System Quality three core divisions](image)

The three core divisions commented on the system quality of the in-house document management system. From Figure 5.1 there is an almost 50/50 agreement and disagreement perception towards the system quality of the DMS.

Navigating through the document system can be a bit of a challenge for many, particularly when users do not understand the system well. In the findings above though, it is evident...
that many of the users agree with the navigation process, 32.9% are in disagreement of this, while a few strongly disagree and only 7.4% of the users strongly agree with the navigation process.

The time responses of the requests from the document system can be rather frustrating as users who depend on the system for answers may tend to be impatient. The statistics here show to be interesting as almost half of the users believe that the system is slow while the rest of the users believe it is fast. Only a few strongly agree with the main fact that the system is slow while only 6.8% are entirely satisfied.

In terms of achieving the desired results from the document system just over half of the users agree and 32% disagree, while a few of the users strongly disagree and 3.4% strongly agree. More than half of the users believe that when using the document system, the desired results are achieved. The next section discusses the system quality variable for all three divisions separately.

5.2.1: Comparison of core divisions: system quality

Figure 5.2 indicates system quality for the Generation Division.

![Figure 5.2: System quality: Generation](image)

In the Generation Division the perceptions of users are leaning more towards being dissatisfied side than satisfied. More users are satisfied with the layout of the DMS in the Generation Division. Figure 5.3 is the next graph in discussion for the Transmission Division system quality.
In Figure 5.3 there is a slightly more positive outlook towards the system quality, where most of the users agreed that they have achieved the desired results when using the DMS and 60% of the users easily understood the layout of Hyperwave. Although there is more positive factors in this graph, the number of users that are dissatisfied is substantial. Figure 5.4 follows with the discussion of the Distribution Division system quality.

Figure 5.4: System quality: Distribution
In Figure 5.4 there is a greater satisfaction towards the system from the users of the Distribution Division, although there are higher than desired percentages of dissatisfaction and also a strong divided perception.

In order to clearly deduce from the graph the total average of the TAM variable system quality for each division, the positive responses for each item were added according to item. For example, in Figure 5.4 item A 1.1 when adding only the positive (agreed 54% and strongly agreed 6%) responses, the total positive response is 60% - this was done for all items in order to draw out the total perceptions in the divisions and ultimately for each TAM variable. Every item then ended up having a positive percentage, of which all the positive responses where added for each division and the percentage was used to represent the total score for system quality in each division. The total average representing a division was added up and divided by three. This gave the total percentage for the entire core division for each TAM variable. Figure 5.5 represents the total percentage of each division according to item, and also gives the total percentage for the variable system quality from all divisions together.

**Figure 5.5: System quality: divisions’ positive responses compared**
Searching for documents on the DMS without achieving the desired results can be frustrating for any user. It is important to keep in mind that the statistics above may be matching the users' perceptions of the number of times that they managed to retrieve a document while navigating through the system. What would be even more important is that users might have asked themselves how many of the documents searched were relevant to the query. The users then must have recalled the fraction of the relevant documents present in the database retrieved each time the DMS was put to use.

The above statistics show that the Transmission Division showed to have achieved more desired results from the system than the Distribution and Generation Divisions. The Distribution and Generation Divisions felt that the DMS was slower to respond to requests than the users in the Transmission Division.

Both the Transmission and Distribution Divisions shared similar sentiments towards the layout of the DMS, and almost half of the users from the Generation Division agreed with the layout. The users’ perceptions of the layout of the DMS are important as they form part of the first encounter with the DMS, although 60% in two of the divisions reflect some of the highest positive responses. 40% of the users that are not happy with this feature on the DMS require this matter to be addressed accordingly.

More users form the Transmission Division showed greater positive responses for the quality of the DMS compared to the other two divisions, although it is a small margin of difference. According to the definition of system quality in paragraph 2.5.3 compared to the other two divisions, the users in the Transmission Division not only find it easier to navigate through the DMS, but they also understand the steps and process followed slightly better. Moreover, the design of the system reflects Transmission users’ needs and expectations better than the other divisions.

Taking into consideration the results of the statistics above, from a system quality point of view the necessary improvements that would have to be looked into are the ability of the DMS to retrieve relevant documents and to avoid irrelevant documents. The user friendliness of this feature needs to be emphasised more in order to attract the users to the DMS.

Therefore, the system quality of the search engine to retrieve documents needs to be adapted according to how and what users deem as being user friendly, thus reflecting the users’ needs and expectations. When this is carried out successfully users are more likely to be satisfied with the DMS that was designed for them. The next TAM variable under
discussion is system satisfaction, which will take on the same sequence of discussion as in system quality.

5.2 System satisfaction

When a user is satisfied with the DMS and the results the system produces, the user is more likely to use the system again. Not only will the user be satisfied with the document management system, but it will also benefit the user’s work. According to the study, system satisfaction is achieved when the user is satisfied with the navigation process of the DMS, content creation, content storing and desktop integration features of the system. Overall the user will be satisfied with the interaction with the DMS. Figure 5.6 is a representation of the perceptions of users of system quality from the three core divisions.

![Figure 5.6: System satisfaction: three core divisions](image)

Almost half of the users from the core divisions were satisfied (B3.5) with the overall interaction on the DMS. This is a problem, since users are meant to be satisfied with their interaction with a DMS which in turn is meant to make their daily work easier. The number of users that are dissatisfied with the system according to the statistics above is worrisome as these numbers should be much lower if the system delivered according to the users’ satisfaction.

Almost half of the users from each item is not happy with the system. It is only when users are interviewed that the IT-team will be able to diagnose and see exactly what kind of remedies need to be provided. Therefore users need to be engaged and communicated with in order to update and upgrade the system according to the users’ needs. The following
Figure 5.7: System satisfaction: Generation

Although between 50% and 62% of the Generation Division showed satisfaction with a number of features of Hyperwave, still only 40.8% of the respondents agreed or strongly agreed with the statement of overall satisfaction with their interaction with Hyperwave.

Figure 5.8: System satisfaction: Transmission
The Transmission Division has higher percentages of satisfaction reflected than Generation, although satisfaction-dissatisfaction remains at a 60%-40% split overall. Figure 5.8 (B3.5) shows that almost half of the users are not satisfied with the overall interaction on the DMS. Users’ interaction therefore needs to be improved. Section 5.8.3 highlights some of the verbatim answers from users regarding such improvements. The perceptions of the system satisfaction from the Distribution Division are reflected below in Figure 5.9.

![Figure 5.9: System satisfaction: Distribution](image)

Similarly to the Generation and Transmission Divisions’ satisfaction levels, Figure 5.9 is also leaning slightly towards the positive side of the graph. B3.2 has more users satisfied with the content creation features on the DMS compared to the other statistics. The statistics also show that overall about half of the users are dissatisfied with the navigation process on the DMS. Figure 5.10 presents the total statistics for system satisfaction, for the three core divisions combined.
Equally average percentages were gained from system satisfaction from all three divisions combined as was received for system quality. Only about half of the users from each of the divisions are satisfied.

When a user is not satisfied with the navigation process in the system, this can be due to a lack of system training. It is also possible that users are well trained in using the system but that they are simply not satisfied with the DMS. These unsatisfied users can more often give ideas on how best to adapt the process in order to suit the users in general.

It is important to understand that the less a user is satisfied with the DMS the less they will be encouraged to use the DMS, and *vice versa*. With this said, it is very important that the information needs of the users are addressed accordingly within the DMS. When users are satisfied with the DMS itself the information presented in the DMS must be communicating good quality.

### 5.3 Information quality

The appearance and impression of any technological system is the first aspect a user encounters after the information itself. The information in any system needs to be fed with quality and care. Information quality in this study refers to when the information is accurate,
easy to read, clearly understandable, information is reliable and contextualised according to Eskom’s business.

It is important to understand that a user from the Distribution Division would mostly retrieve information which is relevant to the Distribution Division. The information retrieved is in most cases compiled by members of the division. Therefore, when perceiving the information as having quality, users might be biased as they trust the quality of the information they themselves created and uploaded.

Figure 5.11 represents the perceptions of the three core divisions for the TAM variable information quality. It should be noted that since Figure 5.11 uses five categories of grading (poor, fair, good very good and excellent) the study considered the first two gradings (poor and fair) as negative and the remaining three were considered as positive (good, very good and excellent).

![Figure 5.11: Information quality: three core divisions](image)

Considering that some of the information residing in the DMS is generated by the users themselves, it is no surprise that Figure 5.11 is slightly leaning more towards the positive side of the graph. For instance, more than 70% of users find the information on the DMS to be reliable, while another 70% (A2.2) find the information easy to read.
Figure 5.12: Information quality: Generation

Figure 5.12 displays a similar trend as Figure 5.11. Figure 5.13 below presents the perceptions of the Transmission Division of the information quality.

Figure 5.13: Information quality: Transmission

Just over half of the users in Figure 5.13 are not satisfied with the information accuracy (A2.1) provided on the DMS. Despite the fact that the graph is leaning more towards the positive side, it is a notable concern that the information created and uploaded by the users themselves is deemed to be fair and poor by so many. Figure 5.14 discusses information quality perceptions from the users of the distribution division.
Figure 5.14: Information quality: Distribution

As in Figure 5.14, many of the users consider the information provided on the DMS to be more reliable (A2.4) than all other items. Similar to the other divisions the graph for the distribution division is leaning more towards the positive side. However, fewer users than in other divisions find the level of context (A2.5) to be good, very good or excellent. Figure 5.15 shows the overall percentages of the TAM variable information quality.
In Figure 5.15 the Generation Division rated overall information quality on the DMS higher whereas the Transmission and Distribution Divisions had the same percentage. It is worth noting that Figure 5.15 is the first graph that reflects positive values of 70% and higher.

Although the overall rating of information quality seems to be higher compared to the previously discussed TAM variables, there continues to be large proportions of users who are not satisfied with the information quality of the system. Necessary action must be taken in order to have more of these users recognising the system to have high quality of information.

According to Knight and Burn (2005: 160) information quality can be explained as information that is fit for use. Therefore any information that is not fit for use cannot be said to have quality. Before any information is fed to the DMS it needs to be audited for quality, and confirmed that it is fit for use. Irrelevant information should not be captured on the DMS. Therefore, those who are responsible for uploading documents on the DMS need to perform integrity checks on every document which will ensure that all documents contain quality information fit for use.

It is important to understand that information has quality in its own right, and no doubt users from each division value the information the DMS provides. Particularly when they search and successfully retrieve the specific document they were looking for. When users find the document they were looking for, trust is gained towards the DMS; what is more the user becomes satisfied with the information at hand.

5.4 Information satisfaction

Users become satisfied with the information provided when the information is able to assist in the work that needs to be performed. In this study information satisfaction is achieved when the user is satisfied with the information, information quality, the accessibility of the information, the depth of the quality of information and the overall information on the document management system.

Achieving the total satisfaction of users towards the in-house DMS is a possibility, with effective planning and implementation. In the following graphs the findings on information satisfaction are discussed in detail. Figure 5.16 is a presentation of the information satisfaction for the three core divisions combined.
In Figure 5.16 greater levels of information satisfaction are recorded, however, the level of unsatisfactory findings is still too high specifically for (B4.3) and (B4.2), but also for all other aspects recorded. Figure 5.17 is a representation of the information satisfaction perceptions from the Generation Division.

Figure 5.17: Information satisfaction: Generation Division
In Figure 5.17 B4.2 has a strongly disagree rating of 16%, while item B4.3 has 14%, despite the fact that the graph is also reflecting a greater positive response. These are significant numbers of users. Figure 5.18 contains the information on satisfaction perceptions of the Transmission Division.

### TRANSMISSION

- **B4.1**: Overall I am satisfied with the information Hyperwave provides.
- **B4.2**: I am satisfied with the quality of information provided in Hyperwave.
- **B4.3**: I am satisfied with the accessibility of information on Hyperwave.
- **B4.4**: I am satisfied with the depth (quantity) of quality information on Hyperwave.
- **B4.5**: Overall I am satisfied with the information on Hyperwave.

### DISTRIBUTION

- **B4.1**: I am satisfied with the information Hyperwave provides.
- **B4.2**: I am satisfied with the quality of information provided in Hyperwave.
- **B4.3**: I am satisfied with the accessibility of information on Hyperwave.
- **B4.4**: I am satisfied with the depth (quantity) of quality information on Hyperwave.
- **B4.5**: Overall I am satisfied with the information on Hyperwave.

---

**Figure 5.18: Information satisfaction: Transmission**

Compared to all the divisions when reporting on information satisfaction, Figure 5.18 (B4.1) seems to contain the highest level of information satisfaction than any of the others. Item B4.2 and B4.3 have equal negative and positive perceptions from users. Figure 5.19 presents the perceptions of the distribution division.
Figure 5.19: Information satisfaction: Distribution

Figure 5.19 shows perceptions of users in items B4.4 and B4.5 as the highest. Most users in the distribution division agreed with the depth of quality information in the DMS, yet a considerable number of users in item B4.1 were not necessarily satisfied with the information provided within the DMS. Figure 5.20 represents the total percentages of divisions according to item and the overall TAM variable percentage for information satisfaction.

![Graph showing information satisfaction]

Even though the total averages are all 60% and slightly above regarding information satisfaction, and some divisional values reach into percentages of 70, the 30-40% dissatisfied users remain a great concern. The next section discusses users’ perceived usefulness towards the DMS.

5.5 Perceived usefulness

The manner in which users of a document management system perceive the usefulness of the system itself plays an important role in their using the system effectively. The perception of the usefulness of the system can only be elaborated on by the user. When a user has confidence in navigating through the DMS the user will more likely deem the DMS as useful.

According to this study a user perceives the DMS as useful when the user utilises the DMS on a daily basis and understands how to navigate through the DMS. Similarly, Bwalya (2011: 114) also found that perceived usefulness is the extent to which a person considers and
believes that the use of a technology system will enhance work productivity. In this way work productivity can be increased. When work productivity is increased the user should be able to perform tasks faster as the user would be more acquainted with the DMS and thus will be more able to retrieve documents from the DMS. Ultimately the user will have a positive attitude towards the DMS with efficient work as a result.

Figure 5.21 presents users’ perceived usefulness of the core divisions combined. In Figure 5.21, it is worth noting that the grading of the graph changes from the previous section, the study considers the grading (never and very rarely) as negative and (often and always) as positive and the grading (sometimes) is seen as neutral.

Figure 5.21: Perceived usefulness: three core divisions

In Figure 5.21 without concentrating on the neutral section, the graph is leaning more towards the negative than the positive side. Almost half of the users from all divisions disagreed that the DMS allows for performing tasks faster (C5.3), while only half (51%) of the users have a positive attitude towards the DMS (C5.5). Figure 5.22 shows the Generation users’ perceptions of the usefulness of the DMS.
Figure 5.22: Perceived usefulness: Generation

Figure 5.22 takes on a similar trend as Figure 5.21. The Generation Division had the biggest issue with the system quality and the least issue with information quality. This finding is therefore not surprising and probably linked to poor system performance being the highest in Figure 5.22 (C5.3). Figure 5.23 reflects the perceptions of perceived usefulness from the Generation Division.

Figure 5.23: Perceived usefulness: Transmission

According to Figure 5.23 (C5.2) only 12% of users in the Transmission division believe that the DMS increases their work productivity. According to the graph there are very high
percentages across the entire graph where users perceived the usefulness of the DMS as neutral. In C5.2 for instance almost half of the users from the Transmission Division had a neutral perception. Most of the perceptions in the graph were leaning more towards the negative side than the positive. Figure 5.24 discusses the usefulness perceptions of Distribution users towards the DMS.

**Figure 5.24: Perceived usefulness: Distribution**

In Figure 5.24 more users in C5.1 only used the DMS sometimes, 22% often and 24% rarely. In both C5.2 and C5.3 users mentioned that the DMS rarely allows them to perform tasks faster and rarely increases work productivity. There is a need for a DMS in the business; however, it is evident from Figure 5.21 that users are not happy with the user-friendliness of the system. In section 5.7.1 Figure 5.36 D8.1 discusses more on users’ general attitudes (user-friendliness) towards the DMS.

The TAM variable’s perceived usefulness has five choices of grading (never, very rarely, sometimes, often and always). For the sake of consistency the study considered the grading “Sometimes” as neutral. This grading was thus not featured in Figure 5.25 and is not discussed.
The state of these percentages is a great concern as the usefulness of the DMS is a vital TAM variable. Perceived usefulness is important in that it links to all the TAM variables and ultimately leads to the user’s behavioural intention to continue using the DMS. In Figure 5.25 (C5.4) Transmission Division is the highest, however is lowest in (C5.3). The Distribution Division has the lowest total average and these percentages are rather disabling. The next section discusses the TAM variable’s perceived ease of use will follow the same pattern as for the other variables.

5.6 Perceived ease of use

In order for users to perceive the DMS as easy to use, they must have first struggled with the DMS itself. One’s first encounter with any technological device can be rather daunting, however, when users learn the rules and shortcuts of a device they train their minds to navigate through it with greater ease and comfort. In a similar manner the DMS can be made one’s own when the user is willing to learn and understand the necessary processes to follow. This will only happen when a user becomes a regular user of a system, which is not currently the case as seen in Section 5.5 and Figure 5.25.

According to the study the user perceives the system as easy to use when the interaction with the system is easy in using the system, adding documents to the system and getting the DMS to do what the user wants it to do. Saade and Kira (2007:1190) agree that perceived
ease of use is the degree to which a user believes the technology system will be free of
effort to a large or lesser extent. When a user of a system considers the system to be easy
to use, it is positive as the user does not in any way feel challenged. Henceforth
understanding the extent to which users find the DMS as easy to use, is important. Figure
5.26 presents the findings for the perceptions of perceived ease of use across the divisions.

Figure 5.26: Perceived ease of use: three core divisions

Figure 5.26 shows an almost 50% split between users perceiving Hyperwave as easy to use
as those not regarding it as easy to use. More than half of the users in item C6.3 do not find
it easy to find documents on the DMS, with 19.5% of the users strongly disagreeing in this
matter.

In this instance the suggestion of a functional search engine may be a potential solution to
the problem. In terms of Hyperwave being perceived as easy to use, a 60%-40% split was
reached with more users perceiving ease of use than not. Figure 5.27 presents the
perceived ease of use from the generation division with a brief discussion.
Although 64% of the users perceive Hyperwave as easy to use, the same 50%-50% split exists on most of the other aspects. Considering this trend, it is essential to determine the reason for low reflected use and hence the TAM variable analysis will shed the necessary light on the topic.

With 62% of users finding interaction with Hyperwave easy (C6.1) and 60% perceiving Hyperwave easy to use (C6.2) in the Transmission Division, the reason for low use as
mentioned in the discussion to Figure 5.27 is essential and can therefore not be ascribed to the ease of use of the system.

Figure 5.29: Perceived ease of use: Distribution

Although a 50%-50% split is recorded for C6.1 and C6.2 in terms of ease of use, fewer users easily find the documents they need (C6.3) or manage to comfortably use the system to accomplish adding documents (C6.4) and other tasks (C6.5). The total divisional comparison in Figure 5.30 clearly shows these lower percentages for the Distribution Division.

Figure 5.30: Perceived ease of use: divisions’ compared positive responses
In Section 5.8 the open ended answers give clear reasons why the findings are recorded as such in Figure 5.30. The following section discusses the TAM variable behavioural intentions.

5.7 Behavioural intentions

Having the intention to use the document management system depends on what the users deems in their minds to be useful. Therefore all the perceptions of TAM variables that have been discussed above are important to consider. And all levels of frustration, expectation and success are encapsulated in the variable behavioural intention.

The study deems the user’s behaviour as positive when the user has intentions to use the system as a routine part of work, uses the system at every opportunity, has the intention to put the system to use, has the intention to visit or revisit the system in less than a month and when the user has the intention to be trained in order to increase skills in navigating and using the system more effectively. Figure 5.31 reports the perceptions of users across all divisions on the TAM variable behavioural intention.

Figure 5.31: Intention to use Hyperwave: three core divisions

All but one item reflect a 60%-40% split where more users have the intent to use the system more often. Only D7.3 reflects an almost 50-50% split.

More about this behavioural intention towards the DMS is expressed in Section 5.8 of the open ended responses. Figure 5.32 is a discussion of the behavioural intention from the Generation Division.
Figure 5.32: Intention of use: Generation

Figure 5.32 shows that the Generation Division closely resembles the combined finding in Figure 5.31. Figure 5.33 shows an almost 70-30% split for D7.5 and D7.1, while the same 60-40% split reflects for D7.4 and D7.2. The users in the Transmission Division clearly show a greater trend towards their intent to use Hyperwave more regularly. Figure 5.33 is the perceptions of the intentions of use from the transmission division.

Figure 5.33: Intention to use: Transmission
In Figure 5.33, despite the fact that the graph is leaning more towards the positive side, the extremely unlikely perceptions of users are significant and pose a great concern. More than 60% of users intend to attend training to increase their skills to use the DMS (D7.5). While nearly half of the users do not intend to use the DMS over the next year (D7.3). Figure 5.34 presents the behavioural intentions for the Distribution Division users.

**DISTRIBUTION**

- **D7.1** I intend to use Hyperwave as a routine, part of work over the next year.
- **D7.2** I intend to use Hyperwave at every opportunity over the next year.
- **D7.3** I intend to increase my use of Hyperwave over the next year.
- **D7.4** I intend to revisit Hyperwave very shortly in less than a month.
- **D7.5** I intend to attend training to increase my skills on Hyperwave.

**Figure 5.34: Intention to use: Distribution**

In contrast to the Transmission Division, the Distribution Division shows a greater reluctance to increase its potential use of the system.

Of the users that are already using the DMS it can be assumed that they aim to continue using the DMS, however, they do not necessarily aim to increase their use of the DMS. The next discussion is the representation of Figure 5.34 of the total percentage for divisional items and TAM variable behavioural intention.
Figure 5.35: Behavioural intention: divisions’ compared positive responses

Figure 5.35 reflects the positive responses for behavioural intention for all the divisions compared. The general percentage of the intention to use the DMS from all three divisions is relatively low. Higher percentages of DMS users from the generation division intend to attend training in order to improve their skills to improve use of the DMS more than the other divisions.

Distribution and Transmission have the same sentiments in terms of revisiting the DMS in less than a month. Across all the divisions the intention to utilise the DMS over the next year is low. Users from the Transmission Division intend to use the DMS over the upcoming years somewhat more than the other divisions. As for the users from the Distribution Division, remarkably less of them plan to use the DMS as a routine part of work over the years to come.

Balawaya (2011:116) has found that since its inception, there have been many modifications and enhancements to improve accordingly the effectiveness and the more relevant modelling for the technology system uptake. According to Pedersen, (2005:209) there should be some extensions on the set of determinants for perceived usefulness and perceived ease of use. As these are the major variables which eventually lead to behavioural intention.
To add, since all levels of frustration, expectation and success are encapsulated in the TAM variable behavioural intention, Figure 5.35 reflects worrisome percentages. Reasons for this will be revealed to some extent in the open ended questions.

Further investigation is needed to determine reasons for likely use and how the DMS can be harnessed to find reasons for the unlikely use. In light of the above mentioned, three issues are raised, first, is the DMS required? Second, is a different DMS required? And third, is there an improved way to work or harness the DMS required? The most feasible question is addressed accordingly by the general attitudes towards the DMS in the next section.

5.7.1 General attitudes towards Hyperwave

Users from the core divisions had the opportunity to express themselves in terms of the perceptions users may have towards the DMS. The general common thoughts that users had were expressed by means of selecting a yes or no answer for each of the categories; whether or not Hyperwave is frustrating (D8.1), user-friendly (D8.2), replaceable (D8.3), worthless (D8.4) and should be scrapped (D8.5). The general thoughts from the three core divisions are presented according to the above categories in Figure 5.36 below.

![General attitudes towards Hyperwave](Figure 5.36: General attitudes to Hyperwave)

Generally Figure 5.36 shows that the core divisions have similar attitudes towards Hyperwave. In (D8.1) for instance, more than half the users in all divisions are frustrated with

---

76
the system, compared with Figure 5.10 where overall, users scored system satisfaction 56%.
If almost half of the users are not satisfied with the DMS, this is reason enough to improve
the system accordingly. Section 5.8 elaborates more on improvement ideas from DMS users.

In D8.2 more users did not consider the DMS as user friendly; this is true particularly from
the users in the Distribution Division (66%). Considering Figure 5.35 (D7.3) this is no
surprise as only 38% of users from the Distribution Division intend to use the DMS over the
next year. The overall percentage (54%) in Figure 5.35 is a rather low percentage for the
intended use of the DMS. In section 5.8, Figure 5.39 (E7.3) users relate the user friendliness
of the system to the search facility.

Many users from all three divisions mentioned that the DMS is replaceable (D8.3), and
should be replaced with some other document management system. In Section 5.8, Table
5.1 (E5) users mention that the DMS should be replaced, however, not all of the responses
express that the specific system should be replaced. One user mentioned that the system
should be replaced with Share Point Table 5.1 (E5.5).

It is evident that users want to use a system that is user-friendly and not frustrating in any
way. Henceforth many users mentioned that the system is replaceable (D8.3) yet again in
D8.4 above. 70% of users considers the DMS as worthy to have in the business. The DMS
is worthy of having in the business as it keeps vital corporate knowledge necessary for
everyday work, however it has to be a system that works for its users.

Scrapping the DMS would not mean that the business would leave the users without a
system to work with. It simply means that users feel that there is no hope for the current
system and thus a new system should be implemented with the users in mind.
Implementation ideas from users are discussed further in Table 5.1 (E4). In Figure 5.36
(D8.5) almost half of the users from the Distribution Division mentioned that the system
should be scrapped, while many users from the other core divisions mentioned that the
system should not be scrapped.

In light of the above, it is evident from all three core divisions that the DMS itself is a worthy
system in the company and that users recognise its value. However, adaptations need to be
looked into to make the DMS more inviting and appealing to its users. Eskom needs to
remember that the DMS exists for the user and should therefore at all times reflect the needs
and meet the expectations of the user.
In terms of the DMS being required, replaced or improved the reported findings show that the DMS is required, but the findings are divided on improving or replacing it. Considering the high capital investment, it is probably worth looking into harnessing what is working well for some users and expanding on that for others.

If indeed the system is to be harnessed, ideas for doing so should come from the users themselves. Similarly if indeed the DMS should be replaced, valid reasons should come from the users of the DMS. The following discussion presents the user’s ideas for possible adaptation of the DMS.

5.8 Open ended answers of possible adaptation for the DMS

There is always room for improvement in any technology. An IT-team will be able to develop features in the DMS which the users prefer and find useful for their everyday work. In the following discussion, users of the DMS from the three core divisions shared their views and ideas on how the in-house DMS should be adapted accordingly.

Some of the common ideas that were extracted from the users’ open ended answers are presented according to themes in Table 5.1. It is important to note that the number of opinions represented does not reflect the total number of users that were sampled; these are only the common ideas that were tallied and presented accordingly.

Table 5.1 Verbatim responses from the Core divisions

<table>
<thead>
<tr>
<th>Theme</th>
<th>Verbatim responses clustered according to themes</th>
</tr>
</thead>
<tbody>
<tr>
<td>E1. Attitude responses</td>
<td>E1.1 “The more you use Hyperwave the better you can use it. Therefore the attitudes of all employees in Eskom has to change.”</td>
</tr>
<tr>
<td></td>
<td>E1.2 “More people should look into using Hyperwave it is an excellent document system.”</td>
</tr>
<tr>
<td>E2. Duplication of system responses</td>
<td>E2.1. “The Hyperwave is the most crucial system in the company. One problem we have is that of duplication of system within the company.”</td>
</tr>
<tr>
<td></td>
<td>E2.2. “The Hyperwave team need to investigate this mess and sort it out.”</td>
</tr>
<tr>
<td></td>
<td>E2.3 “Personally, I think that they should either review Hyperwave as a whole or scrap it out and introduce another DMS that the employees would be happier to use, as there are many duplicate DMS in Eskom.”</td>
</tr>
<tr>
<td></td>
<td>E2.4 “We currently use shared drive as a DMS, if Eskom can make a decision to move to Hyperwave completely that is when this system will work properly.”</td>
</tr>
</tbody>
</table>
E2.5"The system should be rolled out to all departments in Eskom. Meaning that all people must be made to use the system like it or not."

E3. Navigation process responses

E3.1"There needs to be pop up messages showing the user what to do. In order for better navigation."

E3.2 A representative of Hyperware must make part and parcel of each and every department within Eskom. In order that if we have difficulties navigating through the system all queries can go to that person."

E3.3 "I think it's a very user friendly system, and navigating it is not a problem either, but the system is as good as the documents that get uploaded onto it. People can't complain about not being able to navigate through it."

E4. Implementation process responses

E4.1"Eskom needs to work on its implementation process. Most times I feel a bit challenged when having to work on Hyperwave. Most of the people in Eskom do not even know what Hyperwave is."

E4.2"Hyperwave can be a good system, the IT people just need to communicate with the users efficiently in terms of the changes that are likely to happen with the system."

E4.3"The Hyperwave system needs serious revisiting and functionality upgrading to meet the needs of the end users."

E4.4"The implementation process should be reviewed."

E4.5"Must be implemented again, this time well."

E5. Replacement of DMS responses

E5.1"I do not think there is hope for this system. They should really consider scrapping it out of the company and start again with another better system."

E5.2"They should replace it with something more user friendly. That would help a lot."

E5.3"It is not user friendly, must be taken out of Eskom. We can't even find the information we need. I am constantly frustrated when I access this system very bad."

E5.4"I don't like the Hyperwave system it is a daunting system and makes me feel inadequate. If they can just change the whole system I think that would be better."

E5.5"The best thing they can do is get rid of it, rather get share point system."

E5.6"They can get a better system in place."

E5.7"Should be done away with, it is a sad system. Maybe it is because it frustrates me most times."

E5.8, "The system should be replaced with better system."

E6. Training responses

E6.1 "If people learnt how to use the Hyperwave system they would be able to use it. Therefore people must go for training."

E6.2 "I need to go for training I don't understand how to use the system."

E6.3 "I do not know about the others all I know is that I need intense training. Since I have not given Hyperwave much of my time to actually learn how to use it. I think if I do this, the interaction would improve."

E6.4 "I am little negative towards the system mainly because I am unable to use it, but since I am not the only one who doesn't know how to use it well, then the system
definitely has a problem. Maybe we need training.”

E6.5 “There should be constant training sessions for Hyperwave. I know they are thinking of rolling out the system. Before they do this they must talk to us the end users.”

E6.6 “Hyperwave has great potential I think many more people should try and use it. If they can’t they should go for training. Because the Hyperwave system is the companies brain. Thank you.”

E6.7 “I think that managers should be brought on board to encourage their employees to go for training, thereafter strict monitoring should be done by managers to see if employees are putting Hyperwave to use.”

E6.8 “Do not ask me how, but people need to be punished for not using this document management system. That is the only improvement that is needed. The system is fine, or maybe they can also look into the training.”

E7. Search facility responses

E7.1 “Hyperwave is alright, the search facility is just not up to standard.”

E7.2 “The system is well contextualised with its documents but to retrieve the documents is a mission the search engine should fixed.”

E7.3 “The search facility must be changed, I think it is the only one that is making the system to be none user friendly and it is a very important aspect.”

E7.4 “Results on the search engine complicated. Seldom find info when looking for a document. Routes to information are very long. Uploading, editing and updating can be made simpler.”

E7.5 “The find documents search facility is bad. Must be fixed.”

E7.6 “Hyperwave is a user friendly system that has functionality that is very easy to learn and use. The one functionality that can be improved is the search functionality.”

E7.7 “Hyperwave needs to be managed all some of the documents I can never really find on the system and even if I use the search engine it doesn’t retrieve the documents I asked for.”

E7.8 “The layout is too clustered on Hyperwave, and the search facility is not in good condition.”

E7.9 “They should fix the search facility, when one search for a document it produces more than fifty results really beats the point.”

E7.10 “The system keeps good contextual information in it but to retrieve this important information is a mission. Hence I think they should scrap it out or replace the search engine. I’m not trying to be rude or anything.”

E7.11 “I must be able to search using Author function, besides the title and or doc no only. Use many features to search for a document or various approaches not limited approaches. It’s being complicated.”
E8. Improvement of DMS

E8.1 “There is always room for improvement in any technology. See what people need and include it.”

E8.2 “Strong monitoring of the content loaded on Hyperwave needs to improve.”

E8.3 “They have to make it a compulsory tool for all employees in E skom to use. I believe that the system is friendly but can be improved as a whole.”

E8.4 “Process of storing documents should be made easy.”

E8.5 “Give tips when navigating.”

E8.6 “Consultation with end-users is always the best way to start. Involve end-user in the system set-up and ask for suggestions.”

E8.7 “Improve or enhance functionalities.”

E8.8 “It is a good system, just needs a constant facelift every now and again.”

E8.9 “It is difficult to use Hyperwave. Someone should look into the whole system and make serious changes.”

E8.10 “It is a relatively ok system, the IT team need to change most of the functionalities to be user friendly.”

E8.11 “Great potential exists within the Hyperware system. The team need to go do their work.”

E8.12 “Hyperwave needs to be more like SAP, it must have strict audit trails.”

E8.13 “The user interface should present clear options for staff and client users. I use it mostly as a client so my involvement is minimal when it comes to content management”

E8.14 “Usually it can be offline if you can speed up the access that would help a lot.”

E8.15 “For the most part understanding how to use hyperwave is crucial. The end user must thus be the focus, they need to be involved in that which is taking place concerning hyperwave if there is upgrading.”

E8.16 “Hyperware is not that bad a system. It just needs to be motivated well to its end users. If you need help with this ask me for some ideas.”

A brief discussion of the common ideas from users’ answers of the open-ended questions follows. .

5.8.1 Attitude
Users responded on the attitude towards Hyperwave indicating that the more users utilise the DMS, the more efficient users will become (Table 5.1 (E1.1 and E1.2)). Some users therefore feel that the problem is the users’ attitude towards the system. In Figure 5.25 it was found that most users across all divisions have a rather negative attitude towards the DMS.
Also, users did not feel that the system itself helped to perform tasks faster. In Figure 5.25 (C5.3) positive responses were very few. The perceptions of users towards the usefulness of the DMS are very important as they have the potential to shape the users’ attitudes to use the DMS more efficiently.

Also, as excellent as the DMS may be (E1.2), many users are not entirely satisfied with the system as was found in Figure 5.10 (B3.5). Only 40% of users in the Generation Division where satisfied with the overall interaction on the DMS, while only above half for the Transmission and Distribution Divisions.

There are several technological systems that are used in the company, and users’ true attitudes might be directed towards these systems. Some users made mention of the issue of duplicated systems in Eskom and commented on how all users should migrate in using just the one DMS. The next paragraph will elaborate more on duplicated systems.

**5.8.2 Duplication of systems**
The duplication of technological systems within a company can cause serious problems, as this would imply that the company’s knowledge is scattered. Eskom being such a prominent company as it is cannot afford to have its knowledge scattered.

In Table 5.1 some users mentioned that system duplication is one of the biggest problems in the company (E2.1 and E2.3). Some other users showed that there is potential for the company to have one operating system and should rid itself of the duplicated system (E2.2, E2.3 and E2.5). Eskom needs to be serious on the issues mentioned above; all users can be made aware that no other system than Hyperwave is to be used in the company.

If indeed all facets of the company’s knowledge can be gathered and all the TAM variables are ensured in the system, perhaps document management can be unified and all users can be taught only one way of retrieving, storing and searching for documents on the system. Therefore, users would be more likely to learn how to better navigate through the DMS with more ease and with much higher system satisfaction. The next paragraph discusses the responses of users in terms of the navigation on the DMS.

**5.8.3 Navigation process**
It can be frustrating if users find it difficult to be aware of where they are during their use of the DMS. Users commented on the navigation process of the Hyperwave system and made mention that it needs to be improved.

In a form of ideas to improve the DMS navigation process, one user mentioned that the DMS should have pop-up messages particularly in less obvious areas in the DMS (E3.1). The
The pop-up messages idea is an interesting one, as the DMS itself assists the user. This can have the potential of influencing the user’s perception of user-friendliness towards the DMS to increase.

Another user alluded to there being a designated person to handle all system issues in each division (E3.2). With regard to this idea, there are already document controllers in each division who are trained to navigate through the system well. Therefore perhaps these staff members could be made the DMS representatives for their respective divisions.

According to Figure 5.10 (B3.1) only half of the users from the Generation and Distribution Divisions are satisfied with the navigation process on the DMS. This means that the rest of each division’s respondents is not satisfied with this feature. Therefore, the pop-up messages idea could assist some of these users.

While there are others who are positive towards the navigation process of the DMS (E3.3), the fact of the matter is that some people are going to find the navigation and the use of the DMS easy to use and others not. This is evident from the findings in Figure 5.30 (C6.2) where just over half the respondents in the Distribution Division considered the DMS to be easy, 67% and 64% respectively of users in the Transmission and Generation Division considered the DMS as easy to use. Despite these higher percentages in Transmission and Generation, there is still a significant number of users that are not satisfied with the ease of using the DMS.

Perhaps users should have gone through the process of prototyping before the system was implemented. Prototyping a sample of users of a particular system is a cost effective process for the company. It has the capability of eliminating unnecessary events, such as users not being satisfied with the system. The next paragraph contains responses from users based on the implementation process.

### 5.8.4 Implementation process

The implementation process plays an important role in the acceptance of the users of the system. When the implementation is executed together with prototyping, there is more chance that the users will warm to the system. Some of the ideas below are what users have in mind about this issue.

Some users mentioned that the implementation process of the DMS needs work (E4.1, E4.3, E4.4 and E4.5). The system must have missed an important step if indeed there are some users who do not know what the DMS is (E4.1). Also if users feel challenged when using the
DMS (E4.1), it shows that some users do not find it comfortable to use the DMS, thus DMS usage becomes a burden. Figure 5.35, item D7.3 showed that very few users intend to increase their use of the DMS over the next year. With the above responses it is evident that some users are not really satisfied with the DMS.

The IT-team should communicate every update that pertains to the DMS (E4.2). This can be done by means of updating users with the changes that are taking place with regard to the DMS. Eskom could improve the current level at which users are using the DMS.

When the company takes the time to implement a new system for users, careful decisions need to be a priority. While there is a significant number of users who feel that the DMS can be re-implemented and improved accordingly, others feel that the DMS should be replaced. Perhaps if a new DMS is introduced, better measures can be taken to implement the DMS accordingly. The next paragraph discusses ideas on replacing the DMS.

5.8.5 Replacement of the DMS

When a user has utilised a particular technology and is frustrated with it, the first instinct would be to replace it. Many users felt that it was better that the DMS be replaced as they felt that there was no hope for the DMS.

Scrapping the DMS was one of the solutions for some of the users (E5.1, E5.2, E5.5, E5.6 and E5). In Figure 5.36 (D8.3) it is evident that most users consider the DMS to be replaceable. Yet again in the same graphs, this time in item D8.4, more users mentioned that the DMS is worth having in the company as it holds important documents for everyday use. This shows that users were not necessarily referring to the value of the Hyperwave system, but rather to a document management system that caters for their needs.

When referring to the replacing of the DMS in Eskom many users resorted to making mention of the user-friendliness of the system (E5.2). Considering Figure 5.36 (D8.2) more users in Distribution did not consider the system to be user friendly, likewise in Transmission and just over half in the Generation Division. The user friendliness of a system is very important and to have such a high number of users considering the company’s repository as not user-friendly cannot be a good sign.

A better system is one which makes it easy for users to find whatever it is they may be looking for. However, users also need to recognise their need to attend training sessions where they can be taught to use the DMS more efficiently. The following paragraphs will discuss some of the users’ responses pertaining to DMS training.
5.8.6 Training
Training taken up to improve users’ skills to utilise the DMS better, is essential for effectiveness, particularly when the users practice what has been taught and use the skill on a regular basis. Some users, when asked to give ideas on how the DMS can be adapted to better meet the users’ needs, many users related their ideas to training (E6).

If people were to put to practice what they had learnt during training sessions, the system could work more effectively for users (E6.1). Some users admitted that they needed training (E6.2, E6.3, E6.4). No doubt there are many more users with similar needs in the company. From Figure 4.3, it is evident that not many users are attending DMS training sessions. For instance in just half of the year (January 2012 – July 2012), there were only 48 users who had attended the DMS training. This is approximately 48 users from all core divisions. It seems that there is a possible rolling out of the DMS that some are aware of (E6.5).

While some users are not motivated to attend training (E6.4), other users are fairly positive about the DMS. Some respondents feel that the people are the problem as they are not trained to use the system and that if indeed they get the necessary training, results would be more positive (E6.7). One respondent feels that users should be punished for not using the DMS (E6.8). The fact that users are compelled to use the single repository as a means of a DMS in the company, needs to be communicated efficiently (E6.7).

Training followed by the application of what has been taught can make a big difference in the level of usage of the DMS. Bwalya (2011:144) suggests that employees be trained on how to use the DMS by showing them what information the DMS holds, how to extract it and how to utilise it in their work. However, the system itself would need to be improved accordingly, possibly some features such as the search engine need to be improved and adjusted. The next paragraph elaborates more on the users’ search engine responses.

5.8.7 Search facility
The search engine is an important aspect in any technology and if users express negativity on this feature, action needs to be taken as soon as possible. The search facility should be one of the most attractive features on the system, when users are able to search and find what they are looking for, the system becomes more attractive.

Users commented on the search engine of the DMS and mentioned that it needs fixing in order to be up to standard (E7.1 and E7.2). In Figure 5.30 (C6.3) the users’ perceptions in respect of the ease of finding documents was relatively low. Distribution, for instance, only had 39% of users satisfied with the retrieval process of the DMS, where Generation scored
42% and Transmission 52%. A new search facility needs to be introduced where users are able to search with keywords.

Some users blamed the user-unfriendliness of the DMS to the search facility (E7.3 and E.4). The Hyperwave search facility makes it difficult for users to find the specific document they are looking for (E7.5, E7.6, E7.9). Usually when users need a specific document, a request is sent to the Eskom document centre to find the documents for the user. Some of the users are able to find the documents, while other users have lost all hope for this systems feature.

Despite the fact that the DMS keeps sound, contextualised information users find the use of the search facility seriously frustrating (E7.8, E7.10).

The DMS in Eskom should be able to retrieve documents with great ease; the repository is the Google of the company (E7.11). Users need to be satisfied with this feature to a large extent. The above responses show that the search engine needs to be improved.

Perhaps improving the features that users find to be a problem could help in increasing users’ positive perception of the DMS. The next paragraph will discuss the users’ responses pertaining to DMS improvement.

5.8.8 Improvement of DMS
Improving the DMS rather than simply purchasing a new system for the company can save costs. Particularly when the improvements done are focused on the user’s system needs. Some of the responses showed that the IT-team needs to be interested in the users’ perceptions towards the DMS, in order to notice what the users’ complaints are (E8.1, 8.15 and E8.16).

Some users, on the other hand, referred to specific improvements such as the process of storing documents (E8.4 and E8.2), navigational tips (E8.5) and involving end users if there are any DMS upgrades (E8.6 and E7.7). Users need to be involved in all of the improvements that are connected to Hyperwave. When users are included in the improvement stages of the system, they are able to use the system better and with enthusiasm. More so, the users will be able to see the benefits of the system.

Responses from users concerning the DMS are real ideas on and perceptions that users have of the DMS and these need to be taken seriously (E8.16). The mere fact that users took the time to even give some opinions on how the DMS can be improved, creates a platform for the DMS-team to approach users and request their input in adapting the DMS periodically (E8.15). The next paragraph will generally discuss the findings from the study and make conclusions and deductions from these findings.
Some respondents mentioned that the DMS itself is a good system, but that it only needs changes in certain areas, thus the IT should obtain research by experts in this field (E8.7 and 8.10). One user mentioned that the DMS needs to be more like SAP, having strict audit trails (E8.12), while another pointed out that the speed of the DMS needs to improve (E8.14).

Overall, attitude plays an important role in the user's perceptions of the DMS. While some users are frustrated with the navigational process and state of the search facility, others find that using duplicated systems that perform a similar function than the DMS works for them. However, for a company such as Eskom only one single repository should be used, where users are booked for training and are encouraged to utilise the DMS on a daily basis. Whether the system should be improved or replaced are the two major possible results highlighted by the findings in this study. The following section will discuss overall findings of the TAM variable.

5.9 Discussion
The application of the TAM in this study has produced sufficient results to give the necessary responses to the research questions. The factors used, information quality, information satisfaction, system quality, system satisfaction, perceived usefulness, perceived ease of use and behavioural intention are some of the major factors that determine technology system adoption. In agreement with this is Bwalya (2011:120) explaining the importance of appreciating the factors in adoption of technological systems as they are points of reference in this study, which aims to understand the user's behavioural intention towards the DMS.

Figure 5.37 below is a representation of the results obtained from the study from Figure 5.5, 5.10, 5.15, 5.20, 5.25, 5.30 and 5.35 an overall discussion of the obtained results follows.

<table>
<thead>
<tr>
<th>Information quality (62%)</th>
<th>Information satisfaction (62%)</th>
<th>Perceived usefulness (31%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>System quality (55%)</td>
<td>System satisfaction (56%)</td>
<td>Perceived ease of use (52%)</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Behavioural intention to use (54%)</td>
</tr>
</tbody>
</table>

The averages of the user’s perceptions towards the in-house DMS in all the TAM variables are below-average and should have been higher had the system been successfully accepted. If the user’s perceptions in the core divisions in Eskom reflect such low scores,
such ratings are reason enough to take measures and adapt the DMS to suit the user’s needs.

From Figure 5.37, 62% of users from the core divisions are satisfied with both the information quality and the information held in the DMS. The platform for information improvement for obtaining more user acceptability exists. Policies and procedures need to be put in place for consistent layout and relevant information of the information in the documents residing in the DMS.

In Figure 5.37 it is evident that users have more of an issue with the system rather than the information. Information quality and information satisfaction scored 62% and system quality and satisfaction 55%. Almost half of the users are not satisfied with the system, and this requires the necessary adjustments.

From this finding it can be said that the improvement or replacing of the DMS has the potential of increasing the users’ perceptions towards the information residing in the system. This is evident since, according to Figure 5.37, the users’ perception of the system is not only linked to the users’ perception of the information residing in the DMS, but also to the users’ perceived usefulness of the DMS (Wixom and Tod, 2005). Therefore, when the user is satisfied with the information in the DMS, the user may easily perceive the DMS as useful.

Also, according to Figure 5.38, when the user is satisfied with the system quality and the user-friendliness of the DMS, the user will perceive it as easy to use (Wixom and Todd, 2005). Overall, only 52% of users perceive the DMS as easy to use, the rest of the unsatisfied 48% of users, pose as a great concern and just this alone should motivate immediate action from the relevant stakeholders.

Research (has found that TAM’s usage of perceived usefulness and ease of use varies according to the local and cultural context (Bwalya 2011:115). Where the prediction prowess is higher in the West with 45%-70% accuracy levels, in the East it is 10%-35% accurate in most cases (Rose and Straub, 1998:42).

It is of paramount importance that users perceive the DMS as easy to use as ultimately this affects the users’ perceptions of the usefulness of the DMS. It is evident from Figure 5.38 that all the TAM variables are connected and, as mentioned in section 5.5, Figure 5.25 perceived usefulness is a vital TAM variable as all the TAM variables are linked to perceived usefulness and this ultimately leads to the user’s behavioural intention of whether the user will continue using the DMS. Furthermore, only 31% of users in the core divisions perceive the DMS as useful, while only 54% intend to use the DMS over the next year.
Although users acknowledged the fact that the DMS is worth having in Eskom in Figure 5.36 (D8.4), the overall findings have shown that users understand the need of a document management system, however there is low satisfaction with the current DMS (Figure 5.37; 56%). Therefore, this should be motivation enough to replace the current DMS with one that not only is user-friendly but will also address all users’ information and system needs.

From Section 5.8 it seems that some users believe that the DMS can be improved according to the needs of the users. This is also evident from Table 5.1 (E.5) as some users’ responses were centred not only on the improvement of the DMS but also on users attending training to develop more skills to be able to use the DMS more effectively.

Bwalya (2011:144) identified some other factors leading to technological systems failure, such as resistance to change by the user, lack of technical buy in by different users, lack of trust in DMS platforms and lack of clearly defined strategic implementation plan. It does not help having a technological device in place where its users are not able to utilise the DMS effectively.

### 5.10 Summary

Much information was leveraged from the users to understand exactly that which the users want from the DMS. Ultimately two options have emerged from the study. From the findings, the study has found that the responses are divided, where some users want the business to get rid of the system as it is frustrating and not user-friendly, whilst others believe that there can be technological and user attitude improvements. Since this is the case the capital expenditure of either replacing or improving the DMS is weighed. The following chapter provides recommendations and conclusions to the findings, starting off with a synthesis of how the research questions have been addressed.
Chapter 6:

Synthesis, recommendations and conclusions

6.1 Introduction
This chapter commences with a synthesis which highlights the findings of the study by means of showing a clear indication of the manner in which the research questions were answered. Recommendations regarding Eskom are discussed with ideas on what should happen with the DMS, including recommendations for future research that needs to be conducted. Concluding arguments and comments make up the final parts of this chapter.

6.2 Synthesis
The study used the TAM variable to answer seven crucial questions pertaining to the perceptions of users towards Eskom’s in-house DMS. The first three research questions were discussed in chapter 4, where information was extracted from the DMS itself. The information extracted from the DMS was only focused on the core divisions of Eskom, namely Generation, Transmission and Distribution. The study managed to gain relevant information from each question and each was answered in the following manner.

1. What are the document management processes of the in-house document management system?

The study showed that document management is important in Eskom and thus follows a defined process. Before a document is created, the information need is expressed in the department or division, usually by the manager. To make a document available the document controller, compiler, functional responsible manager and the authoriser of the document are identified to be involved.

The DMS was analysed and study found that the in-house DMS has storage and retrieval capabilities of documents readily available for users. Users are able to search for documents using title, author and the document’s unique identifier. Security of confidential documents is ensured by means of DMS rights awarded only to the relevant users of the particular document.

2. To what extent has the current document management system been used from January 2008 to July 2012, in terms of downloading, accessing and logins?

The usage statistics from the core divisions of accessing, logins and downloading documents showed that Distribution, then Transmission and then Generation seemed to be making most use of the DMS respectively.
3. How many users have been trained on the DMS to further enhance their knowledge of using the DMS effectively?

There are two types of users; the guest and the identified user. All types of users can attend training to improve their skills and use the system more effectively. Usage statistics of only the core divisions was extracted from the DMS. Approximately 700 employees from a possible 1000 in each division ought to be using the DMS efficiently since all these employees are working in offices. Statistics from January 2008 – July 2012; 40, 45 and 48 employees from the Generation, Transmission and Distribution Division respectively were trained. The study showed that only 40 from 700 employees were trained. The rest of the 660 did not receive training and these numbers are worrisome.

The last four questions were discussed in Chapter 5, where 150 were sampled from the core divisions. The TAM was used to find answers to these important questions. The TAM variables that were used included, system quality, system satisfaction, information quality, information satisfaction, perceived usefulness, perceived ease of use and behavioural intention. These last four research questions were answered by means of a questionnaire, Appendix A. In short this is how users perceived the TAM variables.

4. What are the perceptions of users in terms of system quality, system satisfaction, information quality and information satisfaction using the DMS?

In terms of users’ perceptions towards system quality, the study found that the Transmission Division achieved more desired results than the Distribution and Generation Divisions. Showing a greater positive response for the quality of the DMS was the Transmission Division compared with the other two, although it was a small margin of difference. The ability of the DMS to retrieve relevant information and avoid irrelevant information was the main concern regarding system quality. It was summed up then that the search facility needs to be improved accordingly.

Only half of the users from each of the three divisions were satisfied with the system. The Generation Division was the least satisfied followed by the other two divisions. Findings showed that users were mostly not satisfied with the navigational process of Hyperwave. This can be due to a lack of system training or that they are simply not satisfied with the DMS. The DMS satisfaction of the user needs to be ensured at all times. If the user is dissatisfied with the DMS, he / she will be discouraged from further using the DMS.

The DMS is the one repository which caters for the user’s document needs. Therefore the information quality residing in the DMS needs to be up to standard. Despite the fact that the
information quality was higher in rating compared to the other discussed TAM variables, there still continues to be substantial perceptions of users who are not satisfied with the information quality of the system. Before information is fed into the system it needs to undergo an auditing process in order to ensure quality. The Generation Division rated information quality higher whereas Transmission and Distribution had the same perceptions.

The same number of users from all three divisions perceived the information quality and satisfaction in the same light. The few other dissatisfied users, however, remain a great concern.

5. What is the perceived usefulness and ease of use of the system?

Whether the users perceive the system as useful or not will influence their attitude towards the DMS. Perceived usefulness is the one variable that links to all other variables and ultimately to behavioural intention. The Distribution Division had the lowest total averages which posed to be disabling. Equally the Transmission and Generation Divisions did not score well either. Perceived usefulness was ultimately the lowest perceived TAM variable compared to all other variables.

When the interaction and navigation of the system is easy to use and understand the user will most likely perceive the system as easy to use. Only half of the users perceived the ease of use of the DMS positively, the rest of the other half posed a great concern. The Transmission Division was more satisfied with the ease of use of the DMS than the Generation and thereafter Distribution Divisions.

6. What are the behavioural intention, and the reasons for the usage patterns of the in-house document management system?

The study deems the user’s behaviour as positive when the user has intentions to use the system continuously as a routine part of work over a period of time. The general intentions to use the DMS from all three divisions were relatively low. The Generation Division had much higher intentions to attend training in order to improve its skills for improved use of the DMS compared to the other divisions. Also, Transmission intended to use the DMS over the upcoming years compared to the other divisions. On the other hand, fewer users from the Distribution Division plan to use the DMS as a routine part of work over the next year. All levels of frustration, expectations and successes are encapsulated in the TAM variable behavioural intention.
Users had the opportunity to give reasons for their lack of intention to use the system over the years. Users’ responses were captured by means of a graph. The study showed that users are generally frustrated with the DMS as many mentioned that it is not user friendly. Many of the users feel that the DMS is worthy of having in the business, although a significant number of users agreed that the current system can be replaced with another system that caters for the system and information needs of the users.

7. How can the DMS be adapted in order to meet the document management needs of the DMS users?

Users also had the opportunity to express how the DMS can be adapted to suit the needs of the users. Where some users mentioned that the attitude of the employees towards the DMS was the problem, others mentioned that the problem may be with the many other duplicated systems and especially the search facility. Many others felt that the navigational process of the DMS was not easy to follow and therefore some users admitted that they themselves needed the necessary training to use the system.

The study also showed that the implementation process of the DMS might be the very problem, as some users do not know of the existence of Hyperwave in the company. Therefore, if the system is to be implemented again, high user consultation will have to be ensured. While some users expressed that the system had potential to be improved, others simply suggested that the system be replaced with one that works and caters for users’ system and information needs. The following paragraphs discuss recommendations produced in the study.

6.3 Recommendations

Eskom’s in-house DMS is generally deemed as worthy to have in the business. However, there are many factors in the DMS which are not reflecting the needs of the users. These factors have been thoroughly communicated by the DMS users in this study.

The number of users that respectively believe that the DMS can be improved and/or replaced is equally significant. The interest of divided perceptions of users towards the current DMS and of the business is carefully considered by the study. Carefully considering the benefits of both options is vital, and either way the study has reached recommendations regarding Eskom and of future possible research.

6.3.1 Recommendations regarding Eskom

Phasing out the current system and replacing it with another system such as Share Point is an option for the business. Some of the benefits of SharePoint include allowing users to share information across boundaries. Share Point provides document management and
team collaboration tools where relevant information can be centrally stored and maintained. The search engine is easy to use as it retrieves only relevant documents that have been searched by the user.

The financial implications to scrap the current DMS and replace it with another may seem to be more costly than simply improving the system. However, when comparing the amount of work and effort required from both the users and the IT-experts to actually improve the system with the energy it would take to introduce and roll out a brand new DMS, the cost and efforts would have to be weighed up against each other.

If indeed the system is improved, the IT team would have to find ways of first improving the search facility to suit users’ needs, and the appearance and operation of the DMS accordingly. Second, a sample of users from each division would have to be mobilised where an in-depth user consultation for system improvement is done. Sampled users would have to be made DMS representatives for their respective divisions where it would be these users, along with the manager, who motivate others in the division to effectively use the improved DMS.

On the other hand, if the system is replaced with a suitable DMS such as SharePoint much work would equally be required. The transition plan in this instance should therefore not be overlooked. In-depth user consultation and designing the system to address the information and system needs of the user, would be necessary. In this instance users from the different divisions would have to undergo prototyping where they are involved from the initial implementation stages.

As much as Hyperwave has already received a bad name for itself among a significant number of users in the business, scrapping the current DMS and replacing it could equally become daunting for many other users. Therefore, if replacement is the choice, vigorous change management, training and awareness would have to be applied in the roll-out plan.

It should not be overlooked that improving or replacing the DMS will not only have financial implications but will also include psychological, emotional, varying attitudes and great effort from the users and the IT-team to make this improvement or replacing of the DMS a success, of which both efforts are well worth it.

According to the findings the users’ negative perceptions towards the DMS are deeply rooted. Considering the financial, psychological and emotional implications of replacing or improving the DMS, it seems much more effort would be required to improve the system since user's attitudes and satisfaction have already been tainted. Just cleaning that would
take much more time before the business can eventually reap the positive benefits and the intended behavioural intentions from users. The business can be in a much better position to reap the benefits much sooner, if the people aspect of implementing the system is not neglected in the initial stages.

Whichever option the business decides to apply, it is important to understand that if the DMS is to be used efficiently by its users, maximum satisfaction and quality of the system and the information in it need to be ensured. When information and system quality are ensured, and emphasis is on finding ways to improve the ease of using the DMS, the system will become more useful to the user. In turn the user will not only be satisfied with the DMS as a whole, but more so the user will also have intentions to use the DMS on a daily basis in order to produce efficient work on a daily basis.

Results of employees' work will eventually permeate through in the reaching of the Eskom goals and objectives. To what extent Eskom's goals and objectives are reached with quality, will depend on each individual employee in the business. The perception of each user of the DMS is vital to consider if ultimate quality and satisfaction are to be ensured.

Despite the fact that it makes more economical sense for the business to improve the DMS, improving the DMS has the potential of creating divided emotions within the users since users have already experienced Hyperwave. Thus, users may struggle to approach the improvement plan with a positive attitude.

Hyperwave already has a bad name with its users. This in turn influences the users' attitudes towards the DMS. Despite the fact that the DMS can be improved, great effort needs to be applied by the DMS team and the users themselves, as both parties will have to be determined to make the necessary technical and attitude changes to benefit from the satisfaction of the improved DMS.

In light of the dynamics, business culture, environment and most importantly the findings, the study recommends that the DMS be replaced. This gives an opportunity for all in the business to be introduced to the company's only document management repository and for the people aspect of introducing the new system not to be compromised. Users in this way learn to share the same line of thought concerning the system and come to an understanding that the navigation, system processes and efficient use of the in-house DMS are compulsory to grasp and apply for the successful achievement of Eskom's goals and objectives.
Considering the discussion above it is evident that SharePoint has the capabilities of addressing user needs to a larger extent. This has the potential of causing a ripple effect to those coming into the business as training would have to be attended during the first week of recruitment. What is more, replacing the DMS gives an opportunity for the business to not compromise on the information and knowledge management in the business. Having the only DMS in place will ensure the united usage across the business and having a centrally accepted repository among users.

The IT-department needs to be of one mind with the employees when implementing a new document management system for instance, it is important that prototyping is not neglected. Prototyping is having a sample of users to test and try a potential system which aims to be implemented in the company. The users then have the opportunity to give feedback on how the system can be adapted to suit the users of the company.

6.3.2 Recommendations for future research
Some of the study’s limitations and recommendations are included in the following paragraphs.

6.3.2.1 Limitation of research
The study used univariate research to address the research questions by means of the TAM Variables. However, a multi-variate research can be conducted for future similar research where broader and findings can be made.

Out of a possible 10 divisions only 3 core divisions made the population of this study and from those only 150 users were sampled. Future research can be conducted where a larger population and sample are used even within the divisions and the entire company. More meaningful findings can possibly be leveraged from those sampled.

The study specifically used the TAM variables of Wixom and Todd (2005). Future research can look into selecting those variables which are relevant and unique for the research environment. Perhaps using an already existing TAM and adding the relevant variables as one continues in the study.

During the discussions of the findings the study divided the positive and negative responses and only used the positive responses and thus only had discussions by means of comparison. Future research can look into setting a benchmark where there is a positive percentage that the researchers can measure their findings with. This makes for easier and more effective reporting. The next section concludes with arguments and comments.
Future research opportunities in Eskom exist, where the change management acceptance of the DMS among users can be investigated. Appropriate implementation strategies uniquely designed for the Eskom business can be analysed. The final section of this study concludes with arguments and comments.

6.4 Conclusion
The DMS has document management processes that can be followed to register and publish documents. Users are made up of two groups, namely the guest user and the identified user. Findings have shown that training attendance is very low across the business, with similar results reflected in the usage statistics. If users from the core divisions reflect such poor system usage and training results, this does not bode well for the entire business.

The TAM variables have shown that users are not satisfied with the DMS, which needs improving or replacing. These parameters were weighed in the study, and recommendations were communicated accordingly.

In brief, it can then be said that perceptions of users towards the DMS were divided, while half is satisfied with the information, system, usefulness and ease of using the system the other half is not satisfied. According to the findings a cross road emerged where either the system should be replaced or improved upon. The benefits of replacing or improving the DMS were weighed and the study suggested that the system be replaced. Further, in-depth user consultation and careful implementation plans will have to be ensured during a possible transition from one system to the other.
7. References

A


B


W


Y


Z


Appendix A

Letter of Informed Consent

Title:  User perspectives on document management system efficiency at Eskom

Department of Information and Knowledge Management
University of Johannesburg

Investigator(s):  Ms Mamatsheke Mabitsela

Supervisor:  Dr. Martie Mearns

1. The main purpose of this study is: To analyse the users' behavioural intention towards using the in-house document management system in Eskom and to establish user needs and requirements to investigate recommendations towards improving document management initiatives.

The overall study design will require that I participate in filling in a questionnaire for the data collection of the research project indicated above.

2. Confidentiality:

I understand that the information provided by this study may be used for research purposes, including publications in research journals. All individual information will be coded and at no time will my personal identity be revealed.

3. Voluntary participation:

The purpose of the study has been explained to me. I understand that participation in this study is voluntary and refusal to participate will involve no penalty or loss of benefits to which I am otherwise entitled. I may terminate my participation at any time I choose, without penalty. I understand that I may withdraw from participation at any point in the study with no penalty.

4. Benefits of participation:

The benefits of participating in this study are to further research only. The University of Johannesburg will not receive any money to conduct this study. My participation will make a contribution to further understanding how users perceive the in-house document management system in Eskom towards making recommendations for improving the system of records management.

5. Remuneration: I understand that I will not receive money or any other reward for participation.

In acknowledgement of informed consent please place your initials here:__________

Date:__________

Thank you for your cooperation and participation.
Questionnaire

Example of how to indicate your responses: Gender: Male or Female ‘x’, if you are a Female.

Section A: In this section we are interested on how you perceive the quality of Hyperwave and the information contained in it.

1. **System Quality:** To what extent do you agree with each of the following statements?

1.1 The layout of Hyperwave is easy to understand.

1.2 The organisation of the content on Hyperwave makes it easy for me to know where I am when navigating it.

1.3 When navigating Hyperwave I feel I am in control of what I can do.

1.4 The Hyperwave system is usually very slow to respond to my requests.

2. **Information Quality:** Please select your level of quality for each of the following sentences below.

2.1 The Information **accuracy** provided on Hyperwave is _______.

2.2 The **ease of reading** information on Hyperwave is ____.

2.3 The **clarity** of information provided on Hyperwave is ________.

2.4 The **reliability** of information provided on Hyperwave is _______.


Section B: In this section we interested in the level of your satisfaction with the system and the information contained in Hyperwave.

3. System Satisfaction: Please indicate your level of satisfaction for each of the following sentences.

3.1 I am satisfied with the navigation process on Hyperwave.
3.2 I am satisfied with the features on Hyperwave.
3.3 Overall I am satisfied with my interaction on Hyperwave.

4. Information Satisfaction: Please indicate your level of satisfaction for each of the following sentences.

4.1 I am satisfied with the information Hyperwave provides.
4.2 I am satisfied with the Quality of information provided in Hyperwave.
4.3 Overall I am satisfied with the information on Hyperwave.

Section C: In this section we want to explore your perceived usefulness and ease of use towards Hyperwave.

5. Perceived Usefulness: Please indicate your level of perceived usefulness towards Hyperwave for each of the following sentences.
5.1 How often did you use Hyperwave during the last year?

5.2 I feel that using Hyperwave increases my work productivity.

5.3 My attitude towards Hyperwave is positive.

6. **Perceived Ease of use:** Please indicate your level of perceived ease of use towards Hyperwave for each of the following sentences.

6.1 My interaction with Hyperwave is easy

6.2 Hyperwave is easy to use.

6.3 I find it easy to find the documents I need on Hyperwave.

6.4 I find it easy to get Hyperwave to do what I want it to do.

Section D: In this section we explore the intention of the user to use Hyperwave.

7. **Intention to use Hyperwave:** How would you rate the following?
7.1 I intend to use Hyperwave as a routine, part of work over the next year.

7.2 I intend to use Hyperwave at every opportunity over the next year.

7.3 I intend to increase my use of Hyperwave over the next year.

7.4 I intend to revisit Hyperwave very shortly in less than a month.

7.5 I intend to attend training to increase my skills on Hyperwave.

7.5 According to you, how should Hyperwave be adapted to become a user friendly Document Management System in Eskom?

_________________________________________________________________________________
_________________________________________________________________________________
_________________________________________________________________________________

8. In general I think the following about Hyperwave:

8.1 Frustrating

8.2 User-friendly

8.3 Replaceable

8.4 Irreplaceable

8.5 Worth having in Eskom
8.6 Worthless in Eskom
8.7 Should be scrapped out
8.8 Should be kept

Thank you for your co-operation in completing this questionnaire.