

THE ROLE OF TAXONOMIES IN KNOWLEDGE MANAGEMENT

by

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With all my love to Pierre & Danika

STATEMENT OF ORIGINALITY

I declare that THE ROLE OF TAXONOMIES IN KNOWLEDGE MANAGEMENT is my own work and that all the sources that I have used have been indicated and acknowledged by means of a complete reference.

SIGNATURE
(MRS M FOUCHÉ)

DATE

CONTENTS

	Page
ACKNOWLEDGEMENTS	i
DEDICATION	ii
STATEMENT OF ORIGINALITY	iii
CONTENTS	iv
LIST OF FIGURES	viii
LIST OF TABLES	ix
SUMMARY	x
KEY TERMS	xi

CHAPTER 1 INTRODUCTION TO THE STUDY

1.1	Introduction	1
1.2	Problem statement	2
1.3	Purpose of the study	4
1.4	Value of the study	6
1.5	Scope of the study	6
1.6	Research profile	7
1.7	Research methodology	8
1.8	Terminology	8
1.9	Summary	9

CHAPTER 2 SKETCHING THE INFORMATION AND KNOWLEDGE MANAGEMENT LANDSCAPES

2.1	Introduction	10
2.2	Change towards knowledge management	11
2.2.1	Implications of knowledge management	14
2.2.2	Influences on knowledge management	15
2.3	Defining concepts in knowledge management	18
2.3.1	Data	20
2.3.1	Information	20
2.3.3	Knowledge	20
2.4	Defining knowledge management	21
2.4.1	Knowledge management approaches	27
2.4.1.1	Tacit and explicit knowledge	32
2.4.1.1.1	Explicit knowledge	33
2.4.1.1.2	Tacit knowledge	33
2.4.2	Tangible and intangible assets	34
2.5	Relationship between information management and knowledge management	34
2.5.1	Information management	35
2.5.2	Knowledge management	37
2.6	Summary	43

CHAPTER 3 KNOWLEDGE MANAGEMENT TOOLS, TECHNOLOGIES AND TECHNIQUES

3.1	Introduction	45
3.2	The need for knowledge management tools, technologies and techniques	46
3.3	The new work environment	48
3.4	Overview of knowledge management tools, technologies and techniques	55
3.4.1	Knowledge management techniques	60
3.4.2	Knowledge management technologies	64
3.4.2.1	Knowledge management architectures	73
3.5	Summary	81

CHAPTER 4 TAXONOMIES

4.1	Introduction	83
4.2	Taxonomies	85
4.2.1	Definition of taxonomies	86
4.2.2	Taxonomy in the business and electronic world	87
4.2.1.1	Taxonomy examples	89
4.3	Origin of taxonomies	92
4.4	Information structures	97
4.4.1	Index	98
4.4.2	Thesaurus	98
4.4.3	Glossary	99
4.4.4	Semantic web	99
4.4.5	Topic map	99
4.4.6	Metadata	100
4.4.7	Ontology	102
4.5	Comparison between ontologies and taxonomies	105
4.6	Corporate taxonomies	106
4.7	Taxonomies and knowledge management	108
4.8	Summary	109

CHAPTER 5 TAXONOMY CREATION

5.1	Introduction	111
5.2	Factors influencing the creation of taxonomies	112
5.2.1	User needs	113
5.2.1.1	Information needs	114
5.2.1.2	Information seeking behaviour	115
5.2.2	Content	117
5.2.3	Technology	119
5.3	Taxonomy creation process	120
5.3.1	Methodology for taxonomy creation	121

5.3.2	Process model for taxonomy creation	122
5.3.3	Taxonomy creation: manual versus automatic	124
5.3.3.1	Automated construction of a taxonomy	124
5.3.3.2	Comparison between manual automatic	125
5.4	Application of taxonomies within organisations	127
5.5	Benefits of taxonomies	128
5.6	Best practices for taxonomy creation	131
5.7	Future trends in taxonomy creation	135
5.8	Taxonomy case studies and findings	137
5.8.1	Study results and findings done by TFPL research 2000	138
5.8.2	Study results and findings done by Delphi Group 2002	145
5.8.2.1	Survey results	146
5.9	Summary	150

CHAPTER 6 RESEARCH DESIGN AS BASIS FOR EMPIRICAL RESEARCH

6.1	Introduction	152
6.2	Types of research	152
6.3	Research approach	155
6.3.1	The quantitative approach	156
6.3.2	The qualitative approach	156
6.3.3	The quantitative versus the qualitative approach	157
6.4	Research methodology	158
6.5	Literature review	159
6.6	Interviews	161
6.6.1	Structured and unstructured interviews	161
6.6.2	Limitations of interviews	163
6.7	Sampling in this research	164
6.8	Summary	166

CHAPTER 7 ANALYSIS AND INTERPRETATION OF RESEARCH FINDINGS

7.1	Introduction	167
7.2	Procedure for data collection	167
7.2.1	Interview process	168
7.2.2	The interview	169
7.2.3	Sampling	170
7.3	Analysis of the responses	171
7.4	Findings	181

CHAPTER 8 CONCLUSION ON THE PROBLEM STATEMENT

8.1	Introduction	184
8.2	Problem statement	185
8.3	Summary of findings	186
8.4	Recommendations	189
8.5	Final remarks	190

BIBLIOGRAPHY	193
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APPENDIX A	201
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LIST OF FIGURES

CHAPTER 2

Fig 2.1	Thrive in the knowledge economy: Integrated approach	25
Fig 2.2	Strategic and operational knowledge management	29
Fig 2.3	Relationship between information management and knowledge management	39
Fig 2.4	Relationship between information management, knowledge management and information technology	42

CHAPTER 3

Fig 3.1	Knowledge worker's environment	53
Fig 3.2	KM Tools: Comparison between techniques and technologies	56
Fig 3.3	The SECI model and the places where IT support fit in	57
Fig 3.4	Knowledge management spectrum	59
Fig 3.5	Knowledge management tools	70
Fig 3.6	Seven layers of KM system architecture	73
Fig 3.7	Hype cycle for the knowledge workplace, 2004	79
Fig 3.8	Top priorities of KM investment	80

CHAPTER 4

Fig 4.1	An example of a simple taxonomy	90
Fig 4.2	Yahoo taxonomy example	91
Fig 4.3	Example of a simple ontology	104

CHAPTER 5

Fig 5.1	Generic process model for taxonomy creation	122
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LIST OF TABLES

CHAPTER 3

Table 3.1	Jobs are changing due to shifts in organisations and management	50
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CHAPTER 4

Table 4.1	Similarities between ontologies and taxonomies	105
Table 4.2	Differences between ontologies and taxonomies	105

CHAPTER 5

Table 5.1	Manual versus automatic	126
Table 5.2	Different organisations approaches to taxonomies	141
Table 5.3	Survey results	146

CHAPTER 6

Table 6.1	Quantitative and qualitative approaches	157
Table 6.2	Steps in interview process	163
Table 6.3	Banker's top one thousand banks	166

CHAPTER 7

Table 7.1	Sampling organisations: Respondents	171
Table 7.2	Summary of number of respondents answering the interview questions	173
Table 7.3	Respondents answers to the interview questions	173

SUMMARY

The knowledge economy has brought about some new challenges for organisations. Accessing data and information in a logical manner is a critical component of information and knowledge management. Taxonomies are viewed as a solution to facilitate ease of access to information in a logical manner.

The aim of this research was to investigate the role of taxonomies within organisations which utilise a knowledge management framework or strategy. An interview process was utilised to gain insight from leading organisations as to the use of taxonomies within the knowledge management environment.

Organisations are starting to use taxonomies to manage multi-sourced environments and facilitate the appropriate sourcing of the organisations intellectual capital. Based on the research it is clear that taxonomies will play a central role in the coming years to help manage the complexity of the organisation's environment and ease the access to relevant information.

KEY TERMS

Corporate Taxonomy

Data Management

Data Warehouse

Digital Whiteboards

E-Learning Tools

Enterprise Pointers

Extranet

Information Management

Information Silo's

Intranet

KM Tools, Technologies and Techniques

Knowledge Economy

Knowledge Management

Ontology

Portal

Taxonomy

Workflow Tools

CHAPTER 1

INTRODUCTION TO THE STUDY

1.1 INTRODUCTION

Today the business world is forced to take a new look at its approach to resources that has suddenly moved to the strategic centre of the economy. Knowledge now plays an overwhelming economic role at a number of levels: global, national, organisational and individual. It is against this background that information and knowledge management as a discipline has come to the fore, to provide some sort of capability to manage one of the new priority resources in the economy namely knowledge (Prusak 2001:1). The concept of knowledge management has emerged as a key component to harness the power of people, the most critical component in what is described as the new knowledge based economy.

Although the degree of importance of knowledge management technologies are being debated, many organisations consider these technologies (such as knowledge mapping tools, collaboration tools and knowledge databases) as very important enablers to support the implementation of a knowledge management strategy. (Egbu *et al.* 2003:10).

Research done by Egbu *et al.* (2003:10) indicates that the most widely used technology within the knowledge management space is

the intranet. Other technologies include document management systems, groupware, collaboration tools and taxonomy tools.

1.2 PROBLEM STATEMENT

Organisations currently use different approaches towards knowledge management and this influence the selection of the available knowledge management tools, technologies and techniques.

Taxonomies can be categorised under the umbrella of knowledge management technologies which are in turn dependant on information technology. Woods (2004:3) has the view that taxonomies are a fundamental part of modern information architectures and taxonomies can help improve the efficiency of application integration, website design and knowledge management initiatives. It also assists with the improvement of information quality; it provides easier navigation and will facilitate better information sharing. Taxonomies are seen as a tool or set of tools or approach that will assist with the structuring of information and provide a vital solution for organisations in their quest to find relevant information in the shortest possible time in a consistent manner.

It is therefore argued that taxonomies can and should be a key component of any knowledge management framework or strategy.

Against this background the following problem will be investigated:
What is the role of taxonomies within organisations with a knowledge management framework?

This problem will be analysed in terms of the following specific sub problems:

- What are the different knowledge management approaches within organisations?
- What are the different knowledge management tools, technologies and techniques supporting the different knowledge management approaches?
- Does the implementation of taxonomies go beyond its role of only facilitating easier access within information technology and information management (facilitating the process to link people to systems – operational knowledge management)?
- Does the application of taxonomies also apply to supporting knowledge discovery and the mapping of an organisation's intellectual capital in support of the overall knowledge management strategy and framework (strategic knowledge management – connecting people to people)?
- What is the framework in which taxonomies are applied within organisations?

1.3 PURPOSE OF THE STUDY

The problem relates to the application of taxonomies within an organisation's overall approach to and strategy for knowledge management. It is therefore not only concerned with the more operational component, namely improving access to relevant information through the use of tools such as corporate portals or shared information workspaces, but also its role in knowledge discovery and the mapping of an organisation's intellectual capital. It is believed that it will become increasingly important for organisations to learn how to convert this universe of information into improved productivity and opportunity instead of being swamped and paralysed by an overload of information and trying to organise it and improve the ease of access. Failing to do this will impact on organisations' ability to search, discover new information and knowledge and act with speed. It will also negatively impact on the sharing of information and knowledge with resultant increase in cost from lowered productivity and bad business decisions.

It is within this context that it is believed that this research will contribute to our understanding of how to improve access to relevant information in the future. The role of taxonomies is gaining the attention of organisations across the globe. Knox and Logan (2003:1) indicate that there have been explicit concerns about metadata and taxonomies during 2003. The questions organisations ask relate to the use of taxonomies; sharing taxonomies; how to construct them; its benefits and potential scenarios if they do not invest in taxonomies.

To answer these questions research needs to focus not only at providing better access to information (to provide improved business effectiveness through improved information access, utilisation, distribution and efficiencies in information retrieval) but to explore its use within a knowledge management context, thus facilitating access to intellectual capital, supporting knowledge discovery and contributing in the development of knowledge focused organisations. According to Harris, Caldwell and Knox (2003:4) organisations consider taxonomy creation to be of paramount importance and the key to enable collaboration, especially for new employees. By understanding each other's language and how documents have been organised, employees can share their documents effectively and improve collaboration around documents.

In order to evaluate the role of taxonomies within a knowledge management context it is important to evaluate current knowledge management strategies within organisations and how taxonomies are applied within the business environment. A number of organisations are already taking some obvious and necessary steps in the area of knowledge management. It is anticipated that the majority of the organisations are still approaching knowledge management in an operational way (focusing on information technologies and tools), focusing on the distribution of information and in this process applying knowledge management tools and technologies for example taxonomies, metadata and technology implementation in a very operational manner. The main concern is to connect people to the systems being used for the distribution and transfer of knowledge. It is essential to also focus on the

implementation of taxonomies within a broader knowledge management framework and strategy to get the full benefits of expensive knowledge management technology implementations.

1.4 VALUE OF THE STUDY

The value of the study relates to the understanding of knowledge management practices within a South Africa context and the role of taxonomies within a broader knowledge management framework and strategy. It will provide a view of the current challenges facing organisations and how some of South Africa's leading organisations are responding to these challenges through the application of knowledge management and taxonomies. It should provide an overview of the state of and approach to knowledge management and the use of a specific knowledge management tool, namely taxonomies, within organisations which are considered the most advanced in information management in South Africa.

1.5 SCOPE OF THE STUDY

The research will be based on a literature review, which will provide the context to the research and an interview process to collect the required information to address the research problem. The literature review will be using various methods of literature searches.

A sampling group of seven organisations within the financial services industry of South Africa is being used for the interview

process. A sample group of seven is considered adequate as it will represent the so called big four banks in South African as well as three providers in the insurance industry. The interview is a data collection method, using personal contact and interaction between an interviewer and respondent. This can take place either face-to-face or via a telephone. For the purpose of this study a combination of structured and unstructured interviews are conducted. The structured interview has as set of questions that are presented to the respondent in advance. The face-to-face interviews focused on both the structured and unstructured components. The structured questions were forwarded to the respondent and the interview was utilised to record the respondents' answers to the questions. The interview will also have an unstructured component, to obtain additional information and provide opportunity to clarify and explain certain information provided by the respondent.

1.6 RESEARCH PROFILE

The study will further examine the use of taxonomies in support of knowledge management initiatives within the following framework:

- Chapter 1: Introduction to the study.
- Chapter 2: Sketching the information and knowledge management landscapes.
- Chapter 3: Knowledge management tools, technologies and techniques.
- Chapter 4: Taxonomies.

- Chapter 5: Taxonomy Creation.
- Chapter 6 Research Design as Basis for Empirical Research.
- Chapter 7 Analysis and Interpretation of Research Findings.
- Chapter 8 Conclusion on the problem statement.

1.7 RESEARCH METHODOLOGY

The aim of this research is to investigate the role of taxonomies within organisations with a knowledge management framework or strategy. To achieve this purpose a basic research approach is adopted. A literature review has been done and face-to-face interviews were conducted within the specific sampling of the financial services industry within South Africa.

The study is explanatory because the researcher is exploring the concept of taxonomies within a knowledge management framework. A literature review is conducted using various methods of literature searches for this study.

1.8 TERMINOLOGY

The following terminology is applicable within this research and the following provide definitions on the terminology used:

- Data is a set of discrete, objective facts about events. It is raw text, numbers, images or sounds. In an organisational

context, data is described as structured records of transactions (Davenport & Prusak 1998:5).

- Information: Information is data put into perspective and meaningful context. Information has relevance and is organised to some purpose. When data has been processed and presented in such a way as to be meaningful in specific decision making or learning contexts, we have information (Davenport & Prusak 1998:5).
- Knowledge: Knowledge can be defined 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 (Davenport & Prusak 1998:2).
- Taxonomy: Taxonomy is a hierarchy of categories which classify documents and other information. The corporate taxonomy is a way of representing the information available within an organisation (Woods 2004:5).

1.9 SUMMARY

The purpose of the study is to investigate the role of taxonomies within a knowledge management framework. Through the process of qualitative research, the researcher is exploring the concept of taxonomies within a knowledge management framework.

CHAPTER 2

SKETCHING THE INFORMATION AND KNOWLEDGE MANAGEMENT LANDSCAPES

2.1 INTRODUCTION

Accessing data and information in a logical manner is a critical component of information and knowledge management. Taxonomies are viewed as a solution, to facilitate ease of access in a logical manner, through which the gap between data, information and the organisational environment, in which people operate, is bridged. The role taxonomies can play in facilitating logical access to data and information is also critical in the more strategic component of knowledge management where it can support knowledge discovery, stimulate knowledge sharing and facilitate the process of mapping an organisation's intellectual capital. Therefore the use of taxonomies can support the concept of knowledge management where the focus is on value added, contextualised information as opposed to the utilisation of indiscriminate information (information that serves no purpose). It is important to note, however, that taxonomies cannot be viewed in isolation as it forms part of a broader information approach or knowledge management strategy. To harness the power of the total information value chain and knowledge assets within organisations, taxonomies need to be placed in context within the concepts of knowledge and information management before it can be explored as a tool or methodology on its own.

This chapter will focus on the concepts of information management and knowledge management in order to lay the foundation from which the use and application of taxonomies will be explored. These concepts will provide the context to understand the use and role of taxonomies within knowledge management practices. The intention of this chapter is not to debate the different knowledge management definitions, models or the different approaches and strategies which exist within the literature, but to provide a basic understanding of knowledge management and its related concepts which will be used as a foundation to view taxonomies in context. The focus is thus to provide an interpretation of information and knowledge management, which will form the point of departure and provide context against which taxonomies and its application will be investigated.

2.2 CHANGES TOWARDS KNOWLEDGE MANAGEMENT

The concept of knowledge management has emerged as a key component to harness the power of people, the most critical component in what is described as the new knowledge based economy. Nordstrom and Ridderstrale (2000:19) describe knowledge as the battle of brains. Knowledge is the new battlefield for countries, corporations and individuals and the time of earning money from natural resources alone is no longer the core problem. The decisive factor in determining success in the knowledge economy is man himself. This is overpowering the traditional means of production: raw material, hard labour and capital. The

world, in which individuals and organisations interact, has changed and the only thing that can be certain is that the certain become uncertain and the unlikely becomes likely. Organisations are increasingly competing on the basis of the competence of people and know how, which demands a mind shift in how organisations and people operate, compete, strategise and survive. In order to compete in the new economy, organisational leadership realised that the differentiating factor does not necessarily reside within its products or material resources anymore but rather their service. Service relates to its interaction with customers, innovation and specific competencies, in other words it resides with its people. It is about achieving extraordinary things with ordinary people (Nordstrom & Ridderstrale 2000:32).

Uncertainty is not the only issue that challenges organisations, within this knowledge based economy, but in addition the complexity of decision making. Decision making will increase and coupled with that the demand to act with utmost speed, respond to the unexpected and unusual demands and coping with the drastic shift from industrial activities to value added services. It also demands a more customer centric approach and constantly striving for innovation. Knowledge is becoming a commodity for organisations (Tissen, Andriessen & Deprez 2000:6).

Wigg (1999:8) explains that the emergence of knowledge management is the confluence and natural evolution of several factors and the necessity driven by the forces of competition, market place demands, new operating and management practices and the availability of information technology.

Knowledge management aims to harness the power of people for the benefit of organisations. According to Prusak (2001:1) knowledge management is the substantive response to real social and economic trends. These trends include globalisation and the revolution in communication and information technology. Prusak (2001:1) also refers to the ubiquitous computing and the knowledge-centric view of organisations. The complexity and volume of global trade is unprecedented, the number of global players, products and distribution channels are more than ever before. The speed of global trade, mainly because of information technology and the decline of centralised economies have created an almost frenetic atmosphere within organisations, which feel compelled to bring new products and services to wider markets at an even greater speed. This combination of global reach and speed compels organisations to ask the following question: "What do we know, who knows it, what do we not know that we should know" Prusak (2001:2). The knowledge economy has become the main drive and focus for most organisations, it is referred to as the knowledge centric view of organisations. Organisations are starting to realise that the impact of the new economy is not only manifesting in the technology, but also in the human mind and the interaction between people. In order to deal with the impact of this new economy; knowledge management has emerged as a discipline to manage the most valuable asset the knowledge that resides within people.

2.2.1 Implications of Knowledge Management

The business world is forced to take a new look at its approach to resources that has suddenly moved to the strategic centre of the economy. Knowledge now plays an overwhelming economic role at a number of levels: global, national, organisational and individual. It is against this background that information and knowledge management as a discipline, has come to the fore to provide some sort of capability to manage one of the new priority resources in the economy namely knowledge (Prusak 2001:1).

Prusak (2001:1) makes the following statements related to the growing importance of knowledge management:

- Knowledge management has become a major determinant of business effectiveness. It influences the bottom line but yet it is not clear how to measure it and how to reflect knowledge assets on the organisation's balance sheet.
- The new focus for information technology in the knowledge age is to extend and leverage the human mind, learning and communication capabilities.
- The knowledge economy implies that companies need to rethink the way they manage, retain, develop, learn and reward people.
- Organisations face a new business context: global competition, knowledge base products and services, rapidly-changing technology more knowledgeable customers and employees. These developments will

demand new organisational designs and structures, new forms of work, new management styles, changing organisational values and culture.

These developments emphasise the need to formally manage information and knowledge as in the case of older economic resources such as people and capital. Knowledge management addresses this need to manage knowledge as a critical resource within the business environment.

2.2.2 Influences on Knowledge Management

Knowledge management emerged in the mid 1980s as a result of the need to derive knowledge from the info glut. It was mainly used as a business term. Organisations adopted the term and linked it with commercial computer technologies, facilitated by development in areas such as the intranet, search engines, portals, and data warehousing. The implementation of knowledge management programmes has increased since the early 1980s and today eighty percent of the largest global organisations world wide has knowledge management projects or initiatives (Rus & Lindvall 2002:60).

According to Prusak (2001:4) three practices namely: information management, quality management and human capital management, have brought the most content and energy to knowledge management. The essence that knowledge management adopted from these disciplines is the following:

- Information management is understood as a subset of the larger information technology but also part of the information science world. Information management focus on how information (content) is managed and supported by information technology. Knowledge management shares information managements' user perspective and focus on value, the quality of the content and the benefits of the user and organisation. The focus is on the content, the originator and the user. The important factor is the realisation that all information is created equal, different types of information has different values and needs to be treated differently and knowledge management in this context focus on knowledge use and knowledge availability.
- Quality management focus significantly more on internal customers, processes and shared goals. Knowledge management has adopted some of these principles in a broader scope and developed knowledge processes, process owners and some governance structures in ways that owe a significant depth to the technique of analysis and improvement developed by quality management practices.
- From the human capital management side the focus is on investing in the individual. Knowledge management is more concerned with groups, communities and networks and builds on the human capital ideas,

innovation and making the value of human capital clear to organisations.

According to Blair (2002:6) the emergence of knowledge management is also due to the realisation that there is something more to be extracted from current information and data systems, than what is actually stored on them. The poor record of decision support systems and expert systems in capturing or utilising this additional information supports this view. In particular, expert systems attempt to capture something that cannot be captured by it - namely knowledge.

The intellectually, broad, present-day knowledge management according to Wigg (1999:3) has many origins. Its roots come from abstract philosophical thinking; others come from concrete concern for requirements of expertise in the workplace, educators and business leaders. Recent perspectives come from efforts to explain economic driving forces in the knowledge era and the 20th century efforts to increase effectiveness. The changes to manage knowledge explicitly and in detail are complex and extensive and will require expertise in the supporting disciplines.

Knowledge management is not seen as one single discipline but rather an integration of numerous disciplines and fields of study and practices and approaches that offers a framework for providing value and tying them together into a seamless whole. There is no single approach to knowledge management, whether the perspective is technological or human, it rather

depends on the organisational drivers, requirements, culture and functions.

2.3 DEFINING CONCEPTS IN KNOWLEDGE MANAGEMENT

Knowledge has always been associated more with universities and higher education than with day-to-day activities or the practice of management in organisations. There is some ambiguity about what knowledge management really means, what it includes and how to implement it. Data management and information management are familiar concepts for most organisations and it is natural to question the requirement for knowledge management as a new or separate focus within business. In order to investigate taxonomies, as a component of knowledge management, it is important to define some basic concepts of knowledge management as these definitions will be used as the terms of reference throughout this study.

The objective of this chapter is to describe the information and knowledge landscape and related concepts (as per the mainstream view) as background (terms of reference) to this study. The focus will not be to debate the different definitions (interpretations) of knowledge management or what the end results and benefits of knowledge management within an organisation should be.

Most organisations (and certainly a view within the larger knowledge management debate) hold the view that knowledge is the natural progression after data and information and thus attempt to define

each term in clearly defined stages e.g. knowledge versus intelligence versus wisdom. However, within the practical business environment, organisations are finding it difficult to distinguish between these terms and concepts used so frequently within the academic environment. This has prompted Probst, Raub and Romhardt (2000:17) to state that organisations need to take an integrated view of data, information and knowledge to ensure that the organisation's knowledge base is well used. It is, however, important to emphasise that data, information and knowledge are not interchangeable concepts. The concepts of data, information and knowledge is key to knowledge management, as it not only illustrates different levels of added value but in some cases, within the business environment, it also determines different areas of organisational responsibility as the management of data, information and knowledge sometimes requires different skill sets and technology support which might reside within different organisational units.

The concepts described in this chapter are seen as the basic components of the knowledge base of an organisation, and thus key concepts related to knowledge management. Organisational success is dependent on understanding these concepts which include: data, information and knowledge and knowing which of them is required, which components exists and what can or cannot be done with each. For organisations the importance of these concepts and the linkage between the concepts will differ depending on the goals, the culture and functions within the organisation.

2.3.1 Data

Data is a set of discrete, objective facts about events. It is raw text, numbers, images or sounds. In an organisational context, data is described as structured records of transactions. Data by itself has little relevance or intrinsic meaning and is usually stored in some sort of technology system. All organisations need data and some are heavily dependent on it for example banks and governments. Examples of data: Account balances, demographic statistics or names and addresses of customers (Davenport & Prusak 1998:2).

2.3.2 Information

Information is data put into perspective and meaningful context. Information has relevance and is organised to some purpose. When data has been processed and presented in such a way as to be meaningful in specific decision making or learning contexts, we have information. Examples of information: A list of names and addresses of an organisation's customers. To turn this into information it must have a particular use and structure. For example identifying particular customers according to demographics that have a particular buying pattern (Davenport & Prusak 1998:2).

2.3.3 Knowledge

Knowledge can be defined 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 originates and is applied in the minds of knowers. In organisations, it often becomes embedded not only in documents or repositories, but also in organisational routines, processes, practices and norms (Davenport & Prusak 1998:5).

Probst, Raub and Romhardt (2000:24) describe knowledge as the whole body of cognitions and skills which individuals use to solve problems. It includes both theories and practical everyday rules and instructions for action. Knowledge is based on data and information, but unlike these, it is always bound to persons. It is constructed by individuals and represents their beliefs about causal relationships.

Wigg (1996:1) defines knowledge as the insights, understanding and practical know-how that all humans possess and the fundamental resource that allows humans to function intelligently. Tiwana (2000:58) defines knowledge as being part of the minds of people through their experiences and jobs, and lies in connection and conversations between people.

2.4 DEFINING KNOWLEDGE MANAGEMENT

There is no simple definition for knowledge management and the lack of a clear definition is due to several factors like the intangibility of knowledge itself, the novelty of the concept and the wide range of applications and manifestations. Ives, Torrey and Gordan

(1998:273) state that knowledge management is an emerging practice, and therefore there are many different interpretations as to what knowledge management is and how to use its potential power effectively.

Knowledge management can be seen as an integrated discipline that seeks to improve the performance of the individual and the organisation by maintaining and leveraging the present and future value of knowledge assets. Knowledge management is a structured effort to make knowledge accessible and share not only explicit factual information, but also the tacit knowledge that exists in an organisation in order to support the organisation's strategy. The information is based on experience, know how and learnings of individuals (Rus & Lindvall 2002:60).

Harris and Berg (2003:2) provide the following definition of knowledge management: Formalising the management of an enterprise's intellectual assets. Organisations look to manage their intellectual assets because of the embedded capital in them. This embedded capital is not financial; but it is rather related to human, organisational and relationship capital. These forms of capital are often hidden, are not highly leveraged and are difficult to value.

According to Conway and Sligar (2002:1) knowledge management is the process of revealing and mapping the work activities and knowledge sources within an organisation.

Duffy (1999:13) defines knowledge management as the identification, growth and effective application of an organisation's critical knowledge. Snowden (1999:42) defines knowledge

management as the body of methods, tools and techniques and values, through which organisations can acquire, develop, measure, distribute and provide a return on their intellectual assets.

Tissen, Andriessen and Deprez (2000:30) provide a model to describe knowledge management within the business environment. According to this model, organisations need to link four core and relevant components, to create six abilities which are required to ensure an organisation's survival in the knowledge era. The four components are:

- Market and strategy.
- Process and structure.
- People and motivation.
- Knowledge and systems.

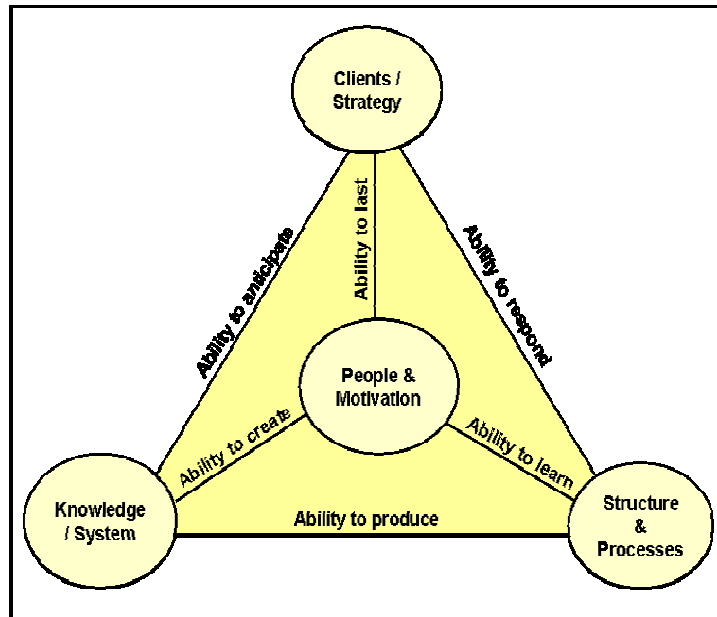
According to Tissen, Andriessen and Deprez (2000: 30) linking these four components will create the following six abilities:

- The ability to produce: Most organisations know how to produce goods and services. The focus now is on using the right application of knowledge within the proper structures and processes.
- The ability to respond: Reacting quickly to market changes is one of the biggest challenges for companies and also one of the biggest opportunities. Successful organisations acknowledge that market responsiveness is key to survival in the new economy.

- The ability to anticipate: Responding to market trends is essential but the key is not only to be able to see the overall picture and not just react to trends but actually anticipate them.
- The ability to learn: The concept of learning organisations has become very popular and valuable. It is important for employees to learn from their own experiences, from their customer's competitors and colleagues.
- The ability to create: Organisations must constantly look for ways in which they can improve and innovate and this largely depends on an organisations' ability to create new knowledge.
- The ability to last: An organisation will have to find new ways of revitalising itself, not only for attracting new and young people but also renewing and refreshing its existing workforce to prevent knowledge walking out the door.

Creating these capabilities implies a new breed of organisations that are effective and efficient in building knowledge and adding value to the organisation and the individual. The integration of the components and their relevant abilities is illustrated in figure 2.1.

FIGURE 2.1
THRIVE IN THE KNOWLEDGE ECONOMY: INTEGRATED
APPROACH



Source: Tissen, Andriessen and Deprez (2000: 30).

According to Harris and Berg (2003:1) knowledge management emerged as a strategy for managing corporate memory and intellectual capital, but organisations do not share a common definition of knowledge management. Multiple definitions are currently competing in the marketplace and some of these are even broad enough to permit any form of information management to be renamed knowledge management. It must be stressed that knowledge management is not about the implementation of technology, but rather a multidiscipline approach that integrates business strategy, cultural values and work processes. Knowledge management is broad in scope and encompass all information assets of the organisation, all knowledge activities from creation to use, and potentially all people in the organisation.

According to the U.S. Army Knowledge Strategic Plan (as cited in Sunassee 2002:21) knowledge management is an integrated, systematic approach to identify, manage and share all information assets, including databases, documents, policies, procedures and previously unarticulated expertise and experience held by individual workers. Fundamentally it is about making the collective information and experience of an organisation available to the individual knowledge worker, who is responsible for using it wisely and for replenishing the stock. This ongoing cycle encourages a learning organisation, stimulates collaboration and empowers people to continually enhance the way they perform work.

Knowledge management has emerged over the last decade as a result of many intellectual, societal and business forces. Some of its roots extended back for millennia, others, particularly those associated with cognitive and information sciences are quite recent. Whereas knowledge management has become a valuable business tool, its complexity is often difficult and as a discipline will still be under development for a long time to come (Wigg 1999:1).

For the purpose of this research, the researcher will adopt the following views:

Harris and Berg (2003:1): Multidisciplinary approach towards knowledge management.

Rus and Lindvall (2002) and Tissen, Andriessen and Deprez (2000): Approach of knowledge management as an integrated discipline.

Snowden (1999): Definition of knowledge management as the body of methods, tools, techniques and values.

2.4.1 Knowledge Management Approaches

According to Tiwana (2000:90) a clearly articulated link between knowledge management and business strategy is the key predictor for the success of knowledge management and requires a balanced mix of technology, cultural change, purposeful reward systems and business focus that is in step with the organisation's business strategy.

Knowledge strategy defines how the organisation uses knowledge to compete and address business drivers, and according to Harris and Berg (2003:2) the strategy spans a continuum from a knowledge focused business strategy to a knowledge enabled one. Organisations with a high ratio of its market value in knowledge and intellectual capital, benefits most from a knowledge focused business strategy. Organisations with a relatively lower ratio of its market value in knowledge capital should rely on operational competencies or tangible assets as the primary sources of competitive advantage.

Studies done by Hansen, Nohria and Tierney (1999:107) indicated that most organisations have two very different knowledge management strategies. The one strategy centres on the computer. Knowledge is carefully codified and stored in databases, where it can be accessed and used easily by anyone in the organisation. This is referred to as the codification strategy. The second approach is the personalisation strategy. With this strategy knowledge is

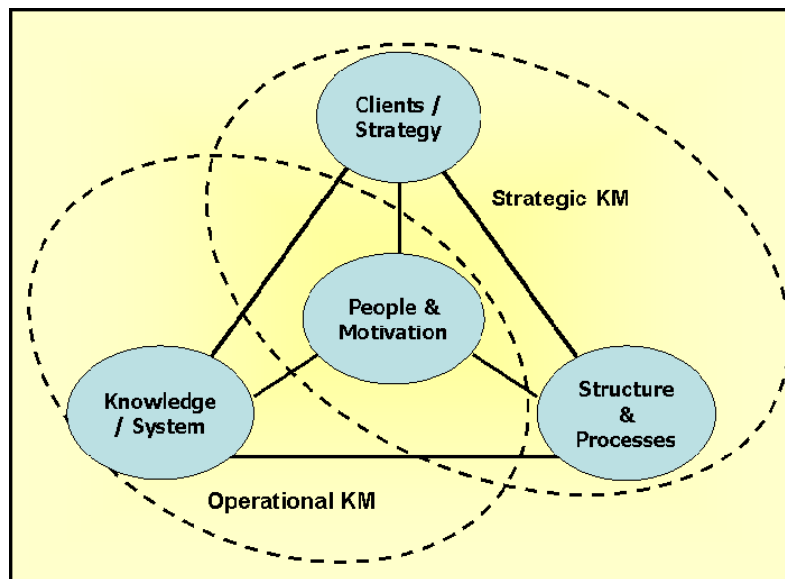
closely tied to the person who developed it and is shared mainly through direct person-to-person contacts.

Tiwana (2000:99) also refers to two expansive knowledge management approaches: codification and personalisation. The personalisation strategy is focused on connecting knowledge workers through networks, and is better suited to organisations that depend more on tacit knowledge and expertise. Codification is focused on technology that enables storage, indexing, retrieval and reuse. According to Tiwana (2000:101) it is foolish for organisations to try using both approaches to the same degree, but equally unsound to use only one. The right balance is determined by the organisation's objectives in pursuing knowledge management.

Sveiby (1996:2) identifies two tracks of activities and, consequently, two components of knowledge management systems: The IT-track, which focuses on information management. People in this group are involved in constructing information management systems, artificial intelligence, reengineering and groupware. For them, knowledge consists of objects that can be handled in information systems. The people-track focuses on the management of people. People in this group are primarily involved in assessing, changing and improving human skills and/or behaviour. They perceive knowledge as a process, a complex set of dynamic skills and know-how.

Knowledge strategy of organisations depends on the way it serves its clients, the people and its economics. Tissen, Andriessen and Deprez (2000:23) refer to it as operational knowledge management and strategic knowledge management as illustrated in figure 2.2.

FIGURE 2.2
STRATEGIC AND OPERATIONAL KNOWLEDGE MANAGEMENT



Source: Tissen, Andriessen and Deprez (2000: 23).

The main concern for organisations that follow an operational knowledge management approach is to connect people to the system and to distribute and transfer knowledge. Strategic knowledge management gives balance by linking the organisation's knowledge base to its business strategy. Information systems alone will not be enough to ensure future business success. Strategic knowledge management complements the tactical (or the information systems) approach by focusing on the management of important relationships and setting the right conditions for collaboration between knowledge

workers, to create a shared understanding of goals and opportunities. Strategic knowledge management is also about creating transparent structures, which allows professionals to see exactly where they are in relation to their organisation's environment and what their value is to the organisation as a whole (Tissen, Andriessen & Deprez 2000: 23).

According to Bukowitz and Williams (1999:8) the knowledge management framework process follows two streams of activity that occur simultaneously in organisations:

- The day-to-day use of knowledge to respond to demands or opportunities from the marketplace.
- The more long-range process of matching intellectual capital to strategic requirements.

Bukowitz and Williams (1999:9) refer in their framework to two different processes called the tactical process and the strategic process. The tactical process spans four basic steps as people gather the information they need for their daily work, use knowledge to create value, learn from what they create and feed this new knowledge back into the system for reuse. The strategic process is aligned to the organisation's knowledge strategy and with the overall business strategy. Strategic knowledge management calls for a continual assessment of existing intellectual capital and a comparison with future needs. It is however important that all elements within the process must be managed in relation to one another, in order to achieve the

right mix and amount of knowledge and the capability to deploy it.

As organisations develop different strategies and different ways of using its organisational knowledge in different contexts, it will develop various artefacts and representations of its knowledge. It is important though to have both processes for creating new knowledge and to leverage knowledge effectively within and across organisations.

According to Wigg (1999:5) some organisations focus on knowledge sharing among individuals or on building elaborate educational and knowledge distribution capabilities. Some organisations emphasise the use of technology to capture, manipulate and locate knowledge and many focus on information management rather than knowledge management. Others focus on knowledge utilisation to improve organisational, operational and overall effectiveness.

According to Wigg (1999:6) the intent with knowledge management is to manage knowledge practically and effectively to reach broad operational and strategic objectives. To be competitive, proactive organisations must increasingly manage knowledge systematically although a variety of knowledge management activities and functions may be implicit in the daily work of employees.

Organisations will have different strategies for different drivers. An organisation's knowledge management strategy should reflect its competitive and business strategy: How it creates

value for customers, how that value supports the economic model and how the employees deliver on the values.

According to the literature, knowledge management has emerged as a result of many forces brought forward by the demands and complexity of the knowledge economy. The challenges to most organisations are to stay competitive, while implementing knowledge management which is by itself a complex discipline, as indicated by the different definitions provided in this research. It is important for organisations to also understand the different tools, technologies and methods available for managing knowledge and aligning it to the organisations business drivers and strategy, with the right mix of the two knowledge management strategies or approaches namely; codification and personalisation.

2.4.1.1 Tacit and Explicit Knowledge

The previous section described two different components or approaches to knowledge management, each critical in its own right to achieve success with knowledge management. Knowledge can also be viewed as an entity which exists in two forms: Tacit and explicit. One of the points of confusion concerning knowledge management often relates to the debate on explicit versus tacit knowledge issues and common questions are: “how can we capture tacit knowledge” and “how do we turn tacit knowledge into explicit knowledge”. Tacit and explicit knowledge are two major

groupings that each requires different management techniques to optimise its influence within context.

2.4.1.1.1 Explicit Knowledge

Explicit knowledge is knowledge that has been captured and is presented in an explicit form. Examples include: databases, documents and e-mails. Explicit knowledge is preserved in information management and is embedded in business rules and metadata that drive work management and business process automation. It is stored in structured records of customer transactions, organisations' policies and procedures, methodologies and tools and instruction manuals (Harris & Berg 2003:3).

Tiwana (2000:45) concurs with its definition when it states that explicit knowledge is that component of knowledge that can be codified and transmitted in a systematic and formal language. Examples are: documents, databases, webs, e-mails and charts.

2.4.1.1.2 Tacit Knowledge

Tacit knowledge is by definition uncaptured. People carry tacit knowledge around in their heads in the form of insight; judgement, craftsmanship, and this knowledge can be expressed or represented in some way, but never fully captured (Harris & Berg 2003:3). Tacit knowledge allows people to act without thinking, to make judgements based on experience rather than concrete facts.

2.4.2 Tangible and Intangible Assets

In addition to explicit and tacit forms of knowledge, individuals and organisations also refer to tangible and intangible knowledge assets. Rus and Lindvall (2002:60), for example, mention that an organisation's intellectual capital consists of tangible and intangible assets. Tangible assets relates to explicit knowledge and although the definition of tangible assets may vary between different industries and applications it usually include manuals, directories, competitor intelligence and knowledge derived from work processes for example project artefacts.

Intangible assets relate to tacit knowledge and undocumented knowledge for example skills, experience and knowledge of an organisation's people. Intangible assets are objects owned by an organisation that have no physical existence but have value. Intangible assets are predominantly invisible and therefore will be difficult to track and quantify (Gorelick, Milton & April 2004:6).

2.5 RELATIONSHIP BETWEEN INFORMATION MANAGEMENT AND KNOWLEDGE MANAGEMENT

It is important to make a clear distinction between information management, knowledge management and information technology (IT) or information systems (IS) management, as although they interrelate there are important differences that need to be taken into

account when reviewing these disciplines. Generally organisations tend to focus on only one or two of these disciplines while developments in one will effect and influence the other. In order to understand the application of taxonomies within a bigger knowledge management framework (including tools and technologies), it is also important to understand the differences and relationships between these concepts.

2.5.1 Information Management

There is no standard definition for information management within the business environment. It is often defined vaguely and terms such as information systems management is often referred to as information management. Within the information science context content management is similar to information management.

Prusak (2001:4) indicated that information management developed as a discipline during the seventies and eighties and is usually understood to be a subset of the larger information technology and information science environment. Information management focuses on how information is managed, independent from technology. It deals with information issues in terms of valuation, operational techniques and governance related to documents, data and structured messages. When compared to information technology, information technology focuses on how many bits an electronic pipeline can carry, whilst information management focus more on the quality of the

content. Information management also deals with different types of information thus it has different values and therefore needs to be handled differently.

According to the Only study guide HTINBE-D (1995:2) information management is the management (planning, organising, directing and controlling) of information within an organisation. Information management is viewed as using technology (computers, information systems, information technology) and techniques (information auditing and mapping) effectively and efficiently, to manage information resources and assets from internal and external sources for proactive decision making and problem solving.

According to Harris and Jacobs (2000:2) information management requires the following three elements:

- Policies and guidelines on an enterprise level for retention, disposal and ownership of information assets. These policies and guidelines should affect all the organisation's records from the data files, project files on the desks of employees and on their personal computers. It relies on legal and critical business requirements as the basis to produce guidance on what is retained and what is thrown away and to identify the owner or authoritative sources of the information.
- Policies, procedures, guidelines and standards relate to data storage. This includes defining business owners of information, improving naming conventions and implementing catalogue management. It also relate to

archiving and disposal techniques and also include technologies to improve information management.

- Policies, procedures, guidelines and standards to improve access to information. This is related to the implementation of processes, techniques and tools to access relevant information but also to organise this information (to ensure easy retrieval). Information access has a link to knowledge management by linking people to information.

2.5.2 Knowledge Management

The shift from the industrial age to the information age changed the focus from information to knowledge; utilising terminology such as knowledge management was thus a logical next step to follow on information management. Tissen, Andriessen and Deprez (2000:36) view information management as a component of knowledge management (they refer to it as operational knowledge management or explicit knowledge, connecting people to systems). However, the increasing importance and role that tacit and intangible knowledge plays have warranted the broadening of the scope of information management to what is now called knowledge management. Likewise Havens and Kapp (1999:5) states that information technology focuses on enabling the collection and management of explicit business information and although this is very important it is only a component within knowledge

management. The management of the explicit component is naturally the first component addressed within organisations as it produces quicker benefits which are more tangible. Knowledge management, as stated, goes beyond the management of explicit information. Havens and Kapp (1999:5) indicates that because knowledge is rooted in human experience and social context, managing it means paying attention to people, culture, organisational structures and information technology.

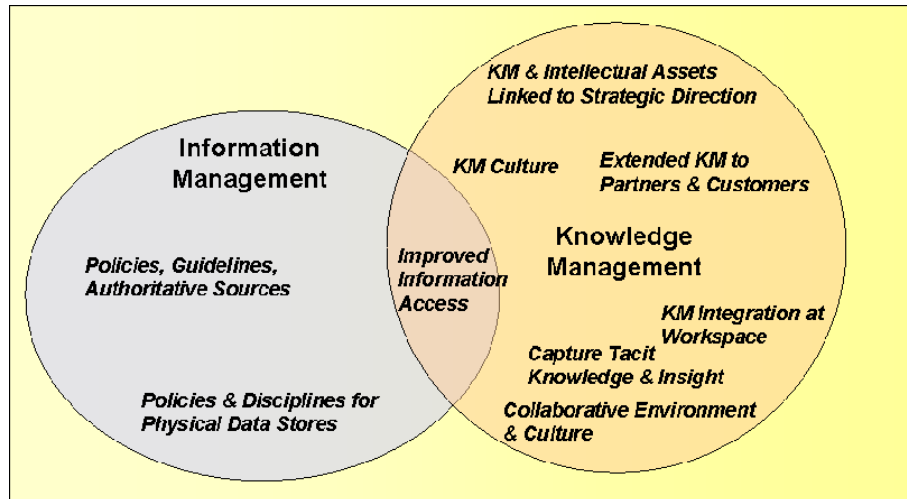
Although information technology is seen as an essential tool for knowledge sharing and collaboration, the information management process stops at applying information. Knowledge management, in turn, also focuses on changing behaviour which requires changes in culture, strategy, processes, people, motivation and information systems.

According to Harris and Jacobs (2000:2) information access is the element that links information management and knowledge management. Knowledge management, however, requires information access to be implemented within a framework of strategy, business objectives and cultural changes as indicated in figure 2.3. Knowledge management is therefore also concerned with providing people access to not only knowledge and information but also the knowledge that resides with other people. It differentiates itself from information management in the sense that it will;

- Improve decisions and work processes,
- Enhance learning, and

- Encourage people to become more creative and innovative.

FIGURE 2.3
RELATIONSHIP BETWEEN INFORMATION MANAGEMENT AND
KNOWLEDGE MANAGEMENT



Source: Harris and Jacobs (2000:2).

Technology remains an important component within knowledge management. According to Tiwana (2000:78) the most valuable role of technology in knowledge management is, to broaden the reach and to enhance the speed of knowledge transfer. Technology supports digital capture, storage, retrieval and distribution of an organisation's explicit knowledge. It has the following key roles to play within knowledge management:

- Technology facilitates communication.
- Technology provides infrastructure for storing codified and explicated knowledge.
- Technology assists with the mapping of dispersed bits and pieces of tacit and explicit knowledge to establish and maintain intricate interdependencies among them.

Gartner (2004:18) provides the following definitions to distinguish between some of these related but different concepts:

- IT (Information Technology): IT is the common term for the entire spectrum of technologies utilised for information processing, including software, hardware, communications technologies and related services. In general, IT does not include embedded technologies that do not generate data for enterprise use.
- IS (Information Systems): The use of and investment in information technology (IT) by the principal or centralised organisation formally charged with the responsibility for IT in an enterprise. Often the IS organisation is led by a chief information officer (CIO), IS vice president or similar executive. Information Systems is also often the formal name of the department within an enterprise that is responsible for IT. Other common names for the IS organisations are: MIS (for "management information systems"); data processing; information processing.
- Information Management (IM): IM is a method of using technology to collect, process and condense information to ensure the efficient management of information. Many large enterprises have a central information management function to facilitate this coordination. The technologies required include a set of modelling tools

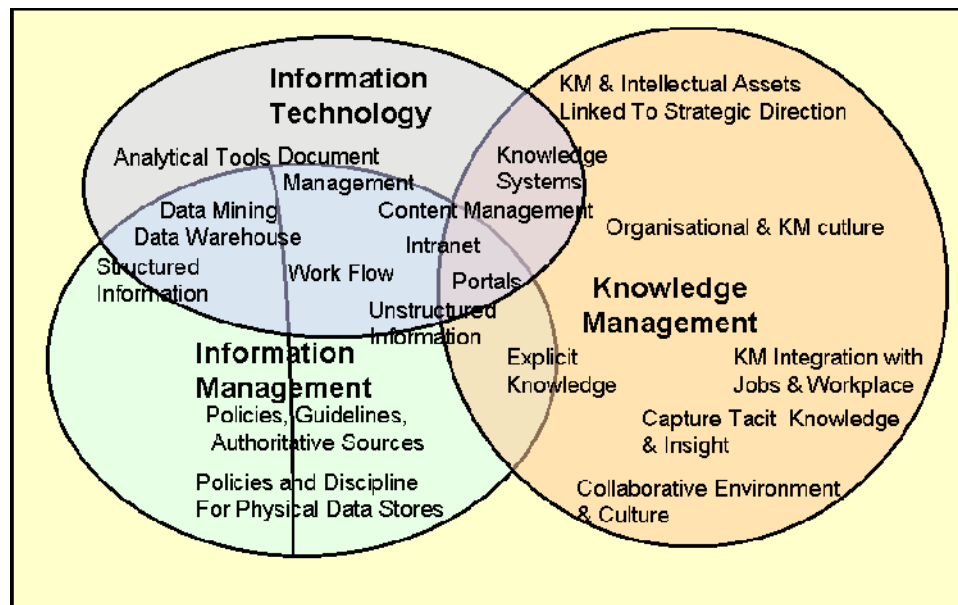
and a production-worthy repository in which to store and manage the information.

- Knowledge Management (KM): KM is a business process for managing intellectual assets, a discipline that promotes an integrated approach to the creation, capture, organisation, access and use of an enterprise's knowledge and information assets (examples: structured databases, textual data, and the tacit knowledge and expertise of individual employees).

Based on the variety of definitions it is clear that definitions for information management and knowledge management are influenced by individuals, conceptual frameworks, different approaches and views. Stenmark (2002:4) agrees with this and states that these different approaches will influence the debate relating to knowledge management versus information management. When defining knowledge management from a personalised or people based approach, knowledge management will be defined as a system: an environment of people, organisational processes, business strategies and information technology. When defining knowledge management from a codification or technology focused base, it is viewed as a computer application used by knowledgeable humans. Stenmark (2002:4) argues that regardless of the knowledge perspective, information technology may successfully be used to facilitate knowledge as long as the user perspective is included.

As these concepts are so inter-related it is difficult to describe it in total isolation. The researcher's view of the different concepts is depicted in figure 2.4. This figure illustrates the links but also the uniqueness of each concept.

FIGURE 2.4
RELATIONSHIP BETWEEN INFORMATION MANAGEMENT,
KNOWLEDGE MANAGEMENT AND INFORMATION TECHNOLOGY



Source: Adapted from Harris and Jacobs (2000:2).

As indicated by figure 2.4 information management has a strong link between the management of unstructured information referred to as explicit knowledge assets and the technology used to manage the unstructured information and tacit knowledge. Information technology enables and supports the capturing, storing, organising and distribution of information and knowledge assets. It is important for this study to understand the relationship between information management and knowledge management and to understand the application of

taxonomies within organisations and within an information or knowledge management framework.

It can thus be said that knowledge management is a rich discipline and the ideal will be to address information management issues, processes and systems in parallel with knowledge management. The focus on information management alone is likely to prove insufficient to support organisations strategies without sound knowledge management principles and processes.

2.6 SUMMARY

Knowledge management has brought about a new thinking and new organisational styles and structures within organisations. Organisations are starting to realise that the impact of the knowledge based economy is not only manifesting through technology but also in the human mind and the interaction between people. It is clear, from this chapter, that there are different approaches and strategies related to the management of information and knowledge. It is therefore important for any organisation to distinguish upfront what is meant with knowledge and information and what the focus within an organisation should be.

This chapter provides an overview of information management and knowledge management, the different perspectives relating to knowledge management and different influences on the concept of knowledge management. It discussed the definitions of knowledge management and related concepts: explicit and tacit knowledge

and the relationship between information management and knowledge management. The next chapter will continue the literature study and will focus on knowledge management technologies and techniques.

CHAPTER 3

KNOWLEDGE MANAGEMENT TOOLS, TECHNOLOGIES AND TECHNIQUES

3.1 INTRODUCTION

The previous chapter introduced knowledge management, related concepts and the relationship between knowledge management (KM) and information management (IM). This chapter explores the different knowledge management tools, technologies and techniques used by organisations to enable the creation, use, transfer and application of knowledge within the new work environment. These tools, technologies and techniques are essential components for the practical implementation of KM thus ensuring organisations and individuals become more efficient and effective in a knowledge based economy.

For the purpose of this research it is important to gain a broad understanding of a variety of knowledge management tools, technologies and techniques, as taxonomies play a central role in the successful utilisation of these tools, technologies and techniques and thus the successful management of knowledge. Likewise the utilisation of these tools, technologies and techniques support the utilisation of taxonomies as a tool within a knowledge management environment. The multitude of tools, technologies and techniques available, however, will add to the complexity, as there are many alternatives with some of them differing quite widely from others. It

is important for this study to illustrate that the application of taxonomies should not be seen in isolation, but rather to illustrate that organisations implementing knowledge management will select different tools, technologies and techniques according to specific requirements. Taxonomies need to be placed in context with the organisation's people, culture, processes and knowledge management approach, which include the tools, technologies and techniques they decide to utilise.

3.2 THE NEED FOR KNOWLEDGE MANAGEMENT TOOLS, TECHNOLOGIES AND TECHNIQUES

According to Duffy (2001:1) the advent of the 21st century increased the need for rapid access to relevant knowledge. The business world is becoming increasingly competitive and the demand for innovative products and services has yet to be satisfied. The 21st century brings with it a new economy that requires organisations to become more productive and there are two key contributors to success in such an environment: people and technology. It is the combination of these two factors in conjunction with new business processes and business models that will underpin success in the next decade. It can therefore be assumed that the role of knowledge management, people and technology in organisational success will increase. Leveraging knowledge effectively, however, requires a conducive environment, which includes certain knowledge management tools, which facilitates knowledge creation, sharing and collaboration as part of routine business processes. An essential part of this environment is a technology infrastructure

that encourages collaboration and facilitates knowledge capture and access.

The selection of knowledge management technology and tools by an organisation will depend on the organisation's knowledge management strategy. As described in the previous chapter organisations approach knowledge management in different ways but there seems to be two distinctive components. Tissen, Andriessen and Deprez (2000:23) refer to operational knowledge management and strategic knowledge management. Sveiby (1996:1) refers to it as the information technology-track and the people-track and Hansen, Nohria and Tierney (1999:107) call it the codification strategy or personalisation strategy. In essence the one component focuses on increasing accessibility to information and knowledge, whilst the other component focus on the creation and application of knowledge based on personal interactions. Although both components are essential, organisations tend to place the emphasis on one or the other.

According to Wigg (1999:5) some organisations focus on knowledge sharing among individuals or on building elaborate educational and knowledge distribution capabilities. Some emphasise the use of technology to capture, manipulate and locate knowledge and many focus on information management rather than knowledge management. Others focus on knowledge utilisation to improve organisational operational and overall effectiveness.

Organisations will have different strategies associated with different drivers and this will influence the selection of KM tools, technology and techniques within an organisation. According to Tiwana

(2000:98) there is no right or wrong approach between codification and personalisation, the right balance is determined by the organisation's objectives in pursuing knowledge management. For any knowledge management initiative to be successful, both approaches must be present in the knowledge orientation of the organisation but with equal weight.

3.3 THE NEW WORK ENVIRONMENT

The knowledge economy challenges organisations and individuals in many ways. This is illustrated through an environment, which is characterised by complexity of decision making and the demand to act with speed, a requirement to respond to the unexpected and to unusual demands, coping with the shift from industrial activities to value added services, also a need for a more customer centric approach and the need to constantly strive for innovation is new challenges. This radically changing environment in which organisations operate demands organisations and people to react faster; requiring information processing, information renewal and knowledge creation to take place at a faster pace. This is and will be changing the individual's working environment drastically (Davenport & Prusak 1998:5). It is essential that these dynamics are understood as it forms the main driver for the use of tools, technologies and techniques, which facilitates the ability to react faster based on the availability of relevant, accurate and actionable knowledge.

Trent (2000:1) indicated that the way in which work was done has changed and this has created and/or facilitated fundamentally different social arrangements in the workplace. The application of new technologies creates new workplaces, new work opportunities, new jobs and demands for new and different skills. Changes in the nature of work have also been driven by changes in organisations' structures and the re-design of management structures. A shift has taken place from fairly rigid, highly structured and hierarchical forms of management, to more team-based settings, with more shared governance. These organisational structures place a premium on communication skills, analytical skills and the ability to access and use knowledge and information. Figure 3.1 summarises many of the characteristics of the "new" work environment.

TABLE 3.1
JOBS ARE CHANGING DUE TO SHIFTS IN ORGANISATIONS AND
MANAGEMENT

Element	Old System (nature of work)	New System (nature of work)
Workplace organisation	Hierarchical Function/Specialised Rigid	Flat Networks of multi/cross-functional teams Flexible
Job Design	Narrow Do one job Repetitive/simplified Standardised	Broad Do many jobs Multiple responsibilities
Employee skills	Specialised	Multi/cross-skilled
Workforce management	Command/control systems	Self-management Performance or out come based
Communications	Top down Need to know	Widely diffused Big picture
Decision making responsibility	Chain of command	Decentralised
Direction	Standard/fixed operating procedures	Procedure under constant change
Work autonomy	Low	High
Employee knowledge of organisation	Narrow	Broad

Source: Trent: 2000:4

Today's knowledge workers are expected to carry out tasks and solve problems that facilitate the effective and efficient supply of the organisation's products and services. These products and services must compete in an environment that has become increasingly global and unpredictable, with constant demands for cost reduction and with changing preferences on the part of increasingly aware customers.

According to Wigg (1999:13) knowledge management practices will continue to modify the workplace drastically. Visible changes will be evident by increased application of, and reliance on, technology for cognitive support compared to the information focus of the 1980s

and 1990s. The changes that people will experience in the workplace according to Wigg (1999:13) will include:

- Emphasis on using interdisciplinary teams with focus on the best mix of competencies and understanding to be applied to work at hand.
- Good understanding of the importance of relying upon strong mental associations and conceptual knowledge to guide direction of work.
- Better understanding by knowledge workers of how to implement enterprise strategy by the small decisions and acts that are part of their daily work.
- Greater willingness to collaborate with associates and coordinate with other activities.
- Increased reliance on automated intelligent reasoning to support work. For example, when confronted with complex situations, automation may assist knowledge workers by identifying and making available relevant information and knowledge. It also makes preliminary sense of the situations and presenting suggestions for how it should be handled.
- New organisations of the physical work environment will change the way people work together and allow greater richness and effectiveness of interaction.
- Improved understanding of different levels of work complexities and what that means for knowledge requirements.

There is a shift towards more complex work related outputs and there are many identifiable targets for intelligent automation in routine areas. The advancement of technology and the experiences gained through complex organisational designs require continued refinement of work related outputs. Knowledge workers are expected to deliver increasingly complex work outputs to ensure better products and services (Wigg 1999:15).

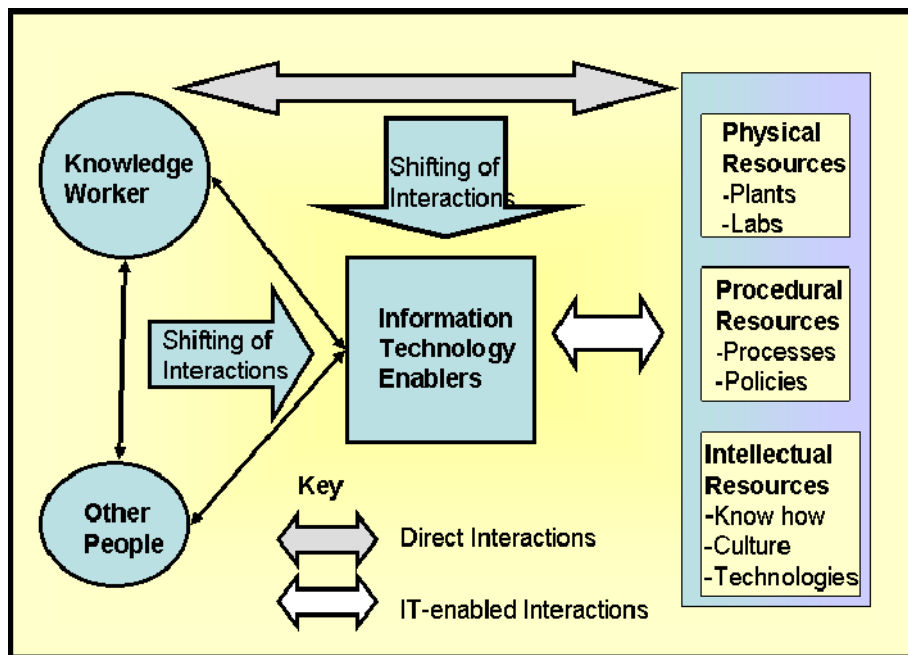
According to Syed (1998:1) these changes in the business environment are having the following profound impacts on the work environment:

- They have increased the interconnectedness of knowledge workers within a organisation and blurred the boundaries between traditional functions such as: planning, finance, human resources, research and development, production, sales and marketing.
- Information technology (IT) has come to play a major role in enabling organisations to integrate their value chains, become more agile, and transfer or share risk with other organisations.
- The time available to respond to changes in the internal and external environments has become shorter, and the time for exploration and experimentation is limited.
- The unpredictability of cascades of change has reduced the ability to specify and choose courses of actions, and foresee their consequences. For a knowledge worker, time and

attention have become the scarcest resources in this environment.

Syed (1998:1) presents a view (somewhat simplified) in figure 3.2 of a knowledge worker's environment. The figure also highlights interactions as a basic element of work process where knowledge is needed, used, created and transferred.

FIGURE 3.1
KNOWLEDGE WORKER'S ENVIRONMENT



Source: Syed (1998:1)

Syed (1998:1) states that the interactions to perform tasks and solve problems in a knowledge-based organisation can be classified into two types of activities namely planning and operations. These activities require the use of a combination of knowledge techniques and tools that can be classified as information gathering; organising; refining; combining; sense making and communicating and

disseminating. The requirements for each activity vary significantly, resulting in different requirements for techniques and tools. For a knowledge-based organisation, this poses problems and the following issues arise:

- What is the nature of interactions among knowledge workers and the resources within the organisation, as well as with the outside world?
- How should these interactions be facilitated through information technology enablers to achieve outcomes consistent with the organisation's goals?

For knowledge workers the question is:

- What strategies should be followed to learn and interpret changes in tools, processes and know-how?
- What is the best way to interact with them and other resources, given the workers' limited time and competition for their attention?

Numerous information technology-based systems are being offered to help carry out more and more of the direct interactions with greater efficiency and effectiveness, thereby raising knowledge worker productivity. These enablers range from desktop application to enterprise-wide systems and data warehouses.

According to Tissen, Andriessen and Deprez (2000:62) the very nature of work has changed due to the advancement of information and knowledge technology. Work has progressed from being repetitive, to requiring the independent judgement of a professional. The focus of work in general has shifted from accomplishing tasks

and set objectives to connecting with customers and exploring new opportunities.

Although there is a great deal of debate relating to the changing nature of the work environment, there is also much agreement that changes have occurred and will continue to occur. It is important to understand these changes, but more important is understanding how to manage these changes both from an organisational and individual perspective.

3.4 OVERVIEW OF KNOWLEDGE MANAGEMENT TOOLS, TECHNOLOGIES AND TECHNIQUES

One of the key drivers for the change within the work environment has been the development of information and communication technology (ICT). Enhancements in technology and changes in the work environment are directly related and technological enhancements result in changes in the dynamics of the work environment. This in turn leads to new technology being developed to support the environment. As in the case with most business related processes within the current working environment, knowledge management is impacted and in some cases dependant on technology, tools and associated techniques. According to Egbu et.al (2003:2) two different approaches have been identified namely knowledge management techniques (non information technology (IT) based) and knowledge management technologies (information technology based). They further indicate that the term “tools” for knowledge management is used very loosely and often the knowledge management (KM) tools relate only to information

technology (IT) tools. A better understanding is needed of the different tools (both IT and non IT). For the purpose of this study knowledge management tools will be used to refer to both the non IT tools and IT tools. Ghassani (as cited by Egbu et al 2003:2) divides KM tools in KM technologies and KM techniques with the following comparison between technologies and techniques (as illustrated in figure 3.3):

FIGURE 3.2
KM TOOLS: COMPARISON BETWEEN TECHNIQUES
AND TECHNOLOGIES

KNOWLEDGE MANAGEMNET TOOLS	
Knowledge Management Techniques	Knowledge Management Technologies
Strategies for learning	Require IT infrastructure
People involvement	Require IT skills
Easy to implement and maintain	Expensive and sophisticated to acquire and maintain
Focus on tacit knowledge	Focus on explicit knowledge
Examples: -Brainstorming -Communities of practice -Face to face interactions -Recruitment -Training	Examples: -Data and text mining -Groupware -Intranet/Extranets -Knowledge bases or repositories -Taxonomies -Ontologies

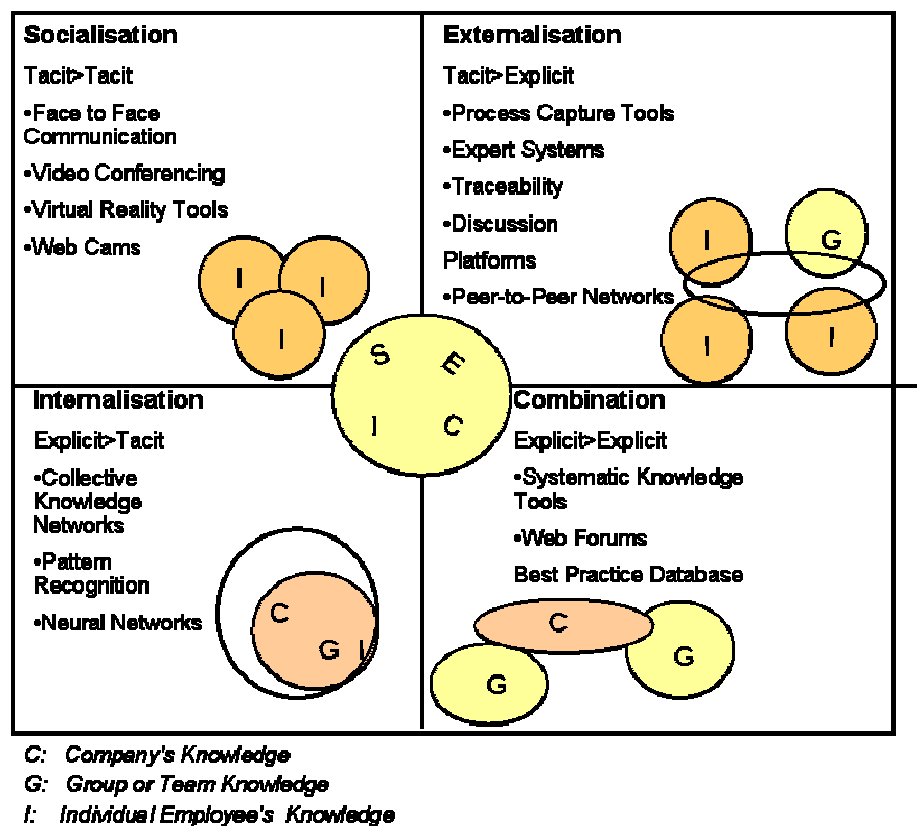
Source: Egbu et al (2003:3).

There is a range of technologies and techniques that can be used in organisations in support of knowledge management. A balance is however required, based on the different approaches to knowledge management. Some of the techniques are not new but most of the technologies are relatively new and are still evolving. Having

developed a KM strategy the organisation must identify the tools (technologies and techniques) with which to implement the strategy. The selection of technologies and techniques will be dependant on the goal of the KM strategy, the nature and location of knowledge and the capabilities of the tools.

Tiwana (2000:168) indicates that the SECI model (figure 3.4) can provide a guide for organisations to see how the technology and human components can fit, when implementing a knowledge management strategy.

FIGURE 3.3
THE SECI MODEL AND THE PLACES WHERE IT SUPPORT FIT IN



Source: Tiwana (2000:168)

The interaction of knowledge at organisation-wide level is indicated by C, at group or task team level by G and at individual level by I.

The corresponding technology enablers are exemplified in each quadrant. Knowledge creation is according to the SECI model through a cycle of socialisation, externalisation, combination and internalisation of knowledge. Figure 3.4 illustrates how each of these phases is supported by technology and this implies that the benefits of one technology element are manifested in multiple knowledge creation phases.

According to Binney (2001:35) knowledge management applications are cluster around common ideas or business problems, for example: creation of new knowledge, process consistency or improvement, understanding patterns in vast amount of data, tapping expertise in organisations or developing employee capabilities and competencies. Binney (2001:38) referred to this as the knowledge management spectrum, which list the enabling technologies in order to provide an inventory, and position current knowledge management activities in organisations. The knowledge management spectrum positions the various knowledge management applications and provides a better understanding of knowledge management applications available.

FIGURE 3.4
KNOWLEDGE MANAGEMENT SPECTRUM

	Transactional	Analytical	Assets Management	Process Based	Developmental	Innovation & Creation
Knowledge Management Applications	<ul style="list-style-type: none"> • Case Based Reasoning • Help Desk Applications • Customer Service Applications • Order Entry Application • Service Agent Support Applications 	<ul style="list-style-type: none"> • Data Warehousing • Data Mining • Business Intelligence • Management Information Systems • Decision Support Systems • CRM • Competitive Intelligence 	<ul style="list-style-type: none"> • Intellectual Property • Document Management • Knowledge Validation • Knowledge Repositories • Content Management 	<ul style="list-style-type: none"> • Best Practice Quality • TQM • Bench-marking • Business Process (Re) Engineering • Process Improvement • Lessons Learned 	<ul style="list-style-type: none"> • Skills Development • Staff Competence • Learning • Training • Teaching 	<ul style="list-style-type: none"> • Communities • Collaboration • Discussion Forums • Networking • Virtual Teams • Research & Development • Multi Disciplined Teams
Enabling Technologies	<ul style="list-style-type: none"> • Expert Systems • Cognitive Technologies • Semantic Networks • Rule Based Expert Systems • Probability Networks 	<ul style="list-style-type: none"> • Intelligent Agents • Web Crawlers • Relational & Object DBMS • Neural Computing • Push Technologies • 	<ul style="list-style-type: none"> • Document Management Tools • Search Engine • Knowledge Maps • Library Systems 	<ul style="list-style-type: none"> • Workflow Management • Process Modelling Tools 	<ul style="list-style-type: none"> • Computer Based Training • Online Training 	<ul style="list-style-type: none"> • Groupware • E-Mail • Video Conferencing • Search Engines • Voice Mail • Push Technologies • Bulletin Boards

Source: Binney (2001:38)

Figure 3.5 represents the groupings, which are called the elements of the knowledge management spectrum and also indicate the KM applications mapped back to these elements. The transactional systems are dealing with codified or explicit knowledge embedded in the transactional systems, to generate new data and information which can be used by analytical KM systems. Assets management and process based KM systems are concerned with the codification of tacit knowledge into explicit knowledge and making this available to be leveraged by others in the organisation. KM systems focused on innovation and creation to complement the above systems by focusing on connecting people, thus encouraging the flow of tacit knowledge across the organisation. To compliment the KM spectrum and to complete any KM strategy it is important to develop

a KM environment, which allows people to come together to work collaboratively having access to all the data, information and knowledge they need. The KM spectrum by Binney (2001:40) provides a view of the totality and complexity of the various knowledge management theories, tools and techniques available. The KM spectrum can also provide a framework in which organisations can balance its knowledge management focus and establish and communicate its strategic knowledge management direction.

3.4.1 Knowledge Management Techniques

Knowledge management techniques do not depend on IT, although it provides support in some cases. KM techniques are not new, as organisations have been implementing them for a long time, mainly under the umbrella of several management approaches like organisational learning. KM techniques are affordable and do not need sophisticated infrastructure but they are resource and people intensive and are dependent on the organisational culture and acceptance due to the focus on tacit knowledge.

Egbu et al (2003:2) list the following KM techniques:

- **Brainstorming:** A process where a group of people meet to focus on a problem or idea. The participants express or contribute their ideas as they strike them and then build on the ideas raised by others. All ideas are captured and afterwards evaluated. Brainstorming

helps in problem solving and in creating new knowledge from existing knowledge.

- Communities of practice: Also referred to as knowledge communities, knowledge networks, learning communities, communities of interest and thematic groups. These consist of a group of people with different skills sets, development histories and experiences that work together to achieve commonly shared goals. People in a community of practice are peers in the execution of “real work” and what holds the community together is the shared goal and a common sense of purpose.
- Face-to-face interaction: Traditional approach for sharing the tacit knowledge owned by an organisation’s employees. These sessions increase the organisational memory, developing trust and encouraging effective learning.
- Post project reviews: Debriefing sessions used to highlight lessons learnt during the course of a project. These reviews capture knowledge about causes of failures, how it was addressed and identifies the best practices.
- Recruitment: This is a tool for acquiring external tacit knowledge, especially experts. This adds new knowledge and expands the organisational knowledge base.

- Apprenticeship: It is a form of training in a particular trade carried out mainly by practical experience or learning by doing. Apprentices often work with their masters and learn craftsmanship through observation, imitation and practice.
- Mentoring: It is a process where a trainee or junior employee is attached or assigned to a senior member within the organisation. The mentor provides a coaching role to facilitate the development of the trainee by identifying training needs and other development aspirations.
- Training: Improving employee's skills and therefore increasing their knowledge. Its implementation depends on plans and strategies developed by the organisation to ensure that employee's knowledge is continuously challenged and updated.

The United Kingdom National Library for Health Specialist Library (<<http://www.library.nhs.uk>) developed the knowledge management toolbox which includes the following tools and techniques used in knowledge management programmes:

- Knowledge audit: Process to identify an organisation's knowledge needs, resources and flows, as a basis for understanding where and how better knowledge management can add value.
- Exit interviews: A tool used to capture the knowledge of departing employees.

- Identifying and sharing best practices: Approaches to capturing best practices discovered in one part of the organisation and sharing them for the benefit of all.
- Knowledge centres: Similar to libraries but with a broader responsibility to include connecting people with each other as well as with information in documents and databases.
- Knowledge harvesting: A tool used to capture the knowledge of experts and make it available to others.
- Social network analysis: Mapping relationships between people, groups and organisations to understand how these relationships either facilitate or impede knowledge flows.
- Storytelling: Using the ancient art of storytelling to share knowledge in a more meaningful and interesting way.
- White papers: A step-up from the usual staff directory, an online resource that allows people to find colleagues with specific knowledge and expertise.

Tissen, Andriessen and Deprez (2000:194) have the following categories:

- Cognitive tools which include: Lessons learned and best practices; creativity tools and brain tools.
- Analysing tools which include: Fishbone diagrams, mind maps, decision trees, force field analysis, SWOT

analysis, systems thinking tools, black boards and white boards.

The application of the knowledge management techniques listed, within an organisation, will depend on the people, process and culture of the organisation and the knowledge management approach or strategy of the organisation. Knowledge management tools and techniques are unlikely to work in isolation and need to be supported by the right kind of environment. Knowledge management techniques tend to change the organisational culture and change the pattern of interaction between people, creating strong and trusting networks between employees for sharing and creation of knowledge.

3.4.2 Knowledge Management Technologies

Choosing knowledge management technologies is not an easy task and more importantly the chosen technologies need to fit seamlessly into the organisation's current processes, culture and technology infrastructure. (Conway & Sligar 2002:153).

Most organisations consider KM technologies as very important enablers to support KM implementations and more time and effort are spent on KM systems. According to Tissen, Andriessen and Deprez (2000:5) the need for KM systems are often triggered by day-to-day problems and the main focus is to distribute information through the organisation and connecting people to systems for the distribution and transfer of knowledge.

Tiwana (2000:82) indicates that many of the technologies that support the management of knowledge have been around for a long time and are not new. A large set of technology components for knowledge management is often already in place within organisations and the focus is therefore more on the proper leverage and tight integration of existing technology, tools and information resources.

According to Egbu et al (2003:2) knowledge management technologies consist of a combination of hardware and software technologies. Hardware technologies and components are important for KM systems as they form the platform for the software technologies to perform, and the medium for the storage and transfer of knowledge. Software technologies play an important part in facilitating the implementation of knowledge management. Solutions offered by software vendors take many forms and perform different tasks. KM software technologies have seen many improvements due to alliances and mergers and acquisitions between vendors but no one technology available makes a complete KM solution.

The following KM technologies are listed by Egbu et al (2003:9).

- Data and text mining: Technology to extract meaningful knowledge from masses of data and text. Data are single facts (structured) about events while text refers to unstructured data. The process of data/text mining enables meaningful patterns and associations of data (words and phrases) to be identified from one or more large databases or knowledge-bases. It is mostly used in

business intelligence, direct marketing and customer relationship management applications.

- **Groupware:** Software that helps groups of people to communicate and share information. Groupware supports distributed and virtual project teams, where team members are from multiple organisations and in geographically dispersed locations. Groupware tools usually contain e-mail communications, instant messaging, discussion areas, document repository and search facilities.
- **Intranet:** Inter-organisational network that is guarded against outside access by special security tools called firewalls. Extranet is an intranet with limited access to outsiders, making it possible to collect and deliver certain knowledge.
- **Knowledge bases:** Repositories that store knowledge about a topic in a concise and organised manner. It presents facts that can be found in a book, a collection of books, web sites or human knowledge. This is different from the knowledge bases of experts systems, which incorporate rules as part of the inference engine that searches the knowledge base to make decisions.
- **Taxonomies:** Collection of terms (and relationships between them) that is commonly used in an organisation. Examples of relationships are hierarchical (where one term is more general hence subsumes another term), functional (where terms are indexed based on their

functional capabilities) and networked (where there are multiple links between the terms defined in the taxonomy).

- **Ontologies:** Also defines the terms and their relationships but in addition, it supports deep (refined) representation (for both descriptive and procedural knowledge) of each of the terms as well as defined domain theory or theories that govern the permissible operations with the concepts in the ontology. Taxonomies and ontologies serve multiple purposes in an organisation. They can be used as a corporate glossary holding detail descriptions of every key term used in the organisation. It can also be used to constrain the search space of search engines and prune search results, identify and group people with common interests and act as a content or knowledge map to improve the compilation and real time navigation of web pages.

The United Kingdom National Library for Health Specialist Library: KM Toolbox (<<http://www.library.nhs.uk>) provides an overview of the most commonly used knowledge management technology. The following are examples of the knowledge-enabling technologies currently available:

- **Intranets:** An intranet can convey information in many forms, not just web pages. It also includes documents, tables, spreadsheets, images and databases. It also provides connectivity that allows people to collaborate, wherever they are located.

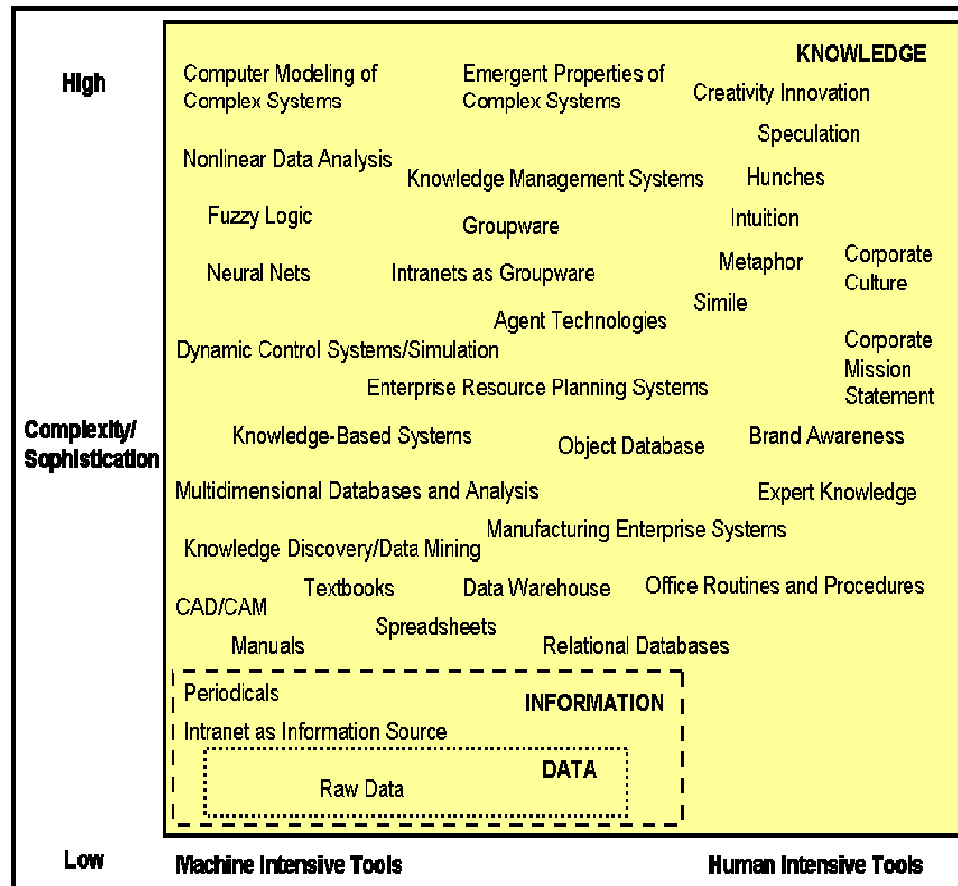
- Discussion boards: Also known as messages boards, bulletin boards or chat rooms. It provides the ability to post and reply to messages in a common area. People can be asked for advice and share information around topics of interest.
- Videoconferencing: Videoconferencing can be done using specialised video facilities or from people's desktops using computer software. It is used for situations that require a degree of trust and relationship-building, for discussing issues and exploring ideas and in situations where you don't need a detailed permanent record to be generated automatically.
- Workflow tools: Workflow tools are developed to model typical processes that take place in organisations. It enables people to work together on shared tasks.
- E-learning tools: This is a rapidly growing field and uses information technology to deliver learning and training to people electronically at their desktop. There is a wide variety of tools and technologies available to support e-learning, many of which include facilities for learners in different locations to work together on assignments, case studies and projects.
- Taxonomies: A hierarchical structure for organising a body of knowledge, it gives a framework for understanding and classifying that knowledge, how to group it and how the various groups relate to each other.

In knowledge management the purpose of taxonomy is to organise information so that users can more easily navigate through it.

- Thesauri: List of the various terms and language that are used to describe a body of knowledge and which specifies the relationship between the terms: antonyms and synonyms, broader terms and narrower terms. In knowledge management the aim of a thesaurus is to enable content to be indexed in a variety of ways so that different users who tend to use different terms can still find it.
- Search engines: Software that carries out searches for information across multiple sources. Search engines vary widely in their level of sophistication.
- Portal: A portal is a website or a web page that provides your main point of entry into an intranet or the internet and which gathers and integrates information from various sources into a single location. Portals are essentially personalised gateways, one-stop-shop for information that is personalised either to an organisation's needs or to individual's needs.
- Data mining: Tools that analyse data in very large databases and look for trends and patterns that can be used to improve organisational processes and performance.

Performing tasks and solving problems in a knowledge-based organisation require the use of a combination of tools and techniques. Figure 3.6 indicates knowledge management tools, technologies and techniques presented by Syed (1998:65).

FIGURE 3.5
KNOWLEDGE MANAGEMENT TOOLS



Sources: Syed (1998:65)

Figure 3.6 illustrates that knowledge management tools are either high or low in complexity and sophistication and are either machine intensive or human intensive. For example the corporate mission statements as indicated by Syed (1998:56) are more human intensive and are moderate on complexity and sophistication, while computer modelling of systems are high on complexity and sophistication and are machine intensive.

Creativity and innovation in contrast to the previous are also high on complexity but are human intensive. This figure indicates the complexity and sophistication of the different knowledge management tools in relation to their machine or human dependence.

Not all organisations will need all the tools listed by Syed but will assemble a solution by selecting from a common set of requirements. Knowledge management uses a wide range of products, many of which are not specifically targeted at knowledge management.

Tissen, Andriessen and Deprez (2000:194) indicate the following categories within knowledge management tools:

- Information tools: Examples are data warehousing and data mining, information systems and databases, workflow management systems and external databases.
- Social tools: Examples are communications tools, e-mails, news groups, bulletin boards, discussion tools, chat groups, videoconferencing and faxes.

According to Davenport and Prusak (1998:129) the concept of knowledge management technologies is not only broad but also difficult to define. Some infrastructure technologies within this category can be useful in facilitating knowledge management but will not necessarily play a role in capturing or distributing structured knowledge, a good example of this is videoconferencing. The main focus for knowledge management technologies is to capture, store and distribute

structured knowledge for use by people. The goal of these technologies is to take knowledge that exist in human heads and paper documents and make it widely available throughout an organisation.

Davenport and Prusak (1998:130) describe knowledge repositories as one of the best known approaches for using technology in knowledge management. The authors also indicated that Lotus Notes and Intranet-based webs are the two leading toolsets for managing knowledge repositories and using an online thesaurus for search and retrieval.

Gorelick, Milton and April (2004:71) refer to KM technology as a team (collaborative) and/or communication technology and divide it into two categories: infrastructure and collaborative applications. Infrastructure is the hardware and software that allow anyone to communicate. Once the infrastructure is in place, collaborative technology or groupware applications can be effectively implemented. The three categories for collaborative technology include:

- Group communication: Involves teleconferencing, screen sharing, group scheduling, meeting support and group writing.
- Group memory: Existing databases, group filing, filtering and refining.
- Group process support: Managing groups or workflow.

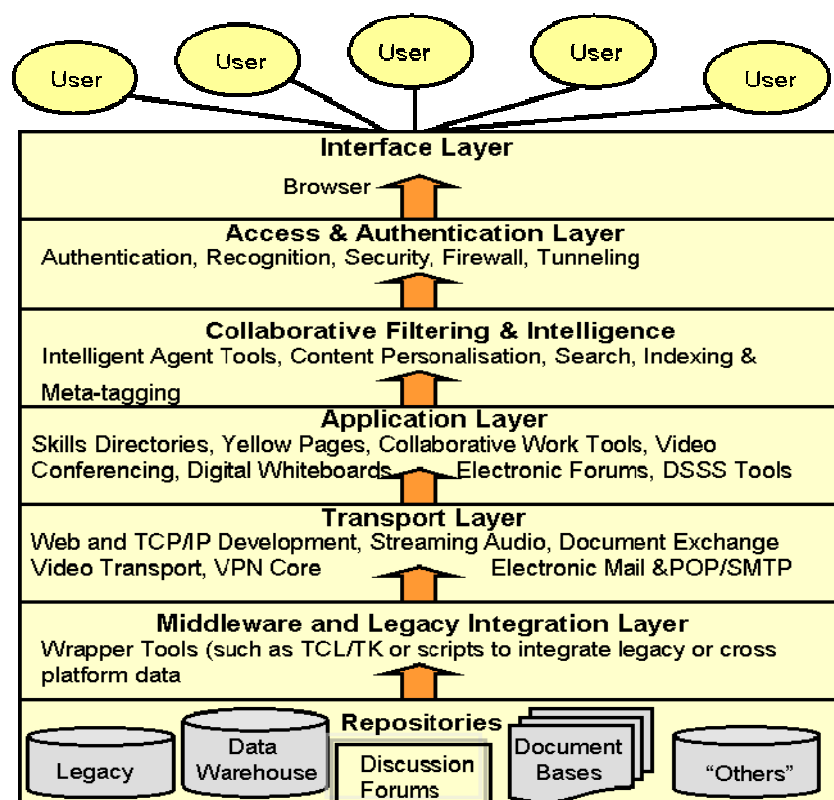
3.4.2.1 Knowledge Management Architectures

Different knowledge management approaches will have different technologies and different technology architecture approaches.

Tiwana (2000:159) provides the seven layer KM architecture for developing a knowledge management system with the technology that constitute of the following seven layers indicated in figure 3.7.

FIGURE 3.6

SEVEN LAYERS OF KM SYSTEM ARCHITECTURE



Source: (Tiwana 2000:309)

The interface layer is the topmost layer in the KM systems architecture and this is the only layer with which end users directly interact. The effectiveness of this layer is a dominant

determinant of the usability of a KM system. Effectiveness of KM platforms is dependent not only on technical and reliability that is the infrastructure, but also on conversational robustness. Tiwana (2000:198) refers to this as the infostructure. This predetermines the extent to which the system provides a language structure and resources that people use to make sense of events taking place within the network. The infrastructure underlying the intelligence and filtering layer supports the transition from infrastructure to infostructure. The focus should be on solutions that can find, summarise, interpret and analyse large volumes of data and information efficiently and effectively.

According to Tiwana (2000:158) the application layer has the necessary tools that enable integration of information sources across tacit (such as people) and explicit (for example databases, transaction-processing repositories and data warehouses) and help create and share context and facilitate sense making. Components of the application layer in a knowledge platform include the following:

- Intranets and Extranets: Organisations are using intranets for improving information flow, collaboration and providing information access, to view content of documents regardless of file format, operating system, or communications protocol. Extranets allow organisations to efficiently tap into knowledge-based resources of partners.

- Document management: Crucial information often exist on paper and organisations try to convert this information into a more easily transferable and searchable electronic format by scanning these documents. Document management provides the ability to develop a database of documents and classify them, automatically.
- Data warehouse: Data representations, such as hypercube data models in multiple dimensions, help immensely in supporting decision making with concrete data from the past. A data warehouse is of little use unless the data is converted to meaningful information and applied when needed.
- Digital whiteboards and shared workspaces: A critical component that promotes knowledge sharing, creation, transfer and collaboration. This encourages and enables informal chat and conversations that are a part of work life in most office settings.
- Decision support systems: Decision support systems, case-based reasoning systems and contextual information retrieval systems provide the needed historical base from past experience that help make both minor and major decisions fast and accurately.
- Web conferencing and multimedia: Videoconferencing enables people to exchange both full-motion video and audio across distributed network. In a KM system,

multimedia allows the system to capture informal content that would otherwise be lost.

- Expertise pointers: Beside their basic roles as publishing and information distribution platforms, intranets are the primary platform for the creation of electronic yellow pages. There is a limit on the knowledge that can be actually elicited from an individual with the necessary expertise. Pointers to the person who actually contributed that knowledge are needed to facilitate knowledge flow. Knowledge yellow pages and skills directories provide that link.

Conway and Sligar (2002:160) refer to the three-tier knowledge management architecture, with each tier performing specific functions and using different technologies. The three-tier knowledge management architecture includes the following:

- Tier 1: User interface (UI), navigation methods and tools. The layer provide a graphical interface so that users can interact with the application, input data, and view the results of requests, but also manages data manipulation and formatting once the user or client receives it. In web applications, the browser performs the tier 1 tasks. Internet explorer and digital dashboards are examples of such applications in this level.
- Tier 2: Methods and tools provide a link between the interface and data services layers. This tier contains the business logic established in the requirements analysis (performed during the planning stage). Business logic,

which states the rules that govern application processing, connects the user at one end with the data at the other. The functions that the rules govern closely mimic everyday business tasks and can be a single task or a series of tasks. Applications on this level can include Internet information server, portal servers and exchange servers.

- Tier 3: Represents the data services, provided by a data store, which manage and provide access to the application data. Data stores can be structured or unstructured.

The specific technology components organisations use to build knowledge management solutions will be dictated by the organisation's current or planned infrastructure, the type of knowledge that needs to be stored and the communication needs.

These techniques and technologies provide valuable support for knowledge management; however it is difficult to select the most appropriate tools for a particular organisation. The large number of technologies available makes it difficult for organisations to identify the most appropriate tools.

Duffy (2001:2) explains that infrastructure provides the base or platform upon which KM solutions are built. It consists of repositories for unstructured data (content and document management) and structured data (data warehousing).

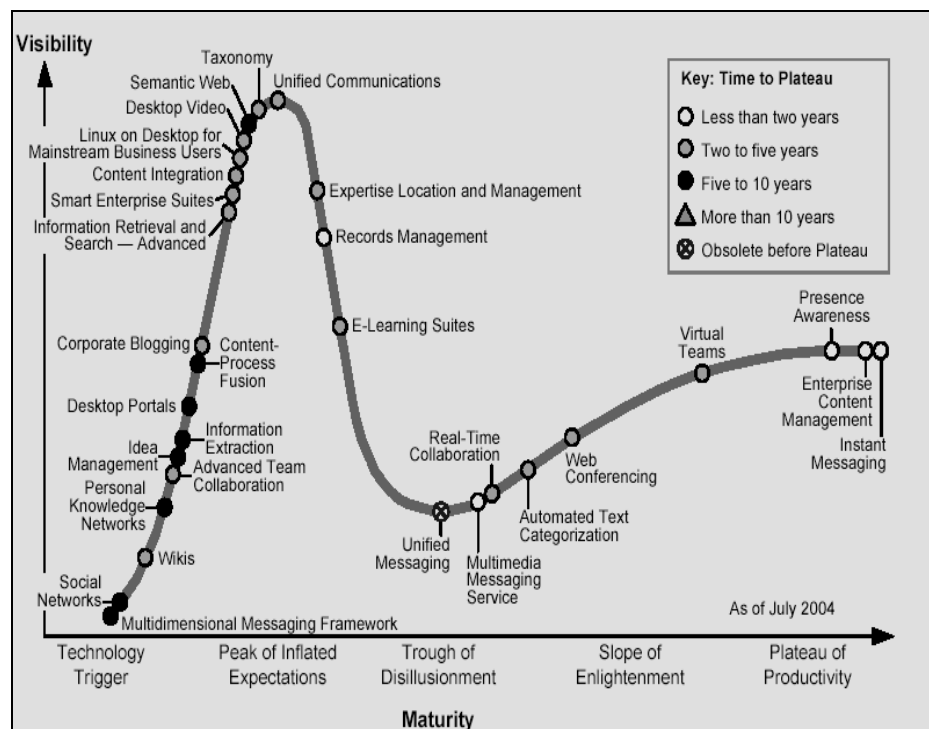
According to Duffy (2001:2) KM initiatives are driving the need for improvements in data warehousing tools and technologies. In particular, KM imposes the need for extraction of information from unstructured data, and the ability to draw conclusions based on its relationship to more structured data. An increasing need for software that supports information access (end user data access and analysis) and analytical applications is also driving growth in the demand for data warehouse tools. Content management software represents the convergence of full-text retrieval, document management, and publishing applications. It supports the unstructured data management requirements of KM initiatives through a process that involves capture, storage, access, selection and document publication. Content management tools enable users to organise information at object level, rather than in binary large objects or full documents (also referred to as taxonomies). The information is broken down by topical area and usually tagged via Extensible Mark-up Language (XML). Both capabilities dramatically increase the opportunity for reuse.

New knowledge management tools, technologies and techniques continue to be developed. The 21st century brings with it a new economy that requires organisations to be more productive without increasing the inflation rate, and the two key contributors to success in such an environment are people and technology (Duffy 2001:15).

According to Knox (2004:1) hype cycle, (see Figure 3.8) focuses on technologies that are particularly relevant to the

knowledge workplace. Many of the technologies according to Knox (2004:1) are immature and have yet to reach their full potential, due to the complex interplay between human and social factors, with technology supporting work processes and the diverse ownership and heritage of the technologies.

FIGURE 3.7
HYPE CYCLE FOR THE KNOWLEDGE WORKPLACE, 2004



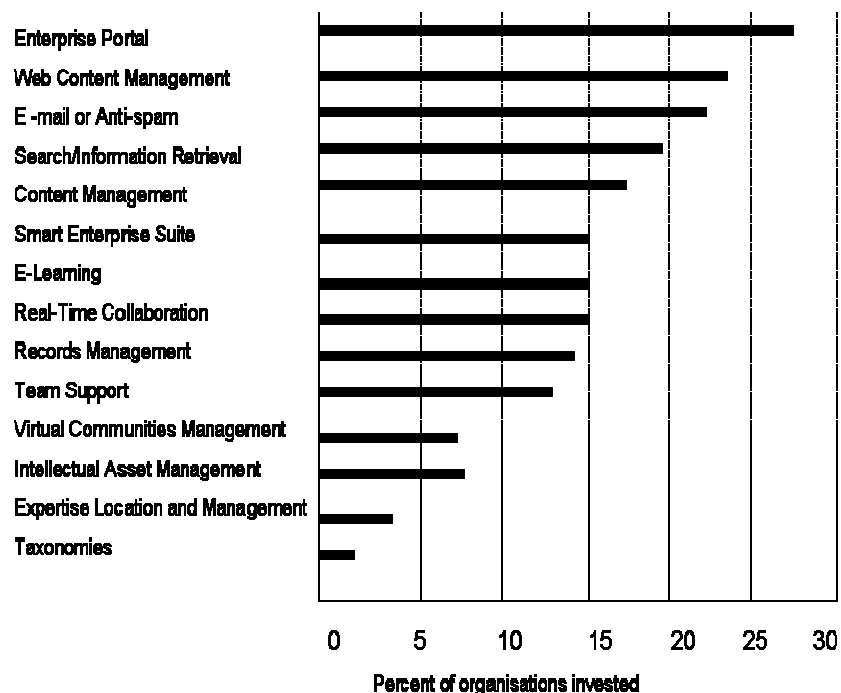
Source: Knox (2004:1)

Some technologies, for example content management, is under enterprise governance and are tracked as part of the enterprise's information technology planning process. Others, for example instant messaging, began as personal tools and have moved to play key roles within organisations. Some technologies began as corporate tools for example portals and now have individualised versions with new products and

challenges, for example personal portals. Advanced search and retrieval is the evolution of older technology and concentrate on more complex content processing and incorporates more sophisticated technologies, for example taxonomies and ontology's, to deliver richer more powerful results to users.

According to Knox (2004:4) portals and web content management are the most frequently cited investments. Figure 3.9 provides a view of the top priorities for knowledge management investment within organisations.

FIGURE 3.8
TOP PRIORITIES OF KM INVESTMENT



Source: Knox (2004:4)

According to Knox (2004:4) organisations are investing the most in enterprise portals and web content management while the concept of taxonomies is still new to most organisations,

and are low on the organisations' list of investment. Investments can also be linked to the hype cycle, the maturity of most of the technology available and the knowledge management strategy of the organisation implementing knowledge management solutions.

3.5 SUMMARY

Having developed a knowledge management strategy the organisation must identify the tools, technologies and techniques in support of the strategy. The selection of technologies and techniques will be determined by the goal of the KM strategy, the nature and location of knowledge and the capabilities of the tools. There is a range of technologies and techniques that can be used in organisations for knowledge management. Balance is needed in using different approaches to knowledge management. Some of the techniques have been used before but most of the technologies are relatively new and are still evolving. A survey done by Loughborough University (as cited in Egbu et al. 2003:13) indicated that communities of practice are the most widely used technique for knowledge management particularly in large organisations. The most widely used technology are intranets as this provide the platform for knowledge sharing, particularly in large contraction organisations that are often geographically dispersed, with diverse knowledge to share. Other popular technologies are document management systems, groupware and taxonomy tools.

According to Knox's hype cycle (2004:4) interest in and awareness of taxonomy technologies has spread and grown rapidly in the past year and more information access implementations will combine taxonomy, search, ontology and information visualisation technologies and technologies for taxonomies will continue to evolve. Individuals and small groups are casually adopting new technologies and at the same time mature technologies are consolidating. Knowledge worker's appetite for new tools and capabilities keeps growing and vendors keep up with diverse, new technologies to support individual and collaborative work. Knowledge workers acquire and deploy new technologies and tools on their own, and organisations will find it challenging between understanding and investing in new tools and technologies within the knowledge management spectrum.

It is essential to have a basic understanding of the different tools, technologies and techniques as it forms an integral component of knowledge management and has an impact on the use of taxonomies, as well as to understand the potential interaction between taxonomy, technologies and other associated knowledge management technologies and techniques.

CHAPTER 4

TAXONOMIES

4.1 INTRODUCTION

The previous chapter provided an overview of knowledge management tools, technologies and techniques of which taxonomies are considered one such a tool. Taxonomies, as a tool, focus on improving access to and retrieval of information and knowledge by providing structure to information.

According to Gilchrist and Kibby (2000:11) the development of structure around information is by no means a new concept. Society tends to organise itself by subject, whilst institutions and organisations such as governments, academia, organisations, industry and people cluster concepts to create order and structure to information in a way that comply with their respective terms of reference and interactions.

With the arrival of the knowledge economy, and the increased reliance on the effective use and exploitation of human intellectual capital to gain competitive advantage, it becomes understandable that organisations want to place some basic structure behind their information. Structuring access to information not only helps prevent information overload but can ease the identification and retrieval of critical information and knowledge resources within the organisation (Gilchrist & Kibby 2000:5).

Today's organisations contain a high number of documents located in distributed content stores across various departments and global

offices. Estimates predict that unstructured information doubles every three months. Employees require consistent and predictable access to this growing knowledge base to enhance efficiency. However, as each new piece of content is added, the ability of employees to find the information they need, diminishes. In the evolution of knowledge management, organising information into an intuitive topical hierarchy or taxonomy has proven to be an efficient and productive way for end users to not only find, access and retrieve but also to discover information (Logan & Knox 2003:2).

Woods (2004:3) has the view that taxonomies are a fundamental part of modern information architectures and taxonomies can help improve the efficiency of application integration, website design and knowledge management initiatives. It also assists with the improvement of information quality; it provides easier navigation and will facilitate better information sharing. Taxonomies are seen as a tool or set of tools that will assist with the structuring of information and provide a vital solution for organisations in their quest to find relevant information in the shortest possible time in a consistent manner.

This chapter will investigate the origins of taxonomies; define taxonomies, describe why taxonomies are viewed as a solution within information and knowledge management, as well as the benefits of taxonomies in organisations.

4.2 TAXONOMIES

Disciplines like botany, biology and medicine have used taxonomies as an important tool for organising information for many years. According to TFPL (2000:5) taxonomies appeal to information and knowledge professions for the following reasons:

- Humans are natural categorisers.
- Categorisation reduces complexity.
- Taxonomies provide an overview of what is within an organisation's corporate memory and information systems.

The constant changing environment in which organisations operate coupled with the growing knowledge base of society have presented new challenges in classification through the years, requiring new responses to those challenges. Examples of the progress in classification includes Linnaeus's system for categorising the natural world in the 18th century, the creation of the Dewey Decimal Classification System for library classification in the 19th century and 20th century medical and scientific taxonomies (Woods 2004:1).

Research done by Water (2003:10) indicated that employees want to "find" information rather than "search for information". Searching implies that the user knows what he or she is looking for. Taxonomies guide an end user from initial search words that could be vaguely related to what they eventually discover; in other words it provides the end user with a "drill down" capability based, on generally accepted vocabulary for that specific environment to find the relevant information (see figure 4.2).

4.2.1 Definition of Taxonomy

The idea of using classification systems to aid understanding goes back to the Greek philosopher Aristotle. Aristotle developed taxonomies to organise and deepen his knowledge of the world around him. (NewsEdge Corporation 2001:6).

The word taxonomy derives from two Greek roots: “*taxis*” meaning arrangement and “*nomos*” meaning name. Taxonomy is the science of classification according to a pre-determined system, with the resulting catalogue used to provide a conceptual framework for discussion, analysis, or information retrieval. In theory, the development of a good taxonomy takes into account the importance of separating elements of a group (taxon) into subgroups (taxa) that are mutually exclusive, unambiguous, and taken together, include all possibilities (Bloor 2004:2).

Taxonomies are systems of labels that form a hierarchical navigation scheme. The term was originally used within the scientific community, for example in biology, where it would be used to describe hierarchies of families of plants and animals that are increasingly more inclusive moving up the hierarchy. In the information architecture community, taxonomies can mean anything from simple lists, to navigation hierarchies, to true thesauri, depending on the school of thought or view point of a specific practitioner (Gilchrist & Mahon 2004:180).

Taxonomy is a hierarchy of categories which classify documents and other information. A corporate taxonomy is a way of representing the information available within an enterprise (Woods 2004:5).

4.2.2 Taxonomy in the Business and Electronic World

According to Daconta, Obrst and Smith (2003:146) the world cannot do without taxonomies, since it is human nature to classify. A taxonomy is a means of classifying or categorising a set of things or concepts and the classification will typically take the form of a hierarchy. Taxonomies have specific connotations based on the perspective from which it is viewed and the specific application of the taxonomy.

Viewed from an information technology perspective, taxonomy relates to the classification of information entities in the form of a hierarchy, according to the presumed relationship of the real-world entities (an object either real or abstract that exist within a specific environment or organisation) that they represent (Daconta, Obrst & Smith 2003:146).

In the digitised, internet world of information, taxonomy means the labelling of metadata, which allows the primary data or information to be systematically managed and manipulated (Bloor 2004:1).

One of the best known taxonomies is the one devised by the Swedish scientist, Carl Linnaeus (Bloor 2004:5), whose classification for biology is still widely used (with modifications).

In web portal design, taxonomies are often created to describe categories and subcategories of topics found on the web site.

According to a study done by NewsEdge Corporation (2001:6) taxonomies are sometimes called “classification schemes” or “categorisation schemes”. Each refers to grouping together similar items into broad “buckets” or “topics” which themselves can be grouped together in ever-broader “hierarchies”. A simple definition of taxonomy is that it is a hierarchy of categories used to classify documents and other information.

A corporate taxonomy is a way of representing the information available within an enterprise (Woods 2004:5).

According to Bloor (2004:12) taxonomy is a way of classifying for example: living organisms, products and books into a series of hierarchical groups to make them easier to identify, study or locate.

It is clear from the above definitions that there is not a single definition for taxonomies. Taxonomies have different meanings in various contexts, depending on the approach, goal or challenge facing the organisation.

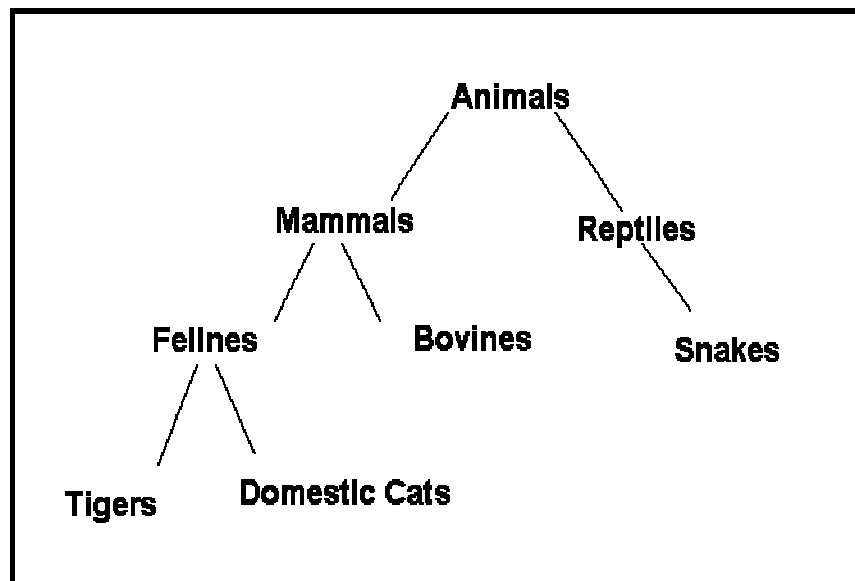
For the purpose of this research, the researcher will adopt the view based on a combination of definitions. A taxonomy is a complex structure which represents a classification or categorisation of things or information entities within a specific context. The classification tends to be hierarchical, according to the presumed relationship of real-world entities that they represent. The end goal is to organise information and knowledge about and within a specific subject.

Taxonomies consist of two parts namely structure and applications. Structure consist of the categories (or terms) themselves and the relationships that link them together. Applications are the navigation tools available to help users find information.

4.2.2.1 Taxonomy Examples

An example of a simple taxonomy is provided in figure 4.1. The taxonomy makes a distinction between mammals and reptiles under their parent subphylum Vertebrata. Mammals and reptiles are at the same level of representation, both being sub-classifications of Vertebrata and both have four legs, mammals are warm blooded and reptiles are cold-blooded. So warm-bloodedness can be considered at least one of the properties that distinguish mammals and reptiles; there could be others.

FIGURE 4.1
AN EXAMPLE OF A SIMPLE TAXONOMY



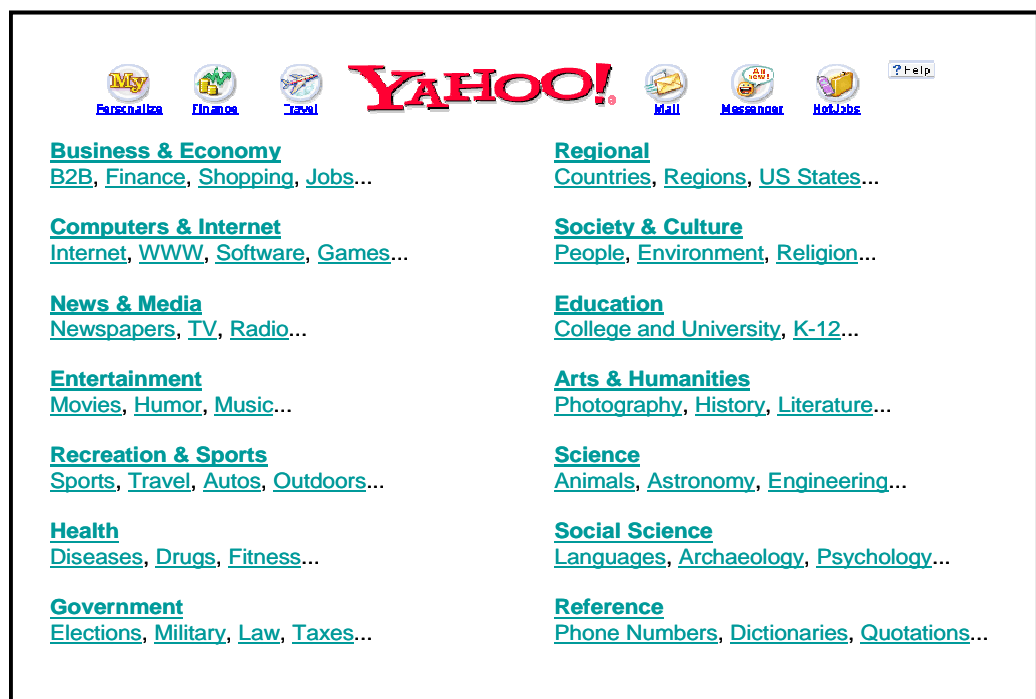
Source: ><http://www.cs.ucl.ac.uk> <.

The most common use of taxonomies according to Daconta, Obrst and Smith (2003:151) is to browse or navigate for information, especially when the knowledge worker has a general idea of what they are looking for.

One of the first e-business organisations to harness taxonomies was Yahoo, to help users navigate the web. They developed a broad and deep structuring of topics covered on the web. Starting from a general topic, users can navigate to topics of interest at an appropriate granularity. According to Pohs (2001:1) Yahoo's taxonomy is opening the door for people to browse through categories and discover information they may not have considered looking for. Yahoo's taxonomy maintenance is manually done by about fifty people and is very labour intensive. Many organisations are not likely to devote that number of employees to maintain their corporate taxonomy

and are automating the creation and maintenance of the taxonomy. The end user however benefits because they can now discover information they probably would not have found before, browse and discover relationships between categories and analyse previously unknown related topics or even discover gaps in the presented information.

FIGURE 4.2
YAHOO TAXONOMY EXAMPLE



Source:>http.www.yahoo.com<.

Taxonomies can have either a hierarchical structure or a non-hierarchical structure. A classical taxonomy for example those developed by libraries, biological sciences or the military has hierarchical structures. Although the purpose for using taxonomies may vary (many organisations are using taxonomies to handle their internal documents, the military and insurance companies use taxonomies to properly standardise

their policies and procedures), they have the same goal, to organise knowledge about and within a specific subject field (Bloor 2004:5).

4.3 ORIGIN OF TAXONOMIES

As information and communication technology converge, enabling cross organisational and also global working, every type of organisation is increasingly confronted with information overload. At the same time complexity within the working environment is increasing, necessitating immediate access to business critical information. Within this growing complexity the ability to access the collective knowledge of the organisation is becoming non negotiable.

NewsEdge Corporation (2001:4) is of the opinion that the problem related to information overload, or as they call it info glut, is on the increase and many employees lack the skills to find the relevant information they require. In order to deal with information overload most organisations implement solution related to technology tools, such as search and retrieval software, search engines and text mining. Mechanisms such as metadata, data dictionaries and link ranking are also utilised to assist users in finding relevant information. Today reality dictates that knowledge workers have to navigate as many as six different search engines and database indexes each day. The amount of information is overwhelming but more importantly searching and finding the right corporate information is proving to be a major challenge. In order to retrieve

relevant information (with technology tools) it is important to be familiar with the terminology and exact information requirement. In this lies a problem, as the knowledge worker in today's workplace deals with uncertainty and is not always aware of what information is required. Knowledge workers will therefore rather explore to locate the relevant information as opposed to searching for a pre-determined information item.

As mentioned most organisations use technology to deal with the information overload, however, research done by NewsEdge Corporation (2001:4) casts doubt on how well technology like search engines and retrieval software, will be able to assist users to decrease information overload. It is not only about what goes into a system, but how well organised it goes into the system (manual or electronic). According to TFPL (2000:5) many approaches to information structuring (for example thesauri and classifications) continue to be valid; but organisations are likely to find these cannot provide the complete answer to information overload as may be experience on different levels within the organisation, for instance, at the level of the enterprise portal, and that corporate taxonomy may be an answer to decrease the overload of information.

NewsEdge Corporation (2001:4) revealed a surprising low information literacy rate within organisations. According to the study most people are not familiar with Boolean search and most users use less than three words when conducting a search. The study also revealed that searchers usually do not know the subject field and / or the relevant terminology and after being unsuccessful with the first attempt, they will usually abandon their search. Most

organisations' content is controlled by individuals or small groups and subject to their idiosyncratic filing (folder structure) habits and naming conventions. The result of this practice is that individuals often cannot find information stored in their own structures after a while. A vast array of information and subjects make it also difficult to organise.

The challenges for organisations relate to dealing with the information overload, amidst low information literacy rates amongst staff and to create an awareness that most of the relevant knowledge already exists, whilst enhancing the organisations' ability to find it. To meet these challenges organisations are moving away from the confines of using only tools such as search engines and retrieval software to the application of new techniques and tools such as taxonomies and ontologies (NewsEdge Corporation 2001:4).

Farmer (2003:3) is of the opinion that in order for employees to readily find relevant information, organisations need to create a structure for its content that provides context, by indicating the specific content item's relationship with other content in a collection. According to Farmer (2003:3) taxonomies provide such a structure.

Related to the views of Newsedge Corporation and Farmer (see above) Woods (2004:2) mention that there are three key drivers for the current level of interest in taxonomies:

- **Information overload:** The convergence of information and communication technology resulted in the increase of accessibility to information and the resultant information overload within organisations. Information techniques must

be applied to improve access to relevant information and it is becoming more important for organisations to gain more control over these information flows.

- **Rise of the web:** The structure of the web internet, extranet or intranet offers new opportunities for information organisations and presents unique challenges in terms of information classification.
- **Growing use of unstructured information management technologies:** In response to and as part of, the evolution of the web, organisations have invested in knowledge management, search and portal technologies. The focus is now on how they can increase the benefits from these technologies and provide a consistent information infrastructure that can be shared across different applications.

Gilchrist (2003:3) adds the following drivers towards the development and progression of taxonomies:

- **Information literacy:** The majority of end-users have severe problems in knowing how to search for information, leading to wasted time and the missing of useful information.
- **Organisational terminology:** Published classification and thesauri do not reflect the particular languages of organisations, in which, typically, eighty percent of the information held has been created internally.
- **Destructing of organisations:** Mergers and acquisitions have created cultural problems at the implementation stage.

Similar problems are encountered in partnering through extranets and in the establishment and operation of virtual communities, as different user groups begin to share information and knowledge within organisational contexts.

- **Collating external and internal information:** The growing trend within organisations to collate external and internal information which has led to a convergence of special librarianship and records management.

As organisations moved into the knowledge era, taxonomies are being developed in an attempt to create order, and to structure information and knowledge. Taxonomies provide the required organisational or subject context to information structures. The purpose of taxonomies is to make information more accessible to people, by collating it within a familiar context, using known subject fields and organisation specific jargon, and thereby assisting people with accessing the increasing amounts of available information.

Taxonomies are developed to create reusable structures that store content components regardless of the format or storage location and enable users to navigate these structures to access a particular subject of interest. For organisations that operate across disparate systems and silos, a carefully constructed taxonomy creates opportunities for more effective working practices, the sharing of information and opportunity to discover information that users might not have known existed (Woods 2004:2).

The environment in which organisations operate and compete has grown more complex requiring innovative tools and approaches to find, store and structure the relevant information. An organisation's

unique environment consisting of its people, business processes, the nature of its business, the specific subject field, as well as the organisation's culture and jargon provide a guideline for the creation of an organisation specific taxonomy.

4.4 INFORMATION STRUCTURES

A taxonomy has been defined as a complex structure which represents a classification or categorisation of things or information entities within a specific context. It is an attempt to create order and to structure information and knowledge. Taxonomies, however, are not the only tool, technique or methodology used to create structure to information. Although it is not the purpose of this study to discuss information structures in detail it is, however, important to look at the following information structures as there tends to be, at times, significant overlap between, and even contradiction in the words that are currently used.

According to Gilchrist (2003:1) the amount of work to be done in rendering the digital information space more efficiently and effectively has attracted a wide range of disciplines which, in turn, has given rise to a degree of confusion in the terminology applied to information problems. The following are some of the most commonly used concepts for structuring information.

4.4.1 Index

An index has been described as a guide to the contents of one or more records (Behrens 1988:91). As describe by Cosijn (2004:4) indexes are maps of knowledge contained in a book, a list of topics and prominent occurrences and the key features are topics, associations between topics and occurrences of topics.

4.4.2 Thesaurus

A thesaurus is a list of words which are arranged in a classified, and not an alphabetical, order. It is also a list of terms used in an information retrieval system (Behrens 1988:175).

Cosijn (2004:10) defines a thesaurus as a network of interrelated terms within a particular domain and it may contain definitions and examples of use, key features, topics and associations

According to Gilchrist and Mahon (2004:180) thesauri are usually restricted to a particular subject domain and usually consist of a large number of terms, sometimes numbering in the thousands. Thesauri currently organise terms in three ways: as equivalent, hierarchical or related terms.

A thesaurus can also be described as a controlled vocabulary arranged in a known order, and structured so that equivalence, homographic, hierarchical and associative relationships among terms are displayed clearly, and identified by standardised relationship indicators. The primary purpose of a thesaurus is to facilitate retrieval of documents and to achieve consistency in

the indexing of written or otherwise recorded documents and other items (Daconta, Obrst & Smith 2003:158).

4.4.3 Glossary

Behrens (1988:175) describes a glossary as a list of explanations of words, terms and phrases which relate to a specific subject. It can also be defined as a list of terms and definitions of words occurring in a particular domain; it may contain see and see-also references and additional information relevant to the term itself. (Cosijn 2004:5).

4.4.4 Semantic Web

A semantic web aims to create a web where information can be “understood” by machines as well as humans. The semantic web requires the emergence of a general purpose representation and mark-up-language to convey information about machine accessible semantics. Taxonomies can be expressed as abbreviated ontologies for the semantic web (Malafsky 2002:11).

Berners-Lee, Hendler and Lassila (2001:1) describe the semantic web as being not a separate web, but an extension of the current one, in which information is given well-defined meaning, better enabling computers and people to work in co-operation.

4.4.5. Topic Map

According to Daconta, Obrst and Smith (2003:166) topic maps provide a content-orientated index into a set of documents,

much like the index of a book but with this qualification. An index of a book does not typically characterise the contents of that book as a set of linked topics, but rather as a set of mostly isolated subject references with occasional cross-references to other subjects.

A topic map acts as a set of linked topics that index a document collection. Multiple topic maps index the same web document collection, much as a book may have multiple indexes, such as a subject index, a name index, multiple topic maps and index subjects in different ways.

Topic maps originated with the merging of electronic indexes and are very much a subject-based classification technique. Topic maps are organised around topics and each topic is used to represent some real-world object. Topics represent concepts, the same way terms in an indexing language refer to concepts. In topic maps the concepts are called subjects, and the standard emphatically states that a subject can be anything. In topic maps three constructs are provided for describing the subjects: names, occurrences and associations. These describe the names, properties and relationships of subjects (Garshol 2004:33).

4.4.6 Metadata

According to Ricci (2004:1) metadata describes an asset and provides a meaningful set of attributes that could be used to further classify or consume content. Taxonomy is a means of

organising content and metadata as a method of further describing it.

Traditionally, metadata has been defined as “data about data”. According to Rockley, Kostur and Manning (2003:184) metadata is much more, it is the encoded knowledge of the organisation.

Marco (2000:5) describes metadata as all physical data (contained in software and other media) and knowledge (contained in employees and various media) from inside and outside an organisation, including information about the physical data, technical and business processes, rules and constraints of the data, and structure of the data used by an organisation. According to Rockley, Kostur and Manning (2003:184) this definition is significant because it includes the often overlooked idea that metadata can be used to describe the data's behaviour, processes, rules and structure. Describing information in this way is important when developing a sound metadata strategy for content search and retrieval, reuse and dynamic content delivery, because you can determine not only what the content is, but who uses it, how it will be used, how it will be delivered and when.

Metadata and taxonomies are used to identify content for storage, organisation, access and retrieval of information. Metadata is data about data, information that accompanies a data element to provide information about it. Taxonomies and metadata work together to identify information and its features

then organise it for access, navigation and retrieval (Logan & Knox 2003:1).

In computer science, metadata means information about a set of data in particular representation, for example schema (structure) information and administrative information. In the context of content management and information architecture, metadata means information about objects, that is information about a document, an image and a reusable content module (Garshol 2004:3).

According to Logan (2001:2) metadata has the following uses in taxonomy construction:

- It can assign information to taxonomies, depending on the use of information.
- Simplify the assignment of a piece of information to its proper place in the hierarchy.
- Be associated with documents, based on where they are placed in the hierarchy.

4.4.7 Ontology

According to Gruber (1993:2) ontology is an explicit specification of conceptualisation and refines the conceptualisation as the objects, concepts and other entities that are assumed to exist in some areas of interest and the relationships that hold among them.

Ontologies tries to capture the meaning of a particular subject area or area of knowledge that corresponds to what a human

being knows about that domain. An ontology also characterises that meaning in terms of concepts and their relationships (Daconta, Obrst & Smith 2003:180).

The interest in ontologies has emerged in the context of the current distributed, heterogeneous computing environment, in particular the internet and the fast growing interest in component-based software engineering.

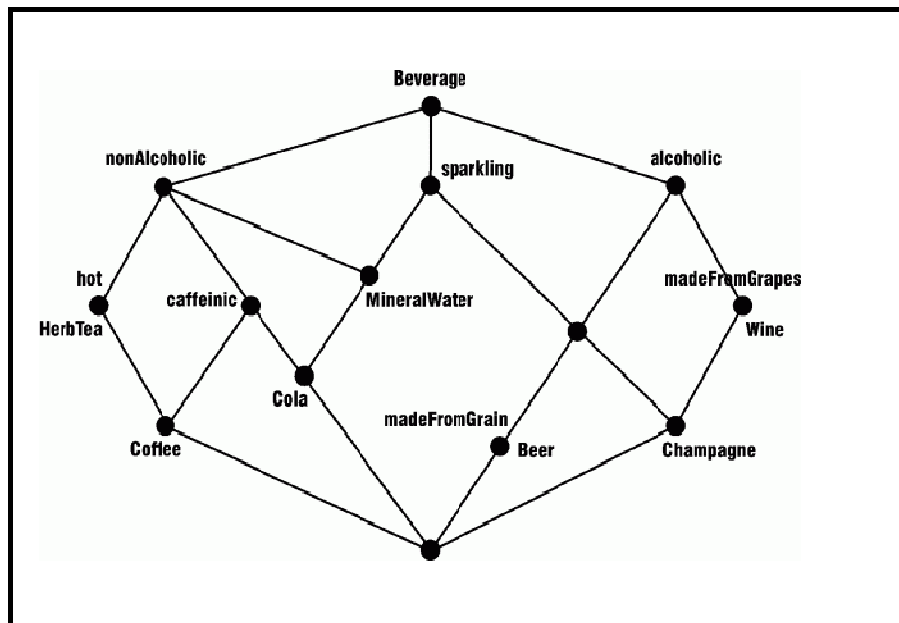
Taxonomies are closely related to ontologies, which are important in the development and maintenance of taxonomies. According to Logan (2001:2) ontologies are data structures that capture the relationships between terms and categories and some of their meaning. Logan (2001:2) refers to the World Wide Web Consortium, which states that an ontology defines terms, their properties and concepts, which are used to describe bodies of knowledge.

Bloor (2004:2) describes ontologies as a high level device constructed to enable its users to gain an understanding of and navigate around available information. Originating from a theological context, ontology generally means the study of what exists in order to achieve a coherent description of reality. An appropriate analogy would be the notion of a knowledge map. Two areas where the use of ontologies is being most ambitiously promoted are in knowledge management and in the semantic web concept.

Enterprise ontology is a collection of terms and definitions relevant to business enterprises. An ontology is more than a

taxonomy or classification of terms. Taxonomies contribute to the semantics of a term in a vocabulary, ontologies include richer relationships that enable the expression of domain-specific knowledge, without the need to include domain-specific terms. In the context of knowledge sharing, ontology is a description of concepts and relationships that can exist for a community (The Delphi Group 2002:5). Figure 4.3 provides an example of a simple ontology:

FIGURE 4.3
EXAMPLE OF A SIMPLE ONTOLOGY



Source: > <http://www.jfsowa.com/ontology/> <.

Geerts and McCarthy (2000:18) indicate that ontology's are vital to corporate memories for the reuse and sharing of accumulated knowledge. It provides specific guidance regarding the types of knowledge to be captured and represented in a corporate memory, such as best practice's, detailed descriptions of resources and composite structures

between resources and expertise needed for execution of specific tasks.

4.5 COMPARISON BETWEEN ONTOLOGIES AND TAXONOMIES

The following table provides a summary of the differences and similarities between taxonomies and ontologies.

TABLE 4.1
SIMILARITIES BETWEEN ONTOLOGIES AND TAXONOMIES

Similarities
Structuring of information, both structured and unstructured.
Provides a way of representing the information available within an enterprise.
Constructed to enable users to gain an understanding of and navigate around available information (Bloor 2004:2).
It provides specific guidance regarding the types of knowledge to be captured and represented in a corporate memory (Geerts & McCarthy 2000:18).

TABLE 4.2
DIFFERENCES BETWEEN ONTOLOGIES AND TAXONOMIES

Taxonomies	Ontologies
Taxonomies contribute to the semantics of a term in a vocabulary (The Delphi Group 2002:5). Example: Animals>Mammals>Fellness>Tigers (See figure 4.1).	Ontologies include richer relationships that enable the expression of domain specific knowledge, without the need to include domain specific terms (The Delphi Group 2002:5). Example: Beverage>Sparkling>Mineral Water (See figure 4.3).
Taxonomies are systems of labels that form a hierarchical navigation scheme (Gilchrist & Mahon 2004:180).	Ontologie tries to capture the meaning of a particular subject area or area of knowledge that corresponds to what a human being knows about the domain (Deconta, Obrst & Smith 2003:180).

4.6 CORPORATE TAXONOMIES

The modern organisation faces all the challenges, as described in the beginning of this chapter. The prime need is to make information easily accessible to its staff through the organisation's information portal or other channels and to provide maps and user guidelines to the repositories and their contents. This will include both internal and external sources. It is clear that a new type of taxonomy is emerging according to Gilchrist (2003:8) called corporate taxonomies. This is usually hand-crafted and results in a high level map on an enterprise portal, guiding staff to the intellectual capital of the organisation.

Woods (2004:5) describes a corporate taxonomy as a way of representing the information available within an enterprise. Corporate taxonomy according to Gilchrist (2003:8) encompasses information about the organisation itself, business processes, methods, guidelines and standards, about people (yellow pages) and content held in the various repositories. It can also be designed to support search engines and provide indexer templates, and can be tailored to provide global, national and even site perspectives. Such a taxonomy may be viewed as a master scheme from which a range of tools, including thesauri can be derived. According to TFPL (2000:15) a corporate taxonomy is a high level device constructed to enable the user to get an understanding of and to navigate around the intellectual capital of the enterprise, providing a kind of knowledge map.

The environment in which organisations operate is complex, dynamic and very flexible to external changes. A study done by NewsEdge Corporation (2001:11) indicated that while subjects are relatively easy to categorise and structure, most organisational functions are not. Organisational activities involve an array of subjects that do not always fall into logical groupings and corporate jargon differs between organisations. Corporate taxonomies should support the organisation's vision, aims and objectives and promote a focus on the most valuable information in the organisation. Not all employees have the same view of the information, or perform the same tasks.

Thesauri and classification schemes are constructed with their users in mind but the starting point has always been the information and not the people; thus the classification of the information without the users in mind. With the coming of the internet the requirement to push information to users as well as users needing to pull information from the internet, promoted a change to the classification of information. The focus is shifting to the users' needs and the classification is done in the light of the users' information requirements. Taxonomies provided an approach to map knowledge in order to facilitate the navigation of, and access to the intellectual capital of an organisation, and applies to both the levels of connecting people to documents and documents to people, as well as to the knowledge management level by connecting people to people (TFPL 2000:21).

4.7 TAXONOMIES AND KNOWLEDGE MANAGEMENT

Within knowledge management, the role of taxonomies is wider. A corporate taxonomy provides perspective on an organisation. Taxonomies break the organisation in smaller parts that is more understandable. The possibilities include: services offered, types of knowledge experts or types of customers. These taxonomies can be illuminating for the participants involved in their construction, and they constitute valuable transferable knowledge that can support decision making.

The two applications of taxonomy in knowledge management according to Hunter (2003:2) relates to helping users navigate to web-based resources such as web-pages and electronic files on a knowledge management intranet, and the construction of a taxonomic breakdown of experts in an organisation. Users navigate these taxonomies to find the information or experts that they require.

Taxonomies must be created specifically for users, but employee profiles, work habits and information priorities cover a broad spectrum within an organisation. A single well constructed taxonomy should meet the needs of a variety of practitioners and professionals within an organisation. Lawyers might spend time in the legal parts of the taxonomy, while accounting staff inhabits the financial area. An effective taxonomy allows each party to traverse the information in the other category when necessary (Ainsbury 2002:6). This allows for a specialist or employees to work within the

specific discipline, but also to work across silo's to retrieve relevant information across the organisation.

According to Conway and Sligar (2002:123) a taxonomy can help to ensure that knowledge workers are seeing the right information in a consistent way. Taxonomies can help to make the authoritative sources of information obvious, and they can help prioritise information for knowledge workers within search returns and by directing navigation.

According to NewsEdge Corporation (2001:11) any successful taxonomy can help to manage the complexity of the organisation's environment.

4.8 SUMMARY

"Knowing what you know" is vital to most organisations in order to accomplish fast access to actionable information (information that can be acted upon), which is one of the major factors determining success in today's knowledge driven economy. Taxonomies can be seen as the foundation of the enterprise information architecture, the first step in providing a blue print of the organisation's information and knowledge assets. Within knowledge management, taxonomies can provide a perspective on an organisation and a map of the organisation's information, knowledge and intellectual capital. Taxonomies classify the organisation in some way and the range of possibilities can be endless. Classification can be done according to types of revenue streams, services and/or products offered,

subject matter field or knowledge experts, customers, industries to name a few.

According to research done by TFPL (2000:11) taxonomy implementations and developments were closely linked to the implementation of knowledge management disciplines. Consequently, taxonomies are being developed with some urgency as organisations look for ways to help their people cope with the increasing amounts of information available. As the volume of information moving around in organisations increase, and as organisations have to integrate more and more internal and external information into enterprise-wide systems, problems related to the identification and management of appropriate information arise. In an effort to combat above mentioned problems organisations are building and implementing taxonomies.

CHAPTER 5

TAXONOMY CREATION

5.1 INTRODUCTION

Organisations use different approaches in developing and creating taxonomies. A study done by TFPL (2000:11) indicated that;

- Modern organisations are complex with advanced technologies and telecommunications enabling many connections.
- Organisations are looking for greater business effectiveness through improved information access, or efficiencies in information retrieval which ensures more productive usage of time.

Taxonomies make it possible to tap into individual expertise, and it supports real-time classification of information. From a user perspective taxonomies make it possible to view information from different perspectives. It also provides specific views to data and information in a way that makes sense to the user, given their unique perspective and problem they are trying to solve at a specific time. Taxonomies are therefore dependant on understanding not only the content, the organisation and its environment, but also the people, for example the users of the information within the organisation (Lewis 2004:12).

Although taxonomy development is difficult and labour intensive Lewis (2004:13) stresses the fact that it should ideally be invisible to

the end user. Users should take it for granted that they have reliable, comprehensive access to all data they need.

Behind the scenes the creation and building of taxonomies are the task of a team responsible for taxonomies. According to Harris, Caldwell and Knox (2003:1) the building of taxonomies will follow a typical process of analysis, design, construct and implement cycle, similar to many information technology initiatives. The challenge of taxonomies, however, is in the detail - as each organisation will have unique requirements for content usage and context. This chapter will focus on the process of taxonomy creation, and possible factors influencing the creation of taxonomies.

5.2 FACTORS INFLUENCING THE CREATION OF TAXONOMIES

According to Lewis (2004:12) taxonomy development is user independent and driven entirely by content, which makes it unique compared to other approaches. Taxonomy creation, however, relates to more than just the content.

Harris, Caldwell and Knox (2003:1) indicate that the complexity of the taxonomy will depend on the unique requirements of the organisation. Each organisation will have unique requirements for content, usage and context. They characterised taxonomy creation as follows:

- A diverse group of people should be involved in taxonomy creation, for example; taxonomy builders, users, content

managers, taxonomy designers, subject matter experts and advisors.

- A diverse set of information assets from across the organisation, for example; multiple repositories, data and file formats, information databases and personal information and knowledge.
- A diverse set of stated usage requirements; how information is used, where it comes from and what is not included (missing).
- To discern and represent the relationship among the information assets as well as the patterns of usage among information asset consumers.

Taxonomies are unique to each organisation, keeping in mind the deep knowledge of the specific organisation, the content, priorities and user patterns.

5.2.1 User Needs

When users start to search for information, they need to know the topic area well, know what information they want to find, and know the words or phrases that will result in finding it. Searching derives information from the words in the text of the content that is searched; a taxonomy does this up front, before users start looking for information. According to Pohs (2001:1) the same knowledge is needed to create the taxonomy, but once created, people can browse through categories and discover information they may not have considered looking for.

In taxonomy creation the importance of reflecting end user needs is just as important as representing information or content in a structured way. It is not sufficient to just group content; it needs to be grouped in ways that reflect the way users will ask for the information. In essence, when creating the taxonomy, an information retrieval application is built at the same time. End users can discover information they wouldn't have found before, browse and discover relationships between categories and analyse previously unknown related topics, or even discover gaps in the information (Pohs 2001:1).

The above indicate that, when designing taxonomies, users and user requirements are just as important as analysing content and understanding the content, subject field and the organisation's environment. When building taxonomies the following is important to consider and understand:

5.2.1.1 Information Needs

An information need is the expression of an objective need for information where the solution to the problem represents the information need (Only study guide INS304-8 2001:9).

A search for information is always inspired by an information need. It is not always easy to determine which information is needed or what the information need really is. When analysing an information need, there are certain aspects to keep in mind, such as why the information need exists, how much information is needed, when the information is needed and what sources could be used to search for the

information. This will clarify what information is needed and why. In the analysis of the information need it is important to focus on the key concepts, the relationships between the concepts, the possible search terms that can be used and how to combine search terms (Only study guide INS304-8 2001:13).

5.2.1.2 Information Seeking Behaviour

Information seeking is a dynamic, purposeful, activity aimed at satisfying a need by means of problem solving. It is usually based on a gap between existing knowledge and the knowledge that is required to solve a problem (Only study guide INS304-8 2001:9).

According to Large, Tedd and Hartley (1999:143) information seeking has the following modes:

- **Browsing:** Browsing is informal, interactive and opportunistic. It means a user skims the available information and makes choices to indicate relevant information. Browsing is more popular and tends to be more attractive, because it makes fewer demands on a searcher's cognitive abilities and memory capacity for identifying suitable searching terms. This searching is particularly useful in cases where the information problem is complex or poorly defined, or when an overview of the subject is required. Browsing assists the user to identify information quickly and it is easily

displayed, using taxonomies (Only study guide INS304-8 2001:145).

- **Analytical searches:** Analytical searches are based on a thorough analysis of the information problem. The assumption is that the users are capable of analysing the information need and identifying suitable search terms (Only study guide INS304-8 2001:144).

It is important for taxonomy building to understand the way in which the information search is accomplished, it depends on the person who is seeking information, the nature of the problem, the information system used and the expected outcome. The existing and potential information user, its information needs as well as the search behaviour of the users need to be studied as part of any taxonomy building process.

Based on the above the following is thus important to consider when creating taxonomies:

- The analysis and understanding of the search behaviour of users.
- The analysis and understanding of information problems and the formulation of possible search strategies to address the problems.
- The analysis of the organisational environment and content and the ability to organise information accordingly.

A search for information is always inspired by an information need, the drivers can be organisational wide, departmental (for example the risk and compliance department), specific group or community, project specific or an individual need. The content within the organisation, the specific information needs and the search behaviour of users can be used as a reference point for the taxonomy creation process.

5.2.2 Content

To group, categorise and/or define the terms to be used to identify content is according to Rockley, Kostur and Manning (2003:189) to automatically create a taxonomy. In constructing a taxonomy attention should be given to the user, the content and the interaction and relationship between the two.

Rockley, Kostur and Manning (2003:203) indicate that content is the lifeblood of an organisation and is integral to the continued existence of the organisation and critical to the users. There is, however, too much content being created and being delivered to users which are not relevant to their needs. Organisations need to do as much as they can to assist employees to find relevant information. Taxonomies provide a blue print for the structuring, categorisation and organising of content within the organisation. Effective taxonomies consider requirements across an entire organisation and identify all the knowledge within an organisation.

When creating taxonomies it is important to consider both the content and the user and include the following when doing an analysis:

- Who is going to retrieve the content? By understanding the user requirements it will assist with the constructing of the taxonomy, the metadata, and it will indicate levels of granularity (level of detail).
- People articulate their need for specific content in different ways, using different terms. Understanding the language of the users will assist with the terms (language) used, and terminology concepts in constructing the taxonomy.

When creating the hierarchy the organisation should ensure that the purpose of creating the taxonomy is not forgotten. It must be logical and navigable and it should always be clear to users why a document or piece of information falls into a particular category or group of categories. A significant challenge when defining a taxonomy is to create a balance between the breadth and the depth of categories. If categories are specific in their description and classification there is a danger that they will be too transient, and need changing as their contents change. If the category is broad it will hinder navigation as the precise nature of its contents will be difficult for the user to determine (Woods 2004:13).

A taxonomy can have an unlimited number of levels, too many will mean that the user becomes lost navigating down to the lowest level. A narrow taxonomy also forces users to make a

navigation decision with little information and users will have to work through many layers before knowing if they are following the right path. The general consensus is that breadth is better than depth as far as usability is concerned (Woods 2004: 13).

Taxonomies are not static, they need to be updated regularly in order to ensure that information and content are still being categorised in a logical and comprehensible manner, and that the categories are still useful and current.

5.2.3 Technology

There is no intrinsic need for technology in the creation and management of a taxonomy. However, there is a growing role for tools that can assist or even eliminate some of the tasks associated with taxonomy creation, design and management. Tools and solutions are available that can assist with any stage of the process; from the simple editing and design of a taxonomy structure, to the automatic identification of categories, and the assignment of content to the relevant classes.

An organisation's choice for using technology will depend on a mixture of the business requirements, the type, volume and volatility of the information to be managed, the skills available and cost involved. In an environment where information classification is largely automated someone still has responsibility for the effectiveness and performance of the system. Using technology in taxonomy creation and design can

reduce maintenance costs, increase efficiency and extend the applicability of organisations taxonomy (Woods 2004:7).

5.3 TAXONOMY CREATION PROCESS

According to Harris, Caldwell and Knox (2003:1) few organisations have formal taxonomies and, at the moment, the practice of taxonomy creation is largely ad hoc and more an art than a science. Different organisations will have different approaches, techniques and tools to develop and build taxonomies but the following generic steps will be visible in any taxonomy creation process:

- Analysis: Understanding the organisation, end users and content
- Define and develop (build): Decision on the scope and content and deciding on the priorities. Before an estimation can be made of the time required for the development (build) phase, it is important to also make decisions related to the level of complexity and whether to build or buy the starting taxonomy.
- Test and refine: It is important to test the taxonomy with end users and refine it as feedback is received.
- Implementation: Implementation time will be influenced by the volume of content as well as the taxonomy complexity.
- Maintain: Initially taxonomy maintenance will be high because changes and undiscovered requirements will emerge. Time requirements for content maintenance will

depend on the volume of new content, the error rate in the initial indexing and the complexity of the taxonomy.

5.3.1 Methodology for Taxonomy Creation

The methodology for creating taxonomy according to Pohs (2001:2) consists of the following steps:

- Determine what information users need. This can be done with a formal or informal information audit.
- Understand how people search, browse or look for information.
- Conduct a content audit to understand what the existing systems and information are.
- Determine if there is an existing taxonomy and consider possible reuse.
- Review meta data attached to documents.
- An option is to select databases from different functional areas to get a representative sampling across the organisation or get more detailed information in only one area.
- While gathering information sources it is important to look for existing keyword fields that is meaningful to users and is potential information categories.
- Review initial taxonomy, matching the way users ask questions with the way they will find information. It also

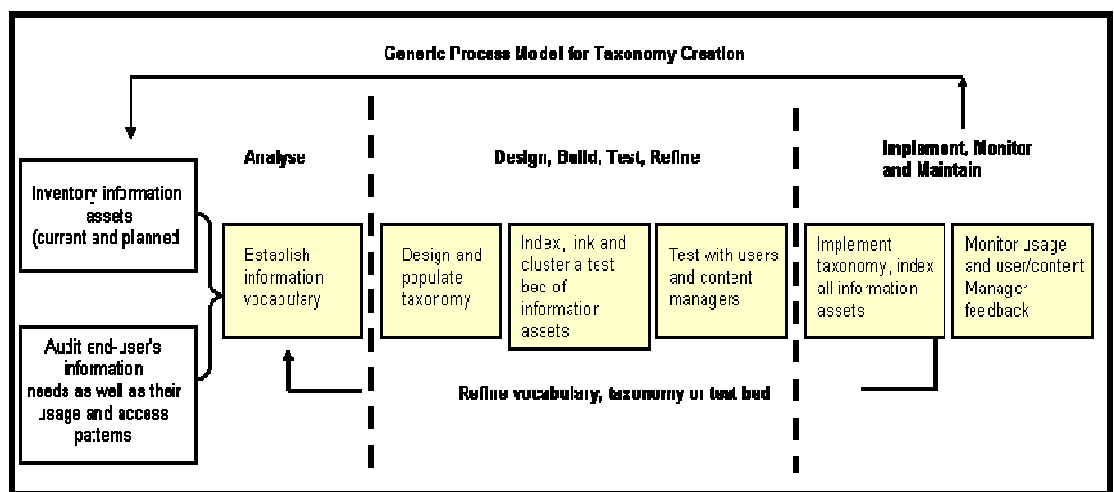
involves reviewing terminology, editing, renaming, eliminating and moving categories.

- The final step is to test the taxonomy on users to see if the categories and their hierarchy actually work for the users.

5.3.2 Process Model for Taxonomy Creation

Harris, Caldwell and Knox (2003:1) provide the following high-level process model for creating a taxonomy.

FIGURE 5.1
GENERIC PROCESS MODEL FOR TAXONOMY CREATION



Source: Harris, Caldwell and Knox (2003:1)

Each phase or process in the model will have many tasks within it. For example, “establish information vocabulary” will include developing a dictionary or thesaurus as well as defining the preferred vocabulary for taxonomy nodes. The time requirements to develop a taxonomy vary widely, depending on each of the processes shown in figure 5.1, and also on the

scope and complexity of the business domain. According to Harris, Caldwell and Knox (2003:2) taxonomy creation can follow a predictable development path. Because a taxonomy will be unique to each organisation, the detailed tasks and outcomes of each process will also be unique.

It is important to understand that creating and building a taxonomy is not a one time effort. Taxonomy creation is an ongoing process that requires a long-term investment which includes business priorities, technology, language and human interest. These components mentioned are in a constant state of flux and the more volatile the information, the more the need arise for a systematic process to keep the information categorised and relevant within the organisation. New information is constantly being added to repositories, while new versions of old information and documents are released, and out-of-date content and information are removed from circulation. Changing strategies, evolving products and advancing technologies all drive changes which will ultimate also affect any taxonomy initiative, creation or maintenance. Taxonomies may be industry, organisation or department specific but information by nature is dynamic and this demands the whole taxonomy system to be dynamic as well (The Delphi Group 2002:53).

5.3.3 Taxonomy Creation: Manual versus Automatic

Because of the cost related to manual taxonomy development and management, organisations are seeking automatic means to develop and manage taxonomies. Most of the solutions provide a generic taxonomy, but still require the same skills as manual taxonomies when it comes to labelling categories, cross referencing, defining common terms and change management. While some technology can automate many of the routine processes, the difficult and time-consuming aspects of taxonomy development still require human intervention and supervision (Ramos & Rasmus: 2003:1).

There seems to be a lot of controversy about taxonomies compiled manually, automatically or a combination of the two mentioned. According to The Delphi Group (2002:52) this issue should not be relevant because in order to make the taxonomy relevant to users, it must meet the user's needs and unique rules for relevancy.

5.3.3.1 Automated Construction of a Taxonomy

There are two distinct steps in constructing a useful taxonomy, namely:

- Design of the structure.
- Populating the structure.

The range of taxonomy software vendors provides a continuum of approaches. According to The Delphi Group

(2002:52) it is critical to bear in mind that the end result of any taxonomy initiative is a human interface. Concepts and ideas are inherently relative, personal and subject to change. All taxonomy vendors supply some type of tools to customise and rename the nodes of the taxonomy structure to suit individual needs.

One of the advantages of an automatic system versus manual is consistency. An important aspect to consider is whether the people doing the classifying have the same criteria for assigning categories as the users. Categorising the same concepts into the same place is what automatic systems do well. If the automatic systems misunderstand a concept, they will mis-categorise all related documents and not place them in multiple categories. The decision to adopt a manual, automatic or hybrid approach is a complex one. The trend however is to combine machine and human processing to develop and maintain taxonomies (The Delphi Group 2002:52).

5.3.3.2 Comparison between Manual and Automatic

Humans and machines don't understand content the same way and therefore a combination of human or manual and automatic will provide a balance in the taxonomy creation process.

The Delphi Group (2002:55) indicates the following advantages and disadvantages with regards to manual versus automatic taxonomies.

TABLE 5.1
MANUAL VERSUS AUTOMATIC

Manual		Automatic	
Advantages	Disadvantages	Advantages	Disadvantages
Accurate, Logical	Inefficient	Efficient	Limited accuracy
Controllable	Does not scale	Scalable	Lacks control
Inconsistent	Resource intensive	Limited resources required	Difficult to train
	Inconsistent		Not as flexible

Source: The Delphi Group (2002:55).

Taxonomy creation involves classifying content, grouping and labelling content components. Human classification alone is too laborious, time consuming and resource intensive. Machine classification is not very accurate and it lacks the appreciation of nuances that humans have. Combining the two approaches produces the best results.

The decision to adopt a manual, automatic or hybrid approach is a complex one. It is important for any organisation, when making these decisions, that the organisation commits sufficient budget and human resources to maintain an accurate, up to date and relevant taxonomy system. The trend in the industry is to combine machines and human processes to develop and maintain taxonomies (The Delphi Group: 2002:52).

5.4 APPLICATION OF TAXONOMIES WITHIN ORGANISATIONS

Taxonomies are used to find and navigate the information (content) or experts (people) that are required within an organisation. Sometimes employees search for a specific document, sometimes they search for documents that are relevant to an explicit topic, or they want to browse through the available content looking for information on broader topics. Taxonomies can add value in each of these scenarios. Taxonomies enhance information sharing across individual departments and the organisation as a whole, allowing colleagues to re-use knowledge assets and ensure knowledge is retained within the organisation even if its authors or architects have left the organisation. Organisations won't have to keep re-inventing the wheel, information that may have been previously undiscovered will be located almost instantly with a properly built taxonomy and this will save organisations needless expenditure on repeating previous work.

Ramos and Rasmus (2003:7) state that as organisations struggle with the need to leverage existing information, processes and people, taxonomies are used in the following ways:

- Retrieve information: Taxonomies are increasingly used with content management systems, portals and search technology to retrieve results organised around the context defined by the taxonomy.
- It is used to organise content and aid with the navigation of information within organisations.

- It is used to identify competency and interest according to affinities: Some technology tools not only categorise content but also people, their interest or behaviour.
- It is used to organise projects, processes and other abstract items by type, topic and other metadata: As with expertise and competency, workspaces and other vital items like processes, can be profiled and subdivided by groups defined in the taxonomy.

According to Ramos and Rasmus (2003:3) organisations typically do not undertake taxonomy projects in isolation but together with other initiatives, for example intranets or extranets, that involve content management, information retrieval or expertise identification (knowledge management).

5.5 BENEFITS OF TAXONOMIES

Taxonomies provide organisations and employees with alternative mechanisms to access information that can't be easily characterised into a well-qualified search. Taxonomies enable people with less experience or skill in using search techniques to find relevant information, despite their lack of search skills. The following provides different authors' views on the benefits of taxonomies. Woods (2004:3) indicates that beyond their value as an alternative search, taxonomies provide the following key benefits for an organisation:

- Improve quality: It provides a basis for accurate and consistent subject metadata and can help to improve efficiency.
- Easier navigation and finding relevant information quicker.
- Taxonomy helps delineate the core relationship that exists within and between various topics.
- Discover information the organisation or individual did not know existed.
- Avoid duplication of information within large organisations, stop people reinventing the wheel.
- Improve information sharing, not repeating the same mistake.
- Provide overview of the organisation and detail about specific subject fields.
- Demonstrate relationships between subject fields and organisational departments.
- Reduce complexity within organisations and departments.
- Assist the organisation to be more efficient and effective in finding and organising information.
- Improve the organisation's overall information quality.
- Identify affinities, demonstrate relationships and make new connections within organisations and between departments.
- Provide overview as well as detailed information about a subject, department or project.

According to Pohs (2001:2) corporate taxonomies provides the following benefits to organisations:

- Employees can easily reuse information.
- Information quality improves as people tend to clean up the existing data before submitting it for analysis.
- In bringing all corporate knowledge together, organisations discover information they did not know they had or existed, and make new connections among the information.
- The process also starts to define people's affinities for topics by seeing how individuals relate to documents and categories.
- Using categories broadens and enhances search capabilities.

Logan and Knox (2003:1) indicate that taxonomies have the following two objectives:

- Create reusable structures that store content components, regardless of the format or storage location.
- Enable users to navigate these structures to access a particular subject of interest.

Harris, Caldwell and Knox (2003:2) provide the following key benefits of taxonomies:

- Improve communication as consistent terminology is used across the user base.
- Accelerate the discovery or direct retrieval of information by providing a summarised view into what is available.

- Improve decisions, when all or most of the relevant information can be easily gathered.
- Improve the return on investments of information, which is made accessible and usable.
- Cross-pollinate ideas when users become aware of information and knowledge assets.

Ramos and Rasmus (2003:7) indicate that taxonomies create organisational synergies, which reduce costs and increase innovation and portrays external credibility and leadership due to a consistent view to and organisation of information. It also supports and resolves organisational issues around language and meaning and the process of coming to consensus plays the biggest role in the taxonomy creation process. The benefits, however, of the taxonomy and value realisation are proportional to the alignment with business objectives and expectations.

5.6 BEST PRACTICES FOR TAXONOMY CREATION

Good corporate taxonomies should support business objectives and promote a focus on the most valuable information in the organisation. If taxonomy creation and use is not rooted in the business process of an organisation, it will not be maintained or used. Taxonomies must be fed as a part of the day-to-day operations of the business. They should ideally include all information objects, paper based, electronic, text, audio and video files, along with the relevant metadata for each data type, and the metadata associated with content components. The broad business

and content management objectives require that comprehensive analysis and design be done before constructing (physically building) a taxonomy .

The following best practices have been identified for developing and maintaining taxonomies by Harris, Caldwell and Knox (2003:2):

- Conduct and audit, even if there is a good understanding of the content. Content and business process audits are the first steps when an organisation commits to developing a taxonomy. Process audits will help understand the procedures people use to do their work.
- Reuse existing taxonomies if possible. Do not use existing organisations taxonomies without modification. Harris, Caldwell and Knox (2003:2): recommend to use it for an initial framework and to define the scope of the domain. Building taxonomies from nothing is difficult and people are better at changing an existing taxonomy to fit their needs than starting with a blank sheet of paper. Well-defined taxonomies offer useful examples of what to include or exclude, and illustrate what the structures should look like as a beginning point.
- Have the right expertise on the taxonomy projects or initiatives. According to Harris, Caldwell and Knox (2003:2), it is important to use information classification specialists. Specialists, such as librarians, are experts at naming things and creating metadata fields and common identifiers so that resources can be labelled consistently, enabling them to be retrieved later. This is done across disconnected

organisations with great success; very few people should be involved.

- Use documents, content, knowledge management and portal implementation teams. There will never be enough experts available, therefore the core team should be augmented by people from document management, content management and portal experts and if available take advantage of internal best practices of the organisation.
- Mix of human and machine classification. Experience shows that you should use both humans and machines for classification and maintenance, automated methods to deal with volume issues, and humans to construct and maintain classification hierarchies and underlying semantic structures.
- The use of thesauri to map internal and external terms. Users will have different terms for the same things. Thesauri tools can help users find the information they are looking for when it is stored under a term they do not expect. These tools can also help them find related concepts.
- Taxonomy structures should be simple and the number of categories must be limited. Detailed taxonomy structures are hard to maintain because slight shifts in how structures are seen mean adjusting other structures to match the new view. At some point the overhead of maintaining the taxonomy exceeds the time saved while it is stable, and it stops being a useful tool. There are general guidelines about the breadth and depth of a taxonomy, but there is no easy formula. The rule is to keep it as simple as possible: No

more than 7 to 10 categories at each level and not too many levels deep.

- Buy and adapt commercial taxonomies where they exist as this could provide a base to start with for any organisation. Pre-build taxonomies exist for many industries and functional areas of a business. The advice is not to start from scratch; there is probably a taxonomy that covers the same subject area that can be used by more than one organisation as a framework or basis.
- Resources must be assigned that enjoy taxonomy maintenance. Taxonomies and their underlying representations change all the time. An underlying semantic representation of the taxonomic information structure is almost necessary. This semantic representation should be visible to taxonomy builders but invisible to taxonomy users. This means changing meanings and external circumstances are reflected but do not affect users. Taxonomy maintenance is an ongoing project that must be staffed appropriately. Appropriate staffing levels depend on how much content is added to the repositories and at what rate, how often changes to the subject domains take place, how many entries are in the thesauri and the connections between the entities.

Harris, Caldwell and Knox (2003:4) recommend organisations to investigate implementing taxonomies if they are not engaged in the process already. Taxonomy creation is a difficult process and can be made easier by adhering to best practices. Existing or

commercial taxonomies provide a basic framework and a small specialist team should be responsible for customising them. The research indicated that common mistakes in taxonomy creation relate to; failing to maintain the classifications, complex structures and failing to accommodate changing terminology.

5.7 FUTURE TRENDS IN TAXONOMY CREATION

The Delphi Group (2002:12) describes the following future trends in the creation, application and usage of taxonomies:

- **Topic Maps:** Topic Maps are new ISO (International Standards Organisation) standards for describing knowledge structures and associating them with information resources. As such they constitute an enabling technology for knowledge management.
- **Personalisation:** Taxonomies are volatile, contextually relevant and personal. An individual's shifting priorities and goals can at any given time change the way they want to view and find information categories. Personalisation functionality is added to products of vendors. The Delphi Group expects this capability to be incorporated in more and more products in the future.
- **Vertical Taxonomies:** Some taxonomy providers are developing and marketing vertical taxonomies. Geared towards a particular vertical market such as pharmaceuticals, financials etc. This will provide a taxonomy basis for organisations to develop.

Organisations, however, have their own culture and approaches in categorising, but vendors supply pre-build taxonomies to allow customisation of organisations and the naming of the nodes for each of the categories.

- Taxonomies integrated with applications: Taxonomy is seen as an enabling technology. The long-term evolution of the market for taxonomy will be its integration into applications such as enterprise portals and content management. The first integration of taxonomy technology will be with search and retrieval software.
- Security: Security issues are among the key topics on the minds of information managers. Most taxonomy applications follow the standard security model for the server they run on within the enterprise system. According to The Delphi Group (2002:55) security issues related to unstructured data in the future will involve at least the following three different aspects:
 1. Security attributes of each individual document.
When the document is created, various properties will be assigned as to which set of clearances and which department, will be permitted to view or edit the document.
 2. Security attributes of the individual. This type of security will be based on clearance levels, membership in particular departments or assigned role in the organisation.

3. Security issues regarding the overall operating environment. Examples of these considerations will be factors such as what time of the day access is allowed, access from inside or outside the firewall, number of documents accessed, etc.
- Beyond text: Some of the vendor companies are expanding the concept of taxonomy to embrace types of data other than text. Although somewhat governed by the limitation of accurate conversion of multimedia files into text, the classification engines can still perform adequately to categorise these files by their content.

The Delphi Group (2002:56) research shows that the unproductive time spent looking for information within the digital repositories of the enterprises is growing, and affecting more and more of the expensive personnel we have managing our organisations. Taxonomies can reduce the reaction time to make informed and timely business decisions, based on the knowledge and information contained within the digital documents. Taxonomies help organisations form ideas from information they didn't know they had, revealing relationships and correlations that would otherwise be lost in the world of information overload.

5.8 TAXONOMY CASE STUDIES AND FINDINGS

Several studies were conducted to understand the current high interest in taxonomies and understanding why organisations are investing in taxonomy projects. The research done to date focused

on how organisations were approaching taxonomy developments and applications, why and how taxonomies can add value to the work of an organisation and the people, the options of machine versus human interaction in generating taxonomies and what supporting software is available. Research to date also focuses on understanding how taxonomies are best updated and maintained, and how to deal with multiple cultures and languages in the development and application of taxonomies. It deals not only with why organisations are using taxonomies but also to what extent the application of taxonomies were successful. From the research it is clear that organisations use different approaches in developing and creating taxonomies. This section will report on research that has explored the current use of the term taxonomy and the reality of taxonomies within organisations.

5.8.1 Study Results and Findings done by TFPL Research 2000

The findings presented in this section provide the findings of a survey done by TFPL (2000:1-175) titled Taxonomies for business. The study is based on a survey, by case study, of the various approaches taken by organisations to the challenge of information structuring. The following overall results were delivered by the particular study:

- The majority of organisations surveyed were looking for greater business effectiveness through improved information access; or efficiencies in information

retrieval, which will provide more time for employees to be productive. Intranets and organisation-wide information portals are likely to fail if the issue of information content structure is not addressed.

- The corporate intranet has provided a common technological platform and XML (Extensible Mark-up Language) has the potential to provide a common data platform. The challenge now is to devise and deliver common information platforms.
- Many approaches to information structuring (for example classification and thesauri) continue to be valid; but enterprises are likely to find that these cannot provide the complete answer to information overload as may be experienced, for instance, at the level of the enterprise portal and that the corporate taxonomy may be an answer.
- Organisations are taking an organisation-wide approach to establishing taxonomies although the tactics for doing so vary and the scope of the taxonomy may well focus specifically on critical areas of information and knowledge.
- Those responsible for co-ordinating the building of taxonomies within an organisation must facilitate (through shared understanding of needs and concepts) the creation of a structure that reflects the needs of the organisation and the sector within which it competes.

- In building a taxonomy there needs to be a balance between top-down (purpose driven) and bottom-up (content driven) development. By involving the user in the decision on what constitutes a valid concept for inclusion in the taxonomy there will be greater buy-in to the use of the taxonomy across the organisation.
- A good taxonomy will always make sure that the information user knows where they are within the information structure even where the taxonomy itself is not directly visible. Good taxonomies ensure that a user can expand or refine their search – upward, downward, or across important terms and concepts.
- Organisations indicated that over-reliance on software solutions was dangerous, and were prepared to invest labour-intensive time for human intervention in building, applying and maintaining taxonomies.
- There is a need to achieve a balance between the talent of the taxonomy designer, the cost of the system to implement the taxonomy and the familiarity of the users both with the system and the structure of the information itself.
- Different languages within the global business environment, force organisations to look at developing an internal meta-language to deal with the multitude of languages.

- The corporate taxonomy provides a knowledge map to facilitate navigation of, and access to the intellectual capital of the organisation.

The study done by TFPL (2000:1-175) focused on the different approaches used by practitioners and undertook a number of case studies in a variety of organisations in order to share the range of approaches that represented current practice. These case studies were collected during August and September 2000. They are drawn from the widest range of environments, and some are projects in their maturity, some just starting, and one or two are still in their planning stages. The following table summarise the different organisational approaches and reasons for applying taxonomies within the business environment.

TABLE 5.2
DIFFERENT ORGANISATIONAL APPROACHES TO TAXONOMIES

Introduction	Aim	Approach	Summary
Arthur Anderson: UK			
Arthur Anderson's business encompasses many diverse areas of professional services. The rise of their intranet has increase the transparency of information resources to the	The business saw the value of the information that employees could find, but realised that there was considerable frustration in not finding counterparts to this information for different sectors or territories: the	The global taxonomy is strictly hierarchical , for the most part using two levels but using four layers in some areas. Some areas content is best retrieved over broad subject areas for browsing and comparison and others	In an organisation as diverse as Arthur Anderson there are a huge number of different technical views of what staff do and the information they use. What Arthur Anderson staff had in common are their cultural norms, business principles and

Introduction	Aim	Approach	Summary
different parts of the organisation. From a centralised approach it was decided that each business group will have their own information structures.	information might have been there but the multitude of structures was obscuring it. Making information accessible would reduce frustration and increase utilisation of both information resources and employees.	are best served by targeting on closely defined subjects. The categories chosen for the subject areas of the content come from the business and its needs, not from the content itself.	the way that they divide the world up, and this is what the global taxonomy expresses. The organisation has a well established doctrine of "one firm" which inculcates shared values and a consistent approach to the customer; the taxonomy expresses this perfectly
Braun: Germany			
Originally a German company, Braun has been part of the American multi-national Gillette since 1967. The company goal is product development and as increasingly short time spans for taking products to market are desirable, easier querying of information is important in helping to decrease that time.	The in house database has always had a taxonomy. The taxonomy supports the whole area of product generation and introduction to market: good taxonomy allows staff to find out more easily what information is available and spreading internal knowledge aids further development work. The taxonomy also support the sharing of information resources and support the objective of reducing the duplication of work by identifying existing information.	The taxonomy is 80% international and 20% their own vocabulary. The taxonomy covers all the content. Classification is by subject, with four levels of hierarchy. To use the taxonomy, the user chooses a classification, then drills down the hierarchy for keyword. This is useful as one can see a select alternative vocabulary or terms about which one did not know. Users can see the taxonomic structures and can direct their online search. Only controlled terms exist	From Braun's perspective it is important to understand the different users within the organisation. Scientist and business people are precise in their retrieval tactics but look around more beforehand. Technical staff search first and look second and this is important to consider when building and implementing organisation wide taxonomies. The main purpose of the taxonomy is for the purpose of indexing and information retrieval and is necessary for efficient retrieval of information but also supports knowledge sharing and reducing

Introduction	Aim	Approach	Summary
		in the hierarchy.	duplication.
Factiva: UK			
Factiva provides a combined global news and business information service to web sites and other content solutions.	<p>Factiva's expressed mission is to be the indispensable provider of business information and customised solutions to their customers.</p> <p>The core competence is the provision of a universal multi-language searchable information source for global news and business content. The requirement is a taxonomy that would allow the cross-content searching of Dow Jones and Reuters information in all supported languages. The key driver for a taxonomy as to develop an effective information product.</p>	<p>Factiva's taxonomy goes under the name of Factiva Intelligence Indexing. All terms used in the taxonomy vocabularies were created in-house. The taxonomy itself is concept-based and indexes are discouraged from adding free terms, but in special cases do allow the importation of a few, weighted free-text terms. The structure of the taxonomy is visible to the end user in both the Windows and web interface. Top level terms are displayed any of which can be used to expand the term and show its narrower terms in a drop-down to display.</p> <p>There are 22 languages used in the taxonomy.</p>	Currently 50% of indexing is done manually and the approach to follow is to have a combination of human and computing effort. The taxonomy is continually evolving and it is being redeveloped in the light of the feedback they received. The constant changes that are required reflect the demands of the changing structure of the global industry base.
Microsoft Corporation Inc: USA			
Microsoft is the	The primary driver for	The taxonomy covers	Microsoft is using humans

Introduction	Aim	Approach	Summary
<p>world's leading software provider and it employs 18,525 at its headquarters in Washington and further 23,542 in the USA and 34,751 people around the world.</p>	<p>implementation of the taxonomy was to provide improved access to content within Microsoft to users of the general purpose portal, MSWEB. The benefits were defined as improved employee productivity through faster and more accurate access to the information needed by employees to do their work. Recognition of the need for a taxonomy arose in several groups within the company at once and the final project was collaborative effort with each group taking the lead in a particular area. The project was also firmly embedded in a Knowledge Management Framework, which related the taxonomy architecture to all stages of the information life cycle.</p>	<p>all the content within the Microsoft firewall, including material licensed from outside publishers for internal redistribution. The taxonomy is Microsoft-wide and several groups are using it. Numerous portal owners are designing their portal navigation hierarchies using the taxonomy tools, integrating these with search using the core taxonomy.</p>	<p>exclusively in the construction of the taxonomies and has been contracted manually through both content analysis and user behaviour analysis. It is maintained and extend manually at present, using tools that the group has developed internally. Great emphasis is placed on the importance of long-term maintenance, as it is recognised that a taxonomy is not a one-off creation but a living reflection of the organisation and the environment in which it lives. Changes in the taxonomy also affect the content accessed through the taxonomy and so tracking and identification techniques are used in order to amend access pathways or identify the need for re-tagging. User feedback and satisfaction are also monitored in a number of ways and metrics employed to cast light on issues of improved productivity.</p>

Source: TFPL (2000: 1-175).

It is clear from the research that no one taxonomy approach exists and organisations have different approaches and reasons for applying taxonomies.

5.8.2 Study Results and Findings done by The Delphi Group 2002

In today's environment the lack of information is no longer the problem but the lack of time to correlate, categorise, analyse and act on the information is a crucial problem. The information is there, hidden in reports, e-mails and published on the corporate web site. This put organisations in the position of being unable to find applicable and pertinent information to make timely business decisions. According to The Delphi Group (2002: 1) a new segment of software has emerged to help with the task of combating "infoglut". There is software that enhances the performance of search engines, text mining, ontology and taxonomy. Taxonomy software correlates and groups unstructured information from a myriad of sources. Taxonomy software also helps with the automation of processes, and the fundamental challenge is to understand the concepts, ideas that group like documents together, and separate unlike documents.

In February 2002, The Delphi Group conducted an extensive survey of approximately four hundred and fifty end user organisations on the subject of categorisation and taxonomy management. The objectives of the survey, amongst other, were the following:

- Report the findings of a market survey of over four hundred and fifty organisations about taxonomies.
- Ascertain if there are taxonomy software projects underway or pending, their relative importance and the proposed budgets for implementation and maintenance of taxonomy.
- Clarify how the taxonomy software should be configured and deployed.
- Discover to what extent the market recognise the leading providers of taxonomy software.

5.8.2.1 Survey Results

The following table provides the survey results conducted by The Delphi Group (2002:120).

TABLE 5.3
SURVEY RESULTS

Problem Statement	Response
Infoglut and knowledge worker efficiency. Infoglut (too much information) is a reality for most organisations today. The exponential rise of unstructured data is impacting on the efficiency of organisations.	Most respondents to this question with job descriptions such as IT managers, project managers, Line of Business managers, spend more than two hours a day searching for information to perform their jobs (25% or more of an 8 hour day). More than 60 % agree that finding information was a difficult process and much of the time they cannot find the information they need. The issue of "search time" is one of the

Problem Statement	Response
	<p>fundamental symptoms of infoglut, and is at the heart of how most organisations measure the business impact of taxonomy management.</p>
<p>The biggest impediments to find information are bad tools and volatility of the data.</p>	<p>As respondents looked and searched for information, 61% of the time they had a 75% chance or less of finding the information they needed. The two main impediments to finding the information they were seeking were bad tools (28% of the time) and volatility of the data (35% of the time).</p> <p>The two most frequently cited reasons for this are “bad tools” and “data changes” or the concern that information is changing too fast. Even with the wide array of available search tools and content management solution, knowledge workers either cannot find the information they need to do their jobs, or they are spending an inordinate amount of time looking for that information.</p> <p>Another impediment to finding information is data change. Over 95% of the respondents reported that more than 10% of their documents change on at least a monthly basis. The study indicated that respondents have access to at least 50, 000 documents within their immediate organisation with often 10,000 or more of those changing on at least a monthly basis.</p>
<p>Current software and manual systems are not adequate. Organisation are looking to</p>	<p>Most of the organisations surveyed have some type of system for classifying</p>

Problem Statement	Response
<p>taxonomy software to help solve this problem.</p>	<p>information within their organisation, but most had no formal policy for tagging the documents and left the classifying up to the author.</p> <p>The surveys central message: Finding formation is extraordinary difficult and time consuming and current approaches are inadequate.</p> <p>Most respondents felt that it was necessary and important to put a taxonomy software system in place. Over 90% of the respondents plan to have a taxonomy strategy in place within the next 24 months.</p> <p>The majority have some system for classifying documents although not a true taxonomy system. Over half were using some type of software or a combination of manual approaches and software for classifying documents.</p>
<p>Implementing taxonomy software and working with taxonomy software.</p>	<p>90% of the respondents are to have a taxonomy strategy within the next 2 years or less. The study indicated that the deployment of taxonomy management software is still very much in the experimental or pilot stages.</p>

Source: The Delphi Group (2002:10-14).

The study indicated that there are a number of taxonomy related issues that organisations are unclear about.

Organisations are particularly uncertain about:

- Who will be responsible for determining the organisations strategy for choosing, implementing and maintaining taxonomy software?
- The cost of acquiring or maintaining the software.
- No vendor is recognised as a leader in the taxonomy technology segment.

The Delphi Group's (2002:10-14) research shows that the unproductive time spent looking for information within the digital repositories is growing, and affecting more and more organisations. Executives, managers and middle office knowledge workers alike require sophisticated new tools for the delivery of relevant information.

The conclusion of their study was that most organisations know they have serious and growing problems with unstructured data and that the problem is dramatically impacting their ability to make rapid and effective business decisions. Current systems are not adequate. Organisations planning on developing a taxonomy strategy remain unsure about how to do so. This presents a significant opportunity for the technology providers seeking to fill this need. Although taxonomy software cannot completely stem the tide of "infoglut", it can help find information that is crucial for survival and prosper in the new knowledge-based economy (The Delphi Group 2002:10-14).

5.9 SUMMARY

Taxonomies are used to find and navigate the information or experts they require. The unproductive time spent looking for information within the digital repositories of the enterprises is growing and affecting more and more of the expensive personnel we have managing our organisations. Taxonomies can reduce the reaction time to make informed and timely business decisions based on the knowledge and information contained within digital documents. Taxonomies help organisations form ideas from information they didn't know they had, revealing relationships and correlations that would otherwise be lost in the world of information overload. Taxonomies are not new but it is bringing new benefits to the electronic age where information and knowledge are vital for the survival of the organisation in the knowledge economy.

There is no one approach to taxonomy development and management and organisation have different business drivers and focuses for taxonomy implementations. Taxonomy development is user independent and driven entirely by content. The complexity of the taxonomy will depend on the unique requirements of the organisation. Each organisation will have unique requirements for content, usage and context, and few organisations have formal taxonomies. The practice of taxonomy creation is largely ad hoc and more an art than a science at the moment. Different organisations will have different approaches, tools and techniques to develop and build taxonomies. One thing is certain, taxonomies will become a fundamental part of organisations and it is important to understand

the challenges and also the value of a serious approach to taxonomy design, development and management.

CHAPTER 6

RESEARCH DESIGN AS BASIS FOR EMPIRICAL RESEARCH

6.1 INTRODUCTION

Research can be defined as the process through which the researcher attempts to achieve systematically, and with the support of data the answer to a question, the resolution of a problem, or a greater understanding of a phenomenon.

The aim of this research is to investigate the role of taxonomies within organisations which utilise a knowledge management framework or strategy. To achieve this purpose a basic research approach was adopted. A literature review was done and face-to-face interviews were conducted within a specific sampling of the financial services industry within The Republic of South Africa. This chapter presents the research to investigate the role of taxonomies within these organisations. The chapter focuses on the types of research, the research approach and methodology that were used for this investigation.

6.2 TYPES OF RESEARCH

According to the Only study guide HINKME-L/1 (2006:82) there are different ways of classifying research in the social sciences. Research can be divided into categories according to what it is used for. The tendency can either be to expand on fundamental

knowledge or to solve specific problems, resulting in the following two types of research:

- Basic research: Research that tends to expand on fundamental knowledge. The researcher first states what social phenomenon is researched, and then describes and explains the phenomenon. Basic research makes use of exploratory, descriptive and explanatory research. It creates a basis for the application of knowledge and insight to many social problems, areas of research or even policies.
- Applied research: Research that tends to solve specific problems or, if necessary, try to make specific recommendations. The researcher aims to address a specific practical social problem. The problem is then investigated and treated in a specific manner by applying acquired researched knowledge. It is generally descriptive in nature, and its main advantage is that it can be applied immediately after having obtained the results.

Although research can be classified as either basic or applied research, these categories are not mutually exclusive. All research can be classified on a continuum between these two poles. If the tendency is to concentrate more on a contribution to knowledge, the research is more basic in nature, and if the tendency is for the research to be more practical, it is more applied in nature.

This study tends to be more explanatory because the researcher is exploring the concept of taxonomies within a knowledge management framework. A literature review is conducted using various methods of literature searches for this study.

It will become increasingly important that organisations learn how to convert information into improved productivity and opportunity, instead of being swamped and paralysed by an overload of information, and trying to organise it and improve the ease of access. Taxonomies are viewed as a solution to bridge the gap between data, information, and the organisational environment in which people operate to facilitate ease of access to data and information in a logical manner. It is against this background that the investigation is being conducted: The question which will be explored relates to what the role of taxonomies is within organisations, which utilise a knowledge management framework or strategy.

The Only study guide HINKME-L/1 (2006:87) indicates that explanatory research is aimed at:

- Determining the accuracy of a principle or theory.
- Finding out which of the various possible explanations are the best.
- Promoting knowledge of an underlying process.
- Combining different factors or topics under a general statement or explanation.
- Building and expanding a theory so that it can be more complete in nature.
- Expanding a theory or principle into new areas of application.

- Providing data to prove or disapprove an explanation or forecast regarding a specific topic.

According to Babbie (2001:2) a researcher has three rationales for conducting an exploratory research:

- Out of curiosity and a desire for better understanding of the issue.
- To test the feasibility of a more extensive study.
- To develop methods for any succeeding study.

6.3 RESEARCH APPROACH

Social scientific research initially evolved from the positivistic school of thought or paradigm, a school of thought which basically stemmed from the natural sciences. According to this approach, scientists investigate the cause and effect of events which, in the social sciences are achieved by using a large number of respondents, called the quantitative approach (Only study guide HINKME-L/1 2006:87).

The quantitative approach was found not to cover all the aspects of man and his or her environment. This did not cover a certain aspect of man namely, his ability to experience situations in a spiritual manner and consequently another school of thought, namely humanism, was developed. This develops a school of thought that acknowledges the uniqueness and meaningfulness of a human situation and behaviour. This is referred to as the qualitative approach and the topics that are researched here are concerned

with the human spirit, human behaviour and conduct as well as the human society (Only study guide HINKME-L/1 2006:87).

6.3.1 The Quantitative Approach

This approach aims at examining the generally accepted explanations of phenomena, and is therefore more structured and controlled in nature. The scope is larger and more universal in nature and can also be defined accurately. For the research to be valid and reliable, use is made of specific scientific methods and techniques, such as questionnaires (Only study guide HINKME-L/1 2006:89).

6.3.2 The Qualitative Approach

In qualitative research, the point of departure is to study the object, namely man, within unique and meaningful human situations or interactions. An important aspect of this type of approach is that often it is observation that generates the investigation. Although qualitative research is not based on fixed and rigid procedures, it provides the researcher with a set of strategies, with which to organise the research and to collect and to process or to interpret data. According to the (Only study guide HINKME-L/1 2006:87) this research uses the following methods and techniques:

- Concepts that capture the meaning of the experience, action or interaction of the research object.

- Unstructured (open) questionnaires and interviews.
- Participant observation, ethnographic studies and case studies.
- Recording of life histories, use of autobiographies and diaries.
- Analysis of collected data by means of non-quantitative frameworks and category systems.

6.3.3 Quantitative versus Qualitative Approach

The following table proves distinguishing characteristics of quantitative and qualitative approaches (Leedy 1997:106).

TABLE 6.1
QUANTITATIVE AND QUALITATIVE APPROACHES

Question	Quantitative	Qualitative
What is the purpose of the research?	To explain and predict. To confirm and validate and test theory. Outcome oriented	To describe and explain. To explore and interpret and to build theory. Process oriented.
What is the nature of the research process?	Focused Known variables Established guidelines Static design Context free Detached view	Holistic Unknown variables Flexible guidelines Emergent design Context bound Personal view
What are the methods of data collection?	Representative, large sample Standardised instruments	Informative, small sample Observations, interviews
What is the form of reasoning used in analysis?	Deductive analysis	Inductive analysis
How are the findings communicated?	Numbers, statistics, aggregated data Formal voice, scientific style	Words, narratives, individual quotes Personal voice, literary style

Source: Leedy 1997:106).

6.4 RESEARCH METHODOLOGY

The qualitative research approach uses various methods of primary data collection. The most common types are:

- Questionnaires
- Interviews
- Documents
- Observation

For the purpose of this study the method of interviewing were decided on. Interviews provide the opportunity for the person being interviewed to ask questions when a question is not clear, or the question is not understood. The interview also allows for immediate feedback and the opportunity to provide explanation on the respondents (interviewee) side and on the interviewer's side. For example if the meaning or context is not clear to the person being interviewed or providing reasons and examples on the respondent's specific response. It also allows for further discussions if the interviewer is not satisfied with the outcome. Interviews have the following advantages (Only study guide HINKME-L/1 2006:87):

- Interviews are flexible and can provide the researcher with detailed and fresh information that the researcher may not have predicted or anticipated.
- Unclear questions can be clarified because an interview involves dialogue between the interviewer and respondent (interviewee).

- Additional information can be obtained by asking follow-up questions, especially where responses are ambiguous or unclear.
- Random samples can be drawn.
- The way in which questions are asked can be standardised.

6.5 LITERATURE REVIEW

The literature review provides an overview of the subject and published research relevant to a research question. The literature also provides an investigation about a topic and introduces the researcher to issues and view points relevant to the topic. This enables the researcher to gain insight into the topic and to identify the key issues that need to be explored. It provides a broad framework, a foundation and justification for further research. The researcher is challenged to think about how his or her work extends, modifies, supports or challenges that of others (Only study guide HINKME-L/1 2006:87).

A literature review discusses published information in a particular subject area, within a certain time period. The focus of a literature review is to summarise and synthesise the arguments and ideas of others (University of North Carolina: Writing centre).

The purpose of a literature review is to assist and explain how the question to be investigated fits into the larger picture and why the researcher has approached the topic in a certain manner. According to Kellsey (2005:1) the literature review must provide the

background and demonstrate the relevance and uniqueness of the study. It contributes to answering the question of why the study was conducted and why it is important.

According to Leedy (1997:71) the literature review has several purposes though primarily it is to assist in understanding the problem for research. The review can also provide the following:

- Reveal similar investigations and can provide more information on how other researchers handled methodological and design issues.
- Reveal sources of data that exists and introduce important research personalities.
- It can provide new ideas and approaches and provides the opportunity to evaluate research efforts by comparing with similar efforts by others.

Sources used for the purpose of this review are the following:

- Books.
- Journals.
- Research reports.
- Case studies.
- Websites.

6.6 INTERVIEWS

An interview is a data-collection method, which uses personal contact and interaction between an interviewer and respondent. This can take place either face-to-face or via a telephone. Both types of contact have certain advantages and limitations.

The purpose of the interview for this research is because of an in depth interest in understanding the experience of organisations and the meaning they make of that experience. At the heart of the interviewing research is an interest in other people's stories and experiences.

Seidman (1991:4) indicates that interviewing provides access to the context of people's behaviour and thereby provides a way for researchers to understand the meaning of that behaviour.

6.6.1 Structured and Unstructured Interviews

Interviews can be structured, semi-structured or completely open and unstructured. The approach will depend on the following:

- Purpose of the interview.
- The nature and sensitivity of the topic.
- The setting and the actual respondent(s).
- The relationship between the interviewer and the interviewee.

In a structured interview, specific lists of question are asked. An unstructured interview allows respondents to give their reactions to general issues, in the absence of specific questions.

For the purpose of this study a combination of structured and unstructured interviews were conducted. The structured interview had a set of questions that were presented to the respondent in advance. The purpose of this was to provide the respondent with enough time to gather relevant information and to prepare for the interview. Face-to-face interviews focused on the structured questions forwarded to the respondent, and the aim was to record the respondents answers to the questions. The unstructured interview approach was to obtain additional information and provide the opportunity to clarify and explain certain information provided by the respondent.

The questions and structured interview focused on taxonomy approaches and implementations within the South African financial services industry.

The following steps were applicable for the interviews:

TABLE 6.2
STEPS IN INTERVIEWING PROCESS

Step 1	A request for an interview is forwarded to specific persons within the financial services industry, for example professionals involved in knowledge management within the organisation. The request is accompanied by a letter explaining the reason and purpose of the interview (data collection), and a note from the University confirming and indicating the researcher's intentions.
Step 2	Indication of the time needed for the interview is communicated, for example an hour of the respondent's time and an indication of each of the prospective respondents (interviewee) availability. Providing several dates and time slots when the interview might be scheduled.
Step 3	With the letter, a separate sheet containing the questions to be asked during the interview is enclosed. All interviews are confirmed in writing and a reminder is mailed to all respondents

6.6.2 Limitations of Interviews

According to Seidman (1991:5) interviews have the following limitations:

- An interviewer may hold a biased opinion towards the interviewee because of the respondent's demographics

for example race, gender, age. This can bias the results.

Bias can also occur when an interviewer shows approval or disapproval of responses.

- Practice and skills required to obtain honest and detailed responses. The interviewer requires the necessary training and skills and needs to know how to ask questions, how to listen, write notes and whether he or she should anticipate the need to ask probing questions.
- The interviewer cannot interview a large sample.
- Interviewing research takes a great deal of time and, sometimes, money.
- Interviewing is also labour intensive as it requires the researcher to establish access and make contact with, potential participants whom they have never met.

6.7 SAMPLING IN THIS RESEARCH

Sampling is the process of actually selecting those individuals whose views will be collected in the survey, in order to be representative of the whole group whose views are being sought. A sample is a limited number taken from a large group for testing and analysis, on the assumption that the sample can be taken as representative of the whole group

According to the Only study guide HINKME-L/1 as well as three (2006:147) researchers need an appropriate way of selecting the people, objects or event from which they can draw their research

information. As a rule, the population that interests researchers is too large, unmanageable and spread out to study directly. Researchers therefore need to define their population and sample. Sampling can provide a more accurate picture of the people being researched than researching the entire population, simply because it is easier to manage a sample than an entire population.

Sampling is an integral part of the research process and it restricts an investigation to a small but well-chosen group of elements (the sample) that represents a much wider group (the population). The sample should always be regarded as part of the whole research process (Only study guide RSC201-H 2000:163).

For this research the sampling group is seven organisations within the South Africa financial services industry. The reason for choosing the financial service industry for the sampling, related to the fact that the financial services industry in South Africa is seen as probably the only “first world” industry (besides mining), and therefore its information maturity has developed to such an extent that the necessary insights regarding the application of taxonomies will be achieved. According to The Banking survey conducted by KPMG, which performs annual rankings of the world’s top one thousand banks, the four big banks in South Africa rate within the top three hundred banks in the world and according to these rankings South African banks continue to improve. (Cited in the Council of Financial Competition 2004:1)

Table 6.3 below highlights the rankings of South African banks featured in the Banker's top one thousand banks.

TABLE 6.3
BANKER'S TOP ONE THOUSAND BANKS

BANK	RANKING			
	2003	2002	2001	200
Standard Bank Group	125	159	146	159
Absa Group	199	309	250	203
Nedcor	202	265	158	204
First Rand Banking Group Ltd	259	254	300	316
Investec Group	393	255	331	343

Source: Council on Financial Competition (2004:2).

Because of the global standing of South African banks, the financial services industry in general is seen as the industry that invests more in new technology and business concepts and continues to improve.

A sample group of seven is also considered adequate as it will represent the so called big four banks in South Africa as well as three providers in the insurance industry.

6.8 SUMMARY

The researcher discovers reality through personal experiences and the personal experiences are dominated by curiosity. Doing research is one way of discovering the world and provides a way of learning and experiencing things.

Through the process of research and specifically, qualitative research, the researcher is exploring the concept of taxonomies within a knowledge management framework.

CHAPTER 7

ANALYSIS AND INTERPRETATION OF RESEARCH FINDINGS

7.1 INTRODUCTION

The purpose of this research is to investigate the role of taxonomies within knowledge management as it is applied within the financial services industry. To achieve this purpose structured and unstructured interviews were used as an instrument to gather relevant data within the financial services industry. The interview process and the sampling for the research were described in chapter 6. This chapter provides a view of the analysis and interpretation of the responses from the interviews conducted with the seven sampling organisations within this industry.

7.2. PROCEDURE FOR DATA COLLECTION

Primary data was collected by means of interviews. Interviews have the advantage in that it provides the opportunity for the person being interviewed to ask clarifying questions when a question is not clear or the question is not fully understood. The interview also allows for immediate feedback and the opportunity to provide additional explanation from both the respondents' (interviewee) and interviewer. Interviews allow for a deeper understanding and appreciation of the respondent's experience and also provide context based on the respondent's experience. It provides and

opportunity for understanding the issues, structures, processes and policies that imbue participants stories (Seidman 1991:103).

7.2.1 Interview Process

The interview questions were mailed to all respondents prior to the interview (See Appendix A: Copy of the mail). The purpose of this was to provide the respondent with enough time to gather relevant information and to prepare for the interview. The purpose of the interview was explained and a date and time was agreed on for the interview to be conducted. The following were communicated to the respondents:

- The interviews will be confidential and will be arranged at a time and place convenient to the respondent (interviewee).
- The time allocated for the interview is one hour.
- The respondent (interviewee) will not be asked for any organisational intellectual capital related information or any commitment of any kind during the interview.
- The interviewer will seek only opinions and perspective on the issues important to the success of the research.
- A brief background to the study was provided.
- Permission, from UNISA, to do interviews was attached to the mail.

7.2.2 The Interview

The specific questions were formulated to structure the conversation and also to provide guidance and focus on the specific information that was needed for the research, within the interview process.

The following questions formed part of the interview questions:

- Question 1(a): Do you have a knowledge management approach within your organisation?
- Question 1(b): What is your knowledge management approach within organisation?
- Question 2: What are the different knowledge management tools, technologies and techniques supporting your knowledge management approach?
- Question 3: Do you have a taxonomy approach?
- Question 3(a): Are taxonomies applied as a knowledge management tool, technology or technique in your organisation?
- Question 3(b): What is the role of taxonomies within your knowledge management approach?
- Question 3(c): Is the application of taxonomies within your knowledge management approach only operationally focused, meaning facilitating better and easier access – thus facilitating the process to link people to systems (operational knowledge management)?

- Question 3 (d): Are taxonomies also applied to support knowledge discovery and the mapping of an organisation's intellectual capital in support of the overall knowledge management strategy and framework (strategic knowledge management – connecting people to people)?
- Question 4: What is the framework in which taxonomies are applied within the organisation if not within knowledge management?

7.2.3 Sampling

As mentioned in chapter 6, for the purposes of this research the sampling group was selected from the financial services industry of South Africa and represents seven of the biggest organisations within this industry.

The following respondents participated in the research:

TABLE 7.1
SAMPLING ORGANISATIONS: RESPONDENTS

Organisation	Respondents Name	Department	Role description
<u>ABSA Bank</u>	Retha Prinsloo	ABSA: Information Management Division: KM Centre of Excellence	Technology Enablement Consultant
<u>NedBank</u>	Helen Schuman	Group IT: Risk & Compliance	Application Architect
<u>First National Bank</u>	Lizelle van der Klashorst	Branch Banking: Content Management	Information Architecture
<u>Standard Bank</u>	Faizel Katkodia & Jan Steenekamp	Group IT: Analytics and Information Management	Head: Analytics and Information Management
<u>Sanlam</u>	Marjetjie Kotze	SPF: IT Architecture	Head: Services & Software Portfolio Management
<u>OUTSurance</u>	John Lombard	Group IT	Head: Group IT
<u>Momentum</u>	Ineke Prinsloo	Research Analytics	Business Intelligence

The first four respondents presented in the above mentioned table are representing the four biggest banks of South Africa and the last three (Sanlam, Outsurance and Momentum) are three of South Africa's biggest insurance organisations.

7.3 ANALYSIS OF THE RESPONSES

The interview questions were forwarded to the respondents prior to the interviews with an attached covering letter providing background to the study and requesting the respondents' participation in the

research (see Appendix A). The purpose of forwarding the interview questions to the respondents prior to the interview was the following:

- It provided the opportunity to the respondents to prepare for the interview.
- It provided sufficient time for the respondent to invite other colleagues, which they feel might add value, to participate in the interview.

As indicated in the paragraph 7.2.3 (Sampling); all the mentioned banks were visited and interviews were conducted face-to-face and on the banks' premises. Background to the study is provided by the researcher and the researcher confirmed the respondent's participation and agreement on the questions being asked.

Momentum was the only insurance organisation where the interview was done face-to-face and on the organisation's premises. As Sanlam's head office is based in Cape Town, the interview was conducted telephonically. OUTsurance opted to provide a written response to the questions and as such no face-to-face interview was conducted with the respondent; John Lombard.

Table 7.2 provides a summary of the number of respondents that answered the research questions.

TABLE 7.2
SUMMARY ON NUMBER OF RESPONDENTS ANSWERING THE INTERVIEW QUESTIONS

Q1(a)	Q(b)	Q2	Q3	Q(a)	Q3(b)	Q3(c)	Q3(d)	Q4
4	7	7	5	4	3	2	0	3

The following table presents the feedback of each of the sampling organisations answers to the research questions.

TABLE 7.3
RESPONDENTS ANSWERS TO THE INTERVIEW QUESTIONS

Sampling Organisation	Response
Question 1	
Absa	Absa has a division that is responsible for knowledge management. Referred to as the Knowledge Management Centre of Excellence.
Momentum	Knowledge Management is a division under the Business Intelligence Department.
Nedbank	Nedbank has a knowledge management division within the Group IT Department.
Standard Bank	Standard Bank has a knowledge management division which form part of the Group IT: Analytics and Information Management.
Question 1(b)	
Absa	Absa indicated that knowledge management (KM) is seen as one of the thirteen (13) core capabilities that will make the bank more competitive within the market. There are two distinct approaches: the one focus on knowledge management consultation within the different business units providing education, guidance and training on KM practices. For example setting up communities of practice or interest. The other is called Technology Enablement for knowledge management. This department is responsible for the technology such

Sampling Organisation	Response
	as the intranet. This department is responsible for an enterprise wide approach and application of the intranet.
First National Bank	First National Bank does not have an enterprise wide knowledge management approach, knowledge management initiatives are conducted within the different business units within the organisation.
Momentum	<p>Momentum has a division called knowledge management which forms part of the business intelligence division. The knowledge management component is responsible for:</p> <ul style="list-style-type: none"> • Primary research. • Information distribution. • Optimising information usage. • Sharing best practices. • Responsible for management and distribution of publications (internal and external).
Nedbank	The knowledge management approach is more related to the portal and the information being published on the portal. It includes the management of unstructured information on the portal; for example policies. They also have communities of practices and interest which are initiated and coordinated by the knowledge management department across the organisation.
Sanlam	<p>Sanlam does not have an enterprise knowledge management approach. Although informal knowledge management practices do exist within each business unit, it is not managed centrally by a specific department or person. The following practices however, do exist within Sanlam:</p> <ul style="list-style-type: none"> • IT Research Lab: It is a service that assists the knowledge workers with research and sourcing of relevant information. Providing access to research

Sampling Organisation	Response
	<p>sources and subscriptions for example Gartner.</p> <ul style="list-style-type: none"> Central repositories, within business units exist, facilitated by Lotus Notes technology. It is mainly used for project information which include standards, processes and management information. <p>The repositories exist within silo's – pertaining information that is related to the specific business unit. The information is not centrally managed.</p>
Standard Bank	<p>Standard Bank's approach is to gather all data, structured and unstructured. The information must have PAST, PRESENT OR FUTURE relevance to their business. The bank must be able to allocate the data to a role in the organisation that takes responsibility for a node in the following dimensions/structures: Location, industry, consumers, internal resources, suppliers, competitors, and partners. Example: Internal resources comprise of people, information and technology and the different models that define them.</p>
OUTSurance	<p>Indicated that although they do not have specifically defined approach to knowledge management, they do have disparate systems that hold information. The information allows them to analyse patterns and produce statistics, which in turn may be used, in theory, to assimilate into a knowledge base, although this is not what they aim for. The interpretation of the information and related statistics are done by the Actuarial Department. From this they gain an understanding of the business, its direction and the trends in the market. The subsequent assimilated information is then distributed in the form of reports to a variety of departments that may need the information in order to make business decisions.</p>
Question 2	
Absa	<p>Various knowledge management tools, techniques and technologies are applied within the bank for example:</p>

Sampling Organisation	Response
	communities of practice, discussion forums, knowledge management measuring tools, social network analysis, the intranet and search engines. Knowledge management is part of Absa's information management and therefore other tools, techniques and technologies for managing structured information is also applied within the bank for example: data warehouse, analytical tools and data mining tools.
First National Bank	There are various tools within FNB that could be classified as knowledge management tools and technologies but these tools and technologies are not managed within a knowledge management framework. Examples are portals, intranet, search engines, document management systems, analytics and business intelligence. Knowledge management techniques exist informally and are referred to as forums or committees. One example of such a forum is the innovation forum where all ideas are analysed, discussed and explored as potential solutions for business challenges and problems. Other techniques are project reviews. These reviews form part of the Project Management methodology but are not always practiced and documents are not always captured within the Project Management database.
Momentum	Various tools and technologies for example intranet/portal, data mining, data analysis, reporting, research, e-mail and face-to-face meetings.
Nedbank	Various knowledge management tools, techniques and technologies applied within the bank for example: intranet, portal, collaboration tools, and communities of interest to mention only a few. Knowledge management is also part of the bank's information management approach and therefore other tools, techniques and technologies for managing structured information is also applied within the bank for example: data warehouse, analytical tools and data mining tools.
Sanlam	File servers, central repositories, intranet to mention a

Sampling Organisation	Response
	few examples.
Standard Bank	Examples of technologies includes: MIS for structured data, using MVS, Datastage EE, Teradata, SAS, Cognos. Intranet/Email/Internet for collaboration, GRG, training courses, various in-house intelligence departments for example: Competitive advantage and media marketing. The following are being proposed: Chat software and web crawlers.
OUTSurance	Databases to store information and to query information from. The data is put through formulas and pre-built function tools that they develop and design. The end-result is a number of reports in Excel format or whatever other format is required by business.
Question 3	
Absa	Indicated that there is some form of structuring information on portal level but that is not called taxonomies and that they do not have a formal taxonomy approach.
First National Bank	Indicated that there is a dedicated team within branch banking; content management, that is responsible for creating taxonomies.
Nedbank	Nedbank have a dedicated department called data management that are applying taxonomy related principles. Understanding where the data is stored, what it is called and where it is applied and managing in the overall information supply chain.
Sanlam	Sanlam recognise the need for taxonomies and understand that it will require a specific skill which is currently not part of their skill set within Sanlam.
Standard Bank	Yes, the bank do have a taxonomy approach
Question 3(a)	
Absa	Indicated that taxonomies form part of the approach to manage the intranet and is used in structuring of information and content for each business unit. It is, however, not based on a taxonomy approach and each

Sampling Organisation	Response
	business unit is responsible for their own structuring of information and content.
First National Bank	Taxonomies are applied within a broad content management strategy and more specifically within an information architecture framework. The main focus of the taxonomies used within content management division is to create structures to manage unstructured information within the content management solution, ensuring reuse and to create the structure within to manage the unstructured information. The second aspect is also to create better access to information on presentation layers.
Nedbank	It is practiced within data management but is not referred to taxonomies but it forms part of the concept of data management.
Standard Bank	It is a technique applied to technology.
Question 3(b)	
Absa	Information structures are used on the intranet to categorise information. They refer to it as content architecture and are decentralised within the bank. Each business unit is responsible for their own classification of information and content on the intranet. There is however a drive towards information architecture that will not only focus on the data warehouse but also on the intranet information.
First National Bank	As mentioned taxonomies are applied within a broad content management strategy and more specifically within an information architecture framework. The taxonomy and information architecture is the blueprint that defines how content will be organised and structured to make up the various collections and information products within the organisation. The taxonomy will assist knowledge workers to find, manage and continue to add to the existing content and information consistently. It follows defined rules for

Sampling Organisation	Response
	<p>structure and semantics conventions for a given implementation of the content management system. The mandate of the taxonomy team is to help structure, classify, model and or represent the concepts and relationships pertaining to some subject matter of interest to FNB project on demand.</p>
<p>Standard Bank</p>	<p>Standard Bank uses an enterprise taxonomy that serves as a classification of information for storage and retrieval. The intranet uses a taxonomy that allows easy navigation by all employees to information without the need for searching. The bank, however, will need to extend the search taxonomy to add real value; it is currently basic string matching. There is also a huge help repository within the intranet that guides employees with all policies and procedures and other relevant help on given operational functions. Most of the sites are driven by departments and the assigning of documents and other content is manual. Tools in this arena are mature and could render the same results; the risk is that the departments lose ownership of their sites contents. The same sites are also used in 16 countries, each with its own culture and incorrect context in a given culture can be devastating to a given world view. The bank uses taxonomies to allow the slicing and dicing of structured information, these are more along business unit rules than those of the enterprise. Here the categories/dimensions/structures are populated automatically at build time. There is another abstract taxonomy that represents the organisation that they would want to use in order to assign ownership to levels in our other knowledge for ownership distribution. This knowledge is currently hidden, but captured in the human resource (HR) system. There is currently multiple intelligence units and the bank will need to start mapping the taxonomies between them.</p>
<p>Question 3(c)</p>	
<p>First National Bank</p>	<p>Taxonomies should include both approaches:</p>

Sampling Organisation	Response
	<p>connecting documents to people, providing easier access but also to connect people to people. It all depends on the maturity of the knowledge management approach and application of taxonomies as well as the organisation's knowledge management approach. Taxonomies should form the basis for structuring and storing all information assets and should be used throughout the organisation – even if it only facilitate better and easier access or if it is related to connecting people to people with a strategic intent.</p>
<p>Standard Bank</p>	<p>Winning ways is an initiative within the bank in which individuals are rewarded for sharing tacit knowledge, it is done in a form that guides it to the taxonomy, a review committee filters all the entries and makes it a part of the explicit learning material in the living organisation.</p>
<p>Question 3(d) No respond</p>	
<p>Question 4</p>	
<p>First National Bank</p>	<p>The current taxonomy methodology and approach are very new. It is in the early stages of development of a full taxonomy methodology that are aligned with the information architecture. Taxonomies represent the description of the relationships between objects in a system. While taxonomy generally refers to a set of hierarchical relationships, in the context of the enterprise content management system, relationships in a taxonomy are generally more complex, and multiple relationships may exist between objects. Taxonomies describe a classification structure for content. This structure, typically highly regimented, impacts the data model, directory structure and file naming. Taxonomies in this environment are presented as information models applying information modeling practices.</p>
<p>Nedbank</p>	<p>Do not refer to their practices as taxonomies but data management and data architecture. These practices</p>

Sampling Organisation	Response
	are more focused on the data and information management environment currently but will eventually influence all data, information and knowledge within the bank. Enterprise wide approach toward the structuring and naming of data is important for the bank and the focus will be on managing all data, information and knowledge centrally through data management/data architecture.
Standard Bank	Indicated that their business is divided into high level taxonomies and all areas are driven to these.

7.4 FINDINGS

The following summarise the research findings:

The researcher's intention with the question; if organisations have a knowledge management approach, was to understand the current state of knowledge management within organisations

- Do organisations have a knowledge management approach?
- Is it referred to as knowledge management?

Form the interviews it was clear that there are organisations that do have a formal knowledge management approach and in some cases this is applied throughout the organisation. There are also organisations that do not have a formal knowledge management approach but which include dedicated people to perform the function, informal knowledge management practices do occur.

The survey questions aimed at determining what the focus of the knowledge management initiatives were and what the organisations hoped to achieve with their specific knowledge management approach. Most of the sampling organisations tried using both approaches as referred to by Tiwana (2000:99):

- Personalisation: This strategy is focused on connecting knowledge workers through networks and codification knowledge management strategy.
- Codification: Focused on technology that enables storage, indexing, retrieval and reuse.

The other sampling organisation only follows a codification strategy – focusing on technology that enables storage.

The purpose of question 2 was to determine what tools, technologies and techniques the sampling organisations use to support their knowledge management initiatives and if taxonomies are utilised as one of these tools, technologies or techniques. One of the sampling organisations indicated that it is a tool but not used within a knowledge management framework. Two of the sampling organisation's indicated that it is a methodology and approach but used within the framework of information architecture and data management.

The purpose of question 3 was to understand if the sampling organisations have a specific approach to taxonomies and to gain insight to the sampling organisation's understanding of taxonomies. The researcher wanted to determine if the sampling organisations have dedicated resources (a specific team of

people) assigned with the responsibility for developing and maintaining taxonomies and what the views were on the skills required for building taxonomies. It is clear from the respondents that there are only 3 organisations that have a taxonomy approach and dedicated people for the specific function. These responses indicate that taxonomies are new for most organisations. This also raises questions for the researcher about most of the organisations knowledge management approaches and what they hope to achieve with it.

The second part of question 3 was to determine the approach to taxonomy implementations, for example on a data level or on a bigger knowledge management level where people (knowledge) is also included. Taxonomies are either seen as a tool and methodology on the data level. Two of the sampling organisations indicated that taxonomies are on the data level and one indicated that it should be applied on both. The other sampling organisations have no view on this or do not see the relationship between the different levels of applying taxonomies within the organisation. They only see the intranet as a possible area to implement taxonomies.

The last question was related to the maturity of taxonomy developments and if there is a specific framework created by the sampling organisations for taxonomies or a taxonomy approach. There is no mature taxonomy framework as yet with one of the 3 organisations that indicated they have a taxonomy approach and they are applying it only on one level for example data. All 3 organisations indicated that they would like to see taxonomies on

all levels of the organisation's data, information and knowledge but they are not there yet.

CHAPTER 8

CONCLUSION ON THE PROBLEM STATEMENT

8.1 INTRODUCTION

The knowledge economy has brought about some new challenges for organisations not the least being the challenge to deal with the vast amounts of available information on all levels of the organisation. The realisation that people and their knowledge has become a key differentiating factor between competing organisations has ensured that organisations are re-looking their traditional approaches to the management of not only information but also knowledge. According to Prusak (2001:2) the knowledge economy has become the main drive and focus for most organisations and the business world is being forced to approach business in new and innovative ways.

According to Rus and Lindvall (2002:60) knowledge management emerged in the mid 1980's from the need to derive knowledge from the info glut. Indicated by the research in chapter 2 knowledge management, is not a single discipline but rather an integration of numerous disciplines, field of studies and practices and approaches that offer a framework for providing value whilst tying these disciplines together into a seamless whole.

It is against this background that the researcher investigated the role of taxonomies within a bigger framework, such as knowledge management.

8.2 PROBLEM STATEMENT

The purpose of the study was to indicate the role of taxonomies within a knowledge management framework and the research problem is analysed in terms of the following specific sub problems:

What are the different knowledge management approaches within organisation's?

What are the different knowledge management tools, technologies and techniques supporting the different knowledge management approaches?

Does the implementation of taxonomies go beyond its role of only facilitating easier access within information technology and information management (facilitating the process to link people to systems – operational knowledge management)?

Does the application of taxonomies also apply to supporting knowledge discovering and the mapping of an organisations intellectual capital in support of the overall knowledge management strategy and framework (strategic knowledge management – connecting people to people)?

What is the framework in which taxonomies are applied?

8.3 SUMMARY OF FINDINGS

The information gathered by the researcher indicated that knowledge management approaches differs from organisation to organisation depending on the purpose of the knowledge management initiative within the organisation. It is, however, evident from the organisations involved in the empirical research that there is a drive within these organisations to approach knowledge management from both an operational (codification) and strategic (personalisation) intent (as indicated by this research);

- Focusing on connecting knowledge workers through networks and codification knowledge management strategy; and
- Focusing on technology that enables storage, indexing, retrieval and reuse.

The concept of taxonomies, are new for most organisations. There is some indication of the existence of taxonomies within the data management and information architecture environments through the application of taxonomy related tools but no real taxonomy framework exists. Organisations implementing knowledge management tools such as intranets and portals indicated that they require and apply some sort of structuring of information. The requirement is based on the large amount of information and

knowledge being produced by the organisation that needs to be made available to the organisation. The main challenge facing the organisation and specifically the people that are responsible for the intranet or portal relates to the following:

- How to make sense out of all the information and knowledge available?
- How to build a structure for this information and knowledge?
- How to provide better access to information and knowledge that keeps on growing?

Chapter 3 indicated that there is a variety of tools, technologies and techniques available for knowledge management; taxonomies being one such a tool or technology that could potentially assist organisations in enhancing the utilisation of information and knowledge. Through the research it is clear that most organisations use a variety of these tools, technologies and techniques but not necessarily within a bigger knowledge management framework. It is also clear from the research that most organisations do not recognise knowledge management as the overarching discipline, bringing different disciplines together as the theory would suggest, but rather view it as a specific component within the more established disciplines and departments such as information management or information technology (IT). This is evident from the fact that most of the knowledge management departments form part of the organisations' information management, information technology (Group IT) or business intelligence divisions.

Based on the research a key conclusion that can be drawn from the insights gained through the interviews is that within the financial services industry organisations are at various stages of maturity in the utilisation of taxonomies as well as knowledge management. The organisations are at a very advanced level of use and application of data management to govern the use of data but not at the same level in terms of the use of taxonomies to govern information and certainly not at a level where a master taxonomy exists which relates to both the data, information and knowledge. This, however, is understandable as the primary focus for the financial services has been the customer related data, hence the focus on the data component. Having said this most of the organisations interviewed acknowledged the fact that the first organisation to successfully integrate data, information and knowledge will have the competitive edge. Currently the only feasible approach to move towards the integration of these three components is through the use and application of data management and taxonomies. These organisations are currently exploring potential linkages between existing financial services data management and taxonomies to try and align these components.

In addition to integration there is also a keen realisation that although the initial focus has been on enhancing access to relevant data and information (through data management) it is no longer enough. Knowledge workers and decision makers require and demand insight, generated through the access to data and information, this can only be achieved to facilitate access to people's knowledge and networks. Taxonomies can facilitate

unlocking these people to people components and therefore will support the use and application of taxonomies in future.

It is against this background that it is expected that taxonomies will become more central and key in these organisations' approach to managing information and knowledge in the knowledge economy.

8.4 RECOMMENDATIONS

The researcher's focus was to investigate the possibility of taxonomies being part of the knowledge management framework. As indicated by this research, knowledge management is no single discipline but rather an integration of numerous disciplines, which provide the opportunity for taxonomies to be applied within a knowledge management framework. The following recommendations can be made:

- As most of the organisations are focusing on data and information management, taxonomies could provide the next level of integration between data, information and knowledge.
- Whilst the current focus (within the sample group) is on data management, resources should be expanded to include the more unstructured components of information to investigate potential linkages between existing data management, information management and the requirement for taxonomies.

- Investigations in expanding current data management tools and practices to also cater for information (content management and information on portals and intranets) may provide the solution for integrating the various data, information and knowledge components.
- The existing use of data management caters for the collation and storage of data within databases and data warehouses but it is conceptual in nature and thus does not link to user behaviour. It therefore does not provide the optimum user interface or navigation scheme. Taxonomies provide the link to user behaviour and therefore could also potentially provide a framework of managing information and knowledge on the level of knowledge worker's accessing relevant information. Providing easier and uniform access to diverse stores (repositories) of data, information and knowledge.

As maturity grows within these organisations and the demand for knowledge or insight grows, organisations will be forced to start focusing on the people component (connecting people and their knowledge) providing the opportunity to position taxonomies as a tool and methodology and approach which could facilitate the seamless integration between these components.

8.5 FINAL REMARKS

Knowledge management is a rich discipline. The ideal will probably be to address information and data management, to some degree,

in parallel with knowledge management. Taxonomies can provide a single, comprehensive view of what information and knowledge exist within an organisation.

Taxonomies, however, can also be seen a discipline on its own within a framework that could include data, information and knowledge. It assists the organisation in understanding how data, information and knowledge are stored and accessed. It provides a blue print for the organisation indicating all the data, information and knowledge resources that exist within the organisation.

Organisations, involved in the research, are familiar with the concept of data management and are quite mature in the concepts of data management and information management. However, these organisations are currently challenged with requirements for more than just data and information, and needs to deal with a complex and dynamic combination of data, information and knowledge. The standard data management tools, technologies and techniques, on their own, do not facilitate the integration of data, information and knowledge. Based on this research, it can be stated that taxonomies can and should be used to manage multi-sourced environments and facilitate the appropriate sourcing of the organisations intellectual capital. The researcher supports the statement of NewsEdge Corporation (2001:11) that any successful taxonomy can help to manage the complexity of the organisation's environment despite of the complexity that exists today within the organisation. This also has prompted Probst, Raub and Romhardt (2000:17) to state that organisations need to take an integrated view

of data, information and knowledge to ensure that the organisation's knowledge base is well used.

Although there is currently not much evidence of the existence of dedicated, organisation wide, resources tasked to develop taxonomies, based on the evidence, it is clear that the next focus area will probably relate to aligning data, information and knowledge. It can therefore be expected that the use and application of taxonomies as a tool to facilitate this interaction will expand in the years to come.

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APPENDIX A: ELECTRONIC MAIL FORWARDED TO THE RESPONDENTS

Dear Respondent

I am a student at UNISA completing my Masters MINF (Information Science). The title of my thesis: The role of taxonomies in knowledge management.

With enthusiasm, vision, and careful planning I intend to complete my research by June 2006 and in order for me to do so I would appreciate your assistance in gathering relevant information for my research. My research focus is on the role of taxonomies in knowledge management. I would like to test my findings within the financial services industry as I believe these organisations have reached the level of maturity in information management and knowledge management to contribute significantly to my research. You and your company have been identified as a significant player in the knowledge and information management space and I would therefore request your participation in an interview to support my research findings. The interviews will be confidential, will be arranged at a time and place convenient to you, and will require no more than one hour. You will not be asked for any organisational intellectual capital related information or any commitment of any kind during the interview. I will seek only your opinions and perspective on the issues important to the success of my research. I have also attached a copy of the interview questions for you to prepare beforehand to keep to our time limit of one hour.

The following provide some background to my research.

Background to this study:

The business world is being forced to take a new look on the way things are done and particularly at resources that have rather suddenly moved to the strategic centre of the economy. Knowledge now plays an overwhelming economic role at a number of levels: global, national, organisational and individual. It is against this background that information and knowledge management as a discipline has come to the fore to provide some sort of capability to manage one of the new priority resources in the economy namely knowledge.

This study focus on the concepts: information management and knowledge management in order to lay the foundation from which the use and application of taxonomies will be explored.

In order to understand the use and role of taxonomies within knowledge management practices, it is important to understand the context in which it occurs. The intention of this research is not to debate the different knowledge management definitions, models or the different approaches and strategies which exist within the discipline, but to provide an understanding of what knowledge management is and what the focus is of organisations' towards knowledge management.

Different knowledge management tools, technologies and techniques are used by organisations to enable the creation, use, transfer and application of knowledge within the new work environment. Taxonomies are viewed as one such tool that can support the knowledge management process. To understand how taxonomies are utilised and applied it needs to be placed in context with the organisation's people, culture, processes and knowledge management approach. Thus in order to support my research I need to understand the identified organisations understanding of information and knowledge management and the role taxonomies play within the knowledge management context (if at all).

The purpose of the interview is to explore the use of taxonomies within a knowledge management context (thus facilitating access to intellectual capital, supporting knowledge discovery and contributing in the development of knowledge focused organisation).

Please confirm your participation in my research by responding to my mail and indicating which of the following dates and times you are available for an interview or any other time not specified in the table below. Also indicate a place convenient to you, for example your office, and please provide me with the physical address

Day	Date & Month	Time Slots
Monday	22 May	8:00-9:00; 9:00-10:00; 10:00-11:00; 11:00-12:00; 12:00-13:00, 13:00-14:00, 14:00-15:00
Tuesday	23 May	
Wednesday	24 May	
Thursday	25 May	
Friday	26 May	
Monday	29 May	
Tuesday	30 May	
Wednesday	31 May	

Thank you for considering my request. I will contact you in the next few days to confirm our appointment. I truly hope it is possible for you to take part in my research.

Thank you

Regards

Marie-Louise