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THE ACCEPTANCE OF TECHNOLOGY-BASED KNOWLEDGE MANAGEMENT SYSTEMS BY KNOWLEDGE WORKERS

By

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DISSERTATION

Submitted in partial fulfilment of the requirements for the degree

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at the UNIVERSITY OF JOHANNESBURG

SUPERVISOR: MRS S. BUCKLEY

OCTOBER 2008
I hereby declare that the dissertation submitted for the M-Tech IT Degree to the University of Johannesburg is my own work. Any work that has been used before has been declared.

Mothlago Stella Moloto
I express my gratitude to the following people:

Sheryl Buckley: Thank you for your guidance and support, for always saying the right motivational words and for sharing wisdom.

A special thank you to my husband Vicky for all the love, patience and kindness you have always provided.

My mother and father for your prayers and kind words.
Knowledge management has developed greatly over the last few decades, particularly in striving for economic and commercial effectiveness. With the growth of technology-based knowledge management systems and an increase in the number of organisations implementing them, there is concern as to how these systems are being accepted by knowledge workers. The systems are currently a pertinent issue on business agendas, and organisations across all sectors are recognising the critical role that effective ones will play in their future success (Malhotra, 2000:56). This creates a concern where these systems are expected to bring success in organisations or to improve return on investments without a deeper understanding of their utilisation by knowledge workers. The goal of this dissertation is to understand the way in which technology-based knowledge management systems are being utilised and accepted by knowledge workers, and furthermore to establish if knowledge workers have full understanding of the systems they use. The focus of this research is therefore on the human dimensions in relation to the systems, and on how they support organisational intellectual capital. The history of interactive computing shows repeatedly that it is the human issues which make or break new methods and tools at work. What are technology-based knowledge management systems? How are they managed? Moreover, how can managers harness the potential of the knowledge workers to expand the knowledge base of the organisation? In order to answer these questions, this research determines how knowledge workers utilise the systems and their level of acceptance of this technology. It considers the importance of organisations that want their employees to use the systems effectively by contributing ideas and knowledge out of their own goodwill. Employees will do so if the concept of trust (of any technology system) has been imparted to them fully.
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1.1 INTRODUCTION

A historical perspective of information technology (IT) has referred IT as a system. In this research the word “system” will be used frequently in a more expansive sense that refers to the whole IT ecosystem, including software, hardware, people-ware, tools and the process through which they interoperate (Snowden, 2007). At the time of writing, organisations implement these systems with expectations for improvement and return on investment, at no increase in cost. Such expectations have to some extent been met by increased effectiveness of technology systems.

An emerging line of systems targets organisations with a focus on creating, gathering and disseminating an organisation’s knowledge as opposed to information or data. These systems are generally known to as ‘knowledge management systems’ (KMSs) (Malhotra, 2000). The key driver of implementing technology-based knowledge management (KM) in most organisations is the unique competitive advantage it offers the organisation (Snowden, 2007). To be competitive, organisations must manage knowledge systematically, which could be difficult because many KM activities and functions are implicit in each employee’s daily work. Several organisations have implemented KM programmes without paying attention to the methodologies behind successful technology-based KMSs (Prusak, 2001).

Most technology-based KM implementations are unsuccessful because organisations are not focusing on key issues, such as organisational culture, the need for a clearly defined KM strategy and the acceptance and utilisation of KMSs by knowledge workers. KM is a pertinent issue and should be linked to the business strategy. The organisational structure and culture should be considered when formulating a KM strategy, and this should cater for the purpose of creation, collection, management, availability, dissemination and communication of knowledge (Snowden, 2004). The result will be a challenge...
not only to organisations but also to knowledge workers, with regard to the utilisation of the technology-based KMS's being deployed by organisations.

1.2 LITERATURE REVIEW

The purpose of a literature review is to examine the latest academic publications relevant to the topic being researched, in this case the key issues facing knowledge workers in organisations when implementing technology-based KMSs. This understanding is necessary for active involvement in the organisational unlearning and relearning processes. According to Snowden (2007), it is only if they understand the implication of changes in their work context for the organisation that they can be instrumental in synchronising the organisational best practices with the external environment. Given the need for autonomy in learning and decision-making, such knowledge workers would also need to be comfortable with self-control and self-learning. They will need to act in an entrepreneurial mode that involves a higher degree of responsibility, authority and intelligence.

Technology plays an important role in enabling KM methodologies and processes. It is important for knowledge workers to note that KM is not technology, but is often facilitated by IT. Technology is therefore an enabler for KM in an organisation (Harris & Katz, 1988:127), and so it is necessary that the knowledge workers fully understand the technology processes, including the knowledge strategies of an organisation. If KM strategies are in place and are communicated well amongst employees, they can result in a more effective manner of organising ideas and sharing knowledge in an efficient manner.

KMSs are a framework in which to assist employees to retrieve and utilise knowledge from different applications. The various systems or tools in such frameworks should help employees to originate and organise ideas and to understand and communicate these ideas more accurately (Stewart, 2002). This should also assist organisations to implement IT systems that are user-friendly and that can effectively be utilised by knowledge workers. KM must have the ultimate objective of achieving a competitive advantage over the
competitors, which should include the technology in use within the organisation.

The impact of IT on managing organisations continues to increase in significance and realising the potential return it has on investment has become a critical concern as economies around the world fall deeper into recession and so highlight the need for careful and shrewd long-term investment. The prosperity, even survival of organisations requires that IT resources be used productively by knowledge workers (Allee, 1997).

From the literature, it is clear that there are a number of constraints in the productive use of technology-based KMSs. Technology infrastructure issues are critical but organisations have not been providing the necessary support to utilise IT KMSs effectively. The literature also indicates that the expected advantages of these KMSs, such as speed and reliability, do not match knowledge workers' expectations (Drucker, 1994:32). According to Landau (2003:27), the gap between expected and realised information technology KMS capabilities is much larger than anticipated. This leads to difficulties such as alienation, anxiety, overload, and ultimately lower productivity.

Chapters 2 and 3 will review the literature on knowledge management and technology-based knowledge management systems respectively.

1.3 MOTIVATION FOR THIS DISSERTATION

In the past, motivating knowledge workers to become more productive was often felt to be a case simply of telling them how to do the job (Snowden: 2007). However, this was not only disempowering and demeaning to the individuals concerned, but also harmful to the organisation. Allowing knowledge workers to participate more actively in their own productivity, through constructivist education required radical changes in attitude, not only on the part of the organisation, but also on the part of the individuals. Organisations that understand knowledge workers' requirements and the tools that they use on a day-to-day basis to carry out tasks will be in a better position to implement the right technology-based systems than those who
clinging to outdated modes of paternalistic leadership. In order to clarify what is necessary for knowledge workers in the knowledge society, organisations need to understand the data and information processing capacity of IT, and the creative and innovative capacity of the human members. Hence, knowledge workers need to be involved in the applications of new technologies in their business context. This understanding is necessary for their active involvement in the organisational unlearning and relearning processes.

Systems such as discussion databases, knowledge bases and specialised telecommunications are utilised to simplify this process. These systems can contribute to increased productivity if supported by both the organisation's goal and the knowledge workers' goals. Some organisations have attempted to develop a workable approach for improving knowledge work and the use of technology-based KMSs. There is, however, very little 'best practice' information in this regard.

1.4 PROBLEM STATEMENT

Against the above background, the following problem statement emerges:

Technology-based KMSs are not adding value and productivity to organisations. Nor is it clear who the knowledge workers are within organisations, or what technology systems they are currently using and finding acceptable.

1.5 RESEARCH GOAL AND OBJECTIVES

The goal of this dissertation is to provide a comprehensive understanding of whether or not the knowledge workers fully accept technology-based KMSs and support their goals within an organisation. The answers to the following research questions will effectively bridge the gap with knowledge workers when aligning KM strategies with organisational strategies:

- What is knowledge management?
• What are technology-based knowledge management systems?
• What are the key success factors to which organisations are committed when implementing technology-based KMS.
• How are technology-based KMSs being accepted by knowledge workers?
• How do organisations manage technology-based KMSs so as to ensure KM benefits?
• How can technology-based KMSs improve productivity in knowledge management organisations?

1.6 RESEARCH APPROACH

This section describes the methodology used in conducting the research, which was mostly qualitative. This section starts by describing the sample selection and research design and will continue by defining the methods of data collection and data analysis.

Data was collected from the five companies listed in table 1.1 (below). Knowledge workers were required to complete the questionnaires and some employees were interviewed. The sample selection for this particular research aimed at targeting KM organisations in the Gauteng Province of South Africa. The area was chosen as it was closest to the researcher and enabled her to conduct interviews and administer questionnaires on a one-to-one basis.

The survey aimed at reaching knowledge workers on various levels in their organisations. The researcher chose a sample of five companies that had instituted KMSs within the scope of their operation. These companies were identified by articles regarding their operation in the field of KM, and 20 questionnaires were distributed to each organisation (Table 1.1, below):

Table 1.1: Organisations surveyed

<table>
<thead>
<tr>
<th>COMPANY</th>
<th>INDUSTRY SEGMENT</th>
</tr>
</thead>
<tbody>
<tr>
<td>A</td>
<td>Telecommunications</td>
</tr>
<tr>
<td>B</td>
<td>Energy supply</td>
</tr>
</tbody>
</table>
The questionnaires were distributed to employees at different levels in their work sections and departments. In some cases, they were sent to respondents via e-mail. The interviews were conducted at the convenience of the participants.

Key to gauging the effects of technology-based KMSs on knowledge workers' productivity are determining how the technology-based KMSs are being utilised and accepted, and understanding if managers fully align their KM strategies and cultures with the organisational strategy. The effects of managers experiencing resistance from the knowledge workers when utilising technology-based KMSs after they are being implemented affects the organisation's success.

1.7 DISSERTATION LAYOUT

The dissertation has five chapters.

Chapter 1 introduces the dissertation, providing the reader with background information regarding the research area, including the problem statement, research questions, goals and objectives.

Chapter 2 reviews the literature on key concepts associated with knowledge management.

Chapter 3 reviews the literature of technology-based KMSs, the intention being to develop a conceptual framework in which to conduct the research into the possibility of establishing a link between KMSs and knowledge workers in an organisation.

The research design used and the findings of the study are discussed in Chapter 4.
Chapter 5 highlights some major principles to consider when implementing a technology-based KMS in an organisation. The benefits of including knowledge workers and aligning all organisational strategies for competitiveness are also clarified. This chapter is a concluding chapter of the dissertation, allowing the researcher the opportunity to review the problems and establish if the research goal and objectives have been achieved. This chapter also mentions further research opportunities.

The research approach having been discussed, the next chapter defines the concepts of KM.
2.1 INTRODUCTION

In chapter 1 the researcher provided an introduction to the research problem, included background information on the problem and the research goal and objectives. The goal of this chapter is to clarify the concepts of KM and knowledge workers, in particular to:

- provide an overview of KM
- define knowledge worker and information worker
- discuss knowledge workers’ activities.

The focus is on understanding KM and its basic principles within an organisation and explaining the difference between tacit and explicit knowledge, looking at their advantages and disadvantages.

2.2 KNOWLEDGE

Knowledge can comprise a single idea or the entirety of what an individual person knows. Collectively it may be regarded in terms of numerous interrelated ideas shared by groups of people working together, or otherwise interacting, in an office, a community, or in society and culture at large.

2.2.1 Definitions

Davenport and Prusak (1998) define knowledge as “a fluid mix of framed experience, values, contextual information, and expert insight that provides a framework for evaluating and incorporating new experiences and information”. It originated and is applied in the minds of knower’s. In organisations, it often becomes embedded not only in documents or repositories, but also in organisational routines, processes, practices and norms.
According to Ackoff (1997), knowledge is a deterministic process and when someone memorises information, they have amassed knowledge. This knowledge is useful meaning to them, but it does not provide for integration in their minds to input further knowledge.

2.2.2 Tacit and explicit knowledge

Nonaka and Takeuchi (1995) describe two types of knowledge: tacit and explicit. Tacit knowledge is that which is understood within a knower's mind and which cannot be directly expressed by data or knowledge representations. It is commonly referred to as 'unstructured' knowledge. Explicit knowledge is knowledge which can be directly expressed by knowledge representations and is known as 'structured' knowledge.

According to Davenport (2001), tacit knowledge is what people carry in their minds and is therefore difficult to access. It is even more difficult when people are not aware of the knowledge they possess or how it can be valuable to their organisational growth or benefit. Tacit (or implicit) knowledge is more important because it provides context for people, places, ideas and experiences. Tacit knowledge can be regarded as part of organisational culture and forms part of adding a competitive advantage to organisations. Organisational culture includes the organisation's beliefs, behaviours and values.

Explicit knowledge is easy to capture and store in databases and documents (Takeuchi, 1998), and is shared with a high degree of accuracy. It can be either structured or unstructured. Structured involves individual elements that are organised in a particular way or scheme for future retrieval, for instance documents, databases and spreadsheets. Unstructured knowledge is not referenced for retrieval, for example e-mail messages, images, training courses, audio and video selections.

Fouche (1999) argues that critical and valuable knowledge of an organisation, whether tacit or explicit, needs to be saved, structured, shared and transferred
into the organisation's processes. Retrieval of such knowledge can be significantly speeded up with the full understanding of which is tacit and which is explicit, and will also assist in recognising which type of technology-based KMS needs to be initiated.

There are several advantages and disadvantages to KMS of tacit and explicit knowledge, set out in tables 2.1 and 2.2 below.

Table 2.1: Advantages of tacit versus explicit KM approaches (Tiwana, 2002)

<table>
<thead>
<tr>
<th>TACIT KNOWLEDGE</th>
<th>EXPLICIT KNOWLEDGE</th>
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<tbody>
<tr>
<td>Relatively easy and inexpensive.</td>
<td>Articulated knowledge (explicit knowledge assets) may be moved instantaneously any time anywhere by information technologies.</td>
</tr>
<tr>
<td>Employees may respond well to recognition of the (claimed) knowledge.</td>
<td>Codified knowledge may be proactively disseminated to people who can use specific forms of knowledge.</td>
</tr>
<tr>
<td>Likely to create interest in further knowledge management processes.</td>
<td>Knowledge that has been made explicit can be discussed, debated, and improved.</td>
</tr>
<tr>
<td>Important knowledge kept in tacit form may be less likely to “leak” to competitors.</td>
<td>Application of explicit knowledge throughout organisation must be assured by adoption of best practices.</td>
</tr>
</tbody>
</table>
Table 2.2: Disadvantages of tacit versus explicit KM approaches (Tiwana, 2002)

<table>
<thead>
<tr>
<th>TACIT KNOWLEDGE</th>
<th>EXPLICIT KNOWLEDGE</th>
</tr>
</thead>
<tbody>
<tr>
<td>Individuals may not have the knowledge they claim to have.</td>
<td>Considerable time and effort may be required to help people articulate their knowledge.</td>
</tr>
<tr>
<td>Knowledge profiles of individuals need frequent updating.</td>
<td>Employment relationship with key knowledge workers may have to be redefined to motivate knowledge articulation.</td>
</tr>
<tr>
<td>Ability to transfer knowledge constrained to moving people, which is costly and limits the reach and speed of knowledge dissemination within the organisation.</td>
<td>Expert committees must be formed to evaluate explicit knowledge assets.</td>
</tr>
<tr>
<td>An organisation may lose key knowledge if key people leave the organisation.</td>
<td>Application of explicit knowledge throughout organisation must be assured by adoption of best practices.</td>
</tr>
</tbody>
</table>

2.3 KNOWLEDGE MANAGEMENT

Jennex (2005) defines KM as the practice of selectively applying knowledge from previous experiences of decision-making to current and future decision-making activities with the express purpose of improving the organisation's effectiveness. For Davenport and Prusak (1998) KM is a set of systematic and disciplined actions that an organisation can take to obtain the greatest value from the knowledge available to it. Knowledge in this context includes both the experience and understanding of the people in the organisation and information artifacts, such as documents and reports, available within the organisation and in the world outside.

Effective KM generally requires an appropriate combination of organisational, social and managerial initiatives, along with, in many cases, deployment of appropriate technology. It is therefore very important for organisations to
deploy a proper understanding of where their knowledge comes from before emerging or implementing any technological system (Snowden, 2007).

**Other definitions of KM**

Other authors define KM as follows:

- The processes of capturing, distributing and effectively using knowledge (Davenport, 1994:63).

- The creation, acquisition and transfer of knowledge and modification of organisational behaviour to reflect new knowledge and insights (Garvin, 1993:81).

- The identification of categories of knowledge needed to support the overall business strategy. This involves the assessment of the current state of the organisation's knowledge and the transformation of the current knowledge base into a more powerful one (Gopal & Gagnon, 1995:16).

**A common theme**

The above definitions are similar in that they all define KM as a process. This process involves a mixture of techniques, technologies and social commitment. KM enables organisations to find new ways to share readily both their explicit and tacit knowledge. Explicit knowledge is easily codified and stored whereas tacit knowledge is elusive and collectively held in the minds and experience of employees. Tacit knowledge is also referred to as 'intellectual capital'. The goal of KM, therefore, is to build and exploit knowledge and intellectual capital effectively and gainfully (Drucker, 1994:35).

**2.4 THE IMPORTANCE OF KM IN ORGANISATIONS**

KM is currently a pertinent issue on the business agenda, and organisations across all sectors are recognising the critical role that effective KM will play in their future success (Malhotra, 2000). One important aspect of effective KM is that it must be able to deal with the complexity of how people use their minds...
and experience to conduct work. It relates to what employees understand, what knowledge they possess and how they access this knowledge. These knowledge processes will determine how employees react under different conditions (Sultan, 1998).

Blacker (1995) explains that the importance of KM within organisations lies in its ability to assist in transferring individual knowledge available to all who need it. This can be very challenging if organisations do not know which knowledge to filter and separate as the most relevant and the most needed, and by whom. A great deal of knowledge and intellectual capital is used every day in conducting an organisation's business. It is important that this knowledge be maximised and further developed in an organised and systematic approach that captures, retains, shares, grows, facilitates and leverages these valuable resources.

The KM strategy needs to enable the organisation to become more knowledge-based by complementing and supporting employees in their everyday work, making work easier, more productive and effective and resulting in improved overall organisational performance. Whenever an organisation experiences growth or forces of pressure, the need for managing knowledge intelligently is particularly urgent. The KM strategy needs to focus attention on the management of tacit knowledge, which consists of things people know but are unable to express. Because it is embedded in people, tacit knowledge leaves the organisation every night, and regularly leaves the organisation for good. Without careful systematic management, the organisation loses this knowledge not just when the people resign, but also when they move to another position, project or location. Generally when this happens there is a considerable loss of organisational effectiveness.

KM is fraught with difficulties and the business world has undergone several painful generations of KM. The majority of KM efforts in both the first and even the second generations of KM practice failed to deliver anywhere near the value that was hoped for. If those mistakes are not to be repeated, it is important to learn from those lessons (Read, 1996:223). Crucially, much of
what can go right or wrong comes down to the view of the nature of knowledge itself. Wiig (1999) also identifies some forces that are driving KM today, such as globalisation of business and international competition and sophisticated customers, suppliers and competition. The increasing speed of communication and travel encapsulated in the concept of a 'global village' means that most organisations will face international as well as local competition (Amm, 1996; Chase, 1997). Many products that were once created within one company or country are now assembled from parts from multiple sources worldwide.

For the latter to survive, organisations need to perform better than their competitors, by improving their understanding of customer needs and capabilities. Wiig (1999) states that to add this issue there has been a move towards improved products and services and a shift in the customer's profile, which has influenced buying trends and behaviour. Suppliers continue to provide their capabilities and can participate in creating and supporting innovations to deliver sophisticated products. To take advantage of these opportunities, enterprises must understand new supplier capabilities and how to integrate them with internal effort, directions and culture. Competing organisations are constantly implementing innovations in products, services and practices. To keep up, these changes need to be accompanied by constant learning to build competitive advantages. There is thus an urgent need to react quickly and accurately to these changes in the marketplace (Wiig, 1999).

2.5 KNOWLEDGE SHARING AND TECHNOLOGY

Knowledge sharing is variously described as the social process of construction (Vygotsky, 1978), as enculturation (Brown, Collins & Duguid, 1989), as enculturation-guided participation (Rogoff, 1990) and as legitimate peripheral participation (Lave & Wenger, 1991). In earlier societies, each age-group had a specific role in handing down knowledge. Paavola, Lipponen and Hakkarainen (2002:24) point out two reasons why modern societies do not have such clear-cut boundaries. Firstly, everyone has to function as a
newcomer who needs to surpass earlier achievements and, secondly, new
gen-erations develop competencies that are difficult for older generations to
attain.

A knowledge-sharing culture is one in which “knowledge, in all its diversity
and representations, is willingly made available and effectively utilised for the
realisation of the mission and goals of the school” (Todd, 2000). Key
dimensions for building a knowledge-sharing culture are identified by Todd

These dimensions are:

- **A knowledge-orientated culture**
  Organisations must first invest in a thorough assessment of the organisation's
culture to assess the overall KM maturity level, which determines how
conducive the environment is to knowledge-sharing.

- **Senior management support**
  Management need to provide the discipline to first evaluate, then assess, and
then implement. Too often organisations jump to the stage of implementing a
system without the supporting processes needed to grow and evolve the
system and its users. As a result, the initiative frustrates the workforce and
fails to achieve the desired objectives. The assessment should evaluate the
people, culture, strategies and other factors impacting the KMS's success.

- **Some level of knowledge structure**
  The main aim of defining the organisational knowledge structure is to give
knowledge users and managers enough information about their knowledge
resource to allow them to make informed decisions about protecting and
developing it.
- **Technical and organisational infrastructure**

Organisations must not only be able to identify the purpose of the system, but also define its relationship to the organisation's strategic vision and communicate the desired outcomes to the appropriate parties.

Cram and Sayers (2001) identify three characteristics of knowledge-sharing practices:

- Sharing and using knowledge are often unnatural acts.
- Knowledge access is only the beginning.
- Effective management of knowledge requires hybrid solutions of people and technology.

The effective use of technology systems often assists organisations to believe that this technology can leverage the know-how of their knowledge users, suppliers or customers. Organisations can connect with their different departments through e-mail or the Web. They can also access electronically the knowledge collections of thematic groups to access the collective wisdom of their professional practice.

As stated above, it is important to acknowledge that most of the knowledge of individuals is tacit. It resides deep in their minds and only a fraction of it is indeed explicit. Only the latter can be captured, synthesised and shared through the World Wide Web. Secondly, to share this explicit knowledge effectively, the technology system should be fast to access, user-friendly and easy to operate. It should provide classification and cataloguing capabilities to easily find and quickly retrieve knowledge.

The technology-based KMS requires a collective visioning effort from the organisation on how knowledge will be shared. Organisations wishing to implement any technology-based KMS must ensure that the users' requirements are met. This will allow the system abilities to be used in the future. It is essential to consider other technology systems that draw on the
tacit knowledge of people. Widely available tools, such as the telephone, e-mail and video conferencing, play a central role in knowledge-sharing activities. The combination of technology systems and human practices is likely to be more successful at sharing knowledge than programmes that focus on one or the other (Blacker, 1995).

2.6 IDENTIFYING CRITICAL KNOWLEDGE

In any KMS, organisations must first identify which knowledge is most critical to the success of their organisation. Critical knowledge is essential so that the organisation can properly structure systems, tools and processes aimed at retaining and sharing this knowledge (Malhotra, 2000). Studer, Benjamins and Fensel et al (1998) report that once relevant critical knowledge has been identified, organisations can develop processes and tools in order to collect and store this knowledge and information. For instance, organisations may need to invest in technology (knowledge databases; discussion and chat technologies; intranets; tools for searching, retrieval and data mining; project collaboration software tools; and expert locators) and management techniques (such as communities of practice, mentoring and training) in order to institutionalise knowledge contained in technological research, although the specific choice of tools and processes will depend on the type, format and use of the desired knowledge. Regardless of the tools and processes involved, the critical knowledge must be stored in a location and format which can be easily found and accessed by users (employees or other external stakeholders).

2.7 INFORMATION WORKER AND KNOWLEDGE WORKER

According to Snowden (2005), the function of personal knowledge, understanding and judgments in achieving effective organisational performance is becoming clearer. Early on, managerial emphasis on work procedures and methods was placed on observable work. It then included the role of information and information flows, which were also observable. Now the focus is shifting to include knowledge. It has always been understood that know-how and expertise influence quality of work, however the knowledge
focus has tended to be centered on the individual's educational and training background and not on considerations of systematic perspectives for broader work processes or knowledge mechanisms within organisations. There has been little focus on invisible work, particularly on how workers think and utilise knowledge systems when performing tasks.

2.7.1 Information worker

The term "information worker" describes any person in the enterprise who actively participates in information flow or business process (Gray, 2001). This definition refers to people who can be classified as personnel managers and line managers, and who deal with critical information and decisions. As the name suggests, information workers are individuals who work specifically with information, but they can be differently trained, with different aptitudes or specialties. They analyse and interpret information, summarise and give it additional meaning. Information workers work primarily with databases or spreadsheets, as this is where the bulk of the information resides. According to Dunham (2001), an information worker is someone who is producing and processing information but may not be responsible for any actions taken based on that information. They are the information capturers in an enterprise, where their primary function is to assist it in the corporation's daily operation. They essentially produce, process, store, transfer and compare information.

McGovern (2001) regards the information worker as a 'hunter-gatherer' of information, the role focusing solely on obtaining the appropriate information. This has resulted in the role becoming a crucial one in an organisation. As a result, solutions have been developed specifically to assist information workers in their everyday tasks. Microsoft is an example of an IT company that has developed solutions specifically for the information worker, such as traditional office applications and new ones being introduced to the market. They can capture and store information using templates that have been designed for that specific role in the organisation (Snowden, 2007).
2.7.2 Knowledge worker

Drucker (1994) is generally believed to have coined the term 'knowledge worker', which he characterises as one who is not satisfied with work that is only a livelihood. The aspirations and views of knowledge workers are of professionals or intellectuals. They demand that knowledge become the basis for accomplishment and are delegated specifically to gather the knowledge of the organisation in order to represent it in a manner easily accessible by the rest of the employees (Malhotra, 1998:58). They use the applicable knowledge technologies for this purpose, manipulating and orchestrating symbols and concepts and identifying more strongly with their peers and professions than their organisations. They have more rapid skill obsolescence and are more critical to the long-term success of the organisation (Despres & Chauve, 1999:111-121).

Malhotra (1998:58) points out that knowledge workers need to be facile in the application of new technologies to their business contexts. This is required so that they can delegate programmable tasks to technologies so as to be able to concentrate their time and effort on value-adding activities that demand creativity and innovation. They should be able to judge whether the best practices of the company are aligned with the KM strategy.

Gharajedaghi and Leddick (2001) divide the knowledge worker into three levels, according to the knowledge work that they do: the doer, the problem-solver and the designer.

- Doer

Doers are the first level of knowledge workers, characterised by repeated performance of a single application of an operation. They are skilled in the use of specialised tools and languages and must master specific content and skills. Doers focus on learning one specific application and they cannot perform new and complex operations. Their jobs focus on the 'how', as they know 'how' to perform operations. Examples of doers are file clerks or computer operators who know how to run a specific programme.
• Problem-solver

The problem-solvers are the second level of knowledge workers and they answer the 'why' questions. Their knowledge includes that of the doer — the procedural knowledge — and builds onto that knowledge to encompass the architecture and operating principles that were designed into the programme they are using. "They are pattern finders who are able to find similarities when faced with situations that appear different and can adapt the algorithms they have mastered" (Gharajedaghi & Leddick, 2001). Problem-solvers are troubleshooters who can tell a colleague 'why' the printer is not working.

• Designer

The designers are the third level of knowledge workers and include the two prior levels. Gharajedaghi and Leddick (2001) explain that the designer appreciates context also, but where the problem solver looks for similarities among differences, the designer is also able to perceive critical differences among apparent similarities. The designer knows how to solve existing problems and also formulate unknown problems that could occur. He or she creates new and unique algorithms, relying on the powers of abstract thinking to create and test new solutions to the new problems. Gharajedaghi and Leddick (2001) assert that the designer knows that success changes the game and is continuously looking to define a new game.

All of these knowledge workers are essential to the enterprise, as they will make for a stronger workforce.

For Weeks (2007), knowledge workers are those who work for a living at the tasks of developing or using knowledge. For example, they might work at any one or more of the tasks of planning, acquiring, searching, analysing, organising, storing, programming, distributing, marketing, or otherwise contributing to the transformation and commerce of information. They are those, often the same people, who work at using the knowledge so produced. Knowledge workers include those in the IT fields, such as programmers, systems analysts, technical writers, academic professionals and researchers.
The term is also frequently used to include people outside IT, such as lawyers, teachers, scientists and students in all fields. Knowledge workers' primary activity is the acquisition, creation, packaging, or application of knowledge. Their activity is characterised by variety and exceptions rather than routine, and it is performed by professional or technical workers with a high level of skill and expertise.

Snowden (2004:23) makes a number of distinctions between knowledge work or knowledge workers and procedural work:

- Knowledge workers are changed by the information in their environment, and in turn, they seek to change others through information.

Information is to be consumed and, once 'digested', it is of little further value. Information resources that may have long-term use are often left visible and uncategorised.

- Diversity and ad hoc behaviour patterns are common in knowledge work.

New information is sought out, reused and passed on in opportunistic ways, depending on the changing context of the worker's activities. In contrast, consistency of method and output is important in procedural work.

- Communication networks are highly variable, with different patterns and use of media.

The structure and job titles in an organisation are no longer indicative of what an employee does or the people with whom they work. Information is exchanged through various and mixed channels, such as documents and e-mails. Employees engaged in predominantly procedural work tend to
have well-defined responsibilities and relationships and the information flow is more clearly defined and structured.

Knowledge workers expect to achieve, and they want to be measured for their actual performance. They require that the demands be made on them by knowledge rather than by bosses - by objectives rather than by people. They require a performance-orientated organisation rather than an authority-orientated organisation. Although knowledge workers respect and acknowledge authority and responsibility within the hierarchical structure, they also recognise that knowledge work itself knows no hierarchy - knowledge is either relevant to a given task or irrelevant to it. The task decides, rather than the name, the age, the budget of the discipline or the rank of the individual applying it (Snowden, 2007).

2.8 KNOWLEDGE WORKER ACTIVITIES

Knowledge workers are individuals who enjoy more autonomy than other workers. Much of their work is invisible and hard to measure, because it is largely conducted in their minds or outside the office. They are a growing part of the organisation’s workforce, and their skills are hard to replace. They have the ability to perform below their potential because organisations still do not know how to manage them (Davenport, 2005: 26). They are becoming the primary force determining which economies are successful and which are not, and they are the key source of growth in most organisations. New products and services, new approaches to marketing and new business models emanate from knowledge workers, so if an organisation wishes for its economy to grow, its knowledge workers have work effectively. This includes accepting all the systems they use on a daily basis.

After studying more than 100 companies and 600 individual knowledge workers, Malik (2003: 70) came to the conclusion that the old dictum of hiring smart people and leaving them alone is not the best way to get the most out of knowledge workers. On the other hand, they "can't be managed in the
traditional sense of the word, you can intervene, but you can't do it in a heavy-handed, hierarchical way".

2.9 CHALLENGES EXPERIENCED BY KNOWLEDGE WORKERS

By making information easy to browse and query, current software tools make it possible for knowledge workers to access vast amounts of information available in document repositories and on the Web. However, when displaying dozens of web page search hits, hundreds of files and folders in a document hierarchy, or tens of thousands of lines of source code, these tools overload knowledge workers with information that is not relevant to the task at hand (Prusak, 2001). The result is that knowledge workers waste time clicking, scrolling and navigating to find the subset of information needed to complete a task. This problem is exacerbated by the fact that many knowledge workers constantly multi-task. With each task switch, they lose the context that they have built up in the browsing and query views. The combination of context loss and information overload has adverse effects on productivity because it requires knowledge workers to repeatedly locate the information that they need to complete a task. The larger the amount of information available and the more frequent the multi-tasking, the worse the problem becomes.

2.9.1 Factors that contribute to knowledge workers' lack of productivity

- Complex systems

A common mistake made by many organisations is to focus on the technology strategies systems rather than the users. IT experts understand the technical possibilities and push for a complete database system with detailed indexing that can fulfill complex searches. This carefully specified system then takes significant time and effort to develop and, later, to maintain. In most instances no training is provided to the users. When the technology users only expect a simple system and do not have the time to learn how to use it fully, then such systems are liable to fall into disuse by the knowledge users (Snowden, 2007).
- Efficient customer support

The value of knowledge systems is in the knowledge that the users contain and the time, effort and expense they can save. This knowledge has to come from somewhere, which means at least somewhere along the line people have to become involved. This work can be significant, as it may include writing down what is currently only in their minds, formatting it into a state where it is useful to others and putting it into the system. The question must consequently be asked: why will people do all of this work? They may be busy, as people with useful knowledge often are. They may find writing and inputting tedious and unsatisfying work. They may feel they are deskilling their job and reducing their employability or potential to earn higher wages. Where knowledge is regarded as power, to give freely what one knows to others can seem professionally detrimental. It may also be work that is rewarded relatively poorly and can lead to people following up and asking one for further information (Snowden, 2007).

2.9.2 Success factors to enhance knowledge worker productivity

Firstly, any technology-based knowledge system must meet the needs of the people who use it. This means spending time understanding the various purposes for which the system is used. As in any commercial system, the user is the ultimate arbiter of quality. People who have knowledge that needs to be entered into the knowledge system must be motivated to provide it. This means the people’s motivation and management systems must be oriented towards achieving this goal. It also means projects and other knowledge-creating processes include mandatory elements, whereby knowledge is extracted from experiences and fed back to the knowledge system (Malhotra, 1997).

A common and effective solution for an effective KMS is to have dedicated resources. Although this may include IT management, the major value is in having someone who has sufficient expertise to understand well the
knowledge topics, and who can add value, for example in creating and formatting the knowledge that will be used.

2.10 CONCLUSION

The chapter began with an overview of knowledge and provided definitions of it. The concept of knowledge was discussed in order to gain a better understanding of the actual significance of the term. Further definitions of KM were given and the different types of knowledge, namely tacit and explicit, were explained. Their comparison was shown for better understanding. Also clarified were the concepts of information worker and knowledge worker. The definition of these roles was given and the daily activities of each mentioned.

From this understanding it was found that there is a distinct gap between knowledge worker activities within organisations and the technology-based KMSs that these workers use on a daily basis. Organisations today have to learn faster than anyone else, share the results across the enterprise and constantly foster the development and sharing of new knowledge. This should begin at the managerial level. Company leaders need to take a serious look at how knowledge flows within the organisation, how it meets other knowledge and how it combines with other flows and so on. The question then arises as to whether this is a case of pure sharing of information?

The next chapter will discuss technology-based KMSs.
Chapter 3: Technology-Based Knowledge Management Systems

3.1 INTRODUCTION

Chapter 2 provided an overview of KM and the knowledge worker, concluding that KM is seen as the most important factor for organisations to remain competitive. It is consequently important to understand what knowledge workers are and what their activities entail. This chapter will address technology-based KMSs.

The objectives of this chapter are:

- To define a KMS
- To define and discuss technology-based KMSs
- To define the KMS categories
- To discuss some of the current technology-based KMSs within organisations.

This chapter will also review functions of current technology-based KMSs, including the key importance and objectives of a KMS strategy.

3.2 KNOWLEDGE MANAGEMENT SYSTEMS

Alavi and Joachimsthaler (2001) define a KMS as the software framework or toolbox that is intended to assist, via knowledge processing functions, those who desire to formulate and retrieve knowledge for different applications, such as system design and specification, and term bank construction and documentation design for (multilingual) language processing. The various tools of such a framework should help users to originate and organise ideas or understand and communicate them more easily and accurately than can be done with most current technologies (Browning, 1990). A KMS is an
integrated multifunctional system that can support all main KM and knowledge-processing activities. These activities are highlighted below.

3.2.1 Capturing

Capturing must include greater accuracy levels, and better quality and access control. Finding the ideal software components and reliable technology to complement the host system and the technology system for capturing knowledge can greatly improve overall productivity and reduce worker-related accidents and system failure. However, all the best technology systems and software are useless if not used properly. Employees should therefore be fully trained in a new system to ensure optimum productivity (Browning, 1990).

3.2.2 Organising

It is vital to establish the correct type of technology-based KMS for competitive knowledge, whether it is a filing cabinet or a database. Organisations must decide, within the context of their resources, what competitive knowledge they require to reduce risks and build profits, and how they want the competitive information organised. This can be achieved by assigning one or more knowledge users to receive competitive knowledge from everyone who gathers it. (Browning, 1990) The users must be responsible for storing the knowledge and seeing that it can be retrieved when needed. They should also establish a procedure to be followed when someone finds knowledge that should be made known instantly to a decision maker.

3.2.3 Classifying and understanding

Classification and understanding specifies how knowledge users must protect the knowledge and system that they use. In other words, they need to fully understand what knowledge or information requires protection or where to make that type of information available, and also to whom (Browning, 1990).
3.2.4 Debugging and editing

Many programmers write their programmes with a primitive text editor that has no knowledge about the edited text. On the other hand, they use ingenious compilers that collect control flow and data flow information to perform optimisations and generate optimised code. It is therefore important that programme editors have the same knowledge about the control flow and data flow of a programme and the knowledge users of the program. Such editors could help programmers to better understand programmes and to be more productive (Browning, 1990).

3.2.5 Finding and retrieving

The so-called “Information Age” has arrived and with it comes a daily bombardment of many citizens with increased information that threatens to exceed people's ability to manage it, while information overload costs businesses and individual's valuable time, effort and additional resources, as well as rising costs (Argyres, 1999:162-180). Information overload can be minimised by allowing easy and accurate access to information or knowledge of the organisation.

3.2.6 Disseminating, transferring and sharing knowledge

Organisations need to harness knowledge not only to stay competitive, but also to become innovative (Reber, 1995). KM requires a major shift in organisational culture and a commitment from all levels. Through a supportive organisational climate, ideally through effective KM, an organisation must have the strategy to encourage dissemination and sharing amongst knowledge users.
3.3 TECHNOLOGY-BASED KMSs

In the rapidly changing business world, organisations are facing a host of challenging questions (Coates, 1980):

- How should more dialogue be encouraged among employees?
- How should better interaction be encouraged between and amongst staff and clients?
- How can I find out who knows what I need to find out more about something?
- How can I find out what I should be reading to find out more about something?
- How can I find out where a particular item of information or knowledge is within the firm?

Technology-based KMSs are tools that should have the capability of capturing the answer to the questions. They are systems to facilitate and organise knowledge processes, enabling better, faster knowledge generation, codification and transfer. In doing so, they can increase the benefits of KM through augmentation and automation (Snowden, 2007).

Other authors define technology-based KMSs as follows:

- The methods and tools for capturing, storing, organising and making accessible knowledge and expertise within and across communities. This includes the ability of organisations to be flexible enough, provide quick responses and to add productivity (Snowden, 2005).

- A system that can store and manage unstructured information in a variety of electronic formats. The software may assist in knowledge in order to capture, categorisation, deployment, inquiry, discovery, or communication (Gaimon, 1997).
A (generally IT-based) system for managing knowledge in organisations, supporting creation, capture, storage and dissemination of information. It can comprise a part (neither necessary nor sufficient) of a KM initiative (Benbya, 2008).

In this study a technology-based KMS is defined as a system that is easily structured and easy to use in the way it has been designed. It should involve effective implementation and be accessible by all knowledge users. The infrastructure and implementation of any new system must be fully understood by all users of all levels before deployment.

3.4. INFRASTRUCTURE, DESIGN, AND IMPLEMENTATION

The basic components of a KMS include capturing, storing, searching, retrieving, using and assessing knowledge. A successful KMS should perform these functions well. However, other factors can influence KMS success. Bukowitz and Williams (1999) describe several issues affecting the design of the KMS. The main focus of a successful KMS is that designers need to reconcile perspectives on knowledge from different organisational groups:

- Quantity designers: They need to decide how much knowledge should be captured and in what formats; decisions need to be made to ensure that information overload does not occur and that storage repositories are not overloaded with video or other images, or with documents, thus avoiding redundant knowledge.
- Filters: Who decides what knowledge is required or what is really knowledge of the organisation?
- Role of self-memory: What reliance and/or limitations is/are placed on the use of individual memories in the KMS?
- Storage: What devices, locations and capacities are needed and at what cost?
- Retrieval: How are information and knowledge organised and stored so that they can be searched and linked to appropriate events and use?
Malhotra (2000) explains that early information technologies were designed to assist organisations by processing and disseminating vast amounts of information within organisations to help in making effective decisions. The current function of technology-based KMSs is the implementation of these systems as a source to add competitive advantage, which is of vital importance for many organisations. It is therefore necessary to understand, communicate and integrate technology strategy with marketing, financial, operations and human resource strategies, or all the organisational strategies. This is an important process when considering increasing cost, pace and complexity of technology developments, combined with adding competitive advantage to KMS strategies.

Steps to consider when initialising technology-based KMSs with knowledge users in mind

A number of steps have been identified (Alavi & Leidner, 2001:107):

- **Assess what knowledge/KMS is required:** It is very important to fully identify what knowledge is required and for whom. This will also assist in eliminating any information overload.

- **Understand the organisational culture of knowledge sharing:** Culture encompasses the values, beliefs, attitudes and behaviour of an organisation. Culture is how things get done in organisations. An organisation’s culture shapes its learning orientation so it is therefore important to understand the cultural aspects of the organisation before planning any KM initiative.

- **Management support:** Managers should become involved in any implementation; in many instances they leave every decision to either the IT department or a knowledge expert. This results in managers not having an idea of the disadvantages that the system can bring into the organisation, but rather only limited advantages that will not increase their investments.

- **Design an integrated system of tools and technologies with the user in mind:** Every system must be implemented or deployed with the users in mind. Knowledge users are often frustrated because
managers or knowledge experts deploy new complex technology systems and do not offer training to their employees. These integrated systems often result in failure and frustration from knowledge users.

- **Design incentives for use:** When employees make up their minds that a KMS is more trouble than it is worth, they stop using it, just as an individual consumer would. This decision affects the employer's bottom line and is a crucial factor in whether the great aspirations for a KMS will be successful. Investments in KMSs frequently underperform, which leaves organisations wondering how they truly can make good use of the know-how that is locked inside their employees.

- **Measure impact:** Measuring impact is one important aspect when implementing or deploying any technology system. This should involve all knowledge users.

- **Promote and advertise success:** Any success of the system should be clearly communicated to all levels within the organisation. Often organisations promote failures rather than successes (Snowden, 2007).

- **Evaluate/re-evaluate success of implementation:** A system that is in a position to succeed must be evaluated and re-evaluated after implementation. It is a major setback if organisations purchase expensive technology systems and accuse them of not working. This can also result in an increase of cost.

- **Always evaluate feedback from the knowledge users (Leidner, 2001:121)** after implementation and evaluation, the re-evaluation part becomes the important one as it involves knowledge users. Failures of the system must be clearly defined for all levels of employees.

The first and most crucial step in any KMS implementation is to assess what knowledge an organisation requires. Identifying critical knowledge is essential so that the organisation can properly structure systems, tools and processes aimed at retaining and sharing this knowledge. One way that organisations can assess what knowledge they may require in the future is to apply scenario planning in order to develop a series of views about its future competitive environment (Benbya, 2008).
Based on these scenarios of its future, the organisation can then develop a strategy which will best position it for competitive success. Once these views of the future are developed, the organisation can assess how various KM initiatives might be instituted to assist it in achieving the strategy it develops, and that will improve the organisation’s information flow, knowledge sharing, cooperation, problem solving, creativity, efficiency and productivity. This has the potential to add substantial value and can greatly assist in achieving the organisation’s strategic objectives.

3.5 THE GOAL OF TECHNOLOGY-BASED KMSs

The goal of technology-based KMSs is to avoid unnecessary repetition of previously tried systems, and to leverage cumulative organisational knowledge for more informed decision-making. Examples of ways in which knowledge can be leveraged are transferring best practices from one part of an organisation to another, codifying individual employee knowledge to protect against employee turnover, and bringing together knowledge from different sources to work on a specific task (Steward, 2002).

Technology-based KMSs must be seen and recognised as the key enabler of KM (although there are many other factors that are necessary for KMS success, discussed in the next chapter). Without the capabilities of technology-based KMSs in terms of both storage and communication, leveraging of knowledge resources would hardly be feasible. A variety of KMSs are available to organisations to facilitate the leveraging of knowledge. These systems are sometimes defined as a class of information systems applied to managing organisational knowledge, that is, they are IT-based systems developed to support and enhance the organisational processes of knowledge creation, storage and retrieval, and transfer (Snyman, 2005).
3.6 CATEGORIES OF TECHNOLOGY-BASED KMSs

3.6.1 Knowledge storage tools

Knowledge story tools allow the organisation to collect and store information electronically. Examples are databases and corporate intranets which serve as a repository of project files and other knowledge created by users. They enable the organisation to store explicit knowledge in multiple formats. Organisations need to design them so that they can offer substantial flexibility and the ability to integrate functionality with other KM tools in use. The major disadvantage of these tools is that they are expensive and require substantial user-training. If the tools are not easy to use this can be a discouragement to the users and the adoption of the tools (Leondes, 2005).

3.6.2 Search and retrieval tools

Search and retrieval tools allow the user to easily search and locate information within a knowledge database or other knowledge repository. They also include tools which allow users to locate specific expertise within (or external to) an organisation. For example, an employee may be working on a project which deals with a specific challenge. Using an expertise locator tool, the employee could query the expertise database and identify other employees (internal or external to the organisation) who may have experience or expertise in this particular field. These tools are particularly useful in helping employees locate others within a dispersed organisation who may possess valuable knowledge relevant to their work. Search and retrieval tools can offer a powerful advantage to locate documents or other information within the organisation's knowledge base. Most tools require little training to master, are relatively easy to use and are inexpensive (Richards, 2003:25).

3.6.3 Collaboration tools

Collaboration tools allow employees to create a virtual, Web-based workspace in which they can share files and interact in an electronic environment. Such tools can provide a collaborative workplace which enables
distributed teams to work together to accelerate and improve development and delivery of products and services, optimise collaborative business processes, and improve innovation, problem-solving and decision-making. These tools allow dispersed project teams to exchange electronic files, discuss topics online, as well as store, retrieve and organise project work in a centralised location. They can also help organisations address their KM issues. These communication technologies can be classified into asynchronous and synchronous tools. Asynchronous tools include technologies which allow communication between two or more users on a sequential basis, examples being e-mail and Web blogs. Synchronous tools are those technologies which facilitate communication between users on a real-time basis.

Communication tools are simple to use and allow enhanced communication. In general, employee adoption is high as employees enjoy the social aspect of these tools. Also, they are usually not cost-prohibitive and complement and integrate well with other KM tools. Communication tools also have a high degree of flexibility, which makes them appropriate for a wide range of activities (Koenig & Srikantaiah, 2003).

3.6.4 Discussion and chat

Technologies and video conferencing are examples of synchronous communication tools. Both asynchronous and synchronous tools help to improve the knowledge sharing, interaction and transfer of information between employees in an organisation.

Based on the above categories of technology-based KMSs, it is clear that these KMSs are designed to allow users to access and utilise the rich sources of data, information and knowledge stored in different forms, but also to support knowledge creation, knowledge transfer and continuous learning for the knowledge workers. Recently, technology-based KMSs, unlike databases, have aimed at going beyond the mere administration of electronic information;
they now aim at fostering learning processes, knowledge sharing and collaboration between knowledge workers (Snowden, 2006).

3.7 OVERVIEW OF CURRENT TECHNOLOGY-BASED KMSs

Steward (2002) states that most available KMSs tend to allow dissemination of know-how, but offer less assistance for knowledge use. Those that assist in knowledge creation are even less well developed, although collaborative workspaces offer promising opportunities, by enabling participation, across time and distance, in project design or knowledge base development; so that those most knowledgeable about development problems are the people experiencing them on a day-to-day basis and can actively contribute to their solution. Some of the more user-friendly technologies are the traditional ones, such as face-to-face discussions, the telephone, and paper-based tools such as flip charts.

3.8 COMMON CONCEPTS OF TECHNOLOGY-BASED KMSs

There are currently many different technology-based KMSs available. The key to all the current and new ones is to understand which one to use and why. Organisations must also consider if a particular KMS is going to give them a competitive advantage before they unintentionally repeat mistakes made by themselves or organisations and competitors. The key lesson is to define what is regarded as knowledge and what knowledge needs to be captured and made accessible to specific individuals for decision-making (Wilson, 1995).

Information overload is the biggest disadvantage in many organisations, for example the wrong information is made available to the wrong divisions within a department. The issue of confidentiality must be addressed, especially with tacit knowledge. An effective technology-based KMS will respect the confidentiality of employees or users by allowing them to choose not to identify themselves. Although anonymity is contrary to the idea of linking
contributions to their originators, this balance is very necessary (Weeks, 2007).

Before discussing other different types of technology-based KMSs, the common components essential to them are that it must:

- be well-accepted in the organisation and be fully utilised, not only by the department that initiated or created it, but also by other departments.
- support multiple ways of expressing ideas, thoughts and communication.
- be transparent to the user.
- be user-friendly at all times.
- be easy to distribute, share and use knowledge in the system (Maier, 2002:57).

The key element is to plan every technology-based KMS with the user in mind, not with what the system can do best. Organisations must consider the users in terms of flexibility of the system, access and navigation.

Zhou and Fink (2003:34-48) believe that among the issues that need to be considered in providing effective technology-based KMSs for knowledge-sharing programmes are:

- **Responsiveness to user needs**: Continuous efforts must be made to ensure that the IT in use meets the varied and changing needs of users.
- **Content structure**: In large systems, classification and cataloguing become important so that items can be easily found and quickly retrieved.
- **Content quality requirements**: Standards for admitting new content into the system need to be established and met to ensure operational relevance and high value.
- **Integration with existing systems**: Since most knowledge-sharing programmes aim at embedding knowledge sharing in the work of staff
as seamlessly as possible, it is crucial to integrate knowledge-related technology with existing technology choices.

- **Scalability**: Solutions that seem to work well in small groups (e.g. HTML web sites) may not be appropriate for extrapolation organisation-wide or on a global basis.

- **Hardware-software compatibility**: This is important to ensure that choices are made that are compatible with the bandwidth and computing capacity available to users.

- **Synchronisation**: Technology needs to be synchronised with the capabilities of users to take full advantage of the potential of the tools, particularly where the technology skills of users differ widely. Knowledge-sharing programmes that focus on the simultaneous improvement of the whole system, both technology tools and human practices, are likely to be more successful than those that focus on one or the other.

Snowden (2004) believes that organisations are adopting the internet portal model for effective communication. This model consists of enterprise information portals (EIPs), which provide a way of gaining access to the diverse information available through intranets, the internet and extranets. EIPs do not, however, provide the complete solution. They will most likely provide only access to hierarchical information. There is a degree of virtualisation in the EIP market, in which the portals deal with a single type of information (e.g. documents and analytics), and are limited in application capabilities, resulting in the need for multiple portals. While providing good initial return on investment (ROI) on an organisation's intranet, the EIP deals only with information.

The enterprise knowledge portal (EKP) is an application under development (Snowden, 2004). The cost of the development was considered to be relatively low, since its implementation was largely a matter of systems integration, with the exception of its intelligent agent (IA) component that exceeded current IA capabilities. On the other hand, the benefits associated with the EKP are competitive, and the realisation of the promise of the EIP to
achieve increased ROI, competitive advantage, increased effectiveness and acceleration of innovation. The EKP was an evolution of the portal that was influenced by the goals of KM. It combines EIP aspects while also capturing tacit knowledge, integrating access to expertise and embedding application functionality (Weeks, 2007). The EKP not only provides the means for information access, but allows users interact to link information with their collective insight, value and experiences. EKPs enable people to make optimal decisions as they combine acquired knowledge and information, and serve as a "self-documenting" centre of experiential learning.

Many businesses are asking what KM is, rather than what it means. Knowledge management puts forth the goal of achieving competitive advantage by leveraging the vast knowledge of a collective corporate memory. Many organisations waste much of their daily time and effort needlessly repeating basic processes. As stated above, most corporate knowledge resides inside the minds of employees digesting the vast amounts of information. While information is captured, knowledge is not. KM theory is the focus of a great deal of academic research, but organisations are only beginning to adopt the non-automated processes and culture to create a knowledge-sharing business model (Snowden, 2005).

3.8.1 The knowledge portal

The knowledge portal is an interface or Web browser to the services offered by other layers. This KM interface becomes a way to see and 'live' in the corporate memory. Within a collaborative environment, it is decision makers' means of communicating with their colleagues, and as a knowledge-discovery tool it is a way to navigate round the network resources, being fed information by agents on a regular basis (Detlor, 2004).

Potential benefits of implementing a knowledge portal include:

- Ability to find and reuse timely and relevant information from systems and reports.
• Location and accessing of documents, projects and best practices by searching or browsing.
• Ability to assemble a view of complementary information from multiple sources, so that users can view customer information from customer relationship management (CRM) systems, e-mail systems, file shares and Web sites (multitasking).
• Benefits from productivity, through immediate access to up-to-date, relevant information, and ability to organise information, files and applications that users access throughout the day in a single view.

3.8.2 The knowledge repository or knowledge base

Integrated KM architecture requires a knowledge base or repository that can link and manage diverse information sources throughout the enterprise. The repository can be more than just a database and must comprise a directory for the corporate memory. It must function as an information store and catalogue, but also as a knowledge exchange linking the diverse knowledge resources that exist in the organisation. It must be seen as a ‘knowledge broker’ (Steward, 2002).

3.8.2.1 Benefits of knowledge repository

There are a number of benefits in having a knowledge repository:

• Information and publications can be made available for the public to read, download, or print at their leisure without being in their located organisations or offices.
• With current online educational software, learners and educators can have access to teaching material, peer-reviewed papers and other resources that help them become more specialised in their subject areas.
• Knowledge repository empowers customers to serve and access important documents on their own, at their own time, through highly organised and searchable data. Customers or employees can find answers to their questions with limited direct correspondence with an extension agent,
thereby reducing the workload of the extension agents and improving customer satisfaction (Gray, 2001:368).

3.8.2.2 Key components of knowledge repository

The key components of a knowledge repository are:

- **Information categories**
  The knowledge repository must be organised into categories and subcategories so that customers, extension educators and agents can easily narrow down their search for items of interest. It must be content-based to meet individual specific needs.

- **Search features**
  The search feature allows customers and extension agents to search the knowledge repository for information using keywords and metadata.

- **Access permissions**
  Access to information in the knowledge repository must be controlled by different levels of security and permissions. Security should never be overlooked within the organisation.

- **Information contribution**
  Users of the system can contribute to the repository by Web form submission requests and direct submission through the content management board.

- **Approval and review process**
  The knowledge repository module has an integrated workflow for the approval and review process. This governance mechanism for the repository helps maintain the integrity of information offered to employees and citizens (Gray, 2001:370).

3.8.3 The knowledge map

Knowledge maps have been used by organisations around the world to transform their employees into knowledge partners, focusing on the most critical issues facing organisational needs. These maps are customised to meet each client's unique needs, whether those needs be organisational-wide strategy communication or executive leadership training. The knowledge map
provides an overall classification for the disparate resources that make up the corporate memory, by providing an accessible means for users to navigate through resources. It makes it easier for users to find the information they need, even when they are unsure of what exactly they are looking for (Newman, 1997:211).

The knowledge map function involves the concept of believing that employees will act only on those things that they understand and accept. The notion that real change occurs from a top-down approach is no longer applicable in some organisations. In the ever-changing technology environment, people crave leadership; they do not like being told what to think. Only change that is self-determined can be regarded as sustainable. Therefore, rather than telling employees about what needs to change and what is critical to the success of the business, organisations use customised knowledge maps designed to transform their employees into knowledge partners.

Knowledge map system functions must implement the benefit of visualising and exploring contexts and relationships in distributed information collections and collaborative knowledge spaces. These function must include modules for semantic analysis of information items and interfaces for visualising relationships and creating new knowledge structures (Snowden, 2007), enabling existing archives and collections of artistic works and scientific research to be connected into a collaborative knowledge map.

3.8.4 Collaboration services

Collaborative tools are computer-based tools that help people work together and share information. They allow for virtual online meetings and data-sharing and are sometimes referred to as ‘groupware’. Some examples of collaborative tools include calendar, bulletin board, chat, whiteboard, audio, video, discussion groups or newsgroups, file sharing tools, presentation tools, application sharing, instant messaging and search capability (Snowden, 2002).
Collaboration services allow the possibility of sharing knowledge and contributing to the corporate memory. Those for KM should create a shared space for network-based 'virtual communities', in which their members can exchange knowledge and manage common tasks and resources. Employees' requirements can be tailored to individual specific work, so it is very important for organisations to provide the right technology-based KMSs that are meant for specific content requirements and work scenarios as they may change. Collaboration services provide KM employees with an effective KMS that can support specific requirements and can easily be changed or adapted. This will add more productivity, flexibility and choice. Effective collaboration services will have the possibility of delivering the right content for server-managed competitive knowledge (Snowden, 2002).

In organisations, collaboration services must provide an opportunity to reduce all costs, including those of travel, by using an online working environment with the benefits of using conferencing and learning. Organisations can assist productivity by adding good collaborative service to employees and providing them with the right capability in the context of their role, and the business activity or the right content on which they are working. This will reduce costs and decrease the demand on technology-based KMS resources using self-service tools for creating an effective knowledge environment. Collaboration services must deliver an integrated collaborative environment that includes a wide range of capabilities, such as e-mail, calendaring, presence awareness, instant messaging, learning, team spaces, Web conferencing, document and Web content management (Muntean, 2004).

The old-fashioned way, namely using telephones and e-mail, is too limiting for organisations such as Ernst and Young, which has over 70 000 employees, writes Whyte (2008), chief information officer at the organisation. Even if those employees are at a great distance from each other, they can communicate efficiently using collaborative tools such as Lotus Notes and sometimes instant messaging applications. With the growing number of organisations worldwide, organisations need to think ahead of the technologies that are required to speed up business decision-making. This
can be done online using the right technology systems, especially if decisions involve knowledge about the organisation. Managers need to be able to make decisions and resolve conflicts online, as well as provide leadership, assign tasks, exact accountability and facilitate meetings: "All the stuff we do naturally face-to-face, we have to be able to do online" (Whyte, 2008). This appears to represent a future application of use to the knowledge environment, with some businesses already making use of technology-based KMSs for functionality of their business.

Some of the major considerations when choosing good collaboration services are listed below (Muntean, 2004):

- Improved scalability and performance.
- Support for the current application software that is being fully utilised by the users.
- Support for out-of-office notifications, which will benefit the users and improve productivity.
- Effective and reliable Web conference management.
- Inclusion of document management enhancements.

### 3.8.5 Discovery services

While collaboration services make it easier for people to share, discovery services help them to understand. From basic search techniques to advanced tools for automatic analysis of textual information, discovery services enable people to find the knowledge that exists within the organisation – whether that be in a document, an e-mail conversation or the personal expertise of an individual (Whitman, 1994).

### 3.9 KEY SUCCESS FACTORS OF TECHNOLOGY-BASED KMSs

KMSs make it easy for departments within organisations, teams and individuals to contribute content to the portal. Departments within organisations can integrate their knowledge portal into the enterprise portal,
enabling them to share knowledge with other departments. Snowden (2007) has defined a KMS as the methods and tools for capturing, storing, organising and making accessible knowledge and expertise within and across communities. This includes the ability of organisations to be flexible enough, provide quick responses and add productivity.

In some organisations, writes Barth (2000), the process of capturing and organising organisational knowledge can be successful if the KMS is flexible and attends to their detailed needs, with a number of software applications currently available. This must not be overlooked if a new system is going to be implemented. It is important to engage everyone in the old system and implementation of the new one, and to continuously provide updates. If the KMS is outsourced, suppliers must understand and know how things were done before bringing in any new technological systems. It is therefore important to understand the organisational strategy and align it with the KMS strategy.

Technology-based KMSs are not available to replace organisational strategies, goals, or people, but their availability is to enhance the way organisations do business and to add productivity or improve the effectiveness and efficiency of organisational goals. The main objective of technology-based KMSs is to add organisational benefits. Weeks (2007) observes that benefits can come in many ways, not just in terms of cost, which seems to be the greatest concern in most organisations, as all they seem to care about is the ROI. Benefits can be in the form of better communication with clients and suppliers, and with the correct technology-based KMS, this can be easily adaptable.

3.10 BENEFITS OF TECHNOLOGY-BASED KMSs

The concept of coding and transmitting knowledge in organisations is not new. Technology has been a major factor in assisting knowledge users to process and disseminate vast amounts of information. The type of technology systems used in the early years assisted managers with specific information
that they required, such as decision support systems (DSSs). DSSs are computer-based information systems designed to help managers to choose one of many alternative solutions to a problem. They assist in increasing profit, reducing costs and enhancing the quality of products.

An effective technology-based KMS for KM must have the ability to enhance and enable knowledge generation, codification and transfer, and to add to organisational benefits. As with any technological system, the technology-based KMSs are designed to ease the burden of work, through augmentation and automation, allowing resources to be applied efficiently to the tasks for which they are most suited. Many organisations develop technological systems designed specifically to facilitate the sharing and integration of knowledge, these systems being referred to as KMSs (Karagiannis, 2002).

3.11 FACTORS TO CONSIDER WHEN IMPLEMENTING A TECHNOLOGY-BASED KMS

Mandviwalla et al. (1998) discuss the fact that the use of technology in KM is not a new concept, and considerable experience has been built up by the early pioneers of knowledge. Even before the availability of solutions such as Lotus Notes, on which many KM solutions are based, organisations were deploying intranets, such as EPRINET (electronic power research institute network), based on early generations of networking and computer technology that improved access to knowledge online. Collaboration and knowledge-sharing solutions also arose from the development of online conferencing and forums using mainframe computer technology. Today, intranets and the internet are ubiquitous, and soon most or all of the written information needed by a person to do his or her job may be available online. However, that is not to say that it can be used effectively with the systems currently available (Benbya et al., 2004).

KM challenges facing organisations today cannot be solved by the deployment of a technology solution alone. In this case technology should be seen only as an enabler. Organisations need to understand how to implement
both the KM strategy and the KMS within their organisation. Some of the critical factors in implementing the KMS strategy is to identify knowledge that is critical to the organisation and how a KMS will contribute to the organisation's competitiveness. Not to be ignored is aligning organisational strategy with the KM strategy. It is also vital to begin with knowledge that already exists in the organisation in various forms. If the organisation is building on an existing IT investment, it needs to consider the value of supporting KM with technology that comes from leveraging existing IT investment, thus identifying the components that can be used as is, and that need further development (Sviokla, 1996:6-40).

The effective use of a KMS requires that an organisation share an interpretive context. When choosing a technological KMS, it is important to consider whether that KMS or the supplier will be available for the entire process of the system implementation and if the technology can deliver the consistency that the application requires. Most importantly, it must be established whether the suppliers will offer support after the implementation. Advantages and disadvantages of any kind must be discussed in advance with all people involved, as this will assist in determining the risk and being prepared when it arises. In many organisations the technology has mistakenly been seen as the business strategy (Meadows, 1980:95).

A common weakness in a KMS is the overemphasis on IT at the expense of well-defined KM roles and responsibilities. The role of technology-based KMSs should enable:

- capturing of knowledge
- defining, storing, categorising, indexing and linking of digital objects corresponding to knowledge units
- searching for and subscribing to relevant content
- presenting content with sufficient flexibility to render it meaningful and applicable across multiple contexts of use (Meadows, 1980:101).
IT tools such as the World Wide Web offer a potentially useful environment within which to build a multimedia repository for rich, explicit knowledge. Input is captured by assigning various labels, categories and each unit of knowledge. The structure must be flexible enough to create knowledge units that can be indexed and linked, using categories that reflect the structure of the contextual knowledge (Mahmood & Mann, 1993:99-100). Effective use of technology-based KMSs can assist in communicating knowledge requirements and organisation to share interpretive contexts. The more the communicators share similar knowledge, background and experience, the more effectively knowledge can be communicated via electronically mediated channels (Mitra & Chala, 1997:38).

3.12 CONCLUSION

There are currently many KMSs available from different vendors or suppliers. The design of the KMS should ensure that the adaptation and innovation of business performance outcomes occur in alignment with changing dynamics of the business environment. The organisations wishing to engage in any KMS should understand that these systems are only the enablers for the business.

Organisations need to develop adaptive knowledge to redefine their organisational values, goals and strategies that will add productivity to the business enterprise. Competitive survival and ongoing sustenance will depend on the ability to continuously redefine and adapt organisational goals, purposes and the organisation's way of doing things.

Success of the KMS implementation will depend on the integration of decision-making and actions across inter-organisational boundaries. The KMS must encourage knowledge sharing amongst employees within an organisation. The KMS implemented within an organisation must be willing to allow individuals to share information with their departmental peers and supervisors, or with other departments, in the belief that what they know provides them with an inherent advantage in bargaining and negotiation.
Organisations should avoid the most sophisticated knowledge-sharing technologies (systems) because they can result in sharing of partial, inaccurate and ambiguous information, or not sharing at all. A KMS must be designed to work in order to gain competitive advantage and knowledge embedded in the organisation processes and employee skills to produce unique capabilities that will deliver more effective and efficient services. A working environment that encourages knowledge-sharing will improve morale and employee satisfaction so that the organisation can reduce costly employee retention issues.

An expert understanding of KMSs is required by organisations and should be involved for organisational core competency and to apply one's knowledge to the organisation's own initiatives, and thus gain and sustain the support of everyone in the organisation, including top management.

An overall conclusion about technology-based KMSs is that they must provide the following advantages:

- Share valuable organisational knowledge.
- Avoid unnecessarily repeating basic procedures and reduce redundant work.
- Reduce training time for new employees.
- Reduce cost.
- Add productivity to individual and organisational work.
- Retain intellectual property even after the employee leaves.
- Add competitive advantage.
- Increase ROI.

The next chapter will discuss the research design used and the findings.
4.1 INTRODUCTION

This chapter will present the research methodology and findings and discuss the results of the research undertaken. Both statistical data and the data obtained from the open-ended questions will be presented and discussed. Looking at which technology-based KMSs organisations use, the purpose is to identify key issues facing organisations when implementing technology-based KMSs. It will examine reasons knowledge workers fail or find it difficult in their day-to-day activities when using technology-based KMSs, and investigate further if the technology-based KMSs are being fully utilised and accepted by knowledge workers.

4.2 METHODOLOGY

Neuman (1997) explains that the search for knowledge within the social sciences is conducted according to specific research methodologies. It is these methodologies that are adhered to during investigations that provide the social sciences with structure. Methodologies do not deal only with the accumulation and understanding of knowledge, but are processes in which methods and procedures are used in the search for knowledge. Thus methods refer to the procedures used in specific investigations (Reber, 1995). These procedures are dependent on the researcher's choice of paradigm.

4.3 SAMPLE SELECTION

The investigation involved the use of questionnaires and interviews to survey KM departments in the Gauteng region of South Africa. This geographic area was chosen as is host to companies that have established a knowledge management department. It was the closest to the researcher and allowed the possibility of conducting interviews and administering questionnaires. The
research was designed to explore specific KM issues with regard to employees' utilisation of technology-based KMSs and determine their acceptance of these. Another purpose was to find out whether managers have a KM strategy and align it with the organisational and cultural strategy. The questionnaire was designed to discover if the managers involved their knowledge workers in discussions of any KM initiatives with all employees.

Data was collected from five companies selected by the researcher. The knowledge workers were required to complete the questionnaires and some employees were interviewed (Table 4.1 below).

Table 4.1: Organisation sectors surveyed

<table>
<thead>
<tr>
<th>COMPANY</th>
<th>INDUSTRY SEGMENT</th>
<th>NUMBER OF EMPLOYEES IN KM DEPARTMENTS</th>
</tr>
</thead>
<tbody>
<tr>
<td>A</td>
<td>Telecommunications</td>
<td>45</td>
</tr>
<tr>
<td>B</td>
<td>Energy supply</td>
<td>22</td>
</tr>
<tr>
<td>C</td>
<td>Auditing and consulting</td>
<td>15</td>
</tr>
<tr>
<td>D</td>
<td>Chemicals, fuel and gas</td>
<td>9</td>
</tr>
<tr>
<td>E</td>
<td>Information technology</td>
<td>14</td>
</tr>
</tbody>
</table>

The sample selection for this particular research was aimed at targeting KM organisations in the Gauteng area. The survey was aimed at knowledge workers at various levels in their organisations. The researcher chose a sample of five companies that had instituted KMSs within the scope of their operation. 20 questionnaires were distributed to each organisation listed in Table 4.1 (above).

The research method for surveying the technology-based KMSs within the KM departments included the use of a questionnaire (Appendix A). The questionnaire was mainly self-constructed with input from StatKon (Statistical consultation service) at the University of Johannesburg, for the construct validity of the instrument. Some of the questions were adapted from previous
research on KM conducted by Anderson (1998). The questionnaire was designed to take not more than 20 minutes to complete and confidentiality was guaranteed as questionnaires were returned anonymously. The questionnaire contained 31 questions and was divided into five sections.

4.4 RESEARCH PARTICIPANTS

This study was conducted mostly in the KM department (see Table 4.1, above), where most companies had between 10 and 50 knowledge workers.

4.5 RESEARCH DESIGN

The research was designed to explore how technology-based KMSs are accepted by knowledge workers and how these systems are being used within their organisation. The qualitative approach was considered the best to highlight knowledge workers’ perceptions and feelings in their work environments.

4.5.1 Qualitative approach

There are five kinds of qualitative research to choose from, namely case study, grounded theory, phenomenology, ethnography and historical research. The main purpose of qualitative research is to study a social reality (Bryman, 2004). Structured interviews and standard questions were developed and posed to each knowledge worker who participated. Senior managers or departmental heads were requested to assist the researcher to collect information which could be quantified and which needed clarification from the respondents. This allowed for an opportunity to provide clarity on terminology used in the research, e.g. some employees were not sure what technology-based KMSs were. The list of questions can be found in Appendix B.
Because of distinctive principles and characteristics, qualitative methods are useful complements to quantitative and participatory methods (Mayouz, 2002), particularly in order to do the following:

- **Increase understanding of WHAT is happening**
  Qualitative methods are useful in informing the selection of criteria and indicators, highlighting any limitations or complexities and hence assisting in their interpretation. These methods are also often necessary to investigate more complex and sensitive impacts which are not so easy to quantify or where quantification would be extremely time-consuming and costly. They are also used to investigate more sensitive issues which cannot be easily aired in the public forum of participatory methods.

- **Contribute to understanding of WHO is affected in which ways**
  Qualitative methods highlight the voices of those who are most disadvantaged in ways which might be difficult, owing to the public and consensual nature of participatory methods. They may also be missed in the process of aggregation of quantitative methods. Qualitative methods can also be used for probing key informants to further investigate issues of diversity and conflict.

- **Analyse WHY particular impacts are occurring**
  Qualitative methods enable a more probing investigation of contexts and development processes, and the complex interactions between contexts, grassroots aspirations and strategies, institutional structures and enterprise interventions.

- **Assessing HOW policy can be improved**
  Qualitative methods are likely to be necessary in investigating more complex and sensitive issues essential to understanding the feasibility of proposals from participatory workshops.

Table 4.2 (below) presents the types of qualitative approaches. For this research the case study approach was chosen.
Table 4.2: Types of qualitative approaches

<table>
<thead>
<tr>
<th>Type</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>CASE STUDY</td>
<td>Attempts to shed light on a phenomenon by studying in depth a single case example. Theory is developed inductively from a corpus of data acquired by a participant-observer. The case can be an individual person, an event, a group, or an institution.</td>
</tr>
<tr>
<td>GROUNDED THEORY</td>
<td>Theory is developed inductively from a corpus of data acquired by a participant-observer.</td>
</tr>
<tr>
<td>PHENOMENOLOGY</td>
<td>Describes the structures of experience as they present themselves to consciousness, without recourse to theory, deduction, or assumptions from other disciplines.</td>
</tr>
<tr>
<td>ETHNOGRAPHY</td>
<td>Focuses on the sociology of meaning through close field observation of socio-cultural phenomena. Typically, the ethnographer focuses on a community.</td>
</tr>
<tr>
<td>HISTORICAL</td>
<td>Systematic collection and objective evaluation of data related to past occurrences in order to test hypotheses concerning causes, effects, or trends of these events that may help to explain present events and anticipate future events (Gay, 1996).</td>
</tr>
</tbody>
</table>
In this study the researcher used the case study method because this type of research is suited to bringing an understanding of a complex issue or object and can extend experience or add strength to what is already known through previous research. Case studies emphasise detailed contextual analysis of a limited number of events or conditions and their relationships. Yin (1994) defines the case study research method as an empirical inquiry that investigates a contemporary phenomenon within its real-life context, when the boundaries between phenomenon and context are not clearly evident and in which multiple sources of evidence are used.

4.5.2 Questionnaire

The questionnaire was divided into the following five sections:

Section 1: Demographic information
The aim of these questions was to enable the researcher to gather information about the department and positions of the staff members. The researcher was able to gather information regarding their level of experience and their working environment.

Section 2: How data, information and knowledge are shared in the organisation
The focus of this section was to establish how data, information and knowledge were shared amongst employees. Also determined were the types of systems they used to share information and whether their organisation provided some kind of incentives for using those systems were.

Section 3: How technology-based KMSs are being utilised in the organisation
This section of the questionnaire dealt with aspects of the types of technology-based KMSs that the respondents used and the barriers they experienced while using those systems.
Section 4: Management questions based on challenges and issues that they face

The focus of this section was to establish how senior managers felt about technology-based KMSs and whether they believed they were a necessity in order to stay competitive. It established if their KM strategy was in line with their organisational and cultural strategy. The purpose of this section was also to find out if managers experienced resistance from the knowledge workers regarding the utilisation of technology-based KMSs.

Section 5: General questions on KM and technology-based KMSs

This section dealt with the degree to which knowledge workers accepted technology-based KMSs, and whether employees believed that the current technology-based KMSs contributed to their creativity or left them confused.

4.6 DATA COLLECTION

Data was collected from the KM departments of the list of selected companies. Questionnaires were distributed to respondents within the KM departments. In most cases they were e-mailed or otherwise distributed physically. However, respondents were allowed to add any relevant information that could assist the researcher. Interviews were conducted exclusively with the knowledge experts or those who had been in the KM field for at least three years or more. Separate interviews were conducted with each departmental head. Before conducting the interview an e-mail was sent to the person in charge or directly to the respondent, requesting their permission to conduct the interview. Interview questions were also e-mailed to the participants two days ahead of the interview to allow the participant time to read through the questions and to add more questions where necessary.

The interview schedule was timed for approximately 30 to 40 minutes, but many of the departmental heads or their representatives enjoyed the study, thus prolonging the interview for approximately 1 hour.
A letter of introduction accompanying the questionnaires included an explanation of the purpose of the study, along with the instructions and the definitions of terminology or abbreviations used in the questionnaire. A period of three weeks was allowed for responses to the questionnaires before analysis was undertaken.

4.7 DATA ANALYSIS

Yin (1994) argues that data analysis consists of examining, categorising, tabulating, or recombining the evidence to address the initial propositions of the study. Data collected in this study from questionnaires and interviews were tabulated and are presented.

4.8 TRUSTWORTHINESS OF THE RESEARCH

The researcher conducted this study among companies that had knowledge of the subject of KM and used many technology-based KMSs within their scope of operation. This helped assure the researcher of the accuracy of the information, and provided an opportunity to read selected articles of the companies on the issues of KM. All information was thus presented with knowledge of the current issues of KM.

4.9 KEY ASSUMPTIONS AND LIMITATIONS

Time was a major limitation in this study, as the survey involved interviewing all the head of departments. Some were unavailable for 30 minutes as requested by the researcher. Time was also affected as some of the respondents were not sure as to what technology-based KMSs were, which meant that the researcher had to go back to respondents to explain these to them, thus reducing the likelihood of them not filling in the questionnaires appropriately. More time could have been taken to target organisations in many sectors around South Africa to provide a more balanced and diverse view. These limitations and assumptions must be taken into account when considering the findings of this research.
Another limitation is that the findings cannot be generalised and the sample was not random but designed largely to suit the researcher.

4.10 DEFINITIONS AND ABBREVIATIONS

The questionnaire that was mailed and delivered to the selected organisations often made reference to data, information and knowledge. These concepts were defined in order to avoid ambiguity, as they were used for the collection, organisation, dissemination, reuse and sharing of data, information and knowledge. In this context the following abbreviations or terminology were used:

- KM: knowledge management
- KMS: knowledge management system
- IT: information technology
- E-mail: electronic mail

4.11 FINDINGS

The findings are presented as follows:

4.11.1 Response rate and participants' profile

100 questionnaires were delivered by hand or e-mailed to KM departments within the chosen companies. The respondents were asked to complete them and the researcher collected them later. Of the 100 questionnaires distributed, only 95 were returned, indicating a response rate of 95%. However, a response rate of 50% is considered adequate, 60% good and 70% excellent (De Vos, Strydom, Fouche & Delport, 2002:172). Therefore, the 95% response rate for this study is deemed excellent to collect the necessary information. A number of knowledge workers refused to complete the questionnaire, in some cases giving no reasons for their refusal. One reason that was given was that staff members were in training.
Participants' current occupations broadly fell into one of the following categories:

Table 4.3: Participants' profile

<table>
<thead>
<tr>
<th>Participants' profile</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>Knowledge workers</td>
<td>82%</td>
</tr>
<tr>
<td>IT specialists</td>
<td>66%</td>
</tr>
<tr>
<td>Administrators</td>
<td>9%</td>
</tr>
<tr>
<td>Senior managers</td>
<td>6%</td>
</tr>
</tbody>
</table>

All participants worked in teams in open-plan offices, but in a few cases managers worked alone in a closed office (with an open door management policy).

4.11.2 Company demographics

Table 4.1 (above) summarises the organisations surveyed and presents those industry segments that had knowledge departments. These departments are dedicated to a specific field of knowledge and have used many KMSs within their time of operation. Some organisations refer to their departments as 'knowledge centres'. Companies that have a dedicated KM department were selected in order to eliminate some confusion about the KM terminology. In some organisations the field of KM is not new but is misunderstood, e.g. there is confusion in terms of understanding who the knowledge users or knowledge workers are and what technology-based KMSs are.

The total number of employees who participated in the survey were 95. The average number of years of experience of knowledge workers was 1 to 5, for administrators 3 years and for IT specialists 1 to 8 years. Senior managers at most had 5 to 13 years’ experience (Figure 4.1, below).
4.12 RESULTS AND DISCUSSION OF RESEARCH FINDINGS

The data collected in the survey was analysed by following an interpretive content analysis approach. The three main objectives of this survey were to collect data on the acceptance of technology-based KMSs, to explore the key success factors organisations are committed to when implementing technology-based KMSs, and how they manage to ensure KM benefits.

There are a number of technology-based KMSs currently being used, and some organisations have used more than one type of system.

4.12.1 How data, information and knowledge is shared

The research findings show that 93% of the employees participating in the survey shared data, information and knowledge amongst themselves or within departments more often. Companies A, B, C and E indicated that they shared knowledge in information discussions and e-mail (87%); while company D indicated that it used both conferences (50%) and meetings (50%).

Most knowledge-users (89%) indicated that their organisations had sophisticated technology-based KMSs that only the “knowledge engineers”
could understand if a technical problem arose. 15% were unsure and only 7% said they did not have a sophisticated technology-based KMS, as indicated by companies E and A.

Technology-based KMSs are continually being developed and investment in new systems increases. This results in many organisations having to introduce the latest technology-based KMSs for knowledge-sharing amongst employees. In all company segments, 97% of respondents agreed that the most common method used to share ideas and knowledge was e-mail, with only 30% of respondents indicating that they preferred to use informal discussion for personal information. 7% of respondents still believed that meetings were the best way to share ideas. Only 3% of respondents indicated the use of telephones.

Companies A, B, D and E responded that the most incentives available in their organisations for using technology-based KMSs were training and resources. They also revealed that some kind of reward would be encouraging, e.g. salary increase, promotion and/or more recognition.

Section 2 of question 4 asked if the employees felt encouraged when utilising the technology-based KMS in order to share data, information and knowledge. 87% of respondents neither agreed nor disagreed, while 35% of respondents agreed.

However, the failure of technology-based KMSs through non-acceptance leads many organisations to rethink why those KMS technologies failed. This was shown by the knowledge experts, who indicated that the technologies were doomed to fail if they were not fully supported by everyone involved and only initiated by senior managers. 67% of respondents indicated that they strongly agreed that a knowledge expert should determine which technology-based KMS should be implemented in the future, and 33% were unsure about the introduction of new technology systems.
11% of the knowledge-users in companies A, B and D were unsure whether the current KMS tools they used were regarded as KM tools or technology-based KMSs. This response indicates a lack of knowledge regarding the current technology-based KMSs.

87% of respondents felt that the most accepted technology-based KMSs were likely to be those where full training was engaged. Among the systems they had used longer, the internet interlinked with the intranet ranked first. Several respondents also recognised the contributions of technologies (Table 4.5, below).

**Table 4.5: Contribution of technology systems**

<table>
<thead>
<tr>
<th>Technology system</th>
<th>Contribution</th>
</tr>
</thead>
<tbody>
<tr>
<td>Record management system</td>
<td>74%</td>
</tr>
<tr>
<td>Groupware</td>
<td>67%</td>
</tr>
<tr>
<td>Data warehousing</td>
<td>67%</td>
</tr>
<tr>
<td>Research archive database</td>
<td>67%</td>
</tr>
<tr>
<td>Document management systems</td>
<td>56%</td>
</tr>
<tr>
<td>CRM</td>
<td>46%</td>
</tr>
<tr>
<td>Expertise database</td>
<td>42%</td>
</tr>
</tbody>
</table>

43% of respondents stated that the organisations had no plans for technology-based KMS initiatives, 33% that they were not sure of some of the technology-based KMSs currently available, and 80% of the knowledge experts indicated that the technology-based KMSs had to be utilised across the departments.

The survey furthermore asked knowledge users whether they considered the use of technology-based KMSs beneficial. The responses showed that 80% of respondents viewed the use as principally beneficial in terms of improved access to information resources. Other indications were that technology-based KMSs were moderately to greatly beneficial with regard to increased efficiency of communication with colleagues (53%-72%); and with regard to
increased efficiency of communication with clients (40%-66%). In access to information, not one participant viewed the use of technology-based KMSs of no value. This result could be that the technology-based KMS does not function correctly or that there is a need for training in the use of the current technology-based KMS in order to reach its full potential.

Participants were asked whether they had concerns regarding the utilisation of technology-based KMSs in their organisations. The responses indicated the following willingness to be made aware of existing current KMSs:

- To distribute, share, capture and apply knowledge (88%)
- To work independently of time and location (99%)
- To collect information created by colleagues (90%)
- To understand the new upgraded system (98%)
- To be part of the development of new KMSs (90%)
- To distribute information to colleagues (87%)

In terms of the user-friendliness of the current technology-based KMSs that the respondents used, 87% indicated that the systems were not user-friendly and believed that, unless proper training were provided to every knowledge worker, this challenge would not go away. 67% of the IT sector indicated that the systems were user-friendly.

During the interviews, many respondents in five companies posed similar questions in all industry segments about what would happen to the KMS if the organisation lost control over knowledge storage. This was because many employees had experienced information overload when trying to find searched topics, especially on the intranet. The knowledge users surveyed believed that technology should be seen by everyone as an enabler and not as a replacement for people. Knowledge-users or anyone using technology, whether it is old or current, should not depend on it fully, but rather look at the advantages and disadvantages of that particular system.
4.12.2 The effectiveness of technology-based KMSs

Technology-based KMSs play an important role in organisations. This was indicated by respondents who agreed that the use of technology was necessary in their day-to-day activities.

The research revealed that 97% of respondents used the internet to access external knowledge, 76% used the intranet, 61% used data warehousing or mining technologies, 59% document management systems, 43% decision support, 39% groupware and 33% extranets as knowledge management tools (see Table 4.6). However, while organisations were most advanced in the use of technology to achieve KM goals, they were failing to exploit its full power. Only 21% of respondents whose companies had implemented relevant technologies said that they had a system specifically configured for KM.

Table 4.6: Most used technology-based KMSs

<table>
<thead>
<tr>
<th>Technology</th>
<th>Usage (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Internet</td>
<td>97%</td>
</tr>
<tr>
<td>Intranet</td>
<td>76%</td>
</tr>
<tr>
<td>Data warehousing or mining</td>
<td>61%</td>
</tr>
<tr>
<td>Document management system</td>
<td>59%</td>
</tr>
<tr>
<td>Decision support</td>
<td>43%</td>
</tr>
<tr>
<td>Groupware</td>
<td>39%</td>
</tr>
<tr>
<td>Extranet</td>
<td>33%</td>
</tr>
</tbody>
</table>

4.12.3 How technology-based KMS were being utilised within the organisation

Knowledge-users indicated that most employees across their organisations used e-mail. Company E indicated that the use of e-mail and video conferencing was still strong in their industry sector.
In general, knowledge workers indicated that their use of the internet constituted 97%, other departments' use of the internet was 86%, and 45% of the intranet combined.

The extent to which knowledge-users experienced barriers to using technology-based KMSs is as follows (Table 4.7, below): The barriers to using technology-based KMSs are experienced by knowledge-users when utilising the technology-based KMSs.

Table 4.7: Barriers to using technology-based KMSs

<table>
<thead>
<tr>
<th>Issue</th>
<th>No extent</th>
<th>Small extent</th>
<th>Moderate extent</th>
<th>Large extent</th>
</tr>
</thead>
<tbody>
<tr>
<td>Inadequate training</td>
<td>33%</td>
<td>45%</td>
<td>15%</td>
<td>79%</td>
</tr>
<tr>
<td>System complexity</td>
<td>11%</td>
<td>30%</td>
<td>55%</td>
<td>89%</td>
</tr>
<tr>
<td>Technological terminology</td>
<td>22%</td>
<td>38%</td>
<td>77%</td>
<td>45%</td>
</tr>
<tr>
<td>Rapidly changing technology</td>
<td>12%</td>
<td>46%</td>
<td>51%</td>
<td>87%</td>
</tr>
<tr>
<td>Expert knowledge of other colleagues' data</td>
<td>9%</td>
<td>15%</td>
<td>45%</td>
<td>89%</td>
</tr>
<tr>
<td>Distrust of other colleagues' data</td>
<td>7%</td>
<td>23%</td>
<td>67%</td>
<td>89%</td>
</tr>
<tr>
<td>Departmental barriers</td>
<td>18%</td>
<td>33%</td>
<td>57%</td>
<td>78%</td>
</tr>
<tr>
<td>Organisational specialisation</td>
<td>67%</td>
<td>55%</td>
<td>21%</td>
<td>30%</td>
</tr>
<tr>
<td>Lack of multi-skilling</td>
<td>33%</td>
<td>45%</td>
<td>51%</td>
<td>76%</td>
</tr>
</tbody>
</table>

The above table indicates the barriers to using technology-based KMSs, one being that lack of training can lead to less productivity. Training is seen as the most important part of being productive. This is true in the sense that employees cannot be expected to be productive, especially with the ever-changing technological environment people inhabit. If new technologies are introduced then more adequate training becomes a necessity. Another barrier, indicated by 89% of respondents, was the complexity of the system. This can result when organisations realise the flexibility of their system which allows them to upgrade and built new systems on top of old ones. This leads to more
complex systems, in turn contributing to employees' frustrations when there is a lack of knowledge about the new system or its complexity. This was experienced to a moderate extent by 55% of participants, to a small extent by 30% and to no extent by 11%. All employees indicated that the technological terminology affected them to a moderate extent (77%), to a large extent (45%), to a small extent (38%) and to no extent (22%).

Respondents who were not IT specialists felt that some technologies or software were meant for IT employees and not for the administrators in other non-IT departments. Expert knowledge of other colleagues was indicated by 89% of respondents to a larger extent, by 45% to a moderate extent, by 15% to a small extent and by 9% to no extent. Although it can be assumed that distrust in other colleagues could be based on employees feeling inferior to ask applicable questions to members of other departments, this distrust was indicated by 89% to a larger extent, 67% to a moderate extent, 23% to a small extent and 7% to no extent.

Departmental barriers can lead to poor knowledge sharing, which can result in a failure to capture and translate requirements into meaningful specifications, delays in product introduction, increased cost and ultimately customer dissatisfaction. It is therefore important that organisations firstly become aware of barriers to knowledge sharing and, secondly, take steps to overcome them. If new technology-based KMSs are deployed in organisations, it does not mean that they replace the people, especially their skills. Knowledge workers should not be seen as technologies or machines that are to compete with the new or current systems. They should still manage their day-to-day activities without the current technology-based KMS hindering their multi-tasking. Credit should be given to employees where this is due, instead of to the system in use. Lack of multi-tasking was indicated as a barrier to a larger extent by 76%, to a moderate extent by 51%, to a small extent by 45% and to no extent by 33%.

Knowledge workers indicated that their organisations had technology-based KMSs and provided the following reasons for having a system:
• For their organisation to remain competitive and to increase costs (78%)
• Because IT professionals considered it necessary (88%)
• Because senior managers considered it extremely important (60%)
• It was a necessity for customer relationship management (89%)

The use of technology-based KMSs is not being ignored by employees. This was indicated when participants were asked about some of the concerns they might have had regarding the utilisation of technology-based KMSs. Most (92%) indicated that technology systems had made working conditions more bearable in the past and that these systems should not be seen or implemented to replace the knowledge users. 78% said that KMSs added a competitive advantage, 78% found that retrieval of relevant information was made more quickly, and 98% felt that KMSs assisted access to online databases for information retrieval. These results might encourage knowledge organisations that plan to implement KM or improve their current KMS to focus their initiatives by involving knowledge-users at all levels.

4.13 CONCLUSION

The survey identified the extent of the use of technology-based KMSs as well as some barriers and concerns regarding this, and the impact they have on knowledge worker creativity. How these technology-based systems are being utilised and accepted in organisations was the main focus of the survey. The survey included organisations that had KM departments and was aimed at those employees involved in KM.

Among the most notable findings of the survey was that, generally, participants indicated, to some extent, the use of technology-based KMSs for managing information and knowledge in their organisations. However, the relatively high percentages of knowledge-users responding negatively or being unsure might indicate a lack of awareness of these systems, or it could...
be an indication that these systems are not currently used within their organisations.

The internet, intranet and e-mail were the highly utilised tools, and the uses for these technologies were valued, but the concept of an extranet proved to be unfamiliar to a certain extent. Some concerns are the relatively high percentage of participants who were not aware of the other current technology-based KMSs available today, such as knowledge portals, although the attitude of most participants was positive towards the potential use of KMSs. There are thus many opportunities for knowledge managers to initiate KM projects aimed at creating or developing systems that could support employees in their daily activities. The results of this study might assist knowledge managers who plan to implement technology-based KMSs to involve knowledge users when implementing these systems and to align their organisational strategies with the culture of their organisation.

The following factors emerged strongly:

- Lack of training.
- Insufficient time to plan and utilise the technology-based KMS.
- Failure to communicate with all relevant users about new technology implementations.

The literature review indicated that knowledge workers must be part of the learning process, have self-control and a high degree of responsibility. Organisations are more interested in a return on investment and need to remain competitive, which can be achieved with the full utilisation of technology-based KMSs by knowledge workers. For technology-based KMSs to be effective and reap the full benefits, knowledge users are to fully understand the risks and benefits involved in the type of system they choose to use.
By providing full details of the technology-based KMSs that are currently available, that is educating all the users within the organisation, this will also eliminate the ultimate poor or lower productivity from knowledge workers.

The next chapter will discuss the summary, draw conclusions and make recommendations.
CHAPTER 5
SUMMARY, CONCLUSIONS AND RECOMMENDATIONS

5.1 INTRODUCTION

The purpose of this study was to gain a better understanding of the acceptance and utilisation of technology-based KMSs by knowledge workers. The focus was to determine whether these KMSs are being fully utilised and if they have an impact on knowledge worker productivity.

After summarising the findings and discussion of previous chapters, a conclusion is drawn and recommendations are made of how technology-based KMSs are being accepted and utilised within organisations.

5.2 OVERVIEW

Chapter 2 discussed KM and provided a definition of knowledge workers and their activities. Firstly, an overview was given of the concept of KM and its application in the knowledge environment. It was observed that many organisations implement KM or have knowledge workers within their environment and that knowledge has become one of the important assets in organisations.

However, it was observed that KM is not only about the creation of a knowledge repository and improved access to information. It is also about enhancing the knowledge environment, managing knowledge as a strategic asset and applying KMSs effectively. KM focuses on technology and is about creating a culture of knowledge-sharing. Without the involvement and commitment of knowledge workers, the objectives of KM will not be reached.

There are many different understandings or definitions of KM. Some focus on knowledge-sharing among individuals and others on building knowledge distribution capabilities. Others, still, emphasise the use of technology to
capture, manipulate and locate knowledge. There are also some definitions that focus on information management rather than KM itself.

Chapter 3 provided the definitions of technology-based KMSs and their concepts, with different types of technology-based KMSs being highlighted, including their concepts and definitions. The goal of this chapter has been achieved by articulating the technology-based KMS objectives and functions and defining current technology-based KMSs that are being utilised by knowledge workers within organisations.

Chapter 4 set out the methodology and results of the study. In this chapter the researcher investigated the key issues that organisations face when implementing technology-based KMSs. It was discovered that data, information and knowledge was shared greatly using emails and then conferences and meetings. In most cases the knowledge workers felt they lacked more detailed skills in some of the technology-based KMs that they were expected to use, and they believed that only the knowledge workers with technical expertise could utilise the technology-based KMS. However, the many who responded indicated that they would rather have some kind of reward, such as salary increase and recognition, than training and resources. Personal reward was more acceptable to them. Knowledge workers believed technology played a major role within the organisation, but also emphasised that organisations should also involve them in the rapidly changing technology that they wished to implement.

Chapter 5 investigated the acceptance of technology-based KMSs by knowledge workers, how these systems are being utilised and if knowledge workers fully utilise them in their day-to-day activities. Organisations spend much time improving the technology systems rather than the knowledge worker's creativity in how to use those systems. This results in employees' resistance towards fully accepting the systems. Although many of the knowledge users agree that they cannot do without technology, they still feel the need to know how to use any systems in operation. No one wants to feel
as if the system is replacing them. The system should be there to enhance and add productivity to what they already know.

5.3 RECOMMENDATIONS

This report emphasises that companies should establish a means of measuring the contribution of a knowledge worker when using technology-based KMSs in order to increase employee productivity. Appropriate and successful frameworks used by other companies should have been evaluated. KM should be seen as a tool for innovation and creativity and not a substitute. For an organisation to maintain uniqueness and creativity while still using technology-based KMSs, there is a need for knowledge workers to understand the purpose and role of the KMSs that organisations are implementing. Although most knowledge workers do not see technology-based KMSs as an obstacle to their career ambitions, there is a need for organisations to appraise employee performance in a way which recognises the significance of their contribution to the organisation's knowledge base.

The technology-based KMS allows the organisation the ability to stay ahead of competitors and to develop employees. Vendors or suppliers that provide any technology-based KMSs must be able to provide all of the features that organisations are looking for in the technology system. It is important to understand the organisation's strategy and align that with the technology-based KMS strategy before any implementations take place. A successful implementation of any technology-based KM strategy happens only when a culture of knowledge sharing is inculcated in the organisation. No system or technology, however efficient, will help unless every prospective knowledge owner understands this.

The researcher further recommends that organisations develop, implement and maintain systems that will fulfil the requirements of every knowledge worker to improve their day-to-day activities when utilising technology-based KMSs. This involves integrated technology-based KMSs for the retrieval and
sharing of knowledge across all departments that will include all employees and offer them the flexibility of using the technology-based system.

Training is an important aspect in any environment, especially if new technologies are to be used. Organisations cannot assume that if one department knows what the technology system is all about, everybody shares that understanding. This realisation can alleviate the problem of underutilising the system.

The most likely way to get people to use technology-based KMSs on the job is to understand how they do their jobs, and then find a way to inject technology systems into the course of their day-to-day work. It should not be a separate thing to be consulted when the system needs to be utilised.

5.4 RECOMMENDATIONS FOR FURTHER RESEARCH

The researcher recommends that further research be conducted into how to measure knowledge worker creativity and performance, with regard to the technology-based KMSs that they use. This can be done by answering the following questions:

- How should knowledge workers' commitment be encouraged when undertaking technology-based KMS initiatives?
- How should knowledge workers' involvement be obtained with the KM initiatives?
- How do employees better share knowledge amongst themselves?
- What incentives can be added or are available to encourage the knowledge worker to fully utilise the technology-based KMS?
- What level of training is required after hiring knowledge workers?

5.5 CONCLUSIONS

Organisations today have to learn faster than anyone else, share the results across the enterprise and constantly foster the development and sharing of
new knowledge, using not only the latest, but most usable, technology. This should begin at managerial level, that is including a top-down approach where everyone is involved. Organisational leaders need to take a serious look at how knowledge flows within the organisation, how it meets other knowledge users and how it combines with other flows. The question that most organisations ask today is: “Is this a case of pure sharing of information?” Some organisations are talking about the difference between superficial information and deeper knowledge. Explicit knowledge that resides in people’s minds and documents is the one kind, while the other is tacit knowledge, the plain know-how that resides in processes and practices that people follow. A technology-based KMS that is able to capture both kinds of knowledge to the best capacity is what will ultimately help most.

Useful information usually resides in various documents, e-mail messages, chat transcripts, projects, processes, and often in people’s heads. Most of the time this knowledge is not stored and therefore becomes difficult to retrieve when required. Information about processes and practices is usually resident in a particular individual’s mind, and even more difficult to capture and use. People tend to work with information that is not shared across an organisation easily. They are forced to indulge in repetitive work when they could actually tap into a knowledge system and work in a more innovative manner. A KMS should afford an easy-to-use interface and allow access to information based on the role the user plays. This system would connect to many kinds of documents, such as web pages, text documents, spreadsheets, e-mails, PDF documents, images and mostly knowledge that also exists in people’s minds.

Most organisations are facing the challenge of not only being able to retrieve knowledge, but to decide which technology-based KMS to use to capture and distribute important knowledge. For some organisations knowledge such as that discussed among users in the coffee shop might be the one that is important and critical.

Another important question organisations need to address is how they are going to benefit by integrating the knowledge base within an actual KM
software application. For some, the first answer is that it will benefit by having a place to maintain and keep the 'knowledge'. It is best to start with a small house of knowledge and as the organisation becomes more adept at identifying the knowledge sources, it might end up with ineffectively utilised knowledge filled with many different rooms from which to choose. KM builds upon itself. If the organisation's knowledge becomes too unwieldy, organisations may suddenly find themselves overwhelmed by trying to track their knowledge-base and keep it organised. That organisation is then a good candidate for a KMS.

The key is to find a system that an organisation will actually use. Often, organisations purchase the latest and supposedly greatest innovation (very expensive KMS) but after a few months it may not be used again. It has to be fully vetted by the entire organisation, and the tools used. It must be inherently understood that the organisation will use the latest resources and put all the others aside. Some employees or department heads who feel that their knowledge is so powerful that they cannot possibly share it with "everyone" may be part of the concerns that may arise within the organisation. The other factor to consider is understanding; whether a KMS can be implemented in an organisation and whether its leaders are willing to share their knowledge fully. There is no technology-based KMS that can allow knowledge sharing without the emphasis made by knowledge-users. For this reason it is imperative for organisations to bear the knowledge-users in mind before implementing or even before buying the system.

Organisations need to understand their knowledge focus, analyse it in its best possible form, and look at their current organisational structures of maintaining that knowledge. It does not matter how strong the knowledge base is if it is unavailable as a resource to the people within an organisation who need to rely on it. If leaders are willing to share, and organisations can organise the knowledge in its best possible form through using a KMS, then they can do so. It is important within organisations that are willing to remain competitive to know and understand that the users of the technology or the KMS tools need to fully support the understanding of the tool and be willing to
share it amongst their colleagues. For technology to enable an organisation, it is very important that the technology be understood first and then the way to align it with organisational strategies and culture be analysed.

Management in organisations must have leadership with a vision, strategy and ability to encourage knowledge workers on how to fully utilise and accept the technology-based KMS. Success in encouraging the knowledge worker as to ways to utilise the technology-based KMS requires not only that knowledge to be collected, captured and distributed, but also the technology systems to be easily accessible and available with accurate information that users require.

Knowledge workers are mostly in need of a system that will help in managing organisational knowledge. The KMS must have the flexibility of being implemented for employees that will allow capturing, storing and dissemination of knowledge.

Technology-based KMSs should be converted to systems that can promote actionable knowledge. Such a system encourages issues relating to knowledge creation, capture, sharing and maintenance. This study suggests that KM benefits will only be realised by organisations that are not only technologically adept, but that make the long-term investment to align the cultural, managerial and organisational elements for knowledge workers.

5.6 FINAL WORD

One of the problems is that organisations treat all knowledge workers alike (Snowden, 2007). It is more convenient and efficient to impose the same solution on everybody, especially in IT. It is problematic if everyone wants different software and computing environments, so common environments are created. However, people work in different ways, with some knowledge workers being better than others, and some deserving of different office environments and technologies. Executives are treated differently, so the question arises, why not an organisation’s most productive knowledge
workers? These are the people determining the future of the company (Weeks, 2007).

"We are entering the knowledge society in which the basic resource is no longer capital, or natural resources, or labour, but is and will be knowledge, and where knowledge workers will play a central role" (Skyrme, 1999).


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EMPLOYEE QUESTIONNAIRE
THE ACCEPTANCE OF TECHNOLOGY-BASED KNOWLEDGE MANAGEMENT SYSTEMS IN AN ORGANISATION

Dear sir/madam

I, Stella Moloto from the UNIVERSITY OF JOHANNESBURG, am undertaking a research project to determine the utilisation of technology-based knowledge management systems in your organisation and to explore the value and benefits of these systems for knowledge workers and competitive advantage.

You are kindly requested to complete the following questionnaire regarding the utilisation of the technology-based knowledge management systems in your organisation. It should take no longer than 20 minutes of your time. Your response is of the utmost importance.

Your input is very valuable and is important to the success of the research.

Due date: September 25th 2008.
For further information please contact me @
☎ (011) 5593953
✆ 0732507711
## SECTION 1

**DEMOGRAPHIC INFORMATION**

1. What is the name of your company?
   
   __________________________

2. Please indicate in which area of Gauteng are you based in?
   
   South  North  East  West  Other

3. Please indicate which department you are working.
   
   __________________________

4. What is your position (job title)?
   
   __________________________

5. How many years have you been employed at the company?
   
   Less than 1 year

   1-3 years

   4-5 years

   6-10 years

   More than 10 years

6. Do you work in teams or alone?
   
   Team  alone  both  other (specify)
7. What kind of work environment do you work in?

- Open-Plan office
- Cubicle
- Closed office
- Other (specify)

SECTION 2
HOW DATA, INFORMATION AND KNOWLEDGE IS SHARED
Mark All applicable or Mark One option only.

1. How do you and your colleague's best share ideas and knowledge?

- Meetings
- Training Sessions
- Conferences
- Internet
- Informal Discussions
- Email
- Intranet
- Other (please explain): __________________________

2. Which of the following systems do you use to share information with your colleagues more often?

- E-mail
- Tele-communication
- Video Conference
- Telephone
- Other (specify): __________________________
3. Which of the following incentives are available for using the technology knowledge management systems?

- Training
- Resources
- Financial Rewards
- Other (specify): ____________________________

4. My company encourages me to use technology-based knowledge management systems to share data, information and knowledge.

<table>
<thead>
<tr>
<th>Strongly Agree</th>
<th>Agree</th>
<th>Neither agree nor disagree</th>
<th>Disagree</th>
<th>Strongly disagree</th>
</tr>
</thead>
</table>

SECTION 3

HOW TECHNOLOGY-BASED KNOWLEDGE MANAGEMENT SYSTEMS ARE UTILISED WITHIN YOUR ORGANISATION.

3.1 What is the most utilised technology-based knowledge management systems in your organisation?

- Browser
- E-mail
- Search retrieval tool
- Video conferencing
- Intranet
- Other (please explain): ____________________________

______________________________
3.2 To what extent does each of the following forms constitute a barrier to the utilisation of knowledge management systems?

<table>
<thead>
<tr>
<th>Form</th>
<th>No Extent</th>
<th>Small Extent</th>
<th>Moderate Extent</th>
<th>Large Extent</th>
</tr>
</thead>
<tbody>
<tr>
<td>Inadequate training</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>System Complexity</td>
<td></td>
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</tr>
<tr>
<td>Technological Terminology</td>
<td></td>
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<tr>
<td>Rapidly changing technology</td>
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<td>Expert knowledge of other colleagues</td>
<td></td>
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<td></td>
</tr>
<tr>
<td>Distrust in other colleagues’ data</td>
<td></td>
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<td>Departmental barriers</td>
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<tr>
<td>Organisational specialisation</td>
<td></td>
<td></td>
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</tr>
<tr>
<td>Lack of multi-skilling</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

3.3 There is a lack of understanding about technology-based KMS from your colleagues.

<table>
<thead>
<tr>
<th>Strongly Agree</th>
<th>Agree</th>
<th>Neither agree nor disagree</th>
<th>Disagree</th>
<th>Strongly disagree</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

3.4 My company keeps up to date with technological developments of knowledge management systems.

<table>
<thead>
<tr>
<th>Strongly Agree</th>
<th>Agree</th>
<th>Neither agree nor disagree</th>
<th>Disagree</th>
<th>Strongly disagree</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

3.5 The current technology-based KMS is user friendly?

<table>
<thead>
<tr>
<th>Strongly Agree</th>
<th>Agree</th>
<th>Neither agree nor disagree</th>
<th>Disagree</th>
<th>Strongly disagree</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
3.6 Briefly explain some of the concerns in your company regarding the utilisation of technology-based KMS.

__________________________________________________________________________
__________________________________________________________________________
__________________________________________________________________________
__________________________________________________________________________
__________________________________________________________________________
__________________________________________________________________________
__________________________________________________________________________

SECTION 4
MANAGEMENT ISSUES
Scale the following by placing an X in the relevant block below. Mark only one block. To what extent do you agree with each of the following items? Please indicate your response by using the 5-point response scale.

4.1 It is important for the company to have a technology-based KMS strategy.

<table>
<thead>
<tr>
<th>Strongly Agree</th>
<th>Agree</th>
<th>Neither agree nor disagree</th>
<th>Disagree</th>
<th>Strongly disagree</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

4.2 Does your company have a technology-based KMS strategy?

<table>
<thead>
<tr>
<th>Strongly Agree</th>
<th>Agree</th>
<th>Neither agree nor disagree</th>
<th>Disagree</th>
<th>Strongly disagree</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
4.3 The KMS strategy is fully aligned with your organisational strategy?

<table>
<thead>
<tr>
<th>Strongly Agree</th>
<th>Agree</th>
<th>Neither agree nor disagree</th>
<th>Disagree</th>
<th>Strongly disagree</th>
</tr>
</thead>
</table>

4.4 The KMS strategy is fully aligned with your organisational culture?

<table>
<thead>
<tr>
<th>Strongly Agree</th>
<th>Agree</th>
<th>Neither agree nor disagree</th>
<th>Disagree</th>
<th>Strongly disagree</th>
</tr>
</thead>
</table>

4.5 The company experiences resistance from staff in utilizing the KMS.

<table>
<thead>
<tr>
<th>Strongly Agree</th>
<th>Agree</th>
<th>Neither agree nor disagree</th>
<th>Disagree</th>
<th>Strongly disagree</th>
</tr>
</thead>
</table>

4.6 The advantages of technology-based KMS have been discussed with all the knowledge workers.

<table>
<thead>
<tr>
<th>Strongly Agree</th>
<th>Agree</th>
<th>Neither agree nor disagree</th>
<th>Disagree</th>
<th>Strongly disagree</th>
</tr>
</thead>
</table>

4.7 The disadvantages of technology-based KMS have been discussed with all the knowledge workers.

<table>
<thead>
<tr>
<th>Strongly Agree</th>
<th>Agree</th>
<th>Neither agree nor disagree</th>
<th>Disagree</th>
<th>Strongly disagree</th>
</tr>
</thead>
</table>

4.8 There is sufficient change management procedures available to aid the understanding of technology-based KMS.

<table>
<thead>
<tr>
<th>Strongly Agree</th>
<th>Agree</th>
<th>Neither agree nor disagree</th>
<th>Disagree</th>
<th>Strongly disagree</th>
</tr>
</thead>
</table>
4.9 There is a need to motivate the knowledge workers involved with the utilisation of the technology-based KMS in the organisation.

<table>
<thead>
<tr>
<th>Strongly Agree</th>
<th>Agree</th>
<th>Neither agree nor disagree</th>
<th>Disagree</th>
<th>Strongly disagree</th>
</tr>
</thead>
</table>

4.10 The availability of the technology-based KMS results in less productivity.

<table>
<thead>
<tr>
<th>Strongly Agree</th>
<th>Agree</th>
<th>Neither agree nor disagree</th>
<th>Disagree</th>
<th>Strongly disagree</th>
</tr>
</thead>
</table>

4.11 What is or (some) of the decision(s) that led your organisation to implement the technology-based KMS?

- Customer service
- Effective communication
- Competition
- Marketing and Sales
- Personnel reduction
- Other (please explain): ____________________________

SECTION 5

GENERAL QUESTIONS ABOUT KM AND TECHNOLOGY-BASED KNOWLEDGE MANAGEMENT SYSTEMS

5.1 There is a lack of commitment about KMS issues from senior management.
<table>
<thead>
<tr>
<th>Strongly Agree</th>
<th>Agree</th>
<th>Neither agree nor disagree</th>
<th>Disagree</th>
<th>Strongly disagree</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
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<tr>
<td>5.2 The current technology-based KMS results in less creativity.</td>
<td></td>
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<tr>
<td>Strongly Agree</td>
<td>Agree</td>
<td>Neither agree nor disagree</td>
<td>Disagree</td>
<td>Strongly disagree</td>
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<tr>
<td></td>
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<tr>
<td>5.3 The current technology-based KMS is confusing.</td>
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</tr>
<tr>
<td>Strongly Agree</td>
<td>Agree</td>
<td>Neither agree nor disagree</td>
<td>Disagree</td>
<td>Strongly disagree</td>
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<td></td>
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</tbody>
</table>

Thank you for your time.
INTERVIEW QUESTIONS

1. What type of technology-based KMS you are aware of?
2. What is the technology-based KMS that you have used in the past?
3. What are/is the technology-based KMS that you are currently using?
4. What are your thoughts regarding the current technology-based KMS that your organisation is using?
5. Who is in charge of the KMS initiatives?
6. Do you believe or think you should be involved in those initiatives?
7. Is your organisation benefiting from the KMS that they currently have?
8. What specific benefits do you want to achieve from KMS?
9. Have you achieved those benefits you have set out?
10. Does your company have an incentive scheme in place that encourages the utilisation of technology-based KMS?
11. Does the incentive scheme reward employees for individual effort over an above the knowledge base?

Any comments????
Appendix C

See attached letter from editor.
Notification of language editing

Date: Thursday, March 12, 2009

To whom it may concern:

This is to certify that I have conducted a language-edit of the following work, endeavouring to ensure the work complies with acceptable standards of academic English:

THE ACCEPTANCE OF TECHNOLOGY-BASED KNOWLEDGE MANAGEMENT SYSTEMS BY KNOWLEDGE WORKERS

by

Mothlago Stella Moloto

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