KNOWLEDGE MANAGEMENT MATURITY FROM A STRATEGIC/MANAGERIAL PERSPECTIVE

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GLOSSARY

1. Definitions

Chief Information Officer (CIO): "The strategic level information and ICT manager who directs information and all ICT systems and personnel while communicating directly with the highest levels of the organisation".

(Haag, Cummings and Dawkins, 1998:515)

Core Competence: "A capability or skill running through a firm's business and that once identified, nurtured and deployed, becomes the basis for lasting competitive advantage".

(Pearce and Robinson, 2000:327)

Effectiveness. "A measure of the extent to which a system achieves its goals; it can be computed by dividing the goals actually achieved by the total of the stated goals".

(Stair and Reynolds, 2003:663)

Efficiency. "A measure of what is produced divided by what is consumed".

(Stair and Reynolds, 2003:663)

Evaluation research. "Implementation evaluation research aims to answer the question of whether an intervention (program, therapy, policy, or strategy), has been properly implemented (process evaluation studies), whether the target group has been adequately covered and whether the intervention was implemented as designed"

(Mouton, 2001:158)

Explicit knowledge: "Structured internal knowledge (explicit knowledge), such as product manuals or research reports".

(Laudon and Laudon, 2004:316)

Growth: "In this context, the meaning of growth must be broadly defined. Although the product impact market studies have shown that growth in market share is correlated with profitability, other important forms of growth do exist. Growth in the number of markets served, in the variety of products offered, and in the technologies that are used to provide goods and services frequently lead to improvement in a firm's competitive ability. Growth means change, and proactive change is essential in a dynamic business environment".

(Pearce and Robinson, 2000:32)

Information Management: "Information management deals with management of resources such as information media, people, information systems and physical facilities that are required if information as content is to play a role on the corporate strategic, organizational, operational and personal levels".

(Boon, 1990:320)

Information technology: "All forms of technology involved in capturing, manipulating, communicating, presenting and using data - and data transformed into information".

(Wainright Martin et al., 2005:688)

Implicit knowledge: "Tacit knowledge in the form of mental models can be expressed to a certain degree, even if only in the mind of the individual, makes it expressible knowledge, in other words information."

(Nonaka and Takeuchi, 1995:63-64)

Innovation. "New products and systems, new technologies and services. In short, everything the outside world perceives as a company's output".

(Weyrich, 1998:01)

Knowledge issues: Principles, success factors, elements critical to efficient and effective management of knowledge as proposed by Bater (1999), Zack (1999, 2001), Mitre cited in Taylor Small and Tattalias (2000), Von Krogh, Nonaka, and Aben (2001), Gartner cited in Logan (2001) and Snyman and Kruger (2004).

Knowledge Management: Viewed from a two-dimensional perspective. "The first dimension consists of the activities that are critical to knowledge creation and innovation: knowledge exchange, knowledge capture, knowledge re-use and knowledge internalization. The second dimension consists of those elements that enable or influence knowledge creation activities. These include:

- Strategy – the alignment of corporate and knowledge management strategies.
- Measurement – the measures and metrics captured to determine if knowledge management improvement is occurring or if a benefit is being derived.
- Policy – the written policy or guidance that is provided by the organisation.
- Content - the corporate knowledge base that is captured electronically.
- Process – the processes that knowledge workers use to achieve the organization's mission and goals.
- Technology – the information technology that facilitates the identification, creation and diffusion of knowledge among organisational elements within and across enterprises, for instance an enterprise portal.
- Culture – the environment and context in which knowledge management processes must occur".

(Taylor Small and Tatalias, 2000:02)

Knowledge management vs. Information management: Grey explains the difference between KM and IM simply by saying that IM is working with objects such as data or information whereas KM is concerned with working with people. He goes on to state that IM deals exclusively with overt representations such as accuracy, speed, cost, storage and retrieval, whereas KM deals more with implicit symbols such as learning, meaning, understanding and negotiation.

(Grey, 1998)

Knowledge management strategies: Knowledge management strategies define the processes and infrastructure for managing knowledge. "Once a firm identifies

opportunities, threats, strengths and weaknesses related to its intellectual resources and capabilities, then actions it may take to manage gaps or surpluses (e.g. recruiting for particular skills, building online documentary repositories, establishing communities of practice, acquiring firms, licensing technologies, etc.) are guided by knowledge management strategies".

(Zack, 2001: online)

Participatory research: "Studies that involve the subjects of research (research participants) as an integral part of the design. Use mainly qualitative methods in order to gain understanding and insight into life-worlds of research participants".

(Mouton, 2001:150)

Strategic Knowledge Management Plan. "A set of longer-range goals that document movement towards the knowledge vision and knowledge architecture and the associated major initiatives that must be undertaken to achieve these goals".

(Snyman and Kruger, 2004:19)

Strategic management: "The set of decisions and actions that results in the formulation and implementation of plans designed to achieve a company's objectives".

(Pearce and Robinson, 2005:03)

Tacit Knowledge: "Informal internal knowledge, often called tacit knowledge, which resides in the minds of the individual employees but has not been documented in structured form."

(Laudon and Laudon, 2004:316)

And,

"Tacit knowledge is hidden knowledge, hidden even from the consciousness of the knower."

(Skyrme and Amidon, 1997:30)

Total Quality Management. "An intense focus on customer satisfaction; on acute measurement of every critical variable in a business's operation; on continuous improvement of products, services and processes, and on work relationships based on trust and teamwork."

(Pearce and Robinson, 2005:373)

2. Abbreviations

CIO - Chief Information Officer

CMM - Capacity Maturity Model

DSS - Decision Support Systems.

ERM – Enterprise Resource Management

ERP – Enterprise Resource Planning

HR – Human Resource

ICT - Information and Communication Technology

IS – Information System

IT – Information Technology

KM – Knowledge Management

KMMA - Knowledge Management Maturity Assessment

KMMAM – Knowledge Management Maturity Assessment Matrix

KMMAQ - Knowledge Management Maturity Assessment Questionnaire

KMMM – Knowledge Management Maturity Model

KMMRS - Knowledge Management Maturity Rating System

KM3 – Knowledge Management Maturity Model

R&D - Research and Development

SEI - Software Engineering Institute

SEI-CMM - Software Engineering Institute Capacity Maturity Model

SKMP - Strategic Knowledge Management Plan

SM – Strategic Management

TQM- Total Quality Management

TPS - Transaction Processing System

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CHAPTER 1: INTRODUCTION AND AIM OF THE RESEARCH

1.1 Introduction

"Why is it that a concept [knowledge management] so powerful has not delivered what it was supposed to?" (Kazimi, Dasgupta and Natarajan, 2004:01). Without substantial proof that knowledge management adds profound value to organizations, the importance and sufficient commitment to embark on knowledge management will continue to be underplayed (Kazimi, Dasgupta and Natarajan, 2004).

According to Armistead and Meakins (2002:49), the value of knowledge "results from the way in which it is used in the firm's processes in the production of products and services. Firms gain advantage from using the capabilities that arise from knowledge assets in ways which are difficult for others to imitate or replicate, as well as the intellectual property associated with the assets". In essence, knowledge and Information and Communication Technology (ICT) fulfil somewhat similar functions in an organization with both containing a non-quantifiable value to an organization. Value calculation is done with much difficulty or cannot be calculated at all (Armistead and Meakins, 2002). According to Laudon and Laudon (2004), this non-quantifiable value of knowledge refers to an ability to positively affect the efficiency and effectiveness of other resources. However, Laudon and Laudon (2004:315) emphasise that "as knowledge becomes a central productive and strategic asset, (as Drucker predicted in 1970), organizational success increasingly "also" depends on the ability to produce, gather, store, and disseminate knowledge". It is therefore the ability to manage knowledge successfully and not per se "only knowledge" that drives the efficiency and effectiveness of other resources.

As early as 1970, Peter Drucker (cited in Tiwana, 2000:08) stated that the "most valuable assets of the twenty-first-century enterprise will be its knowledge and knowledge workers". Drucker provided a clairvoyant perspective on the future of knowledge and knowledge workers, a future where the ability of enterprises to manage and exploit their intangible assets needed to become far more decisive than the ability to invest and

manage physical assets. However, in order to manage intangible assets, Davenport (1998) contends that managers need to have a sound understanding of the underlying principles, policies and strategies that guide the successful institutionalization of knowledge management. Laudon and Laudon (2004) in continuing with this line of reasoning goes even further, arguing that the understanding of the principles of knowledge management are enough to sustain competitive advantage in a knowledge-networked economy. These authors contend that managers need to actively participate in, if not lead, knowledge management decision making. But, as Zack (1999) and Earl (2001) maintain, even though organizations accept that knowledge enhances performance; managers often do not know how and where to start dealing with knowledge management endeavours, especially in the domain of decision making and strategy formulation.

A sound understanding of business strategy formulation is crucial in the foundation of an efficient and effective knowledge management strategy, and vice versa. According to Papp (1996), such an alignment will enable a firm to maximize its investments and to achieve harmony with the business strategies and plans. This, in turn, will equate to an increased profitability and competitive advantage. Zack (1999) contests this position and believes that scholars barely touch on the holistic relationship and interdependency between setting the direction for the business and setting the overall direction for knowledge management. This, according to Zack (1999), leads to an insufficient number of models providing guidelines for managers to successfully incorporate knowledge management endeavours into strategy formulation. Without sufficient guidelines, managers will continue to consider knowledge management as being separate from strategy formulation, leading to misalignment of knowledge management goals with corporate goals.

1.2 Background to the problem

In questioning why knowledge management goals are not aligned to corporate goals and why managers struggle with the successful institutionalization of knowledge management, Kruger (2002) argues that even though leading university's business

programmes include Information and Communication Technology (ICT) and Information Management as core courses, Knowledge Management is rarely studied or at most just briefly touched on within ICT, Information - and Strategic Management coursework. Kruger (2002), in arguments similar to those proposed earlier by Davenport (1998), states that textbooks often neglect to supply a roadmap to the successful institutionalization of knowledge management, especially from within a strategic/managerial perspective, rather than from within a technological perspective.

Authors such as Botha and Fouche (2002) and Kazimi, Dasgupta and Natarajan (2004) are of the opinion that because we are working with abstract components such as knowledge, culture, processes or communities, there is a great deal of disillusionment about knowledge management that first needs to be addressed before we can embark on endeavours to successfully institutionalise knowledge management. According to these authors, realization that although knowledge enables the formulation of new ideas and new strategies, endeavours in knowledge management should be the result of the managerial processes. The argument is forwarded by Tiwana (2000:103) that "[k]nowledge must drive strategy, and strategy in turn must drive knowledge management."

Until issues such as the interdependency between knowledge, knowledge management and strategy are better understood, and until more is known of the issues, principles, policies and strategies that determine the successful institutionalisation and utilisation of knowledge, endeavours to successfully illustrate the value knowledge and knowledge management add to an organization, will remain problematic. Laudon and Laudon (2004) argue that it is primarily because guidelines regarding how to integrate knowledge management programs with business are still technologically and not managerially or strategically orientated.

Therefore, in order for managers to have a rock-solid business view of the value knowledge adds to an organization, and for line managers to demonstrate that they understand knowledge management and are using it in an efficient and effective manner;

further research into this problem area is required. Hence the focus of this thesis will attempt to address the stated problem.

1.2.1 Aim

The aim of the study is to investigate the interdependencies between knowledge, knowledge management and business from a managerial/strategic perspective (rather than from a technological perspective), to supply practitioners and managers with guidelines to successfully institutionalize and manage knowledge.

1.2.2 Objectives of research

In order to achieve this aim, the objectives of the research are to:

- Heightening awareness of the critical role knowledge plays as a strategic corporate resource.

- Determine if there are any issues/models/methods or perspectives available, from within a strategic/managerial perspective (rather than from a technological perspective) to guide strategists in the quest to efficiently and effectively manage knowledge.

- Illustrate the progression of knowledge management maturity from a strategic/managerial perspective.

- Investigate knowledge management's performance in relation to the objectives and measures that determine the overall efficiency and effectiveness of an organization.

- Formulate guidelines (a knowledge management maturity questionnaire) to assess the knowledge management maturity of organizations.

Finally, all propositions made in the scholarly research (as reflected in the proposed knowledge management maturity questionnaire) are tested in the South African industry. This is done to expand the research beyond purely theoretical and/or academic value, thus to illustrate the usability and applicability of the questionnaire in a real world scenario. Although not directly supportive of the aim, knowledge gained from this research component is also reported upon. This, as a lesser objective, is done to supply knowledge management practitioners with a baseline of data against which they could benchmark their organizations' knowledge management maturity.

1.3 Research methodology

Different paradigms in philosophy of science (positivism, realism, postmodernism, critical theory, phenomenology, etc.[2]) all impact on the way we think about the concept knowledge. Arguments surrounding knowledge and knowledge management therefore often bordered on the philosophical. All methodologies and models proposed in this thesis ultimately had to answer and adhere to a number of scientific and meta-scientific perspectives.

The study is based upon the theory that knowledge is the most strategically significant resource of the firm[3], and that organizational knowledge is created through a continuous dialogue between tacit and explicit knowledge via patterns of interactions, socialization, combination, internalization and externalization[4]. Due to the interdependency between

[2] Meta-discipline: "The nature of science and scientific research" (Mouton; 2001:139), or "paradigms in the philosophy of science" (Mouton, 2001:140).

[3] The knowledge-based theory of the firm considers knowledge as the most strategically significant resource of the firm. Its proponents argue that because knowledge-based resources are usually difficult to imitate and socially complex, heterogeneous knowledge bases and capabilities among firms are the major determinants of sustained competitive advantage and superior corporate performance. Originating from the strategic management literature, this perspective builds upon and extends the resource-based view of the firm. Wernerfelt (1984), Barney (1991), Conner (1991)

[4] Nonaka's (1994) dynamic theory of organizational knowledge creation.

people, objects and organizations being analysed, an element of Actor-Network Theory (ANT)[5] is presented.

To come to an understanding of the crucial role knowledge and knowledge management play in any organization, a review of literature was conducted. The selection of sources was driven by the quest to assess knowledge and knowledge management's role in the maturation process of businesses. Appropriate measurement criteria for determining the effectiveness and efficiency of knowledge management was thoroughly analysed, with special emphasis on determining if innovation can be considered an appropriate measure of the effectiveness and efficiency of knowledge management. In comparing different knowledge management success factors to one another, a new perspective to knowledge management's maturity could be formulated (Chapter 6.2).

For this research to reach its full potential, the decision was taken to turn all prepositions made out of the scholarly review into exploratory questions – questions that led to the formulation of a Knowledge Management Maturity Assessment Questionnaire (KMMAQ) (Appendix B). The questionnaire was used as a baseline to determine the knowledge management maturity of 86 South African-based organizations and to supply knowledge management practitioners with a baseline of data against which to benchmark their organizations' knowledge management performance.

Analysis of captured data used either standard statistical techniques and/or qualitative methods recommended by the University of Pretoria, South Africa. All data collected was thoroughly checked for errors, and carefully prepared for tabular and graphic representation, analysis and interpretation. The computer software used for analysis and

[5] The primary tenet of actor-network theory is the concept of the heterogeneous network. That is, a network containing many dissimilar elements. These coextensive networks comprise of both social and technical parts. Moreover, the social and technical are treated as inseparable by ANT. Actor-network theory claims that any actor, whether person, object (including computer software, hardware, and technical standards), or organization, is equally important to a social network. As such, societal order is an effect caused by the smooth running of an actor network. This order begins to break down when certain actors are removed.

modelling of the dataset was SAS version 8.3, from the SAS Institute. All graphs and figures were created using Microsoft Excel (2003).

Due to restrictions such as sensitivity, confidentiality and availability of information, subjects of the research were drawn in as integral parts of the research design. This necessitated that a hybrid of participatory[6], and evaluation[7] research be used. Not only was it required of subjects to critically review the knowledge management maturity of an organization with which they were familiar (evaluation research), but they also had to comment (first individually and thereafter as a group) on the applicability of the research instrument used (Knowledge Management Maturity Assessment Questionnaire).

1.4 Limitations

Given the time and logistical limitations plus a focus on providing insights rather than generating quantitative results made it impractical and unnecessary to include all organizations within the South African industry[8]. However, due to the subjects of research being drawn in as integral parts of the research design, manipulation due to "overly emotional or subjective involvement" could have occurred due to respondents serving their own, rather than the research needs (Mouton, 2001:151).

1.5 Assumptions

"Science cannot make progress without theories and models. Through the construction of theories and models we attempt to explain phenomena in the world' (Mouton: 2001:77).

[6] **Participatory research**: "Studies that involve the subjects of research (research participants) as an integral part of the design. Use mainly qualitative methods in order to gain understanding and insight into life-worlds of research participants" (Mouton, 2001:150).
[7] **Evaluation research**. "Implementation evaluation research aims to answer the question of whether an intervention (program, therapy, policy, or strategy), has been properly implemented (process evaluation studies), whether the target group has been adequately covered and whether the intervention was implemented as designed" (Mouton, 2001:158).
[8] Methodological considerations such as access to organizations, accuracy and availability of information and also practical consideration (available time, resources and physical access to data sources) resulted in only a sample of the total population being analysed.

The line of reasoning followed throughout this thesis is that no single approach can cover all the essential aspects involved. All models and methods proposed in this thesis are therefore at best only "tools" to harness the power knowledge and knowledge management add to individuals and organizations. However, it is proposed that holistic criteria can be devised that can cover most of the major issues involved in determining sound knowledge management practices. Criteria proposed not only simplify the understanding of the interdependent nature of knowledge, knowledge management and organizational success, but also allow the making of predictive claims under certain conditions. Wisdom of the underlying issues that guide the successful institutionalisation of knowledge management can therefore guide the establishment of sound knowledge management practices - practices that can enable business managers to formulate efficient and effective knowledge management policies, strategies and endeavours.

1.6 Contribution to the fields of knowledge management

The main contribution of the research is to bring more conceptual coherence to the fields of knowledge management and strategic management resulting in a transfer of knowledge, enabling individuals and organizations to:

- Better understand the paramount role knowledge plays in organizations as a strategic resource and knowledge management as a managerial enabler.

- Understand that there are appropriate measurement criteria not only to determine the effectiveness and efficiency of knowledge management, but also to determine the level of knowledge management maturity reached.

- Set criteria to enable managers to successfully institutionalize formal knowledge management endeavours within, as well as beyond organizational boundaries.

- Understand the factors that play a role in the institutionalization of knowledge management from within a strategic/managerial rather than from a purely theoretical perspective.

1.7 Overview of Chapters

1.7.1 Chapter 1: Introduction

Chapter 1 contextualises the motivation behind conducting this study. This chapter primarily focuses on the relevance and importance of answering the research problem. Special emphasis is placed on:

- Background leading to the formulation of the problem statement (Preliminary literature review leading to identification of the research problem),
- Main and secondary research objectives, and
- Research approach/design proposed (methodology, assumptions, and contribution to the discipline).

Chapter 1 concludes with a brief outline of the rest of the thesis including the main topics that achieve the thesis aim.

1.7.2 Chapter 2: Knowledge as a strategic corporate resource

In order to review and report on evidence pertaining to the role and success of knowledge as a strategic corporate resource, special emphasis is placed on the following topics:

- The complexity of knowledge,
- Strategic importance of knowledge, and
- The role knowledge plays in the formulation of strategies, with particular emphasis on:
    - The role knowledge played in the evolution of strategy,
    - The role of knowledge in assessing the organization's external and internal environments, and
    - The future of strategy formulation.

1.7.3 Chapter 3: Knowledge management issues, policies and strategies

Chapter 3 sets out to address whether there are any issues/models/methodologies or perspectives available in literature to guide strategists in identifying how to effectively manage knowledge.

Emphasis in Chapter 3 is specifically placed on:

- Defining the concept knowledge management,
- Conceptualising knowledge management with regard to strategy formulation,
- Identifying and describing issues involved in knowledge management,
- Identifying and defining strategies to govern knowledge management, and
- Discussing the need to create knowledge domains.

1.7.4 Chapter 4: Knowledge and knowledge management maturity

In Chapter 4, it is argued that there is a chronological sequence of events that needs to take place in order to institutionalise knowledge management successfully, especially from within a strategic perspective. The aim of this chapter is therefore to propose an evolutionary methodology with regard to the progression of knowledge management maturity within an organizational setting.

In order to be able to answer the above-mentioned aim, emphasis is placed on:

- The evolution of knowledge management,
- Criteria to determine the organization's knowledge management orientation, and
- The formulation of a holistic ICT and knowledge management maturity model.

1.7.5 Chapter 5: Determining the value of knowledge management

The aim of chapter 5 is to bring knowledge management's performance into context with the objectives and measures that determine the overall efficiency and effectiveness of an organization.

In the quest to achieve the above-mentioned, emphasis is placed on:

- Knowledge management in relation to business strategy and innovation,
- Criteria to determine the efficiency and effectiveness of an organization,
- How to assess the efficiency and effectiveness of knowledge management within an organizational perspective, and
- The value of knowledge management in relation to maturity.

This chapter in numerous ways, focused on the difference in opinion/viewpoints with regard to innovation's role as a measurement criteria for knowledge management success.

1.7.6 Chapter 6: Methodology to assess knowledge management maturity

This chapter builds on the reasoning proposed in the previous four chapters and proposes a questionnaire to empirically test the knowledge management maturity of an organization. Chapter 5 concludes with the hypothesis that progressions in knowledge management maturity (from a strategic perspective) directly relate to an increased ability to shorten the strategic cycle of imitation, consolidation, and innovation, and in doing this induce profitability, growth and sustainability.

Chapter 6 not only supplies an explanation why this research method was selected, but also comments on the sampling techniques used, the way in which the knowledge management maturity questionnaire has been formulated, the data collection process, and in short, of problems encountered with regard to gaining access to subjects.

1.7.7 Chapter 7: Study of the knowledge management maturity of South African Industry

In order to supply a baseline of data on which to benchmark knowledge management maturity, chapter 7 reports on the stance of knowledge management maturity in 86 South African-based organizations. Not only does it elaborate upon on the way data was captured, edited, and analysed, but throughout the discussion, care is taken to debate all anomalies and surprising results, especially where results deviate from the expected.

1.7.8 Chapter 8: Conclusion

The final chapter summarises all facts, arguments, findings and recommendations presented in this thesis. Results and conclusions reached in Chapter 7 are meticulously related to the literature reviewed in chapters 2, 3, 4 and 5. In addition to identifying whether results confirm or deviate from the expected, special emphasis is placed on highlighting gaps and uncertainties that might require further study. Chapter 8 concludes with an elaboration on the main findings, and also proposes a number of recommendations regarding further research.

CHAPTER 2: KNOWLEDGE AS A STRATEGIC CORPORATE RESOURCE

2.1 Introduction

According to Henczel (2000:210), 'knowledge is universally recognized as the most important asset an organization has'. It would seem that the ability to reason with knowledge is becoming the distinguishing factor between being recognized as a leader or being considered a follower. Though knowledge is becoming freely available, it is seldom there when you need it most. This is because knowledge in itself is normally not tangible, resides in the head of the knower, and in a managerial sense can be internal as well as external to the firm (Zack 1999). As Davenport and Prusak (1998:05) state, knowledge is '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 mind of the knower. In organizations, it often becomes embedded not only in documents or repositories but also in organizational routines, processes, practices and norms'. Therefore, even though knowledge starts off as an individual entity, it can be shared, it can be built upon, and it can be used over and over again. Unfortunately it can also be lost in the process.

Murray (2000) argues that it is the uniqueness, the quality of knowledge that makes it one of a firm's most precious assets. Zack (1999:127) states that: 'companies having superior knowledge are able to coordinate and combine their traditional resources and capabilities in new and distinctive ways, providing more value for their customers than can their competitors'. In agreement with this, Tiwana (2000:100) argues that knowledge is crucial to any organization: 'no technology, no market share, no product, etc. can ever provide a competitive advantage that is anything other than temporary. They can all be copied – knowledge is the only resource that cannot be copied, for knowledge is protected by context'. No wonder that management experts such as Drucker (1970), as early as the seventies, were already pointing out that the most valuable assets of the twenty-first-century enterprise, will be knowledge and knowledgeable workers.

2.1.1 Aim

In this chapter (as an introductory chapter) the focus is on reporting on the critical role that knowledge plays as a strategic corporate resource and the success it achieves.

2.1.2. Scope

In order to sensitise the reader to the major impact that knowledge has on corporate strategy and organizational success, a managerial perspective on the reasoning is followed. Thus, to emphasise the above-mentioned aim, the following topics are discussed:

- The complexity of knowledge.
- The strategic importance of knowledge.
- The role knowledge plays in the formulation of strategies, with particular emphasis on:
  - The role knowledge played in the evolution of strategy.
  - The role of knowledge in assessing an organization's external and internal environments.
  - The future of strategy formulation.
- Finally all facts, arguments, and findings pertaining to the complexity of knowledge are briefly summarised.

2.2 The complexity of knowledge

In an organizational sense, the problem with aligning knowledge and strategy is not only rooted in the complexity of knowledge, but also in the sharing of knowledge. As far back as 1958, Polanyi (1958) struggled with the concept of sharing knowledge. Polanyi (1958:49) argued that: 'The successful performance of a skill depends on the observance of a set of rules which are not known as such to the person following them'. This notion later led Polanyi (1966:04) to come to the conclusion that the problem with knowledge sharing is that 'we know more than we can tell'. Gertler (2003:77), also struggling with the idea that the dimension of knowledge exists in the background of our consciousness, argues in similar vein that 'when the skilled performer attempts to describe or explain their performance to an unskilled pupil, they must first try to develop their own awareness of all of the key components of success before they can attempt to communicate these to their student'.

Tiwana (2000) is of the opinion that this uniqueness, this inability to share knowledge, makes it one of the most difficult and most precious assets business has to manage. Furthermore, in an organizational sense the awareness of all of the key components of success extends beyond the individual, to include group and organizational dimensions. In addition, Henczel (2000) argues that when the data-to-information transfer process is combined with the execution of a task, this leads to a further transformation process, a process of creating new information, a process of creating both explicit and tacit knowledge. To study a concept as complex and elusive as knowledge is therefore not an easy task. As Davenport and Prusak (1998:05) stress: 'knowledge is a fluid mix of framed experience' and according to Snyman and Kruger (2004), knowledge means different things to different people; knowledge is extremely complex; and although it can be shared, the manner in which it is internalised and applied (managed) will be different for every person, situation and enterprise. Laudon and Laudon (2004), building on the works of Davenport, DeLong and Beers (1998), argue in similar fashion that an

organization's knowledge base consists of the different sources that constitute knowledge. According to Laudon and Laudon (2004:316), these sources comprise:

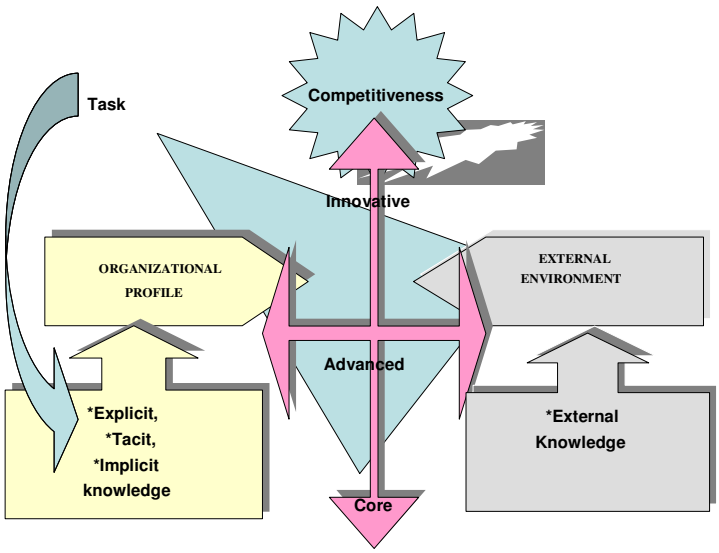
- 'Structured internal knowledge (explicit knowledge), such as product manuals or research reports.
- External knowledge of competitors, products and markets, including competitive intelligence.
- Informal internal knowledge, often called tacit knowledge, which resides in the minds of the individual employees but has not been documented in structured form.'

Of interest is the fact that Nonaka and Takeuchi (1995:63) earlier established a fourth type of knowledge, namely 'implicit knowledge'. Nonaka and Takeuchi (1995) argue that internal (tacit) knowledge in the form of mental models can to a certain extent be expressed, even if only in the mind of the individual, and thus becomes expressible knowledge, in other words, information (refer to Figure 2.1: Knowledge sources present in an organization).

Zack (1999:131), referring to the managerial use of knowledge, came to the conclusion that regardless of the sources of knowledge and regardless of how knowledge is categorized, it can also be classified according to whether it is 'core, advanced or innovative knowledge[9]'.

[9] Core Knowledge. 'Core Knowledge is the minimum scope and level of knowledge required just to play the game' (Zack, 1999:131).
Advanced Knowledge. 'Advanced knowledge enables a firm to be competitively viable' (Zack 1999:131).
Innovative Knowledge. 'Innovative knowledge is that knowledge that enables a firm to lead its industry and competitors and to significantly differentiate itself from its competitors' (Zack, 1999:131).

Figure 2.1: Knowledge sources present in an organization



In a business sense, even if knowledge in the head of the knower has perceived value, it means nothing - for knowledge to have real value, it must be shared, it must be applied, and it must influence and change something, e.g. knowledge must lead to an innovative idea. However, as has been stated, knowledge is complex, requires a number of managerial processes to institutionalize and/or apply it, is called different things by different people, and probably does not have the same effect under all conditions. In this context, authors such as Von Krogh, Nonaka and Aben (2001), state that the key resource for achieving sustainable competitive advantage and superior profitability is not knowledge in all its complexity, but more specifically some application of knowledge. Darroch and McNaughton (2002), quoting the work of Day (1994), Fahey and Prusak (1998), Grant (1996), and Teece (1998), came to basically the same conclusion. Although Darroch and McNaughton (2002) agree with Von Krogh, Nonaka and Aben (2001) that certain knowledge management processes lead to growth and profitability, these authors disagree about which process can truly be considered the enabler. According to Darroch and McNaughton (2002), due to ambiguity and the uniqueness of firms, knowledge dissemination and responsiveness have the most impact on the creation of a sustainable

competitive advantage, especially with regard to the importance of knowledge dissemination practice for innovation. Although it can be argued that in the quest to be *au fait* with knowledge in all its complexity, it is imperative that thorough appreciations be done to determine which knowledge management process (or processes) leads to growth and profitability. This, however fall outside the scope and aim of this study. Although knowledge is complex and means different things to different people, it is important at this stage not to get trapped in an in-depth discussion of what specifically constitutes knowledge. The focus should rather be on determining whether there is any evidence to support the notion that knowledge (in all its complexity), is truly of strategic importance.

2.3 The strategic importance of knowledge

Skyrme (2000:62) is of the opinion that knowledge and other forms of 'intellectual capital' can be considered 'hidden assets'. Zack (1999) argues that organizations gain competitive advantage by successfully excluding competitors from valuable resources. Unfortunately, according to Zack (1999), organizations struggle to sustain these advantages primarily due to competitors developing substitute resources, and/or imitating such resources. Zack (1999) maintains that due to the uniqueness of knowledge it is extremely difficult if not impossible to imitate knowledge, especially context-specific tacit knowledge. In agreement with this, Teece (1998) argues that the ability to build, utilize and protect knowledge assets that are difficult to imitate, is one way of sustaining competitive advantage. Zack (1999:127) goes on to argue that 'to acquire similar knowledge, competitors have to engage in similar experiences. However, acquiring knowledge through experience takes time, and competitors are limited in how much they can accelerate their learning merely through greater investment'. Zack (1999:126) is therefore of the opinion that: 'by having superior intellectual resources, an organization can understand how to exploit and develop their traditional resources better than competitors', and continues: 'Therefore, knowledge can be considered the most important strategic resource'. To emphasize this point, Zack (1999) refers to a number of organizations[10] which leveraged their knowledge capabilities to achieve competitive

[10] LeaseCo, Big6, Lincoln Re, Dow Chemicals, Apple, etc.

advantage. In accordance with this, Tiwana (2000) stresses the fact that companies such as Microsoft, General Electric, Intel, Merck, IBM, Coca-Cola, to name but a few, are all driven by and valued for their knowledge, not their capital assets. Von Krogh, Nonaka and Aben (2001), also agree with this statement and argue that managers at Unilever[11], after actively managing knowledge for 10 years, have achieved increased efficiency in manufacturing and supply chain, a faster rate of innovation, and an acceleration of rolling out best practice – all instances where knowledge was put into motion. According to Von Krogh, Nonaka and Aben (2001), managers at Unilever are convinced that knowledge is a key differentiator, and investment in knowledge truly leads to accelerated growth and profitability.

One must take note that knowledge, when broken down into separate knowledge management processes, does not all specifically or directly lead to growth and profitability. In agreement with this, Darroch and McNaughton, (2002:02), [quoting the work of various authors such as Cooper (1979); Abbey (1983); Kitchell (1995); Amabile et al (1996); Anderson and West (1996); Hurley and Hult (1998); Li and Calantone (1998); Tang, (1999); and Lynn, Reilly, and Akgun (2000)], argue that although there is convincing empirical evidence that knowledge acquisition and spending money on Research and Development (R&D) will positively affect innovation, there seems to be mixed evidence of a link between the knowledge management processes of dissemination or responsiveness to knowledge, and innovation. Darroch and McNaughton (2002) pointed out that these discrepancies arose not only as a result of a lack of research linking knowledge and knowledge management with innovation, but also due to studies failing to account for different types of innovation[12]. Again it is argued that knowledge must be applied differently in different situations. If knowledge must be applied in different ways (especially in a business sense) in order to have value then, owing to all the above-mentioned confusion, it is necessary to focus on the role knowledge plays and its effect on the methodology strategists use to allocate resources. In agreement with this, Bater (1999:39) states that: 'We need to understand how knowledge and information and skills

[11]Unilever. One of the world's largest fastest-moving consumer goods companies.
[12]Please refer to Chapter 5 (Section 5.2) for a more thorough analysis of the link between knowledge management and innovation.

"lubricate" the achievement of organizational objectives. We need to determine how the business works – its chains of activity – and we need to determine the exact points at which knowledge, skills and information inject their value'. What Bater (1999) is proposing is that in assessing the strategic value of knowledge, strategists must look at business from a holistic perspective**.** Strategists not only need to look at the environment in which the organization competes, the chain of events that take place to transform input into output, the organization's culture, norms, values, structure and even politics, but also where and how specifically knowledge, skills and information inject value in the effort to sustain survival, the quest to achieve growth, profitability and sustainability. In the attempt to determine whether or not knowledge is of strategic importance, strategists need to focus on the very incision point in business management where knowledgeable reasoning really counts - the managerial point where the business' most important decisions are made, where resources (even those needed to manage knowledge) are allocated. In accordance with this, Carneiro (2000:97) maintains that 'a deepening of the analysis of manager's interest in knowledge is critical to understand how knowledge management can contribute to improve strategies formulation'. Therefore, in assessing the way strategy is formulated, strategists should not only assess the role knowledge plays in strategy formulation, but also the filtering role strategy plays in the allocation of resources needed to manage knowledge effectively. Quoting the words of Tiwana (2000:103): 'Knowledge must drive strategy, and strategy in turn must drive knowledge management'.

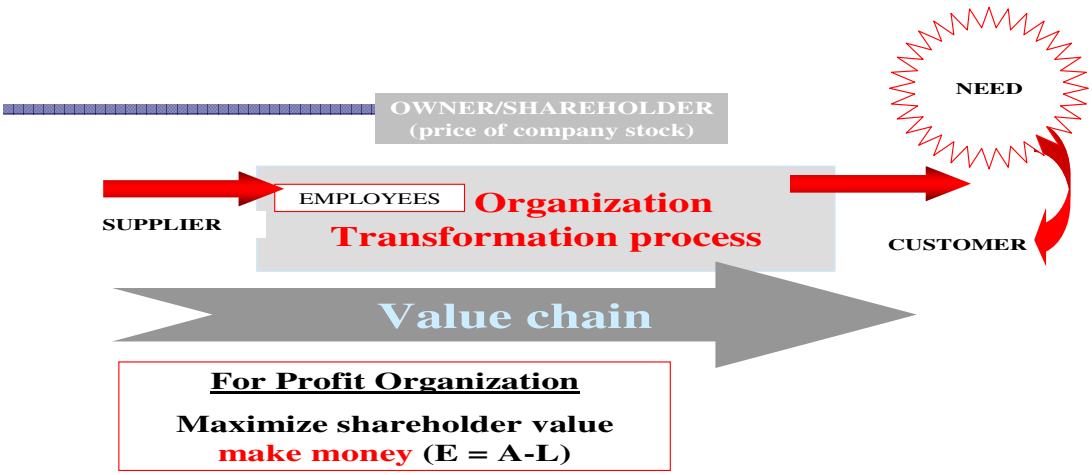
2.4 The role knowledge plays in the formulation of strategy

As a point of departure in assessing the role knowledge plays in strategy formulation, it is imperative to start off by looking at strategy from a holistic business perspective. Mintzberg and Lampel (1999:28), reflecting on the different ways of formulating strategy, conclude that: 'the field of strategy management should seek an understanding of its own evolution. But it must do so without adopting a pseudoscientific theory of change. It may be that the development of strategic management is at odds with the assumed development in evolutionary biology. This assumes a succession of species,

with one often replacing another'. The same authors later continue: 'the schools of strategy represent a line of descent through the history of the field, but this may not be a descent by replacement'. What Mintzberg and Lampel (1999) are proposing is not to upset the apple cart for every new management fad/mindset. Rather than focusing on the differences in opinion/methodologies with regard to strategy formulation, strategists should redirect their attention towards what in particular makes business and strategy work.

According to Pearce and Robinson (2005), the goal of all organizations is to supply value to internal and external stakeholders. Stakeholders are more than simply owners or shareholders of the organization. Stakeholders include owners, shareholders, suppliers, customers and especially employees (refer to Figure 2.2: Providing stakeholders with value).

Figure 2.2: Providing stakeholders with value

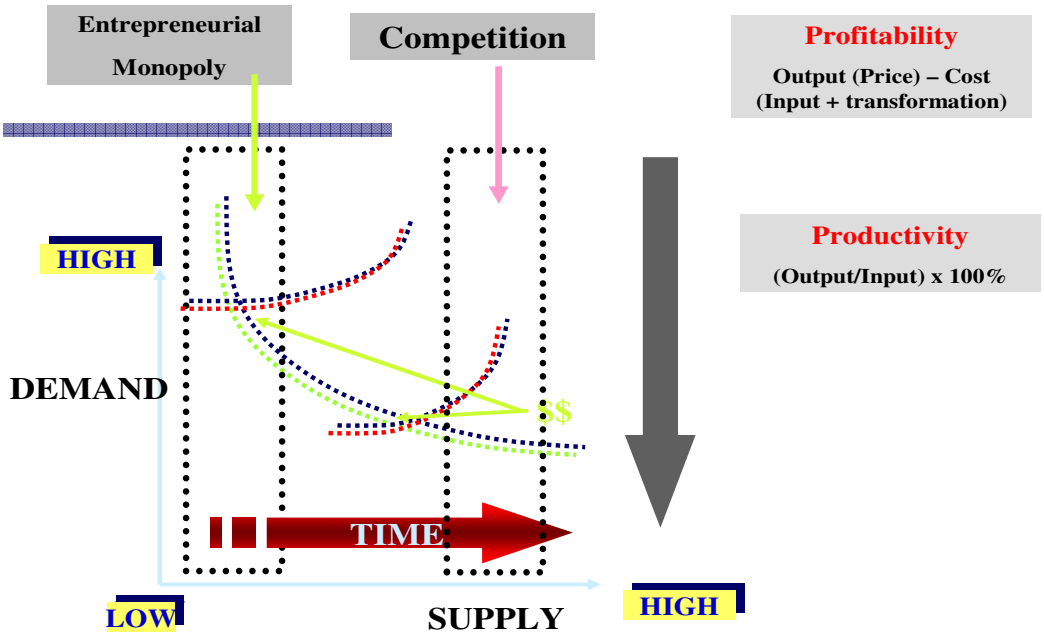


In essence, the sole purpose of organizations is to service the needs of all these different stakeholders, e.g. to add value to all stakeholders. All business is rooted in the quest to satisfy needs, to utilize windows of opportunity. Therefore, in order to survive over a prolonged period of time, the different needs of all stakeholders must be addressed. Unfortunately, business managers became accustomed to servicing the needs of only

those stakeholders responsible for the greatest flow of money into the organization, e.g. the needs of owners/shareholders and customers (Tiwana, 2000). To a great extent, the needs of suppliers, employees and the society that sustain the organization, are still being neglected (Pearce and Robinson, 2005). This might primarily be due to difficulties experienced in measuring the satisfaction of these needs. First of all, these needs are not always tangible ones; therefore success cannot be measured accurately by the use of only tangible (hard) measurement criteria such as ROI, Earnings Growth, etc. An example of this would be the requirement of employees to experience work satisfaction. Fulfilment of this need cannot be measured accurately using only tangible measurements - these needs can only be addressed by toughening up the very soul of those experiencing them.

If there is demand for a need to be satisfied, and if a need can be satisfied with less consumption of input than competitors can manage, it is clear that some kind of gain/profit can be made. If the organization is the only entity servicing the needs of stakeholders, and if there is a high demand for that satisfaction of needs, profit or gain maximization can be achieved. Unfortunately, success of any kind draws attention, and attention normally leads to competition or rivalry in servicing lucrative needs. Dividing the bounty between more competitors generally leads to a lower premium being paid for the satisfaction of a particular need - the economic principle determining the intrinsic value of all commodities, the principle of demand vs. supply (see Figure 2.3).

Figure 2.3: Demand vs. Supply



To ensure a continued stay at that most favourable point of the demand and supply graph, the satisfaction of different needs is being played off against one another, i.e. organizations formulate strategy. Snyman and Kruger (2004:05) argue that all strategy formulation is in essence the quest to achieve superior (economic) results, by means of the manipulation of sound business principles. In order to remain at the most favourable point on the demand and supply graph (the point that also represents the fiercest competition), organizations strive to be entrepreneurial or even to achieve a monopoly. This entails organizations structuring their core capabilities and competencies in such a way as to produce (transform input into output) more cheaply; to create new needs i.e. be entrepreneurial; to succeed in setting up efficient and effective barriers to entry; to kill off all competition; or at the very least be able to act on lucrative opportunities speedily, e.g. be able to transform quickly (Pearce and Robinson 2005).

Considering that the goal of all organizations is to supply value to all stakeholders, to survive over time requires a play-off between the satisfactions of all the different needs (Porter 1980). However, whatever the need, it always revolves around growth in the external environment (creating new market segment), growth internally, and/or transforming input into output in the most effective and efficient manner. This is the essence of all strategy formulation; the quest to satisfy the different needs of stakeholders by means of drawing a synthesis between the organization's profile and the environment in which the organization competes. By either growing and/or being profitable, organizations can ensure the satisfaction of the different needs of stakeholders. An example of this would be to follow a strategy of cost leadership, e.g. producing more cheaply than competitors, for the same level of quality. Cost leadership, e.g. saving on the utilization of resources, reflects favourably on any balance sheet. Without doubt, savings that impact favourably on the Equity = Assets – Liability equation satisfy the need of shareholders (especially if these savings are paid out as dividends). This in turn can lead to even more investment. Another example might relate back to the satisfaction of the need of a totally different stakeholder. By rewarding employees for incremental improvement, e.g. small innovative ideas, organizations can start to follow an incremental growth strategy. Incremental improvement normally leads to a lower rate of resource consumption, faster transformation of input into output, worker satisfaction, and can even lead to growth in the external environment e.g. establishing and/or penetrating a new market segment. The satisfaction of needs is nothing more than playing off growth against profitability, with growth and profitability feeding on one another. Precisely what Pearce and Robinson (2000:31), authors renowned for their work in strategic management, phrase as: 'the firm's intention to secure survival, through growth and profitability'[13]. Porter (1980), in proving insight to strategists with regard to the formulation/structuring of strategies, states that in order to achieve a competitive advantage, organizations can follow one of two generic strategies, cost and

[13] Pearce and Robinson (2000) came to the conclusion that in order to achieve superior economic results (competitive advantage) three business principles (goals) guide the strategic direction of almost every business organization, namely survival through growth and profitability.

differentiation[14]. According to Zack (1999), the work of Porter came under scrutiny by authors such as Teece (1984), Barney (1991) and Connor (1991). These authors are of the opinion that Porter's models address the profitability of industries rather than individual firms, and wrongly maintain that with sufficient barriers, all firms in an industry could realize exceptional returns. Zack (1999:127) correctly argues that: 'to put balance back into the original notion of business strategy, recent work in the area of strategic management and economic theory has begun to focus on the internal side of the equation – the firm's resources and capabilities'. Although disagreeing with some of the earlier work done by Porter, Zack (1999) acknowledges that Porter's models have contributed immensely to our understanding of strategy, primarily because they are based on solid economic thinking.

Pearce and Robinson (2005), building largely on the work of Porter (1980, 1981, 1985, 1987), put some balance back into the original notion of formulating strategy. Pearce and Robinson (2005) pose that in order to survive, organizations constantly need to analyze their internal strengths and weaknesses (strong points, weak points), be on the lookout for new opportunities and threats, outperform their competitors, grow internally, within an industry, or even beyond the borders of their competitive environment. According to these authors, this can only be achieved if strategy is based on the mustering/exploitation of core competencies and capabilities[15]. The gist of the argument proposed by Pearce and Robinson (2005) is again that strategy relates back to survival and sustainability through growth and profitability. Against this background, Snyman and Kruger (2004) came to the conclusion that the goals of all strategy formulation revolve around the economic

[14]Cost: Being a low cost producer of goods and services. e.g. in the quest to become more efficient and effective gaining certain competencies and capabilities (profitability and growth).
Differentiation. Differentiation of product or service e.g. growth into new market segments in order to satisfy new or different needs of stakeholders (primarily growth).
Porter (1985) revised this statement and included Focus as the third generic strategy (a combination of cast and differentiation focusing on mustering a particular force to gain advantage). Porter (1980, 1985) particularly emphasized the role that economic (demand and supply) forces play in strategy formulation. Porter consequently not only identified five external forces impacting on the organization, but also emphasized that organizations operate as small-interlinked value chains, chains linking the organization into the external competitive environment (Porter 1980, 1985).
[15]Core competencies and capabilities. Pearce and Robinson (2005) specifically state that core competencies and capabilities not only refer to the organization's internal competencies and capabilities, but also to the competencies and capabilities of the organization's extended partners.

principle of supply versus demand. One might argue that this is nothing new, the fundamental workings of economics are determined by demand versus supply, thus it is only logical that these principles will also hold true for strategy formulation. This might hold true for the present, but what about the future? Will the economic principle of demand vs. supply still hold true in future? Stated differently, will organizational survival still be determined by the ability to both grow (internally as well as externally) and at the same time be profitable, and will organizations still need to satisfy the needs of all stakeholders, i.e. achieve sustainability?

According to Zack (1999:127), 'levering resources and capabilities across many markets and products, rather than targeting specific products for specific markets, becomes the strategic driver'. This argument relates to statements made by Snyman and Kruger (2004). Referring to a futuristic environment of continuous change, these authors state that organizations will in future need to pool not only their own core competencies and capabilities, but also the competencies and capabilities of their stakeholders, and also, focus (in an innovative way) on specific internal and external forces – forces that will give an organization a competitive edge. The problem that presents itself here is that the competencies and capabilities of some of the stakeholders are the very forces impacting, dictating and even determining the environment in which organizations compete.

One can hypothesize on this point, but not being clairvoyant, the only certainty about the future is that organizations will be dealing with change. Mintzberg (1994), Porter (1996) and Camillus (1997) rightly argue that the new environment will necessitate a completely new way of thinking. Change, being unpredictable and difficult to adapt to, will oblige role-players to force their own change upon their environment (Rayport and Sviokla, 1995) Thus, if constant change is going to be the norm in future, to answer the question: 'will strategy continue to be a play-off between the allocations of resources, to muster capabilities and competencies, all in the quest to satisfy needs?' strategists need to return to the root of all change - the need to evolve.

Without the ability to evolve, all life on earth would over time cease to exist. This law of nature not only holds true in the natural world, but in our ever-changing business environment, is just as applicable to organizational survival. Thus, in a business sense, in order to adapt to changes in the field of play, or even to become the very force necessitating change, some form of evolution is needed. In natural science, evolution is an extremely slow process; perceived over a short time span as nothing more than slight, but constant behavioural change. Cognisance must be taken of the fact that constant behavioural change must, over time, lead to a physical change in the form and function of the organism in order for it to be deemed evolutionary, i.e. there must be a change in the form, or at least the permanent behaviour of the organism. Therefore, in order for changes to be deemed evolutionary in a business sense, they must (like natural evolution) lead to a transformation in the form and function of the organization. In Chapter 5 (section 5.2) it is argued that the entity that instills this type of change within an organization is some form of innovation. Consequently, if the purpose of evolutionary change is to ensure survival, then innovation (being the entity that instills this type of change) is also the change agent for ensuring growth and profitability. As attack is often considered the best form of defence, one can argue that in an ever-changing environment if constant evolution is needed in order to survive, constant innovation would be the best form of defence. Considering that the emphasis in this statement would be on time, and more specifically an extremely long period of time, innovation, just for the sake of it, will in the short term deliver no better results than any game of chance. Unlike nature, time is the only commodity business managers do not have in abundance. Innovation in itself is thus not enough. Arguably, business managers can turn to the distinguishing attribute that made man the crown of all creation, the attribute that enabled man to conquer evolution - knowledgeable reasoning. Authors such as Nonaka and Takeuchi (1995); Dove, (1999); Carneiro, (2000); Darroch and McNaughton, (2002); and Snyman and Kruger, (2004) suggest that for innovation to have real value, it needs to be brought into perspective with knowledge. Taking into account Bater's (1999) contention that strategists need to determine the exact points at which knowledge, skills and information inject most value into the managerial process, the point where knowledge is supposed to be brought into perspective with innovation should also be the point (of incision) where knowledge entry

into the managerial process will yield the highest gain to the organization. As argued, this point of incision resides within business strategy.

If the essence of all strategy formulation is to change for the better, the question can be posed: Why don't all strategies lead to some form of competitive advantage? Simply put, just as not all evolution leads to the survival of the species, not all strategies can lead to competitive advantage. Arguably this is due to the dynamics, the fundamental way all evolution works – survival of the fittest. In nature, the environment determines the strongest, or most adaptable, and survival is secured by ensuring that the genes of the strongest are replicated for future generations. The best is determined through trial and error and, as previously stated, over an extremely long period of time. Trial and error is thus nature's way of learning – learning how to ensure survival. Unfortunately, if the environment changes too quickly, trial-and-error simply does not work. Extinction, of even the best genes, normally follows. This is also true in a business sense. Without having the luxury of ample time, in an ever-changing business environment, the trial-and-error method simply does not work. Once again it is argued that the distinguishing factor between winning and losing, survival and extinction, profit and loss, in an ever-changing environment where time is of the essence, is knowledgeable reasoning.

In order for businesses to evolve, innovation is an indispensable ingredient. However, in order to survive, grow and be profitable – especially in a rapidly changing environment, in order to be distinguished as a capable competitor - innovation needs to be brought into relation with knowledgeable reasoning. Only when this is done can innovation act as an efficient and effective agent of change, but once again it is argued that strategy is the incision point where innovative plans are made, plans to enable the organization to grow and/or be profitable, the very point on the managerial agenda where innovation is supposed to be brought into relation with knowledgeable reasoning. Strategy is thus nothing more than a hypothetical moment of truth, a moment when all knowledge is supposed to come together. Therefore, knowledge must first be consolidated in a hypothetical moment of truth; it must lead to plans to speed up the business evolutionary process; it must then be filtered by and render strategy possible before it can be related to

any form of innovation, for strategy is the filter (where you decide on the best genes) for all knowledgeable reasoning. Pearce and Robinson (2005), therefore assert that in future knowledge will only gain in stature, and strategy will become a managerial process taking place at all levels of the organization, not only employed by strategic (top) managers.

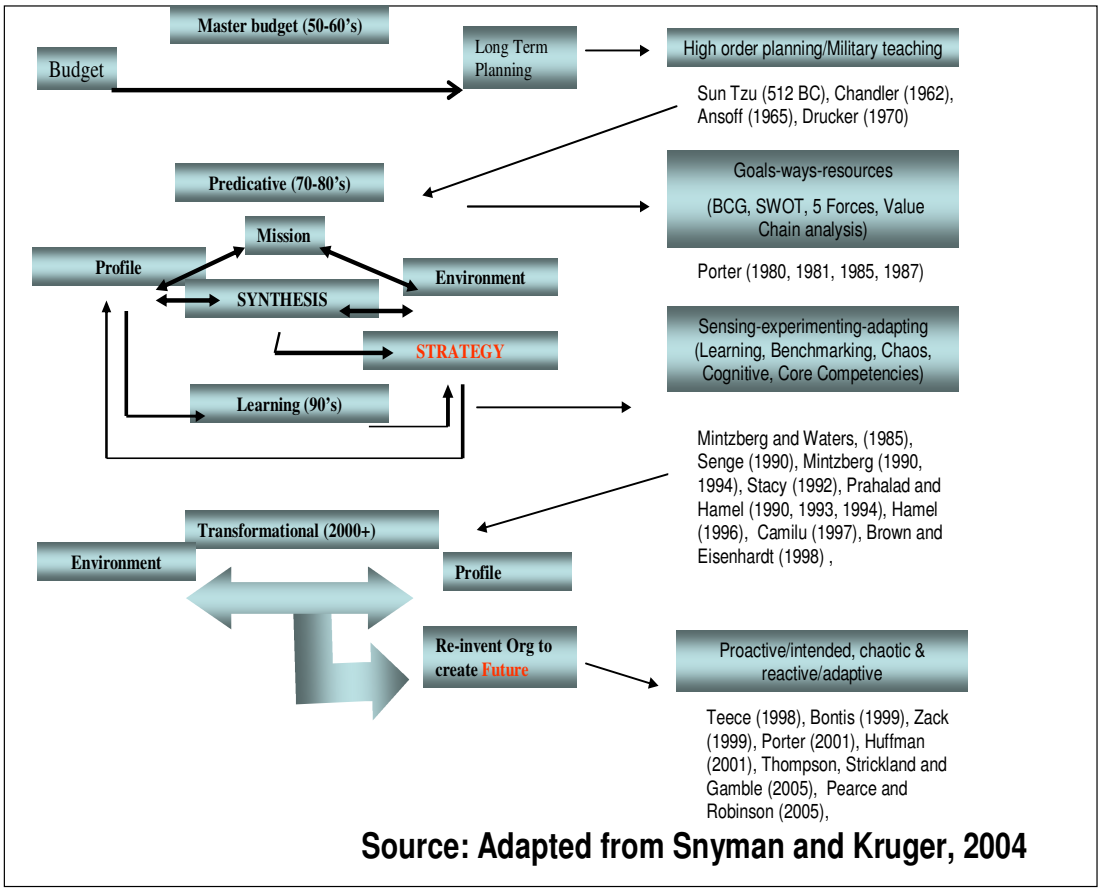
It is only now that knowledge is becoming freely available that strategists are realizing its potential as an enabler, an agent of change enabling managers to drastically speed up the business evolutionary process. Strategy based on knowledgeable reasoning is undoubtly changing the competitive environment, rewriting the rules, and enabling organizations to evolve and draw new types of synthesis. With reason, authors such as Bater (1999:38) maintain: 'It's knowledge and information that feed the business; the technology is important, certainly, but it remains merely the vehicle for delivery. No amount of IT will make an iota of difference to business success unless it is geared to supporting an organization's knowledge and information needs'.

2.4.1 The role played by knowledge in the evolution of strategy

'The field of strategy management should seek an understanding of its own evolution. But it must do so without adopting a pseudoscientific theory of change' (Mintzberg and Lampel, 1999:21).

As a point of departure in assessing the role that knowledge plays, and most probably will continue to play in strategy formulation, it is important to begin by considering strategy from a historical perspective (refer to Figure 2.4). Strategy, the old military concept of higher-order planning (Sun Tzu, 1971) started coming to the fore in business planning during the 1960s and 1970s. Accounting and operational principles clouded decision-making prior to this period (Snyman and Kruger, 2004).

Figure 2.4: Models for strategy formulation



During the 1970s, mostly as a result of work done earlier by Chandler (1962) and Ansoff (1965), organizations began experimenting with a concept called 'higher-order planning or strategy'. As in military teachings (Sun Tzu, 1971), authors such as Chandler (1962) proposed that organizations relate their internal state and external expectations to each other. The methodology used was similar to the methodology used to solve military appreciations and problems: a predetermined 'vision and mission' to conquer the enemy, primarily via the reconnaissance of enemy forces, and skilful deployment of one's own forces. Thus the concept of 'business strategy' was born.

During the 1980s, strategy was for the most part influenced by the work of Porter[16] of the Harvard Business School. Apart from proposing that a synthesis between external and internal forces be drawn, an element of predictability was being incorporated into strategy formulation. Strategy formulation shifted towards a methodology of trying to design a competitive formula around a prediction of the future, that is, predictive models. In essence, in returning to economic and marketing principles, strategic thinkers suggested that strategic choice centres on predetermined or 'generic' strategies ((*vide* Boston Consulting Group's *Growth Share Matrix* (Henderson, 1979) and *Generic Strategies of Cost, Focus, Differentiation* (Porter, 1985)). The common thread among all predictive models was the drawing of a synthesis between organizations' strong and weak points, and the opportunities and threats presented in the external environment, called the SWOT analysis. Important variations on this methodology included the adding of a predetermined vision (primarily building on an earlier idea proposed by Drucker (1970), a clear-sighted and entrepreneurial futuristic view/end state (Westley and Mintzberg, 1989), or even some form of strategic objective or 'intent' (Hamel and Prahalad, 1989). Mintzberg, Ahlstrand and Lampel (1998) therefore argue that advocates of this 'school' followed the dogma of 'goals-ways-resources' (Zeleny, 1997), viewing personalized leadership, based on strategic vision, as the key to organizational success.

During the latter part of the 1980s, spectacular gains in the Japanese industry forced organizations to rethink the way they had perceived strategy. Porter's work came under critical scrutiny of authors such as Teece (1984), Mintzberg and Waters (1985), Mintzberg (1990, 1994), Connor (1991) and Hamel (1996). These authors argued that Porter's models address the profitability of industries rather than of individual firms, and incorrectly suggest that with sufficient barriers, all firms in an industry can realize exceptional returns. Moreover, Mintzberg, Ahlstrand and Lampel (1998), started to argue that Porter's work, in as much as it deals with the assessment of organizational strength and weaknesses, bypasses learning, making strategy explicit, promoting inflexibility. Largely due to Senge's book, *The Fifth Discipline* (1990), and Mintzberg's (1994) critique of predictive models, organizations bent upon learning from and benchmarking

[16] Porter (1980, 1981, 1985, 1987).

the best, started placing more emphasis on a learning methodology (Main, 1992; Watson, 1993).

Criticism of predictive models encouraged a shift away from strategy only being vested in the highest echelons of management to include other spheres of the organization as well. Beer, Eisenstat, and Spector (1990), for instance, argued that change should not be a top-down process and suggested that the most successful transformations and strategies should start at the periphery of the organization, and be led by general managers, not the Chief Executive Officers (CEOs). Strategic thinkers began to argue that the ability to have an instant grasp of the whole not only necessitated an understanding of the external environment, but also called for an effort to combine all the knowledge locked up within the organization – 'the sixth sense of Kan' (*vide* earlier work done by Shimizi, 1980).

Strategy was therefore no longer perceived to be exclusively a predictive process of planning, implementation and control. Strategy started to encapsulate learning. According to Zeleny (1997), learning advocates followed a doctrine of 'sensing, experimenting and adapting' instead. The pivotal aspect of the learning perspective on strategy was therefore to learn faster than the competition, rather than to outwit them.

The 1990s saw yet another reassessment of the way in which strategy was perceived. As early as the mid-eighties, Wernerfelt (1984) suggests that a company's resources and competitive capabilities play a significant role in strategy formulation. Authors such as Grant (1991), Prahalad and Hamel (1990), Hamel and Prahalad (1993, 1994), Barney (1991, 1995) as well as Nonaka and Takeuchi (1995) begin to emphasize the power of organizational core competencies (capabilities based on knowledge, and continuous learning) as vehicles in the quest to sustain competitive advantage. Grant (1991), for instance, points out that in a volatile environment, organizations have no choice but to rely on internal conditions in order to define and redefine themselves. Huff (1990) argues that in order to understand strategic vision and the way strategies are formed, one also needs an understanding of human cognition. Followers of the 'cognitive' school of strategy formulation subscribe to the notion that strategy is perspectives, or rather

interpretations of the world, that are driven more by prior experience and knowledge than by drawing strategic syntheses.

Stacy (1992) in a sense refutes previous claims made by strategists, and argues that it is neither set ways, nor experience, but rather inconsistencies that create new strategies. Brown and Eisenhardt (1998), building on the work of Stacy (1992), therefore suggest that organizations need to be in a constant state of instability or even chaos in order to be able to act on and react to opportunities, especially if the organization is competing in an extremely volatile environment. In a similar manner, scholars such as Taylor (1997) start to question the value of set ways of formulating strategy, proposing that strategists look at strategy formulation from a different perspective, one in which they raise new and outrageous questions. Camillus (1997) even goes so far as to argue that in an ever-changing environment, experience and knowledge of strategy formulation theories constitute an impediment rather than a source of help to strategic thinkers.

During this time, many strategists start to acknowledge the power of hidden assets. Teece (1998), Bontis et al (1999) as well as Birchall and Tovstiga (1999) all propose that in sustaining a competitive advantage, emphasis should be placed on the value of intangible assets, especially the value of knowledge in strategy formulation. According to Snyman and Kruger (2004), strategists in the late 1990s realize that in an ever-changing environment, simply adapting to change no longer ensures survival. Strategy formulation became an on-going process, a process of reinventing the organization in order to create the future (Rajogapalan and Speitzer, 1996). In essence, strategists start looking beyond predicting, even beyond learning to include a methodology where the organization is kept in a continuous state of self-inflicted chaos. Mintzberg, Ahlstrand and Lampel (1998) go so far as to suggest that chaos, instability and even disorder are as important as order, to keep the organization in a permanent revolutionary state, or rather a strategic state where new and innovative knowledge is generated in a continuous and evolutionary manner.

In summarizing strategic thinking, Thompson, Strickland and Gamble (2005) maintain that because the business environment necessitates continuous change, the best strategy

formulation methodology (in this day and age) should be an evolutionary and transformational process, typically including a blend of proactive/intended/chaotic and also reactive/adaptive actions. Thompson, Strickland and Gamble (2005) argue that the strongest methodologies are repetitive by nature, evolving in themselves over time, and then merging with the strengths of other methodologies.

Shortly after the turn of the century, strategists such as Huffman (2001) as well as Leibold, Probst and Gibbert (2002) contend that without the luxury of time, in a changing environment, trial-and-error stratagems such as predictive learning and even revolutionary methodologies such as Chaos Theory, will no longer work. Tapscott (2001:03), in elaborating on the evolution caused by the Internet, promotes new frontiers in strategic thinking, arguing that: 'Yesterday's strategy orthodoxy blinds managers to unprecedented corporate opportunities'. Porter (2001), however, in defending previous strategic thinking, argues that the Internet and associated technology are not causing a revolution in managerial and strategic thinking, but rather bringing about a rapid increase in the speed of doing transactions, the making of decisions and the exchange of knowledge. Even though authors such as Porter, Huffman and Tapscott disagree about the severity of the impact of technological innovations (such as the Internet) on strategy formulation, they agree that technology is becoming an enabler, a means to speed up the data-to-information-to-knowledge cycle, enabling strategists to reach the hypothetical moment of truth, the moment when all knowledge is supposed to come together, much faster. Gertler (2003) argues, in much the same way as Teece (1998) and Bontis et al. (1999), that the ability to manage knowledge, especially in a knowledge-rich economy, is becoming critical to strategic management.

In essence, knowledge as a strategic catalyst (in the past a scarce commodity) is becoming available to more and more takers. However, just as adding more catalyst can accelerate a chemical reaction, more knowledge can also accelerate the strategic management process. However, in the natural sciences a fine balance must exist between the chemicals and the catalyst. If it does not, a reaction may never take place, or an explosion might even occur. As in the natural sciences, a fine balance must be struck

between the amounts of knowledge needed to produce a successful outcome. Weyrich (1998) therefore maintains that although innovation is built on knowledge, it is not a flash of genius; it is a deliberate process that must be managed. In other words, in an organizational context, it is knowledge management and not knowledge *per se* that drives innovation. In a similar manner Carneiro, (2000); Dove, (1999); and Nonaka and Takeuchi, (1995), as cited by Darroch and McNaughton, (2002), are all of the opinion that knowledge management, as a managerial entity, is emerging as the antecedent of strategy and innovation.

In order to prove the interdependency between Strategic Management and Knowledge Management, Snyman and Kruger (2004:5) find that: 'the different strategy formulation methodologies differ primarily with regard to the way they perceive the interaction between the organization's profile, and the competitive environment in which the organization functions'. Snyman and Kruger (2004:5) also state that: 'although all the different strategy formulation methodologies differ with regard to their interaction with knowledge as a strategic resource, they are all in agreement that one needs to know what your organization's key resources are, and what your core competencies/capabilities should look like to sustain competitiveness in future'. Snyman and Kruger (2004:5) go on to say that: 'the key to developing a model capable of synthesizing strategic management and strategic knowledge management, lies in the foundation of knowledge, and especially knowledge of the area of excellence'. Finally these authors come to the conclusion that 'strategy should dictate how information and knowledge should be used. At the same time, knowledge should make new strategies and new ways of competing possible'. These statements are in accord with work done by Zack (1999) and Tiwana (2000:158). Zack (1999:130) is of the opinion that 'regardless of the strategy formulation process, organizations have a *de facto* strategy that must first be articulated. Every strategic position is linked to some set of intellectual resources and capabilities'. Tiwana (2000:158), in trying to establish the interdependency between the two strategies (business strategy and knowledge management strategy) states clearly and concisely that: 'It's your company's business strategy that drives its knowledge management strategy, and not the other way around' but adjusts this statement later (Tiwana, 2000:188) to say

that: 'Knowledge management and business strategy must drive each other. This is possible only if the two are in perfect alignment'.

In effect the above-mentioned authors are trying to say that the formulation of winning strategies is built upon the foundation of knowledge, and especially knowledge of the area of excellence. Zack (1999:130) argues that: 'every strategic position is linked to some set of intellectual resources and capabilities'. Snyman and Kruger (2004:08) write that all strategy formulation models are based on the foundation of knowledge. 'In the predictive model, three ingredients are critical to the success of a strategy. Firstly, the strategy must be consistent with the conditions in the competitive environment. Specifically, it must take advantage of existing or projected opportunities and minimize the impact of major threats. This is only possible with a sound knowledge of one's competitive environment (opportunities, threats). Secondly, the strategy must be based on the exploitation of core capabilities, i.e. strategy must place realistic requirements on the firm's internal capabilities (strong points, weak points). Knowledge of one's capabilities, core competencies and areas of excellence is thus of paramount importance. Thirdly, in order to execute the strategies successfully, knowledge and understanding of the strategy should be communicated throughout the organization. In corroboration of this perspective, the learning model not only emphasizes flexibility but also the fact that organizations should become learning, thus knowledgeable organizations, building strategies around core competencies (areas of excellence)'. Snyman and Kruger (2004) continue with this line of reasoning and argue that the critical essence of the learning perspective on strategy formulation is to learn faster than the competition rather than to outwit them. Finally, Snyman and Kruger (2004) come to the conclusion that even this critical essence of the transformational perspective on strategy formulation is based on the leverage of internal as well as external knowledge. Knowledge has undoubtedly played a crucial role in the evolution of strategy and will continue to do so. However, if knowledge is of such strategic importance, how then do we manage and allocate resources to knowledge? As Von Krogh, Nonaka and Aben (2001:421) state: 'Currently strategic planners, for example, know perfectly well how to analyse the strengths and weaknesses of a company's tangible resources, as well as how to match these with

opportunities and threats in the environment. They know how to use these analyses for capital resource allocation, for calculating discounted cash-flow from investment in intangible assets; but do they know equally well how to analyse knowledge and allocate resources according to knowledge activities?'

2.4.2 The role of knowledge in assessing the organization's environments

The immense influence that Porter's (1980) Five Forces Model exerted on strategy formulation, forced strategists to rethink the way in which the value of core capabilities and capacities of an organization is determined. Strategists using Porter's Five Forces Model as a baseline in determining opportunities and threats presented by the external environment, found it extremely difficult to draw a synthesis between external forces and the internal power locked up in the core capabilities and competencies of the organization. Attempting to formulate winning strategies proved to be a daunting task when, on the one hand, strategists needed to focus on the organization as a number of distinct functions, and on the other hand needed to assess the external environment as distinct forces. Porter proposed a solution. In order to be able to draw a synthesis between external factors and internal capabilities, Porter (1985) suggested that strategists needed to assess the organization not as distinct functions but as value-adding processes (maybe even value-adding forces). Like the Five Forces Model, the value chain concept broke new ground. Strategy formulation methodology thus shifted away from structuring the organization as a number of distinct functions (logistics, finance, human resources, marketing, manufacturing, etc.), to an organizational structure consisting of a succession of value-adding processes (e.g. Porter's value chain). This set of integrated business applications motivated strategists to propose a new way of bolstering business process reengineering efforts (Wainright Martin et al, 2005). The stage was set to build strategy formulation on drawing a synthesis between the organization's value chain and the forces present in the external environment. In effect what Porter was proposing was to look at the organization as a continuum of value-adding processes, all relating back to supplying value to stakeholders, i.e. ensuring sustainability. The forces Porter maintained were present in the external environment were nothing more than the power capabilities of

external stakeholders, and the internal environment was seen by Porter as the way input resources presented by these stakeholders were supposed to be utilized in the most effective and efficient manner possible – all to supply value to stakeholders.

2.4.3 The Future of strategy formulation

What Porter proposed was not a 'descent by replacement' of the old military concept of drawing a synthesis. In order to be successful, strategists still need to know more about their own capabilities and competencies, and the external forces they face, than their competition does. Even though it remains an open-ended question as to what specifically strategy will comprise of in future, strategy will continue to be built upon knowledgeable reasoning. Possibly this can be attributed to knowledge being the only strategic resource that cannot be consumed by the strategy formulation process. As Zack (1999:128) argues: 'Unlike traditional physical goods that are consumed as they are used, providing decreasing returns over time, knowledge provides increased returns as it is used. The more it is used the more valuable it becomes, creating a self-reinforcing cycle'. As Mintzberg and Lampel (1999) point out, strategy needs to evolve on a path of descent where new strategic insight is integrated with existing methodologies. As the environment changes and business evolves, knowledge will continue to affect and/or even alter the way strategy is perceived.

In agreement with this statement, Leibold, Probst and Gibbert (2005:78) argue that 'in the global knowledge economy, the concept of competitive advantage is now being seen differently: the firm's potential relative to the overall processes and resources in business ecosystems and organizational networks, with a balancing of competitive advantage and collaborative co-evolution'.

An example of knowledge altering the way strategy is perceived can already be seen in ICT[17] innovation. In essence, innovation in ICT is supplying a communication channel to speed up the data-to-information-to-knowledge transformation process. It is enabling strategists to reach the hypothetical moment when all knowledge is supposed to come together, much faster. It is not only enabling strategists to add more knowledge to the process of strategy formulation, but also to 'virtually' collapse the external environment into the organization's value chain. Another example of innovation in ICT supplying strategists with new options can be found in the evolution of Enterprise Resource Planning (ERP) systems. ERP systems, coupled with telecommunication systems, are evolving into Enterprise Resource Management (ERM) Systems. These systems are evolving from mere Transaction Processing Systems (TPS) utilized over telecommunications media, to true Decision Support Systems (DSS). Systems developed to shift data and information between value chain partners become strategic management tools with the capacity to supply strategists with crucial information regarding strategy formulation.

The statement made by Snyman and Kruger (2004) that in order to be transformational, organizations should (in future) pool primary resources, areas of excellence and core competencies of different business units and partners in an extended value chain, therefore does not seem far-fetched. In future, in order to survive, organizations will need to pool not only their own core competencies and capabilities, but also the competencies and capabilities of stakeholders (Sviokla and Rayport, 1995). As a result of information technology unmasking the forces controlled by stakeholders, these statements are becoming reality. A boundary is nothing more than a beginning and end to something, and in managerial terms it is often the point between what is under control and what is

[17]Innovation in ICT: The Internet is an example of innovation in ICT altering the way strategy is perceived. The power of the Internet lies in its ability to enable business to distribute products through another business to interact directly with end customers - the sixth competitive force proposed by Porter. The Internet also offers a channel for the rapid flow of information and business transactions between multiple buyers and seller in a much greater sphere of influence. The Internet is thus not only linking companies electronically. Its power is vested in the vast information it contains. It is a global information centre with valued information on the location, situation, and even strategies, of stakeholders. (Leibold, Probst and Gibbert, 2005).

not. In fact, in supplying strategists with fast and timely information on the forces controlled by stakeholders, distinct boundaries between the external and internal environments are disappearing. Knowledge is expanding the organization's sphere of influence. Forces that used to be exclusively under the control of stakeholders, primarily due to time and space constraints, can now be used to the advantage of the organization via the enabling power vested in technology. Threats are identified early enough for them to be turned into opportunities, and these opportunities in turn become strong points. External forces are no longer seen as mere opportunities and threats - through the power of knowing and knowledge exchange they are becoming core competencies and capabilities.

In future, strategy formulations will no longer constitute the drawing of a synthesis between the organization's external and internal environment, as the boundaries between these environments are quickly disappearing. As Leibold, Probst and Gibbert (2005) argue, organizations will no longer compete with one another. Value-adding chains built on extended core capabilities and competencies of stakeholders will compete primarily in respect of the value and perceived value of satisfying beneficial needs. Strategy will not only necessitate drawing a synthesis between the organization's extended value chain (on the one hand), and the extended value chains of competitors, but also the extended environment in which the organization functions. In future, organizational survival will be in direct proportion to the organization's ability to address the needs of all shareholders timeously. Knowledge will definitely continue to be the catalyst in the game of continuous survival and will keep organizations on the cutting edge.

Another indication that knowledgeable reasoning is changing the way we perceive strategy formulation, can be found in literature supporting the notion that the increase in knowledge is also heightening an understanding of the interdependency between different managerial endeavours. Huffman (2001), in contemplating the features of brilliant strategy, argues that performance measurement is mostly divorced from the strategy formulation process, relegating performance management to the status of an 'after-the-fact tool', destined never to reach its full potential. Huffman therefore contends that

performance management needs to advance to the strategic dimension. Mistra (2004) concurs with the arguments proposed by Huffman, and adds that performance management, as a strategic phenomenon, gives strategic managers huge opportunities (still untapped)[18]. According to Huffman (2001), the institution of such a strategic intent calls for a change, not only in the way strategy formulation is perceived, but also in the way performance and tactics are validated.

As in strategic management, knowledge is crucial to performance management. Responding to debate surrounding the evolution of performance measurement and management, Kruger (2005) argues that a merger between strategy formulation, performance management and knowledge management has the capacity to add a dimension of geography to the knowledge-strategy cycle, opening up social interplay, enabling organizations to interact and trade knowledge (even tacit knowledge) with the very forces that shape competitiveness. Kruger (2005) is also of the opinion that: 'Implicit in performance appraisal, due to social and environmental dimensions, are huge opportunities and also responsibilities to align and merge strategic management with knowledge management' Kruger (2005:19).

The interdependency between knowledge management, strategy, tactics and performance management is also strongly supported by studies conducted by SAM Research and Hewitt Associates. According to SAM Insight (2004), there is a clear, statistically significant indication that successful companies support and encourage the development of networks that cut across the boundaries of hierarchies, supported by knowledge management systems and tools to manage organizational learning (SAM Insight, 2004).

2.5 Summary

This chapter emphasizes the fact that although there is a constant reassessment of the way in which strategy is perceived, all the different strategy formulation models follow the

[18] Also refer to arguments proposed by various contributors to the Performance Measurement Association's official newsletter *Perspective on Performance* available http://www.performanceportal.org.

same general path, a methodology based on trying to find an answer to the problem of satisfying stakeholder needs. In focusing on the evolution of strategy, it was determined that knowledge has played, and will continue to play, a crucial and enabling role in the formulation of strategies. It was argued that the evolution of strategy should continue to progress along the line of descent through the history of the field, not by replacing previous notions, but rather by building knowledgeably upon them. As a result of advances in information and communications technology, information is becoming freely available, enabling organizations to speed up the data-to-information cycle. This phenomenon is causing the barriers between external and internal organizational spheres to become blurred and/or even collapse, compelling organizations to create new ways to formulate strategy, whether of a structured, unstructured or even chaotic nature.

In conclusion, it is proposed that the changing environment is catapulting knowledge management into a strategic dimension. The merger between strategic management and knowledge management is in itself becoming a strategic methodology, a methodology directed towards satisfying as many stakeholder needs as possible. If the statement made by Gertler (2003:76) that: 'No matter which label one prefers, the production, acquisition, absorption, reproduction, and dissemination of knowledge is seen by many as the fundamental characteristic of contemporary competitive dynamics', is brought into relation with the essence of all organizational performance, i.e. 'how well do we sustain survival via the satisfaction of stakeholder needs' it becomes apparent that within any form of strategy formulation, lie huge opportunities, or rather a responsibility to share knowledge. It is therefore argued that knowledge management has the capacity to add a dimension of geography to the knowledge-strategy cycle, opening up social interplay, enabling organizations to tactically interact and trade knowledge, especially tacit knowledge, with the very forces that shape competitiveness. This power is already being utilized by numerous organizations that have demonstrably outperformed peers in the quest to sustain survival, pooling areas of excellence and core competencies in an extended value chain. These are organizations capable of finding answers to the question 'what knowledge is specifically needed by my organization in order to ensure survivability?'

After reporting on the role knowledge plays as a strategic corporate resource and after determining the interdependence of strategy, knowledge and knowledge management, in the next chapter these notions and proposes are expounded and ways to manage knowledge within a strategic context are proposed.

CHAPTER 3: KNOWLEDGE MANAGEMENT ISSUES, POLICIES AND STRATEGIES

3.1 Introduction

In the quest to determine if efficient and effective knowledge management do indeed lead to accelerated growth, profitability and sustainability, Chapter 2 focuses on the evolution of strategy and the role of knowledge in this evolutionary process. It is argued that even though knowledge means different things to different people, knowledgeable reasoning will continue to play a crucial and enabling role in the formulation of winning strategies. In this context, Zack (1999) argues that one can assume that the ability to exploit intangible assets needs to become far more decisive than the ability to invest and manage physical assets. In agreement with this viewpoint, Laudon and Laudon (2004:315) claim that 'knowledge assets are as important for competitive advantage and survival, if not more important, than physical and financial assets'.

While it is easy to state that knowledge must be incorporated into strategic thinking, according to Davenport (1998), Earl (2001), and Von Krogh, Nonaka and Aben (2001), it is not obvious how this should be done, or even how this resource should be managed. In the latter part of the nineties, Davenport (1998) emphasises that although many companies are beginning to feel that knowledge is their most valued asset, only a few have actively begun to manage knowledge efficiently and effectively, especially on a daily basis. Arguably, this statement by Davenport is still applicable today. In similar fashion, Earl (2001) argues that even though organizations accept that knowledge can enhance performance, they often do not know where to start managing knowledge. Von Krogh, Nonaka and Aben (2001) concur and assert that although strategic managers know perfectly well how to manage tangible assets, they battle to analyse knowledge and allocate resources according to knowledge activities. Earl (2001) is of the opinion that the difficulty inherent in managing knowledge can be attributed to the fact that knowledge management, like knowledge itself, is extremely difficult to define. Darroch and McNaughton (2002) attribute this phenomenon to managers not agreeing on what

knowledge management really entails and/or to the complex nature of knowledge. Darroch and McNaughton (2002:211), therefore stress that until there is a widely accepted definition of knowledge and knowledge management, measuring knowledge management and identifying its effects on outcomes such as innovation and a firm's performance will be very difficult.

Whatever the turmoil, due to the strategic significance of knowledge, strategists are now faced with a rapidly growing need to find and improve on ways to create, locate, manage and ensure that the power of knowledge is leveraged and shared throughout the organization. The need to imbue knowledge management with good governance and accountability is becoming increasingly important.

3.1.1 Aim

The aim of this chapter is to determine if there are any issues/models/methodologies or perspectives available in the literature on the subject, from a knowledge management point of view, to guide strategists in their efforts to manage knowledge effectively.

3.1.2 Scope

In order to supply a strategic perspective on the line of reasoning followed throughout this chapter, all issues/models/strategies discussed, are meticulously brought into context with business strategy formulation. In the attempt to remain true to this notion and in order to answer the above-mentioned aim, special emphasis is placed on the following:

- Defining knowledge management.
- Conceptualising knowledge management with regard to strategy formulation.
- Identifying and describing the issues surrounding knowledge management.
- Identifying and defining strategies to govern knowledge management.
- Discussing the need to create knowledge domains.

The main thrust of this chapter is not only to identify issues, policies and strategies that are pertinent to the effective management of knowledge, but also to relate these entities to one another, thus determining whether or not there is a chronological sequence of events that needs to take place in order to institutionalise knowledge management successfully.

3.2 Definition of knowledge management

According to Roffe (1999:224): 'Knowing the strengths and weaknesses of a particular management tool is one challenge, but its practical application inevitably involves another, in the shape of change of one form or another. Such change in turn creates a new set of problems that too often seem unique to the individual, the department, or the organization. In reality, someone else has already solved the problem and the real complications are in finding, and then gaining access, to the solution. This dilemma has spawned yet another tool (activity): knowledge management'. Knowledge management is thus a managerial activity, and according to Zack (1999:125): 'the primary focus of these efforts (in knowledge management) has been on developing new applications of information technology to support the digital capture, storage, retrieval and distribution of an organization's explicitly documented knowledge'.

Based on descriptive and inductive research, Earl (2001) in analysing the classification and typology of 'schools' of knowledge management, came to the conclusion that knowledge management is not just another IT application. Earl (2001:218) argues that: 'knowledge management endeavours are concerned with both explicit and tacit knowledge and both internal and external knowledge, and goes on to say that 'some also encompass what some may see as information systems'. Zack (1999) stresses that only a small number of organizations are attempting to manage tacit knowledge. Ndlela and du Toit (2001) argue that in managing knowledge, a holistic and integrated approach should be followed. Providing a more holistic view of knowledge management, Darroch and McNaughton (2001:211) maintain that: 'Knowledge management is the management function that creates or locates knowledge, manages the flow of knowledge within the organization and ensures that the knowledge is used effectively and efficiently for the

long-term benefit of the organization'. In agreement with this, Laudon and Laudon (2004:315) argue that knowledge management increases the ability of organizations to learn both externally and internally, and define knowledge management as: 'the set of processes developed in an organization to create, gather, store, transfer and apply knowledge'. In essence what all these authors are saying is that knowledge management is more than the processes that drive it, more than the technology that institutionalises it, more than the people that govern it - knowledge management is the custodian of the evolution of organizational learning.

3.3 Knowledge management in relation to business strategy

According to Henczel (2000:210), 'the challenge for today's information professional is to identify the information that is needed to optimize the achievement of organizational objectives, who it is needed by, how it will be used, its sources and how it flows through the organization and between the organization and its external environment'. In the previous chapter (section 2.4), it was argued that strategy is the quintessential moment of truth, the moment when all knowledge is supposed to come together. Zack (1999:126), after researching the knowledge management practice of more than 25 firms regarding 'which knowledge management efforts are appropriate', and 'what knowledge should be managed and developed', comes to the conclusion that: 'the most important context for guiding knowledge management is the firm's strategy'. Zack (2001:08) later amends this statement to read: 'a firm's business strategy should reflect the role of knowledge in helping the firm to compete', adding that 'once the role between strategy and knowledge is defined, then other aspects of strategic management such as resources allocation, organization design, product development and market segmentation can be configured to bolster knowledge strengths, reduce knowledge weaknesses, etc.' In essence Zack (1999, 2001) emphasizes that in the quest to formulate winning strategies, strategists should not only assess the enabling role knowledge plays in strategy formulation, but should also assess the filtering role that strategy plays in the allocation of resources needed to effectively manage knowledge. This interdependency between knowledge and strategy is the cornerstone on which all knowledge management endeavours rest. In agreement with

this, Snyman and Kruger (2004:15) argue that: 'The successful management of an organization's resources in the next century will be determined to a greater extent by the organization's ability to combine knowledge management with a thorough understanding of principles involved in business strategy formulation to guide the development of information resources for the firm. Only when combined with direction setting (setting a vision, architecture and a technology plan) and excellent management of the intellectual assets, can an organization perform most effectively'.

In analyzing all the different perspectives on strategy formulation from a business as well as a knowledge management point of view, Snyman and Kruger (2004), come to the conclusion that business strategies and knowledge management strategies should feed upon each other and need to work interdependently. This statement is synonymous with the line of reasoning followed by authors such as Bater (1999:38), who states that: 'a knowledge management strategy needs to ensure that the destination is consistent with corporate ambitions, that the techniques, technologies, resources, roles, skills, culture etc. are aligned with, i.e. *support* business objectives'. Unfortunately, according to Zack (1999), even though the link between knowledge management and strategy is widely acknowledged, it is for the most part still being ignored by business. Laudon and Laudon (2004), building on earlier work done by Grover and Davenport (2001), and Davenport, Thomas and Cantrell (2002), argue in similar vein that it is very difficult to integrate knowledge management programs with business strategy, possibly due to the difficulties inherent in managing and aligning processes and interactions between information technology and social elements in organizations.

3.4 Issues of knowledge management

Due to the uniqueness of knowledge management as a management science, and also because only a limited number of organizations implement knowledge management within an organizational setting, Davenport's statement about knowledge management still being in its infancy, is just as applicable today as it was eight years ago. Davenport (1998:01), in contemplating the value knowledge management can add to an

organization, proposed that companies should refrain from embarking on detailed knowledge management tactics, and as a point of departure should rather focus on high-level knowledge management issues: 'When an organization decides what principles it agrees upon with respect to knowledge management, it can then create detailed approaches and plans based upon these principles'. It would seem that for organizations just beginning to embark on knowledge management ventures, this proposition by Davenport is still of extreme significance. Before trying to institutionalize knowledge management practice, organizations should, as a point of departure, concentrate on finding principles that bestow governance on knowledge management. Owing to the importance of defining issues in the quest to determine suitable criteria for assessing the effectiveness and efficiency of knowledge management practice, the issues Davenport (1998) describes will be briefly summarized in the following section.

3.4.1 Knowledge management is expensive

Davenport (1998:02), states that: 'Knowledge is an asset, but its effective management requires investment of other assets' and goes on to say 'But while knowledge management is expensive, the obvious retort is that not managing knowledge is even more so. What is the cost of ignorance and stupidity? How much does it cost an organization to forget what key employees know, to not be able to answer customer questions quickly or at all, or to make poor decisions based on faulty knowledge?' This argument is in agreement with work done by Zack (1999), Murray (2000) and Tiwana (2000). These authors argue that the cost of having suitable knowledge available to people such as strategists, is non-negotiable. Unfortunately, Zack (1999) is also of the opinion that because it is so difficult to allocate costs to knowledge management, managers are refraining from allocating funds at all.

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3.4.2 Effective management of knowledge requires hybrid solutions of people and technology

Davenport (1998) argues that humans excel in interpreting, understanding, visualizing, combining and synthesizing information into knowledge. On the other hand, computers surpass humans when it comes to the capture, transformation and distribution of knowledge. Given this mixture of skills, Davenport (1998:03), points out that: 'we need to construct hybrid knowledge management environments in which we use both human and computers in complementary ways'. As an example, Davenport suggests that when compiling computerized databases of organizational knowledge, entries recorded should contain just enough information to capture the reader's interest, and include the name and contact details of the bearer of knowledge. In addition, Henczel (2000) argues that solid information technology is an essential prerequisite for developing knowledge management strategies. Gurteen (1998) agrees with this statement and argues that ICT is the channel for representing, organizing and deploying knowledge. Scheraga (1998), similarly, is of the opinion that without having suitable Information Technology in place, organizations will never fully be able to exploit the value of knowledge.

3.4.3 Knowledge management is highly political

In trying to answer the question: 'what does knowledge politics mean for effective knowledge management?' Davenport (1998:03) disagrees with managers who decry politics and argue that it only gets in the way of sound business practice (especially if knowledge is used as a power tool, leading to lobbying, intrigue and back-room deals). Instead he maintains that: 'astute managers of knowledge need to acknowledge and cultivate politics. They need to lobby for the use and value of knowledge - at the highest level, they need to shape the governance of knowledge to better utilize it across the organization'. This statement by Davenport is in agreement with a statement by Ndlela and du Toit (2001) to the effect that knowledge management requires committed and

strong leadership and a change in both attitude and behaviour to bring about the successful management of knowledge.

3.4.4 Knowledge management requires knowledge managers

Davenport (1998) emphasizes the fact that all strategic resources (human resources, finances, IT, Infrastructure, etc.) have substantial organizational functions devoted to their management, and argues that until some group within an organization is specifically given the responsibility for knowledge management, knowledge will not be well managed at all. Once established, the knowledge management function should accept responsibility for collecting and categorizing knowledge, establishing a knowledge-orientated technology infrastructure and monitoring the use of knowledge. Taking cognizance of the fact that knowledge management is political, Davenport (1998:04) maintains that the knowledge management function should not: 'seek to assemble and control all knowledge', as this could lead to political play and resentment, but should rather: 'merely facilitate the creation, distribution, and use of knowledge by others'. In agreement with this, Davenport (1998), Taylor, Small and Tatalias (2000), Tiwana (2000), Logan (2001), and Laudon and Laudon (2004) all assert that as a starting point in institutionalizing knowledge management, it is imperative that a knowledge management department and knowledge management team be appointed.

3.4.5 Knowledge management benefits more from maps than from models

Davenport (1998:04) warns that: 'It is tempting when managing knowledge to create a hierarchical model for knowledge, similar to the Encyclopedia Britannica's Propaedia, that would govern the collection and categorization of knowledge'. Davenport (1998) proposes that organizations should rather let the knowledge market work, and simply provide and map the knowledge that is really needed. In agreement with this, Zack (1999:132) says that: 'categorizing or describing what a business firm knows and must know is not easy'. In order to ease the retrieval of data, Davenport proposes the use of a map or a thesaurus with the capacity to link technical terms to terms used by the

knowledge requester (client). In similar fashion Tiwana (2000), contemplating key lessons that successful knowledge management projects have taught, maintains that ease of use and ease of retrieval are crucial to the process of effectively and efficiently sharing and tapping into the organization's knowledge pool. Tiwana (2000) stresses that knowledge sharing and retrieval should never be blurred by cryptic interfaces that are hard to decipher and use, but should rather be kept simple and straightforward.

3.4.6 Sharing and using knowledge are often unnatural acts.

Davenport (1998:05), argues that knowledge is personal. To the knowledge bearer it is an extremely valued resource: 'people have a natural tendency to hoard their own knowledge: and to look suspiciously upon knowledge from others'. Davenport stresses that making information available will not necessarily lead to widespread sharing and use of knowledge. 'We should realize that sharing and usage have to be motivated through time-honored techniques - performance evaluation and compensation, for example'. What Davenport is proposing is that managers and especially strategists should not only be assessed with regard to how effectively and efficiently they manage knowledge, but also with regard to their ability to share and use it in collaboration with others, again emphasizing that knowledge must be shared in order to be of real value to the organization. In similar fashion, Tiwana (2000) argues that all problems cannot be solved by an intranet, an intelligent search engine or a database. People possess a natural tendency to keep knowledge to themselves, and according to Tiwana (2000:172), the only way to overcome this natural tendency, is to 'give incentives that are too attractive to ignore'.

3.4.7 Knowledge management means improving knowledge work processes

Davenport (1998:05) states that: 'knowledge work processes of any type are only rarely addressed in process improvement initiatives' and stresses that in order to improve knowledge management, not only must generic knowledge management processes be improved (creating, e.g. research; packaging, e.g. publishing; and applying, e.g. system

development), but special attention must also be devoted to processes where knowledge is generated, used and shared intensively (market research, product design and development, and especially strategy formulation).

3.4.8 Knowledge access is only the beginning

Building on the previous notion, Davenport (1998:06) argues that: '(knowledge) access is important, but successful knowledge management also requires attention and engagement'. In similar vein to the propositions of Davenport, DeLong and Beers (1998), Von Krogh, Nonaka and Aben (2001), Darroch and McNaughton (2002), Snyman and Kruger (2004) and others, Davenport (1998) argues that different types of knowledge necessitate different information engagement approaches. Davenport asserts that 'knowledge consumers' should become more than just passive recipients. To get everyone actively involved with knowledge, Davenport proposes 'war gaming' exercises, 'role-playing' exercises, 'close interaction' and even 'fraternization' between knowledge sharers (internal as well as external). In agreement with Davenport, Bater (1999:40) emphasizes that knowledge management must transcend conventional boundaries: 'An effective knowledge strategy requires a constructive dialog among information professionals, IT professionals, management and HR, and an insight into each other's domain of contribution'.

3.4.9 Knowledge management never ends

Davenport (1998) argues that the tasks of knowledge management are never-ending; the external environment is always changing and companies change their market focus, strategies, technologies, management approaches, etc. Zack (1999:132) concurs, saying that: 'Knowledge is not static, and what is innovative knowledge today will ultimately become core knowledge tomorrow'. According to Davenport (1998), these rapid changes in the competitive environment require that mapping or modelling a particular knowledge environment should never be too extensive and time consuming. In order to be able to

adapt to change quickly, descriptions of knowledge environments should be 'quick and dirty'.

3.4.10 Knowledge management requires a knowledge contract

Taking cognizance of the fact that issues surrounding intellectual property law are extremely vague, Davenport (1998) proposes that there should be policies and/or at least some kind of contract between the employee and the organization to govern the retention and use (and usage rights) of knowledge (employee and organizational).

Viewed holistically, what these above-mentioned principals propose is that before an organization embarks on any knowledge management endeavours, the following should be in place:

- There must be a conscious decision to invest in knowledge management.
- It must be agreed upon that knowledge management must be an efficient and effective process; all endeavours in knowledge management must lead to growth and profitability.
- It must be accepted that there is going to be a need for hybrid knowledge management environments – technological and human.
- There must be high-ranking knowledge champions, people who are familiar with the organization's politics.
- A working knowledge of the management function, with a high-ranking officer guiding this function, should exist.
- There must be a conscious decision that only knowledge that is of strategic value will be mapped.
- A working definition must be formulated, describing the organization's knowledge dictionary. This dictionary should have the capacity to link technical terms to terms used by knowledge requesters.
- A conscious decision must be taken to judge people according to their ability to share knowledge.

- A conscious decision must be made to constantly improve knowledge work processes.
- There must be an explicit drive to get all employees involved in knowledge-sharing exercises.
- The focus of knowledge management should be on quality not quantity.
- There should be a knowledge contract between the company and the employees.

Earl (2001:218), drawing on both descriptive and inductive research, proposes a typology of different 'schools' of knowledge management[19]. Earl argues that each school represents a particular orientation of intervening with the organization. Although at a much higher conceptual level than the principles proposed by Davenport (1998), the knowledge management classifications proposed by Earl (2001) also address fundamental knowledge management ideas. Technocratic schools address the idea that specialist knowledge should be validated, mapped, captured, codified, controlled and updated in knowledge bases. Without information and communications technology (ICT) these schools would not be feasible. In order to facilitate the dissemination of knowledge, the use of knowledge dictionaries is advocated. Furthermore, contributions to knowledge bases should be rewarded, and there should be a continuous drive to improve knowledge processes. Earl (2001) maintains that in contrast to 'technocratic schools', 'economic schools' place more emphasis on exploitation of knowledge and less on exploration of knowledge, i.e. emphasis is placed on protecting and exploiting knowledge assets to produce return on investments. According to Earl (2001), the ability to aggressively manage the property value of knowledge, and the ability to manage intellectual assets as routine processes can be seen as the success factor behind these schools. Behavioural schools promote the breakdown of 'knowledge barriers', emphasizing that connectivity between knowledge workers should be increased, and advocating the bundling of groups of people with common interests, problems and expertise (in organizational structures

[19] Schools of knowledge management:
* Technocratic – based on information and management technologies.
* Economic - commercial in orientation, explicitly creating revenue streams from the exploitation of knowledge and intellectual capital.
* Behavioural – stimulating and orchestrating managers and management to be proactive in the creation, sharing, and use of knowledge as a resource" (Earl, 2001).

and networks), with a common goal to share knowledge. According to Earl (2001:216), a subsection of the behavioural school (the strategic school) is essentially concerned with raising consciousness about the value of knowledge as a strategic resource, and considers knowledge management to be the essence of competitive strategy. Earl, however, stresses that: 'no claims are made that any school outperforms others'.

In contrast to Davenport, Taylor, Small and Tatalias (2000) view knowledge management from a two-dimensional perspective. According to Taylor, Small and Tatalias (2000), the first dimension consists of knowledge exchange, knowledge capture, knowledge re-use and knowledge internalization, i.e. activities critical to the creation of knowledge. However, Taylor, Small and Tatalias are of the opinion that this dimension is built on a second, higher-order dimension, consisting of elements that enable or influence knowledge creation activities. According to Taylor, Small and Tatalias these elements include:

- Strategy – the alignment of corporate and knowledge management strategies.
- Measurement – the measures and metrics captured to determine if knowledge management improvement is occurring or if a benefit is being derived.
- Policy – the written policy or guidance that is provided by the organization.
- Content - the corporate knowledge base that is captured electronically.
- Process – the processes that knowledge workers use to achieve the organization's mission and goals.
- Technology – the information technology that facilitates the identification, creation and diffusion of knowledge among organizational elements within and across enterprises, for instance an enterprise portal.
- Culture – the environment and context in which knowledge management processes must occur (Taylor, Small and Tatalias, 2000:2).

Logan (2001:29) emphasizes that certain factors are prerequisites for the successful implementation of knowledge management processes. According to these authors before

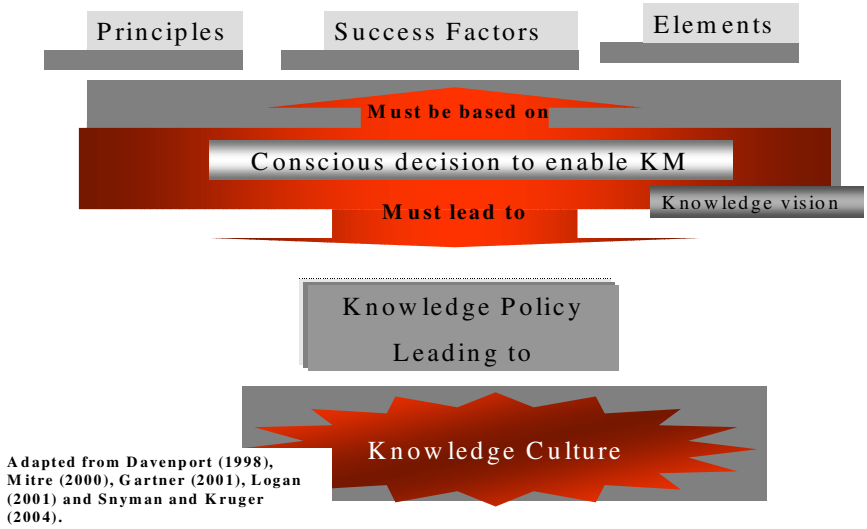
attempting to embark on a knowledge management programme, the following should be taken into account:

- 'Knowledge management must be linked to the strategic direction of the organization.
- Knowledge management requires an organizational culture and discipline that promotes and supports knowledge sharing, collaboration across and among employees/business units, and a drive toward innovation.
- Knowledge management must be enabled by robust business and human processes.
- Knowledge management depends on a compelling technology environment to automate the processes and to support collaboration and the knowledge management discipline.
- Knowledge management requires an extended-enterprise scale and scope of processes, people and content; additionally, this expanded-enterprise view must support both formal and informal relationships' (Logan, 2001:02).

Viewed holistically, as far as their fields of study overlap, principles proposed by Davenport, elements proposed by Taylor, Small and Tatalias (2000), knowledge management 'schools' proposed by Earl and success factors proposed by Logan (2001) address the same issues and concerns. What these authors are trying to emphasize is that before any endeavours in knowledge management can commence, organizations should not only explicitly recognize that knowledge is of strategic importance, but more importantly there should be a conscious drive towards establishing a culture of knowledge within the organization. This line of reasoning concurs with an argument proposed by Ndlela and du Toit (2001:152). These authors argue that 'people are the key component of knowledge management; hence the type of culture existing in the enterprise is crucial to the success of knowledge management'. In essence, by institutionalizing these issues, organizations will create an organizational environment conducive to nurturing knowledge. Ndlela and du Toit (2001) argue that even though establishing a 'knowledge-friendly culture' is one of the most vital success factors for

managing knowledge, it is extremely difficult to achieve. Merely attempting to institutionalize these principles should present strategists with a future vision of how to set the stage for the efficient and effective management of knowledge (refer to Figure 3.1).

Figure 3.1: Setting the stage for knowledge management



Earl (2001:216) maintains that: 'in terms of practice the (above-mentioned) taxonomy could help a firm select a knowledge management "strategy" or even answer the question "Where do we start?".' Earl suggests that after a conscious decision has been made to embark on knowledge management, organizations should formulate a statement of corporate purpose, a vision that embodies or embraces knowledge. In essence such a vision should encapsulate the 'contribution that knowledge-based value creation can make', to the organization. In a similar manner, Von Krogh, Nonaka and Aben (2001), using Unilever as a case study, stress that in order to make any knowledge management endeavour succeed, top management must, as a point of departure, concede that the management and development of knowledge and creativity is of strategic importance, i.e. set the stage for the formulation of a knowledge vision. Snyman and Kruger (2004) clarify this notion even further, arguing that certain principles not only form the basis for developing an organizational knowledge vision, but in order to encapsulate them (to

institutionalize a knowledge culture), organizations should also embark on the formulation of a knowledge policy. According to these authors this policy should comprise of high-order guidelines on how the organization is going to capture, access, reuse, qualify, account, exchange, secure and protect knowledge resources, as well as address issues concerning confidentiality, privacy, cost and value, ownership/intellectual property, and misuse of information and knowledge. Snyman and Kruger (2004) go on to say that the knowledge policy should be 'non-negotiable' in terms of objectives, targets and actions (for achieving knowledge excellence), and as such should provide governance not only of the formulation of knowledge management strategies, but also of the business strategy. However, even though the idea of creating a knowledge vision might be a step in the right direction, and even if policies are put in place to set the stage for the creation of a knowledge culture, in itself a knowledge vision cannot guarantee that knowledge will lead to organizational growth and profitability. It would seem that for knowledge to have real value it must be brought into context with where the company is going in future (Davenport, 1998; Zack, 1999; Taylor, Small and Tatalias, 2000; Logan, 2001; Snyman and Kruger, 2004). This statement is also in agreement with an earlier proposition by Manville and Foote (1996: online) to the effect that knowledge-based strategies[20] begin with strategy and not knowledge. 'If a company does not have fundamentals (strategic guidelines) in place, all the corporate learning, information technology, knowledge databases will be of no use. A company needs to know the kind of value it intends to provide and to whom'. What Manville and Foote (1996) suggest is similar to the proposition that knowledge management should be governed (or filtered) by strategy before detailed knowledge management plans can be made. As argued, the future knowledge vision and knowledge management policy lend themselves to inculcating a knowledge culture in the organization.

[20]Care should be taken not to confuse knowledge-based strategies with the organization's knowledge management strategies. Knowledge-based strategies are business strategies based on knowledgeable reasoning. These strategies are governed by high-order strategy and policy, thus also the knowledge strategy and knowledge policy. Primarily these strategies are the organization's generic strategies (cost, focus, differentiation), aimed at achieving the organization's ultimate goals. Not all knowledge-based strategies are knowledge management strategies, but all knowledge management strategies should be knowledge-based strategies.

It should be noted that the knowledge vision and policy by no means determine or even focus on the incision points (within the organization) where knowledge is specifically needed. In order to achieve this, knowledge must be aligned with the knowledge requirements of the organization. In the previous chapter (section 2.4), it was argued that this resides within business strategy formulation. Of interest is the fact that Taylor, Small and Tatalias (2000), Earl (2001) and Logan (2001) all identified the alignment of corporate and knowledge management strategies as the number one success factor in all knowledge management endeavours.

To illustrate the interdependency between knowledge and strategy, when the principles proposed by Davenport (1998), the elements proposed by Taylor, Small and Tatalias (2000) and the success factors proposed by Logan (2001) are brought into context with business strategy, the following are revealed:

- Strategy governs the allocation of money to resources.
- Strategy is the drawing of a synthesis to determine hybrid solutions.
- Strategy is high-order politics.
- Strategy is the most precious point on the knowledge management agenda, the point at which knowledge, skills and information inject their greatest value into the organization.
- Strategy is also instrumental in setting a vision, architecture and a technology plan to govern improvements in intellectual assets and knowledge management processes.
- Strategy never ends, needs a constant supply of knowledge, and most definitely needs to be protected from prying eyes.

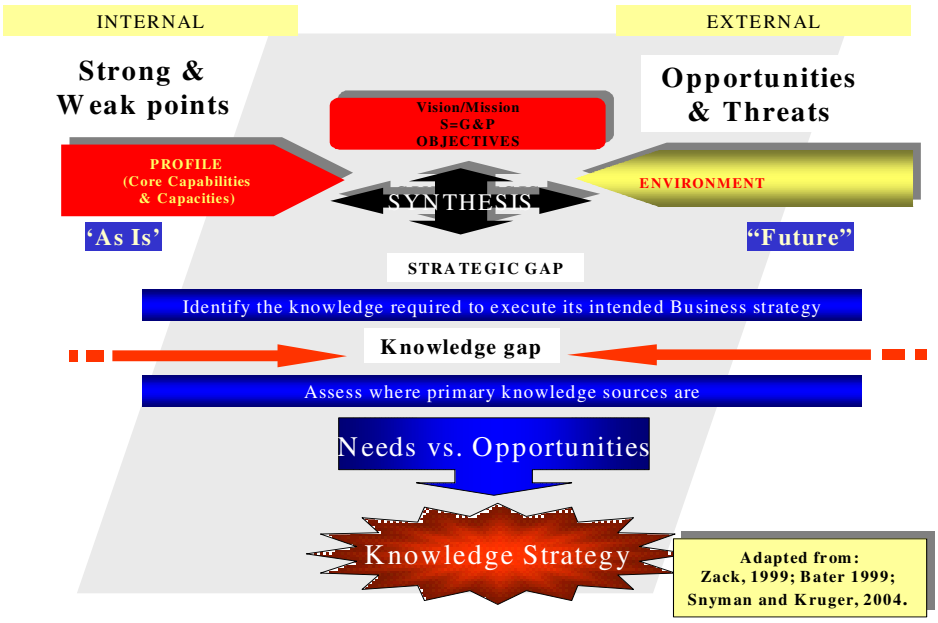
These issues not only highlight the interdependency between knowledge and strategy again, but also emphasise the fact that for knowledge to have real value, it must be brought into context with where the company is going to be in future. Quoting the words of Tiwana (2000:103) ‘Knowledge drives strategy, and strategy drives knowledge management’ and he continues ‘Without a clearly articulated link between knowledge

management and business strategy, even the world's best knowledge management system will deliver zilch'.

3.5 Strategies to govern efficient and effective knowledge management

According to Zack (1999, 2001), the conscious drive to inculcate a culture of knowledge should culminate in the formulation of a strategy oriented towards understanding what strategic knowledge is, and why it is strategic (refer to Figure 3.2).

Figure 3.2: Formulation of a knowledge strategy



The line of reasoning followed by Zack (1999) concurs with a statement by Bater (1999). In assessing the nature of what is to be handled – knowledge and information, Bater (1999) proposes that organizations should formulate a knowledge strategy as a point of departure.

Zack (1999), in explicating the link between strategy and knowledge, suggests that the traditional SWOT framework can provide a basis for describing a knowledge strategy.

Zack (1999) argues that, as a point of departure, a firm must first draw a synthesis between what it is actually doing (and what it is capable of doing), and compare this to what must be done in order to remain competitive. In a similar manner, Earl (2001) argues that a grounded way of discovering where knowledge management initiatives should be aimed is to analyse performance gaps in the business. However, Snyman and Kruger (2004) building on the works of Bater (1999) and Zack (1999; 2001), maintain that even before an organization can draw a synthesis between what it is doing and what it is supposed to do in order to remain competitive, as a point of departure it should assess the use of knowledge and knowledge systems in support of core business functions and processes. According to these authors, this assessment should not only review the way in which knowledge flows through the organization, but also assess the manner in which knowledge is captured, exchanged and reused in the organization. In similar fashion Davenport and Prusak (1998) argue that organizations cannot take full advantage of knowledge resources if they fail to first identify and appreciate the value of the knowledge they already possess. Snyman and Kruger (2004) are of the opinion that special emphasis should be placed on determining the quantity and the quality of knowledge resources, both implicit and explicit, and also the strengths and weaknesses of the organization's knowledge management and knowledge management structure. According to Snyman and Kruger (2004), this constitutes a knowledge audit, and if this audit is conducted in an effective and efficient manner, it should provide strategists with a clear picture of the 'As Is' knowledge profile of the organization. Analogous to the earlier proposition by Zack (1999) and Earl (2001) that firms need to compare their actual knowledge to the knowledge required to execute their intended strategies, Snyman and Kruger (2004) propose that after assessment of the 'As Is' (knowledge) profile, strategists need to determine whether or not this profile is adequate to ensure the achievement of the organization's primary goals and strategies[21]. Zack (1999), Earl (2001) and Snyman and Kruger (2004) feel that this type of analysis will reveal strategic knowledge gaps and set the stage for the development of a knowledge strategy. In order to formulate such a

[21] 'In order to excel in strategy formulation, businesses should, as a point of departure, determine how the competitive environment of the organization could change in future and how the organization, through knowledgeable reasoning, could transform competitive forces in order to create a favourable future' (Snyman and Kruger, 2004:11).

strategy, Zack (1999) states that strategists need to determine whether primary sources of knowledge are internal or external to the firm. Zack is of the opinion that assessment of knowledge resources (internal and external) present strategists with a 'need vs. opportunity' scenario, or stated differently, a knowledge gap. According to Zack (1999:133), 'together these characteristics help a firm describe and evaluate its current and desired knowledge strategy'. The line of reasoning followed by Zack (1999), and Snyman and Kruger (2004), is similar to a proposition by Henczel (2000). Henczel (2000:214-215) maintains that three audits[22] are needed to move an organization from information management to knowledge management, and argues that the first step (in developing knowledge management strategies) is to identify where knowledge exists and where it is needed to support decisions and actions.

Zack (2001), in revisiting some of his previous statements, warns against the danger of confusing knowledge strategy with knowledge management strategies. According to Zack (2001), assessing where knowledge sources are situated, what constitutes an organization's knowledge resources, what knowledge is strategically needed and what opportunities knowledge represents, implies a notion of knowledge-based strategy, that is competitive business strategy built around a firm's intellectual resources and capabilities. In contrast to these high-order strategies, Zack (2001: online) is of the opinion that knowledge management strategies define the processes and infrastructure for managing knowledge. 'Once a firm identifies opportunities, threats, strengths and weaknesses related to its intellectual resources and capabilities, then actions it may take to manage gaps or surpluses (e.g. recruiting for particular skills, building online documentary repositories, establishing communities of practice, acquiring firms, licensing technologies, etc.) are guided by knowledge management strategies'.

[22] Needs analysis. 'A process by which information users are asked precisely what information resources or services they need to perform their jobs'. Information Audit. 'Goes one step further in not only finding out what information resources and services people need to do their jobs, but how these information resources and services are actually used'. Knowledge Audit. 'Is conducted to identify an organization's knowledge assets, how they are produced and by whom' (Henczel, 2000:214-215).

In order to bridge the strategic knowledge gap, Zack (1999) argues that strategists can either increase knowledge in a particular area, or leverage existing but under-exploited knowledge resources. Earl (2001) argues that the line of reasoning followed by Zack in formulating a knowledge strategy, unfortunately only addresses the exploring of knowledge to support business strategy. Earl proposes that once performance gaps and knowledge opportunities are identified, a realistic conceptualisation emerges, enabling strategists to formulate a knowledge business vision. Earl, however, stresses that the gist of the reasoning followed by Zack (1999) (and himself), is to ensure that knowledge management initiatives are linked to business strategy.

Von Krogh, Nonaka and Aben (2001:427), building on the work of Zack (1999), maintain that 'leveraging knowledge throughout the organization; expanding knowledge further based on existing expertise; appropriate knowledge from partners and other organizations; and developing completely new expertise by probing new technology or markets', are all strategies that organizations can use to manage knowledge. Leveraging knowledge throughout the organization and expanding knowledge further based on existing expertise, as proposed by Von Krogh, Nonaka and Aben (2001), relates to Zack's (1999) proposition about leveraging existing internal knowledge resources. On the other hand, appropriating knowledge from partners and other organizations and developing completely new expertise by probing new technology or markets relates to Zack's notion to increase knowledge in a particular area. In a similar manner, Earl (2001) proposes that in order to 'operationalize the knowledge strategy intent', organizations should examine possible knowledge management initiatives. These initiatives should lead to the formulation of a knowledge management programme, with resources allocated to it, and a plan to execute it (Earl, 2001). Of interest is the fact that Earl (2001) contends that different knowledge management initiatives relate to the different knowledge management schools. Earl therefore argues that critical success factors highlighted in these different schools' taxonomies could be used as guidelines to formulate knowledge management programmes. This statement by Earl is of the utmost importance, for it indubitably links all endeavours in knowledge management to the essence of all

knowledge management issues, the need to institute and grow a knowledge culture within the organization.

It should be noted that Von Krogh, Nonaka and Aben (2001) and Earl (2001) are referring to knowledge management strategies and not strategies to emphasise what strategic knowledge is, and why it is strategic, i.e. the knowledge strategy as proposed by Zack (1999) and Bater (1999). Read in context, what Zack, Earl and Von Krogh, Nonaka and Aben are proposing is not only ways to formulate knowledge management strategies, but in fact also a re-look at the way strategy is formulated (kindly refer to arguments proposed in Chapter 2, sections 2.4.2 and 2.4.3). Not only is emphasis placed on managing knowledge within the organization's domain, but also on the fact that knowledge should be managed even beyond the sphere of the organization. Referring to the institutionalisation of knowledge management strategies, Zack (1999:133) asserts that; 'not only will a high level of knowledge processing be necessary, but due to the environment changing rapidly, organizations may need to create new knowledge just to remain competitive, e.g. be a knowledge explorer, creator or acquirer'. In a similar manner, Von Krogh, Nonaka and Aben (2001:421), maintain that: 'the two core processes of knowledge creation and transfer (internal and external) are central to the execution of these (knowledge management) strategies, as is the company's domains of knowledge'.

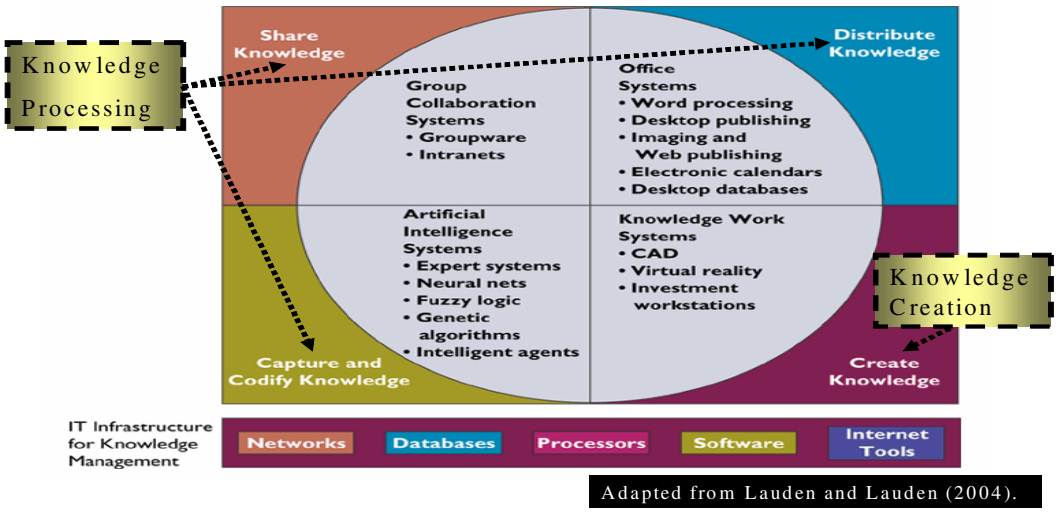
Determining and assessing 'knowledge gaps' are what Bater (1999), Zack (1999), Earl (2001) and Snyman and Kruger (2004) term a 'Knowledge Strategy'. In contrast, strategies to further explore, acquire, transfer, capture, codify, share, distribute and create knowledge are managerial strategies aimed at addressing knowledge gaps, and growing the organization's knowledge culture. The strategies proposed by Von Krogh, Nonaka and Aben (2001), and the knowledge management programme proposed by Earl (2001), are therefore similar to the knowledge management strategies proposed by Zack (1999), i.e. strategies to ensure that knowledge is available (institutionalised) to answer future

strategic questions[23]. This line of reasoning is comparable to an earlier proposition by Taylor, Small and Tatalias (2000) that knowledge management can be seen from within a two-dimensional perspective. According to Taylor, Small and Tatalias (2000), the first dimension consists of activities that are critical to knowledge creation. Hence Taylor, Small and Tatalias propose that in order to create knowledge, organizations should embark on the following activities (or at a conceptual level – strategies): knowledge exchange, knowledge capture, knowledge re-use and knowledge internalisation.

In agreement with this, Laudon and Laudon (2004) argue that knowledge management strategies lead to the construction of information system applications specifically designed to help organizations to create, capture, distribute and apply knowledge and information. Although it might seem that there is considerable disagreement on the specific terms/phrases used to identify the managerial activities needed to institutionalise knowledge management strategies (strategies to explore, create, acquire, transfer, capture, codify, share, distribute, etc.), Laudon and Laudon (2004) argue that all these activities can be categorized as either addressing the creation of knowledge, or the processing of knowledge (refer to Figure 3.3).

[23]Knowledge management strategies proposed by Von Krogh, Nonaka and Aben (2001:421) leveraging knowledge throughout the organization, expanding knowledge further based on existing expertise, appropriating knowledge from partners and other organizations, and developing complete new expertise by probing new technology or markets'.

Figure 3.3: Knowledge creation and knowledge processing



Adapted from Lauden and Lauden (2004).

3.6 The Creation of knowledge domains

Von Krogh, Nonaka and Aben (2001) argue that in order to create and process knowledge, a company must first capture what it knows and does not know about its various functional and production areas (rather like the knowledge audit proposed by Snyman and Kruger, 2004). In order to achieve this, Von Krogh, Nonaka and Aben (2001:423) propose the creation of 'knowledge domains[24]' - domains bound by the same 'line (community) of practice', where knowledge is facilitated in a structured way. According to Von Krogh, Nonaka and Aben (2001), the purpose of these domains is not only to bring key experts and practitioners together (in a workshop[25] scenario), but also to decide and share vocabulary and terminology, and most importantly also to identify gaps in knowledge.

[24]Knowledge Domain. 'A knowledge domain consists of relevant data, information, articulated knowledge, such as handbooks, manuals, or presentations, and a list of key people and groups with tacit knowledge based on long-term work experiences' (Von Krogh, Nonaka and Aben, 2001:423).
[25]Knowledge Workshop. 'Organised to bring together key experts and practitioners from around the world. The knowledge workshop defines the Knowledge Domain to which the line (community) of practice participants contributes' (Von Krogh, Nonaka and Aben, 2001:422).

Von Krogh, Nonaka and Aben (2001) emphasize that in order to set up these domains, not only must domains be identified, but senior business managers must also be appointed to champion each of these domains. Von Krogh, Nonaka and Aben (2001 stress that senior officers (domain champions) must ensure that key participants are identified – key players that can contribute to the success of the different domains. Once domains are set up, managers can contact the individual domains with queries relating to the expertise residing in that domain. In order to facilitate such information queries, Von Krogh, Nonaka and Aben (2001) propose that experts in each domain (among themselves) appoint a domain leader[26]. The purpose of this domain leader is thus to facilitate the entry to knowledge contained in that specific domain. Von Krogh, Nonaka and Aben (2001:423) also propose that if there is insufficient knowledge on how to solve a particular problem (a knowledge gap) subgroups within the domain should be charged with: 'the task of collecting data, information, and creating knowledge around how to solve the problem based on their existing work practice'. Von Krogh, Nonaka and Aben (2001:423) further argue that in order to enlarge the scope of knowledge in a domain: 'other professionals must be invited to join the line of practice on a short to medium-term basis to help solve the problem'. After implementing the above-mentioned methodology at Unilever, Von Krogh, Nonaka and Aben (2001:424) came to the realisation that 'On a personal side, members of the community (line) of practice learn, pick up small and large tricks of improving their own local manufacturing practice, and jointly develop a more refined language for analysing the manufacturing process' and continue (Von Krogh, Nonaka and Aben, 2001:424) 'normally, because the benefit to each of the participants of membership is direct and valuable, sharing knowledge within a knowledge domain is not necessarily considered a problem'. Finally, Von Krogh, Nonaka and Aben (2001:424) argue that: 'In general a company has several such knowledge domains at its disposal, and thus has a choice of focusing on existing and new knowledge domains. First, you can decide to let knowledge develop from the existing knowledge domain, that is, increase the depth and/or scope of the knowledge. Second you can decide to create a new knowledge domain, that is, create new data, new information, and new tacit and explicit

[26]Domain Leader. 'This is not necessarily the most highly recognised expert in the field, but a *primus inter pares*, that co-ordinates and integrates the work of the people contributing to the domain' (Von Krogh et al, 2001:423).

knowledge at the individual and collective levels, e.g. new community (line) of practice, with loose connections to existing knowledge domains'. According to Pearce and Robinson (2000), the formulation of strategy is primarily the responsibility of high-ranking business officers/managers. Depending on the way the organization is structured (functional or process-driven) these officers are known as functional/process heads, directors, or owners. It is the responsibility of these functional/process owners to ensure that the right information and knowledge is available when strategising. Arguably, the responsibility assigned to domain champions (as proposed by Von Krogh, Nonaka and Aben, 2001:422) to: 'capture what it knows and does not know about its various functional and production areas' is exactly the same responsibility Pearce and Robinson propose should be assigned to functional/process owners, in order to strategise.

3.7 Summary

In the previous chapter it was argued that once the role between strategy and knowledge is defined, then other aspects of strategic management such as resource allocation, organizational design, product development and market segmentation can be configured to bolster knowledge strengths, reduce knowledge weaknesses, etc. Arguing from within this perspective, this chapter not only emphasized the strategic link between knowledge management and strategy, but also focused on determining if there are any issues/models/perspectives/strategies available from within a knowledge management perspective, to guide strategists in the quest to manage knowledge effectively.

By meticulously analysing literature with regard to determining the best way to manage knowledge, the author found that organizations should institute a culture conducive to knowledge within the organization before any endeavours in knowledge management can commence. It was found that only once principles and policy promoting the institution of a knowledge culture are in place, can strategies be formulated to manage knowledge. As a point of departure in formulating these strategies, it was established that emphasis should be placed on determining where knowledge sources are situated, and what specifically constitutes these resources. It is argued that as soon as the organization's knowledge profile is known, this profile should be brought into context with strategic

questions regarding organizational strong points, weak points, opportunities and threats. Only after sufficient knowledge is available to answer strategic questions (e.g. when strategic knowledge is strong), can knowledge management endeavours start to focus on further exploration and even exploitation of the power vested in knowledge. Central to all of these strategies are the knowledge management processes of exploring, creating, acquiring, transferring, capturing, codifying, sharing, distributing, etc**.**

However, even though the idea of creating a knowledge culture might be a step in the right direction, and even if policies and principles are put in place to set the stage for the creation of formal knowledge management endeavours, the latter cannot guarantee that knowledge will lead to organizational growth, profitability and sustainability. It would seem that for knowledge to have real value, all knowledge management endeavours must be brought into relation with the capabilities and competencies present within the company, and also the strategic direction of the company, i.e. knowledge must be managed in a structured and formal manner. In the next chapter this idea is expanded upon and explored in the context of ways to achieve maturity and implement knowledge management successfully, efficiently and effectively.

CHAPTER 4: KNOWLEDGE AND KNOWLEDGE MANAGEMENT MATURITY

4.1 Introduction

By analyzing all the different perspectives with regard to knowledge management from a strategic business point of view, as well as from a knowledge management point of view, it became clear that not only should knowledge be governed by strategy before detailed knowledge management plans can be made, but more importantly that sound knowledge management practice should be based on certain issues, policies, and strategies. Any criteria proposed for assessing the effectiveness and efficiency of knowledge management, should be governed by these entities. This chapter builds on this notion and argues that the criteria used to formulate knowledge management practice, can also serve as a checklist to determine the knowledge management maturity of an organization.

4.1.1 Aim

The aim of this chapter is to propose an evolutionary methodology with regard to the progression of knowledge management in an organizational setting. The methodology followed will not only be capable of incorporating the major issues, policies and strategies involved in knowledge management formulation, but will also incorporate ICT and Information Management into knowledge management.

4.1.2 Scope

In order to address the above-mentioned aim, emphasis is placed on:

- The evolution of knowledge management
- Criteria to determine the organization's knowledge management orientation
- The formulation of a holistic ICT and knowledge management maturity model

4.2 The Evolution of knowledge management

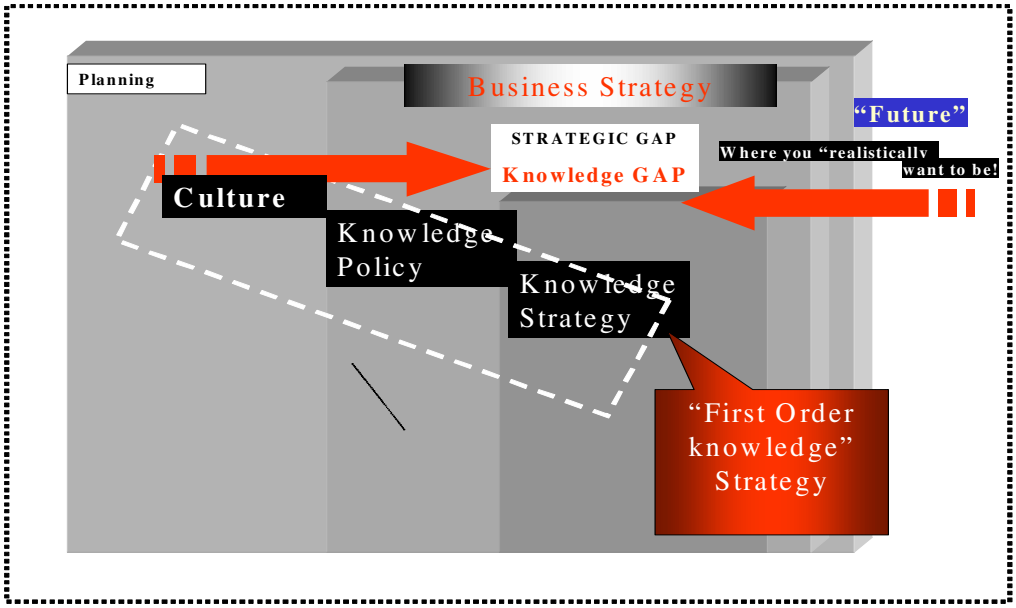
According to Gallager and Hazlett (2004:04), 'there is much agreement in literature that managing knowledge effectively requires a time-consuming, multidimensional perspective'. In the previous chapter (sections 3.4 and 3.5), it was demonstrated that the institutionalization of knowledge management is an evolutionary process that takes place over time, consisting of different phases. These phases correlate closely to the managerial steps of planning, organizing, leading and control. Certain checks and balances can be built into this methodology[27], to act as guidelines in determining the extent to which knowledge management is successfully being institutionalized in the organization. As argued in the previous chapter, (section 3.4) to start this evolutionary process, i.e. the planning phase (Refer to Figure 4.1), endeavours in knowledge management should commence with identifying, determining and deciding on knowledge issues[28] that render possible or influence knowledge creation activities. Von Krogh, Nonaka and Aben (2001) are of the opinion that these issues should be unique to every organization, i.e. criteria to guide the knowledge management should be scrutinized and adapted to suit the specific needs of the organization. However, it should be noted that in the previous chapter (section 3.4), it was argued that certain knowledge management issues, due to their recurrence in literature, are deemed to be of such importance that they could (should) be used as a baseline in the attempt to determine applicability with regard to the unique circumstances surrounding knowledge management in an organizational setting.

[27] If strategy and knowledge are interdependent, all the issues, policies, and strategies knowledge management is supposed to be built on, should form the basis for developing measurement criteria to determine the efficiency and effectiveness of knowledge management.

[28] Principles, issues, success factors, elements proposed by Bater (1999), Zack (1999, 2001), Mitre cited in Taylor Small and Tattalias (2000), Von Krogh, Nonaka and Aben (2001), Gartner cited in Logan (2001), and Snyman and Kruger (2004), and/or any other knowledge management issues as proposed in literature, not specifically dealt with in this study.

In referring to generic knowledge management issues, Chait (1999) proposes that due to similarities between some of these issues, different issues can be classified into different domains. Chait (1999) therefore maintains that knowledge management requires the concurrent management of four domains, e.g. Culture, Content, Process and Infrastructure.

Figure 4.1: Planning to manage knowledge as a strategic corporate resource



The argument followed by Chait (1999) is similar to arguments put forward by Gallager and Hazlett (2004) and Kazimi, Dasgupta, and Natarajan (2004). Gallager and Hazlett (2004) argue that in order to manage knowledge in an effective and efficient manner, attention needs to be devoted to people, culture, organizational structure and information technology. In similar fashion, Kazimi, Dasgupta and Natarajan (2004:03) propose that: 'every organization that needs to leverage its intellectual assets is dealing with knowledge as an asset; communities and cultures as the focal areas; and processes as the medium of institutionalizing knowledge management'. Adding to this line of reasoning, Kochikar (2004) is of the opinion that although there is widespread recognition of the need to leverage the power of knowledge, this notion is to a great extent hampered by the

realization that such a path involves significant change, especially with regard to people, process and technology. Kochikar (2004), however, warns that such change cannot be achieved in one great leap, and thus proposes that a staggered approach to the institutionalization of knowledge management be followed. Similarly, Gallager and Hazlett (2004:08) emphasize that knowledge management cannot be left to 'grow and develop on its own', and argue that the highest authority in the organization should therefore express commitment to managing knowledge.

As argued in the previous chapter, (section 3.4), Davenport (1998), Taylor, Small and Tattalias (2000), Tiwana (2000), Logan (2001), and Laudon and Laudon (2004), all assert that as a starting point in institutionalizing knowledge management, it is imperative that a knowledge management department, and knowledge management team[29] be appointed. According to Davenport (1998), a knowledge management team must be headed by a senior manager, and be manned by knowledge practitioners. In agreement with these statements, Snyman and Kruger (2004) argue that in the effort to encapsulate knowledge issues, the head of the knowledge management function (in collaboration with high-ranking business officers) should formulate a vision[30] and policy[31] to govern the effective use of knowledge. In a similar manner, Gallager and Hazlett (2004:08) argue that: 'Knowledge sharing begins with vision and direction from upper management'.

As argued in the previous chapter, (section 3.5), after issues are decided upon, and after policy is put in place to govern the effective use of knowledge, Zack (1999), and Henczel (2000) as well as Snyman and Kruger (2004), maintain that emphasis should be placed on determining where knowledge sources are situated. This requires that organizations know

[29] Knowledge management team. In order to design an effective knowledge management team, Tiwana (2000:106) argues: 'organizations must identify key stakeholders both within and outside the company and identify sources of expertise that is needed to successfully design, build, and deploy the system while balancing the technical and managerial requirements'.
[30] Snyman and Kruger (2004), are of the opinion that in order to focus all knowledge management efforts, there should be a distinct expression of the future state (knowledge vision) of knowledge within the organization.
[31] In order to focus organizational efforts with regard to achieving the knowledge vision, Snyman and Kruger (2004) feel that strategists should formulate high-order guidelines (knowledge management policy) on how the organization is going to manage, secure, and protect knowledge as a strategic resource; and how the organization's knowledge repository should be constructed.

what their knowledge resources are; why certain knowledge can be considered as being strategic; as well as what opportunities are presented by these resources. In agreement with this statement, Gallagher and Hazlett (2004:07) state that: 'any organization attempting to implement knowledge management must first understand its current structure and processes, and also what knowledge is required to make those processes work'. Gallagher and Hazlett (2004:06) argue that 'such a process-orientated view' is synonymous with ideas proposed by Coen, cited in Scheraga (1998), De Long and Miller (1997) and Carnelley, cited in Romberg (1998), with regard to conducting a knowledge audit to establish where the gaps lie in knowledge process provision. Building on the works of Seeman (1996) and Martiny (1998), Gallagher and Hazlett (2004:06) therefore propose that a knowledge map should be constructed to guide organizations in determining 'what knowledge is important and where it can be found'. In similar fashion, Henczel (2000) (as argued in section 3.5), asserts that three audits are needed to move an organization from information management to knowledge management, and maintains that the first step (in developing knowledge management strategies) is to identify where knowledge exists and where it is needed to support decisions and actions. According to Snyman and Kruger (2004), determining the current knowledge management structure should therefore not only review the way in which data, information and knowledge flow through the different knowledge domains and the organization as a whole, but should also assess whether or not the manner in which data, information and knowledge are captured, exchanged and reused, is in accordance with set policy. These authors are of the opinion that emphasis should be placed on the quantity and the quality of knowledge resources, both implicit and explicit, and also the strengths and weaknesses of the organization's existing knowledge and knowledge management structure.

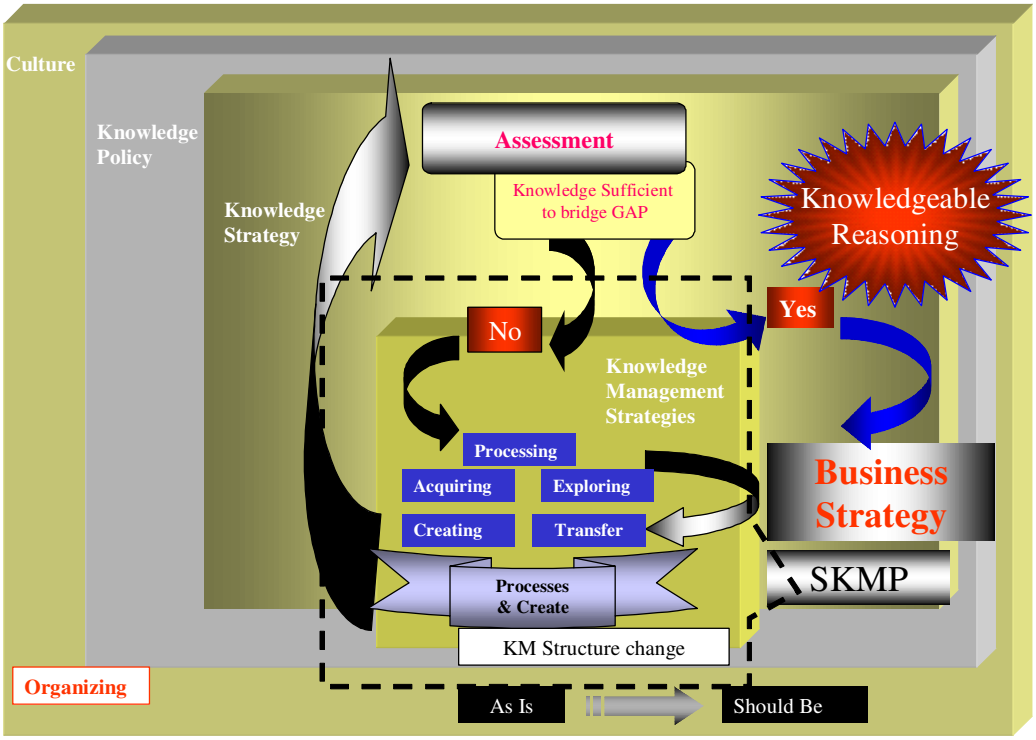
As argued in the previous chapter, (section 3.5), Zack (1999), Earl(2001), and Snyman and Kruger (2004) are all in agreement that as soon as the organization's knowledge, and existing knowledge management profile is known, this profile should be brought into relation with strategic questions regarding organizational strong points, weak points, opportunities and threats. Zack (1999), argues that as a starting point to bridge the 'gap' between current knowledge and the knowledge needed (to base strategy formulation on),

a knowledge strategy should be formulated. Arguably this 'first-order' knowledge strategy is designed specifically to answer strategic questions, and as such relies heavily on competitive intelligence and internal knowledge retrieval systems. As soon as enough knowledge is available to enable strategists to draw a well-informed synthesis between organizational strong points, weak points, opportunities and threats, any further knowledge management endeavour should become part and parcel of the normal business strategy formulation process, and as such should be governed by the future direction and goals of the organization. After this point, any further investment in knowledge management should be assessed according to sound economic principles, i.e. any further investment in knowledge management should be judged according to its ability to lead to organizational growth, profitability and sustainability. To illustrate this point: during the formulation of knowledge strategies, if it is found that the current knowledge management 'As Is' profile is insufficient, and/or if strategists (functional owners) point out that 'new and more' knowledge and intellectual capital are needed in order to institutionalize future business strategies, this possibly necessitates changes to the organization's ICT infrastructure, knowledge repository (repositories), knowledge management structure, and even knowledge culture (refer to Figure 4.2). In agreement with this, Zack (1999) argues that in order to successfully transmogrify the 'As is' knowledge management structure into a more efficient and effective structure, the organization can either leverage the power of existing internal or external knowledge resources, or increase knowledge in a particular area, i.e. focus on further exploring the power vested in knowledge. Von Krogh, Nonaka, and Aben (2001) argue that this constitutes the formulation of knowledge management strategies:

- to leverage knowledge throughout the organization (within and between knowledge domains),
- to cultivate knowledge from existing expertise,
- to extract knowledge from partners and other organizations, and
- to develop new expertise by probing new technology or markets.

In relating these strategies to the institutionalization of knowledge issues, Nicolas (2004) argues that the characteristics of these strategies will be of a technical, personal, or social nature.

Figure 4.2: Changing the knowledge management structure



After strategies are decided upon, Snyman and Kruger (2004:16) maintain that: 'in order to implement these (knowledge management) strategies, hierarchies of plans must be formulated'. Snyman and Kruger (2004:16) therefore propose the formulation of a Strategic Knowledge Management Plan (SKMP). These authors are of the opinion that the formulation of such a plan should be a collaborative process of mutual agreement between the organization's different functional owners (strategists), and as such should 'typically contain a set of longer-range goals that document movement towards the knowledge vision and knowledge architecture and the associated major initiatives that must be undertaken to achieve these goals'.

After formulating a SKMP, Snyman and Kruger (2004) argue that the initiatives identified in such a plan should be translated into a set of more detailed knowledge management projects with precise, expected results, due dates, priorities and responsibilities. In agreement with authors such as Zack (1999), Von Krogh, Nonaka, and Aben (2001), and Laudon and Laudon (2004), Snyman and Kruger (2004) assert that central to all of these strategies, plans and projects are knowledge management processes of exploring, creating, acquiring, capturing, codifying, organizing, transferring, sharing, using and distributing.

4.3 Criteria to determine the organization's knowledge management orientation

Darroch and McNaughton (2002), drawing heavily on knowledge management literature (using the Kohli Jaworski instrument as a starting point), developed a scale to measure a firm's knowledge management orientation. The scale was broken down into three components each consisting of a number of factors[32] explaining these components. The following is a brief extract from the Darroch and McNaughton (2002) scale:

Component 1: Knowledge acquisition

- Valuing employees' attitudes and opinions and encouraging employees to upgrade their skills.
- Having a well-developed financial reporting system.
- Being market-focused by actively obtaining customer and industry information.
- Being sensitive to information about changes in the marketplace.
- Employing and retaining a large number of people trained in science, engineering or mathematics (having a science and technology human capital profile).
- Working in partnership with international customers.
- Getting information from market surveys.

Component 2: Knowledge dissemination construct

[32]Darroch and McNaughton's scale for measuring knowledge management orientation. 'Three knowledge management components that include 16 [sic – must be 17] factors and represent a total of 59 variables' (Darroch, and McNaughton, 2002:210).

- Readily disseminating market information around the organization.
- Disseminating knowledge on the job.
- Using technology such as teleconferencing, videoconferencing and groupware to facilitate communication.
- Preferring written communication to disseminate knowledge.
- Using specific techniques such as quality circles, mentoring and coaching and written case notes.

Component 3: Responsiveness to knowledge

- Responding to knowledge about customers.
- Responding to technology about competitors.
- Responding to knowledge about technology.
- Having a well-developed marketing function.
- Being flexible and opportunistic.

At first sight the ideas proposed by Darroch and McNaughton (2002) seem different from the line of reasoning followed thus far with regard to successfully institutionalizing knowledge management within an organization. However, if these ideas are brought into perspective with one another, the following findings can be made. Responding to knowledge about customers, competitors, technology, the market, etc., (as proposed by Darroch and McNaughton, 2002), relates to the strategic principle of assessing opportunities and threats in the external environment[33]. Similarly, the dissemination of knowledge (the second component identified by Darroch and McNaughton) essentially relates to building or rather enhancing the organization's core knowledge competencies and capabilities, e.g. knowledge management strategies. In addition, knowledge management components that relate to knowledge acquisition, address not only strategic issues, but also issues like those proposed by Davenport (1998), Zack (1999), Taylor Small and Tattalias (2000), Logan (2001) and Snyman and Kruger (2004), as identified in

[33] Similar in reasoning to the notions of Porter (1980), Zack (1999), Pearce and Robinson (2000), Von Krogh, Nonaka, and Aben (2001) (2001), Darroch and McNaughton (2002), and Snyman and Kruger (2004), in arguing that knowledge of certain external forces is crucial in the formulation of business and knowledge management strategies.

the previous chapter (section 3.4). In placing these ideas within a timeframe, insight is gained with regard to what specifically needs to be addressed in order to successfully manage knowledge. Darroch and McNaughton (2002) address the same strategic principles, but rather than focusing on an evolutionary methodology (progression along the line of descent through the history of the field), these authors only assess criteria to determine the organization's orientation towards knowledge management. Without doubt the model proposed by Darroch and McNaughton (2002) is an extremely useful tool in the attempt to determine the knowledge management orientation of organizations. However, it is argued that in assessing how successfully knowledge management is institutionalised within an organization, cognisance should also be taken of the knowledge management maturity of the organization.

4.4 Formulation of a holistic knowledge management maturity model

Like the line of reasoning followed thus far, Klimko (2001) argues that maturity modelling is an evolutionary and a generic approach describing the development of an entity over time, progressing through different levels of maturity towards a usually idealistic ultimate state. Referring to the Capacity Maturity Model[34] (SEI-CMM) developed in the 1990s for the software industry, Mark, Curtis, Chrissis and Webber (1993) maintain that maturity is not only a measure of effectiveness, but also the extent to which a specific process is explicitly defined, managed, measured and controlled. According to Mark, Curtis, Chrissis and Webber (1993), maturity not only implies a potential for growth in capability, but also focuses on richness and consistency with regard to execution. Of interest is the fact that the definition proposed by Mark, Curtis, Chrissis and Webber (1993) correlates closely to the managerial steps of planning, leading, organizing and control.

[34]Capacity Maturity Model developed by the Software Engineering Institute at Carnegie Mellon University.

In a similar manner Gallagher and Hazlett (2004:12) posit that most maturity models[35] are incremental in nature, representing an attempt to interpret a succession of positions/phases/stages with regard to growth and maturity, all with the ultimate aim of improving processes and business performance. Gallagher and Hazlett (2004:12), however, criticize current maturity models, arguing that they either devote too much time to technological issues or are not focused enough, providing little practical help, and/or not enough 'emphasis is placed upon culture and other management issues'. As an example, Gallagher and Hazlett (2004) point out that the maturity levels of the Siemens Knowledge Management Maturity Model (KMMM) are of an extremely technical nature, possibly because the model was derived from methodology applicable to the software industry's SEI-CMM model.

In an attempt to integrate and further develop current theory, Gallagher and Hazlett (2004) therefore propose a knowledge management maturity model (KM3), consisting of four stages; Aware, Managed, Enabled and Optimised. Gallagher and Hazlett (2004:11) are of the opinion that 'in contrast to other maturity models, relating specifically to information system usage' their model explicitly also considers the human dimension and its inter-connectedness with technology and infrastructure. Similarly, Kochikar (2004) proposes a Knowledge Management Maturity Model (KMM Model) characterized by certain observable capabilities along each of the major lines of People, Process and Technology. However, because both of these maturity models are also derived from the Software Engineering Institute's Capability Maturity Model, both the KM3 and the KMM still in a sense closely resemble the Siemens (2004) KMMM model, especially with regard to the progression of stages[36]. It should be noted, however, that even though there are a great many similarities between these models, especially with regard to the progression of stages, there is also major disagreement concerning what specifically

[35]"SEI's Capacity Maturity Model for software development – Paulk et al (1993), KPMG's Knowledge Management Framework Assessment Exercise – KPMG (1999), KPMG's characterisation of the Knowledge Journey – Parlby (1999a and b), Microsoft's IT Adviser for Knowledge Management – Microsoft (1999), and Crosby's 'Quality Management Maturity Grid' – Crosby (1978).
Source: Gallagher and Hazlett (2004:12)

[36] KMMM proposes five evolutionary stages: Initial, Repeat, Define, Manage and Optimise, the KM3 model proposes four stages; Aware, Managed, Enabled, and Optimised, and like KMMM the KMM Model also proposes five evolutionary phases: Default, Reactive, Aware, Convinced and Shared. .

constitutes areas of importance within these stages. As an example, in the Capability Maturity Model there are 18 key process areas, in the KMM Model there are 15 Key Result Areas, and the KMMM suggests that there are only eight areas of importance. In essence the KM3 model simplifies key areas, and suggests that only three components are of major significance. Of interest is the fact that due to all of these knowledge management maturity models being based on the Software Engineering Institute's Capability Maturity Model, they all closely resemble the maturity regression of Initial, Aware, Managed and Optimised as proposed by Hirvonen (2004), with regard to ICT maturity.

In contrast to the above-mentioned authors, Kazimi, Dasgupta and Natarajan (2004) question whether knowledge management maturity should be based on the Software Engineering Institute's Capability Maturity Model at all. These authors argue that due to working with abstract components (knowledge, culture, processes or communities) there is much disillusionment about knowledge management that first needs to be addressed. Rather like Gallagher and Hazlett (2004), Kazimi, Dasgupta and Natarajan (2004) maintain that knowledge management maturity models should not only focus on technological issues, but also on dispelling disillusionment about knowledge management and as such make organizations aware of:

- What they want to transform into – Maturity Framework.
- How to create visibility from an invisible asset like knowledge – Maturity Plateaux.
- What efforts need to be made and in which directions – Maturity Dimensions.
- How to keep focused on business strategy and profit from these efforts – Maturity Drivers.

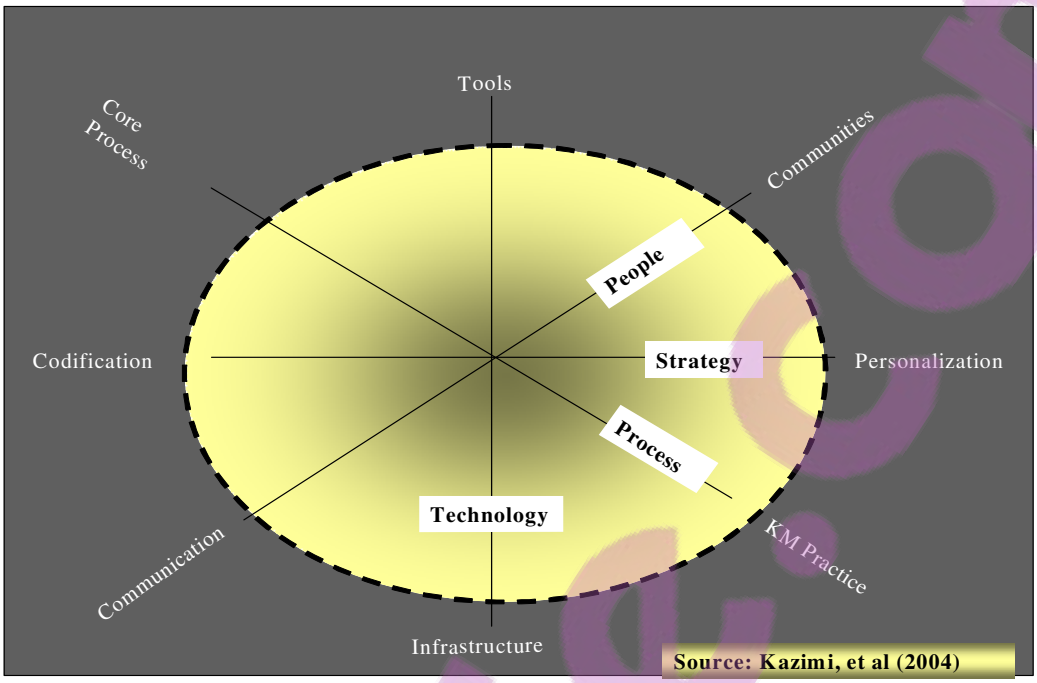
Kazimi, Dasgupta and Natarajan (2004) are therefore of the opinion that current knowledge management maturity models, which are derived from the SEI-CM Model and/or are based on pre-defined business dimensions to chart out maturity, unfortunately only address a few of the above-mentioned issues, and therefore cannot fully address the

subject of knowledge maturity. In emphasising this point, Kazimi, Dasgupta and Natarajan (2004:04) assert that these models are based on a 'project environment' and as such focus on 'a set of symptoms indicating the adoption of stable, standardized processes', e.g. processes to create, capture, store, retrieve and disseminate knowledge within the organization. Kazimi, Dasgupta and Natarajan (2004:04) argue that even though some of the models derived from SEI-CMM methodology (arguably also the model Gallagher and Hazlett, 2004 propose) led to the identification of the pillars (knowledge issues) that knowledge management is based upon (people, process, technology and strategy – refer to Figure 4.3), and even though these models enabled organizations to understand that knowledge management is not just another technological solution, there are also other pillars (leadership, culture and communities) that cannot be scaled down and converted into processes. Kazimi, Dasgupta and Natarajan (2004:04) are therefore of the opinion that owing to limitations with regard to addressing all knowledge issues, and/or due to not all organizations being categorized according to projects, models based on the SEI-CMM methodology are not of a sufficiently generic nature. They question the extent to which progress across these models really relates to knowledge management maturity. Kazimi, Dasgupta and Natarajan (2004:05), therefore question whether organizations represented by a full circle of maximum radius (maximum growth along each dimension) are indeed the most mature knowledge organizations. Kazimi, Dasgupta and Natarajan (2004:05) thus maintain that: 'graphical representation (of these issues) is (no more than) an effective tool for conducting a knowledge audit, i.e. understanding an organization's readiness for knowledge management and identifying thrust areas (knowledge issues)'.

The arguments advanced by Kazimi, Dasgupta and Natarajan (2004) appear to be similar to the proposition made earlier that as a point of departure, organizations should first identify knowledge issues, formulate policy to guide the institutionalisation of these issues, conduct an audit to determine where knowledge resources are situated, and in the attempt to address shortcomings, relate the management of knowledge (as a strategic resource) to strategy formulation, i.e. not only formulate strategy to utilize knowledge as a strategic resource, but also use the strategy formulation process to guide the

institutionalisation of knowledge management strategies, planning and processes. Further underlining the suggestion that the methodology proposed by Kazimi, Dasgupta and Natarajan (2004) is similar to the above-mentioned methodology, Kazimi, Dasgupta and Natarajan (2004:05) go on to say that: 'What determines an organization's knowledge maturity is how well it can execute its business strategy by capitalizing on its knowledge strengths and opportunities and by mitigating the risks of its knowledge weaknesses and threats', or stated differently (Kazimi, Dasgupta and Natarajan, 2004:06), 'the ability of an organization to create knowledge and provide long-term business advantage will determine its maturity'. Kazimi, Dasgupta and Natarajan (2004) therefore propose that a new model of knowledge management maturity should be formulated, a model not only capable of addressing the objectives and issues of importance with regard to knowledge management, but also a model capable of addressing limitations present in today's models. Kazimi, Dasgupta and Natarajan (2004:06) therefore opine that this 'may well be the beginning of a new step by step Knowledge Management methodology which will blow away many of the clouds that come in the way of implementing and enabling organizations to move towards Knowledge Maturity'.

Figure 4.3: Representation of knowledge management dimensions



Although the above-mentioned authors differ with regard to what specifically constitutes knowledge management issues, and even though there are conflicting opinions regarding ICT's involvement in knowledge management, there is consensus that technology, and especially ICT, can be considered a primary issue (and possibly a primary domain) in knowledge management. In order to illustrate this point, Gurteen (1998) argues that ICT is the channel for representing, organizing and deploying knowledge. In agreement with this, Scheraga (1998) feels that without having suitable technology in place, organizations will never be able to fully exploit the value of knowledge. In a similar fashion Henczel (2000) emphasizes that good information management is a prerequisite for knowledge management, and adds that no endeavours in knowledge management should be inaugurated unless efficient and effective information and communication technology is available to support them[37].

[37] Arguably, the statement by Henczel refers to knowledge management in a relatively mature state. Surely, information and knowledge can be management via manual systems; however it is the author's opinion that primarily due to technical restraints, such endeavours would place an extreme limitation on the growth potential of knowledge management in particular.

These statements are also in agreement with statements made by Earl (1994), Chait (1999), and Gallager and Hazlett (2004) emphasizing that knowledge management requires a combination of technical and social interaction. What specifically constitutes efficient and effective ICT is a debatable issue. Hirvonen (2004) argues that organizations are at different levels of maturity in respect of ICT management, some in a chaotic situation, whilst others, due to proven procedures and practice, are capable of optimizing information systems, and information system investments. As a tool to assist with strategic ICT management, Weill and Broadbent (1998) and Ward and Peppard (2002) propose the use of application portfolios[38], i.e. ICT applications and technologies classified into different categories depending on their contribution to business success. In proposing tools to assist in determining the organizational maturity for information system investment planning, Hirvonen (2004), building on the works of Weill and Broadbent (1998), and Ward and Peppard (2002), proposes four levels of ICT maturity, i.e. Initial, Aware, Managed and Optimized maturity. Hirvonen (2004) is of the opinion that it is only when organizational systems are known, i.e. in Phase Three (managed) of ICT maturity that organizations start to benefit from using application portfolio models with regard to strategic ICT management[39]. Hirvonen (2004) therefore argues that system development should be planned for and business requirements must become an important part of investment decision-making.

Since most ICT and knowledge management maturity models are derived from the Software Engineering Institute's Capability Maturity Model software and since many authors agree that knowledge management is dependent on ICT, it should be possible to derive a holistic ICT knowledge management maturity model by superimposing these models upon one another. This, however, would mean accepting that knowledge management is an extension of, or is part and parcel of ICT management, or vice versa, exactly the trap authors such as Kazimi, et al (2004), and Gallagher and Hazlett (2004) warn us against. However, it is my belief that in determining the best way to

[38] Application Portfolios. 'An application portfolio is needed to evaluate an IT system's relation to business success and answer strategic questions such as how much should be invested in new systems and technology' (Hirvonen, 2004:03).

institutionalise knowledge management, this avenue should be explored, with the proviso that cognisance should also be taken of other knowledge management issues, which also need to be addressed. At first glance such a proposition might seem far-fetched, but considering that the progression of knowledge (as a strategic resource) follows the methodology of transition of data into information, into knowledge, this proposition might not be as preposterous as it seems. It seems logical that the management of data, information, and knowledge should follow the same line of reasoning. To emphasise this close correlation between knowledge management and ICT management, as in the models proposed by Gallagher and Hazlett (2004), and Kochikar (2004), Ross, Breath and Goodhue (1996) propose that three ICT assets need to be managed well in order for ICT to play a strategic role: A Technology Asset, a Human Asset and a Relationship Asset, areas all deemed to be of great importance to successful knowledge management (refer to knowledge issues identified in section 3.4). Of interest is the fact that the evolution of ICT systems does indeed seem to follow this methodology. Applegate, McFarlen and McKenney (1999), building on the work of Zwass (1998), argue that the role that information systems play in organizations, evolves over time. According to these authors the stages in which any organization finds itself with regard to ICT can be divided into four areas:

- Operational support. Primarily shifting data in support of business operations.

- Support for management and knowledge work. With the aid of personal computers, information systems go beyond the support of operations to support management and knowledge work as well.

- Support of business transformation and competition. Organizations rely on information systems to achieve and sustain the competitive advantage. Decision support and strategic information systems directly support and even render knowledgeable decision-making and group decision-making possible.

[39] Hirvonen (2004) is of the opinion that for preliminary phases simple system maps and lists can be used to clarify ICT issues.

- Ubiquitous computing. ICT systems extend the influence of the organization beyond the borders of the organization. Systems are aimed at sharing knowledge and expertise with all stakeholders in an extended value chain.

In essence, after looking carefully at this evolutionary process it becomes apparent that ICT systems being developed to suit the needs of latter stages, all tend to render knowledge management possible, emphasising an increased interdependency between ICT management and knowledge management, especially with regard to increased maturity. In agreement with this, Kazimi, Dasgupta and Natarajan (2004;01) argue that 'today there is a growing realization that organizations can attain maturity in knowledge management only through a healthy coexistence of technology, processes and people, thereby paving the way for knowledge management successes in the years to come'. Possibly this phenomenon emphasises that knowledge management and ICT management have in the past mistakenly been managed as separate managerial entities. A word of caution: In suggesting that knowledge management and ICT management have in the past mistakenly been managed as separate managerial entities, one is in no way implying that ICT management, Information management and Knowledge management are one and the same thing, nor is it the intention of the author to propose that Information Management = ICT. ICT is no more than a vehicle/tool to support both Information and Knowledge Management. One is also not suggesting that Information Management = Knowledge Management. Information Management deals with the management of information (as opposed to knowledge) and is at best only capable of addressing explicit knowledge. Refer to the definition of Information Management offered by Boon (1990:320): 'Information management deals with management of resources such as information media, people, information systems and physical facilities that are required if information as contents is to play a role on the corporate strategic, organizational, operational and personal levels'. However, the author stands firm in the belief that both effective ICT and Information Management are enablers of effective Knowledge Management.

Care should therefore be taken not to fall into the trap and try to replace 'Information' or 'Data' with the word 'Knowledge' and presume that ICT systems that tend to support these entities can under all circumstances support, or be adapted to support knowledge or even information management. What is being proposed is similar to a proposition by Kazimi, Dasgupta and Natarajan (2004). These authors argue that due to subtle differences between data, information and knowledge, the tools to manage these entities will in most cases not be the same. However, it is the opinion of these authors that the underlying technology remains the same. What is being proposed is that in the organizational quest to continue growing, there is an evolutionary process of converting data into information and then into knowledge, with knowledge being the ultimate strategic resource. In all of these endeavours ICT is the vehicle, or rather the technology, that can supply tools to efficiently and effectively manage data, information and knowledge. By looking at the evolution of ICT management, information management and knowledge management, it is easy to understand why discrepancies arose. In the early stages of these managerial entities, it is not obvious that there is a correlation between shifting data, information and sharing knowledge. Only later is it revealed that by shifting data and managing information, knowledge can be gained, knowledge that is crucial to decision making. When organizations reach the later stages of both ICT management, information management and knowledge management, it becomes obvious that the main thrust shifts towards an effort to supply sufficient information to decision makers, to enable them to formulate winning strategies[40]. Ironically Applegate, McFarlen and McKenney (1999) (referring to ICT management) predicted that as soon as ICT becomes mature within an organization, ICT systems evolution tends first to start supporting the sharing of data, then information and finally knowledge beyond the borders of the organization. In similar vein, Gallagher and Hazlett (2004) propose that after optimisation of knowledge management within the organization, the next step should take one along a path towards knowledge management integration - a path towards sharing knowledge beyond the borders of the organization. Of interest is the fact that Kochikar (2004) came to basically the same conclusion, arguing that the knowledge

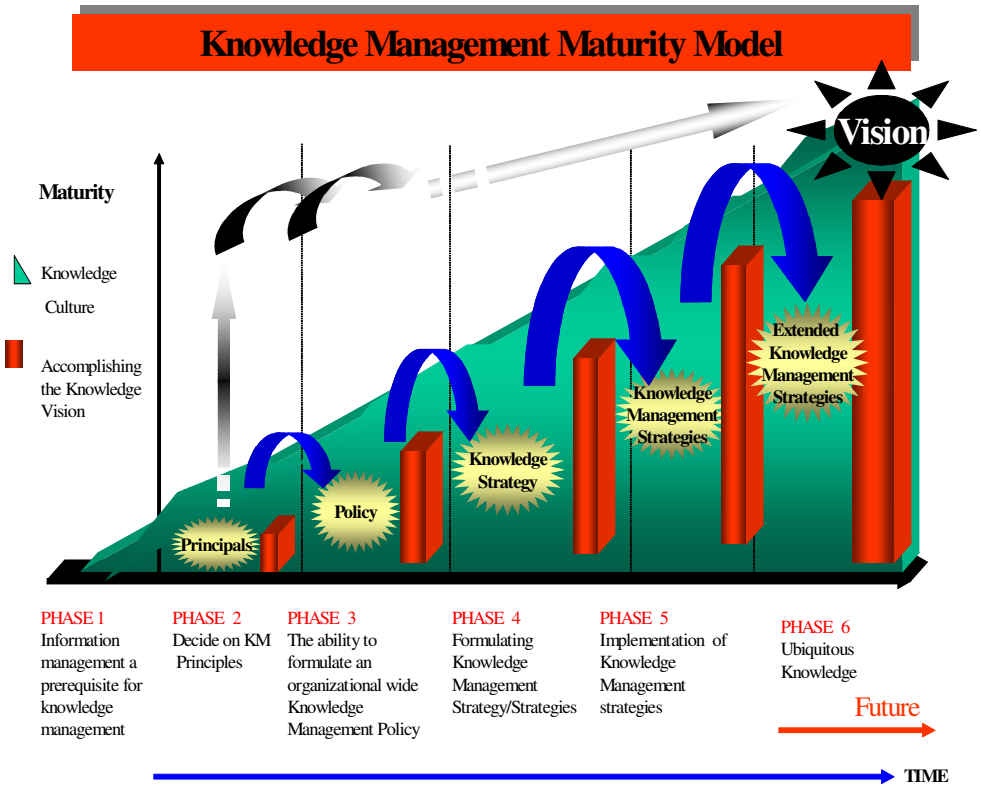
[40] According to Gallagher and Hazlett (2004:13) knowledge management phases range from: 'no awareness of knowledge management to a complete and focused knowledge strategy that is tightly coupled to the business strategy and ultimately results in improved business performance'.

life cycle not only consists of the stages of knowledge acquisition, sharing/dissemination, and reuse, but also that there is a fourth dimension – a dimension that only comes into play in the later phases of knowledge management maturity. According to Kochikar (2004), this fourth (next) dimension in the knowledge life cycle is Virtual Teamwork, e.g. the ability to support knowledge transfer across geographical distances, even beyond the organization's boundaries.

Referring to the Knowledge Management Model proposed earlier, it is becoming clearer and clearer that only after the filtering effect of strategy on knowledgeable reasoning is determined (what the organization needs to know in order to strategise), should resources be allocated to formulate knowledge management strategies. This argument is in agreement with a proposition made by Kazimi, Dasgupta and Natarajan (2004). These authors emphasize that in order to manage knowledge successfully, organizations first need to establish knowledge as a strategic asset and then utilize such knowledge to provide strategic leverage in terms of competitive advantage, increased market share and increased intellectual capital. This means that for knowledge to be sufficiently managed, organizations must progress to a point where they are able to manage both ICT, information and knowledge simultaneously. Therefore it is proposed that by building checks and balances into the evolutionary path of ICT, information and knowledge management[41], a holistic knowledge management maturity model can be formulated. The next section is a short explanation of the proposed model (refer to Figure 4.4).

[41] Presenting knowledge management as an evolutionary process consisting of several distinct phases.

Figure 4.4: Knowledge management maturity model



4.4.1 Phase 1: ICT and Information management enablers for knowledge management

Before any endeavour in knowledge management commences, a certain amount of ICT and information management (as enablers of effective knowledge management) needs to be present in the organization (vide Boon, 1990, Gurteen, 1998, Gallager and Hazlett, 2004). According to Kazimi, Dasgupta and Natarajan (2004:06): 'At a basic operational level, knowledge that helps an organization to conduct its day-to-day operations is necessary, without which work would grind to a halt'. The mere fact that organizations exist and survive indicates that a certain amount of knowledge is available within the organization. Primarily, all knowledge resides in the head of the knower, and if it is being shared, this is done in an informal manner. The following aspects are characteristic of this phase:

- Organizations are not yet made aware of the power vested in knowledge, and/or the importance of knowledge as a strategic resource.

- ICT (if it is present within the organization) is not managed in an effective and efficient manner. Organizations are getting to grips with the way they handle data and information. There is a need to develop an understanding of existing ICT systems, ICT technology, where information resources are situated and what the capabilities of technical personnel, etc., are.

During these preliminary phases, organizations should progress to an ICT maturity level where they are capable of knowing and managing what constitutes data and information. At the end of this stage, organizations should be capable of shifting data and information by means of ICT, in support of business operations. ICT-related relationships should be of a sound nature. In order to aid in these endeavours, it is proposed that simple system maps and lists can be used to clarify ICT issues. Although ICT and information management can be considered enablers of knowledge management, due to the data-to-information cycle, a certain amount of ICT should be in place in order for information management to function optimally. In a similar manner the information-to-knowledge cycle dictates that certain information management practices can be regarded as prerequisites to successful knowledge management. These include:

- The ability to determine information needs.

- The ability to determine the value and cost of information.

- The ability to procure, store, distribute, retrieve, share, dispose and protect information.

- Having an information management policy and strategy in place.

It should be noted, however, that it is envisaged that some of the initial phases will run concurrently with successive ICT and knowledge management phases.

4.4.2 Phase 2: Deciding on knowledge management issues

During the second level of maturity, there must be a realisation of the importance of knowledge, recognition that a formal knowledge management function exists, and an associated drive to instill this realisation into the entire organization ((Davenport (1998), Taylor Small and Tattalias (2000), Tiwana (2000), Logan (2001), and Laudon and Laudon (2004)).

In order to launch this phase it is proposed that the level of knowledge management orientation within the organization be determined. It is imperative that the extent to which knowledge is regarded as a strategic resource, be assessed. Emphasis should not only be placed on assessing the knowledge orientation of the organization, but this orientation should be consciously turned into a commitment to inculcate a knowledge culture in the organization. It is proposed that while the preliminary technological platform is put in place (as proposed in Phase 1), endeavours in knowledge management should start off by identifying issues, success factors and elements that will promote the institution of a culture of knowledge and knowledge management architecture within the organization. In order to focus all knowledge management efforts, the future state of knowledge (the formulation of a knowledge vision) within the organization should be dealt with explicitly. It should be noted that at this point only the conscious decision to embark on knowledge management should be addressed, and not the extent to which knowledge issues are institutionalised.

During this stage ICT systems within the organization should at least have evolved to a level where the organization knows what constitutes data and information systems. Ideally, an ICT audit should be done, enabling managers to assess ICT's applicability to knowledge management.

4.4.3 Phase 3: The formulation of an organization-wide knowledge management policy

This level constitutes a realization among business managers that knowledge is of extreme importance. In essence plans and policies to establish a knowledge culture within

the organization are formulated. During the latter part of this phase there should be a realization that for knowledge to have an exponential effect, it must be shared throughout the organization, e.g. knowledge cannot be managed in isolation within different organizational functions. Thus, the key element of this phase should be a conscious decision to establish a knowledge management function, knowledge domains, as well as forums to provide knowledge management with governance.

The primary goal of this phase would be the formulation of an organization-wide knowledge management policy on how the organization is going to manage, secure and protect knowledge as a strategic resource (both tacit and explicit); as well as guidelines on how the organization's knowledge repository should be formulated. At this level of maturity, ICT systems should have evolved to a stage where they are capable of going beyond the point of merely supporting operations to a point of being capable of supporting management decisions and knowledge work[42].

4.4.4 Phase 4: Formulating knowledge management strategy/strategies

The next level of maturity commences with a focus on determining to what extent organizations know what constitutes knowledge resources (both tacit and explicit), where knowledge resources are situated and why resources are strategic (i.e. organizational awareness of the power vested in knowledge, and/or the importance of knowledge as a strategic resource). In order to bridge the gap between current knowledge and knowledge needed (to base business strategy formulisation on), organizations at this level must be able (via the use of competitive intelligence and internal knowledge-sharing systems) to formulate a knowledge strategy and knowledge management strategies. In essence, this constitutes the ability to formulate strategies to explore, create, acquire, transfer, capture, codify, share and distribute knowledge. Of importance is the realisation that strategies include ICT, information management, human resource and other organizational aspects.

[42] Unsophisticated decision support systems, management information systems, fragmented databases, office automation systems, etc.

At this level, efficient and effective ICT architectures and knowledge infrastructures[43] should already be in place. During this phase, managers must become more than just aware of the power vested in knowledge. They must consciously begin encouraging endeavours in knowledge management. Typical of this phase will be the need of organizations to rely heavily on information systems to achieve and sustain competitive advantage. Decision support and strategic information systems should be available to support and even enable knowledgeable decision-making, as well as group decision-making, to take place.

4.4.5 Phase 5: Implementation of knowledge management strategies

Kazimi, Dasgupta and Natarajan (2004:06) state that 'Investment in technology, and improvement in culture is not enough. It is the currency of knowledge creation that matters most for organizations seeking sustained knowledge advantage'. At this level strategists start perceiving ICT, information management and knowledge management as interdependent entities, entities irreplaceable in the quest to sustain competitive advantage. The emphasis in ICT and knowledge management shifts to streamlining processes and procedures. Where the knowledge strategy is insufficient to supply answers to strategic knowledge gaps, and/or if strategists (functional owners) point out that 'new and more' knowledge and intellectual capital are needed in order to institutionalize future business strategies, there is a necessity to either leverage the power of existing internal knowledge resources, or increase knowledge in a particular area. A checklist to determine whether or not this level of maturity has been reached should not only focus on questions to determine if strategists can formulate strategies to increase knowledge in a particular area, and/or leverage existing knowledge, but should also assess whether or not the organization is capable of formulating efficient and effective plans[44] to change the

[43] Single access point, centralised knowledge management databases, competitive intelligence systems, single enterprise resource planning systems, integrated decision support systems, group and team supporting systems, and possibly even executive support systems.

[44] These plans must lead to defined Knowledge Management Projects with precise expected results, due dates, priorities and responsibilities – Long-term Operational Knowledge Management plans (per knowledge domain) and Short-term Knowledge Management plans (per knowledge domain). According to Ndlela and du Toit (2001), these action plans should include specific time frames, people involved and the amount of resources required to successfully institutionalise knowledge management.

organization's knowledge structure and supporting ICT structure from the 'as is' to the required 'should be' structure (refer to Figure 4.2). At this level the goals of ICT management and knowledge management converge in a quest to continually improve processes, i.e. optimize the use of ICT with regard to maximizing the value gained from knowledge.

Central to all of these strategies and plans is the quest to institutionalize knowledge and ICT systems that gradually enhance the effectiveness and efficiency of the organization's ability to explore, create, acquire, transfer, capture, codify, share and distribute knowledge. According to Kochikar (2004:09). 'more of what (knowledge) goes out, comes in'. In essence this phase represents the capstone of knowledge management maturity within the organization. In the words of Kochikar (2004:10), 'the culture of sharing has institutionalized; sharing becomes second nature to all'.

4.4.6 Phase 6: Ubiquitous knowledge

As soon as organizations are capable of continually enhancing and formulating strategies to further create and/or to process knowledge internally, the next evolutionary step involves utilizing the knowledge of the organization's partners and extended partners. To emphasise this point, Kazimi, Dasgupta and Natarajan (2004:06) state that knowledge maturity will in the end be determined by how well the organization can manage knowledge across all segments. During this phase 'knowledge management needs to seamlessly integrate with the enterprise eco-system', an eco-system consisting of customers, business partners, (shareholders, alliances, etc), operations and vendors (Kazimi, Dasgupta and Natarajan, 2004:06). This mindset requires that the organization's ICT architecture be capable of transcending the borders of the organization, i.e. capable of not only sharing data and information, but also knowledge and expertise with all stakeholders in the organization's extended value chain. However, due to cost and technological restrictions, most organizations will not easily reach or pass this point of knowledge management maturity. A checklist to determine whether or not this level of maturity has been reached should not only focus on determining if knowledge is being shared among value chain partners, but more specifically to what extent knowledge

management has become institutionalised between partners. If this level has not been reached, then organizations must return to Phase One of the maturity model, and once again progress through all these phases, this time adding the sharing of knowledge access boundaries to the line of reasoning, e.g. deciding on knowledge issues applicable to all stakeholders, formulating a knowledge management policy to govern the sharing of knowledge across the extended value chain, formulating holistic knowledge management strategies, etc. In agreement with this, Kazimi, Dasgupta and Natarajan (2004:06) maintain that: 'Knowledge management has come in the e-business era when basic architectures are being reinvented. Organizations implementing knowledge management programs also have the daunting task of implementing a gamut of e-business applications. As such knowledge management should not only co-exist with these applications, but it should integrate seamlessly. As the organization attains higher maturity, it will be able to manage this in an increasingly effortless manner'.

4.4.7. The next phase - The future

The evolution of knowledge management beyond the point of sharing knowledge between partners in an extended value chain remains a mystery. In future, if knowledge is going to be regarded as the organization's most precious resource, this will necessitate the sharing and trading of knowledge even beyond the borders of the organization's extended value chain. Following the argument proposed by Ndlela and du Toit (2001) that if the same characteristics of knowledge management are found in competing enterprises then the characteristics cannot continue to be a source of competitive advantage, indications are that in future knowledge management could reach a saturation point, a point where the cost of sustaining an extended knowledge management infrastructure could no longer be financially justified, and/or technologically supported. This could lead to a point where knowledge and ICT management, rather like the universe in the 'big bang' theory', diverge, implode and collapse back into the organization.

It should be noted that the transition from one phase to another is not cast in concrete - discrepancies and divergence between phases is a reality. The model should therefore not be seen as being too prescriptive - an all-inclusive approach to determining knowledge management maturity[45]. As Gallagher and Hazlett (2004:14) agree, the implication is not that in all cases organizations should zealously strive to progress to the next evolutionary level. In certain circumstances, before attempting a succeeding phase, it might be necessary to embark on a period of discontinuity, and first reflect on what has been achieved. However, what is certain is that phases progress along a line of descent, not by replacing previous phases, but by building knowledgeably on prior phases. Even though progressions through these phases should bring the organization closer and closer to reaching its ultimate knowledge vision, organizations constantly need to revisit and amend prior phases. Knowledge issues, success factors, policy, and strategy need to be constantly revised to adhere to changes in the organization's internal and external environment.

4.5 Summary

In the previous chapter (section 3.4 and 3.5), it was emphasized that certain issues, policies and strategies are crucial to effective and efficient knowledge management. It is argued that when placed in chronological order, these issues follow a managerial methodology of planning, organizing, leading and control. In this chapter an evolutionary methodology is proposed in respect of the progression of knowledge management within an organizational setting - a methodology not built solely on determining capability maturity, but rather on determining the progression of strategic issues related to knowledge management. By meticulously analysing the relevant literature it emerges that one of these issues is ICT and another is information management. It is argued that for knowledge to be sufficiently managed, organizations must progress to a point where they are able to manage ICT, information and knowledge simultaneously as strategic resources.

[45] Cognizance is taken of Parlby's (1999a and b) warning against prescriptive approaches to knowledge management.

The next chapter builds on this notion and argues that knowledge management maturity, when brought into context with business strategy formulation, can assist in establishing criteria to assess the efficiency and effectiveness of knowledge management in an organizational setting.

CHAPTER 5: DETERMINING THE VALUE OF KNOWLEDGE MANAGEMENT

5.1 Introduction

The previous chapter concluded with a proposition concerning an evolutionary methodology in respect of the progression of knowledge management maturity within an organizational setting. However, in the quest to find out whether efficient and effective knowledge management does indeed lead to organizational growth, profitability and sustainability, knowledge management must be aligned with criteria that determine the overall success of an organization. Whatever the level of maturity reached, in order to justify investment in knowledge management, organizations still need to determine if investment in any of these endeavours is adding real value to the organization, i.e. knowledge management must be brought into context with the objectives and measures that determine the overall efficiency and effectiveness of the enterprise.

5.1.1 Aim

This aim of this chapter is therefore to relate knowledge management's performance to the objectives and measures that determine the overall efficiency and effectiveness of an organization.

5.1.2 Scope

In order to achieve the above-mentioned aim, emphasis is placed on:

- Knowledge management in relation to business strategy and innovation.
- Criteria to determine the efficiency and effectiveness of an organization.
- How to assess the efficiency and effectiveness of knowledge management from an organizational perspective.

- Finally, all facts, arguments and findings made with regard to determining the value of knowledge management in an organizational setting, are brought into relation with knowledge management maturity.

5.2 Knowledge management in relation to business strategy and innovation

In Chapter 2 (section 2.4), it was argued that when organizations deliberately use knowledge to change the future in the most favourable manner in the shortest time possible, the transformation of data into information into knowledge becomes more than just a process of natural evolution - it becomes a deliberate enabling process. Bater (1999), phrases this deliberate attempt to manage knowledge as the quest to determine the precise points at which knowledge injects most value into the organization. As argued, determining the exact points at which knowledge, skills and information inject their greatest value into the organization requires that the management of knowledge be brought into relation with strategy formulation. In following the same line of reasoning, authors such as Zack (1999), and Snyman and Kruger (2004) propose that knowledge management and strategy formulation are interdependent. Zack (1999) argues that the power of knowledge management does not only reside in the ability to positively influence strategy formulation (i.e. knowledge exploration leading to innovative ideas), but also, and just as importantly, in the ability to exploit the power of knowledge via strategy formulation. In agreement with this, Tiwana (2000) says that the process of knowledge driving strategy, and strategy in turn driving knowledge management, should be deliberate and well executed.

As far back as the sixties authors such as Chandler (1962) emphasised that strategy just for the sake of it, means nothing. Strategy must lead to something, and this something is some form of innovation. Weyrich (1998:01), in arguing the meaning of innovation, comes to the conclusion that innovation is everything the outside world perceives as output; ‘New products and systems, new technologies and services. In short, everything the outside world perceives as a company’s output’. The above-mentioned line of reasoning seems to have led to the notion that the value of strategy is encapsulated within

some form of innovation. In following this line of reasoning, the question arises whether knowledge management (being the enabler of strategy) is also the enabler of innovation. According to Leonard-Barton (1995) and Carneiro (2000:01), innovation depends on knowledge, and especially the evolution of knowledge, e.g. building new knowledge on existing knowledge. Authors such as Zack (1999), Tiwana (2000) and Murray (2000) agree, stating that knowledge is the only source of innovation and sustainable competitive advantage. However, Weyrich (1998) argues that although innovation is built on knowledge (clear vision, quality of planning, clear strategic direction) innovation is not a flash of genius; but a deliberate process that must be managed, i.e. in an organizational context it is knowledge management and not knowledge *per se* that drives innovation. As argued in Chapter 2 (section 2.4), Carneiro (2000); Dove (1999); and Nonaka and Takeuchi (1995), as cited by Darroch and McNaughton (2002) are therefore all of the opinion that knowledge management as a managerial entity is emerging as the antecedent of innovation.

Darroch and McNaughton (2002), however, warn that literature is yet to provide empirical evidence linking knowledge management to innovation. In defending the above-mentioned proposition, following an extensive search of literature dealing with innovation, Darroch and McNaughton, (2002:02) came to the conclusion that the 'relationship between knowledge management and innovation is not well understood' (arguably because the relationship between knowledge management and strategy formulation is not well understood). According to these authors there is convincing empirical evidence in literature that knowledge acquisition and spending money on R&D will positively affect innovation (Cooper, 1979; Li and Calantone, 1998; Tang, 1999; Lynn, Reilly and Akgun, 2000, quoted in Darroch and McNaughton, 2002). However, there also seems to be mixed evidence of a link between dissemination and responsiveness to knowledge and innovation (Abbey, 1983; Amabile et al, 1996, Anderson and West, 1996, Hurley and Hult, 1998; Kitchell, 1995; Tang, 1999). In arguing the reasons behind these phenomena, Darroch and McNaughton, (2002:03) come to the conclusion that discrepancies arose not only as a result of a lack of 'research linking knowledge management with innovation, but also due to studies failing to

account for different types of innovation'. Darroch and McNaughton (2002) therefore propose that research attempting to relate knowledge management to innovation needs to focus on linking knowledge management to both incremental and radical (technological) innovation. Based on the above-mentioned proposition, and drawing heavily on some of their earlier work (Darroch and McNaughton, 2001), Darroch and McNaughton (2002) propose the following hypotheses:

- Knowledge management processes positively affect innovation.

- Some knowledge management processes are more important than others for different types of innovation. More specifically:

    - Managing knowledge about the marketplace has a stronger positive effect on incremental innovation.

    - Managing science-based knowledge has a stronger positive effect on innovations that change consumer's behaviour or destroy business competencies.

As indicated in Chapter 4 (section 4.3), in order to test the above-mentioned hypothesis, using data collected from 443 New Zealand firms, a knowledge management instrument that comprises three components and 17 factors was tested against a three-factor innovation scale[46]. In part the results obtained, as quoted in the work of Darroch and McNaughton (2002:216), were 'shocking'. These authors found that: 'all innovations require flexible and opportunistic organizations; most firms develop incremental innovations, followed by innovations that change consumer's behaviour and then innovations that destroy business competencies; no informal or formal knowledge dissemination factors were found to directly affect innovation; knowledge management did not prove a sufficient explanation of innovations that destroy business competencies;

[46] Darroch and McNaughton's (2002:115) scale to measure innovation: 'accounts for innovation that is incremental in nature, innovation that changes consumer' behaviour, both new-to-the-world and new-to the-firm innovations that have the potential to destroy existing competencies'.

and only six of the sixteen knowledge management practices[47] were positively affecting innovation'. Interestingly enough these authors also found that one of the factors (having a well-developed financial reporting system) even had a negative effect on innovation. In essence, nine factors were found not to be significant enough to predict any form of innovation[48]. Darroch and McNaughton (2002) therefore contest earlier claims and propose that there is insufficient evidence to conclude that knowledge management processes do indeed lead to innovation; only weak support for the theory that managing knowledge about the marketplace will have a stronger effect on incremental innovation; and only partial support for concluding that managing science-based knowledge will have such a strong positive effect on innovation that it will change the consumer's behaviour or destroy competencies.

According to Darroch and McNaughton (2002), the results of their research in a sense refute previously held assumptions about the importance of knowledge dissemination practice for innovation (as proposed by Nonaka and Takeuchi, 1995), and show that knowledge acquisition and spending money on R&D are more important to innovation than knowledge dissemination. However, although knowledge dissemination, knowledge acquisition and spending money on R&D all relate to strategies to explore knowledge,

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[47] 'This research showed that six out of 13 [sic - must be 17] factors positively affected innovation:

- Being sensitive to information about changes in the marketplace
- Employing and retaining a large number of people trained in science, engineering or mathematics (having a science and technology human capital profile).
- Working in partnership with international customers.
- Using technology such as teleconferencing, videoconferencing and groupware to facilitate communication.
- Responding to knowledge about technology.
- Being flexible and opportunistic.

Darroch and McNaughton's (2002:217)

[48] A total of nine factors were not significant predictors of innovation:

- Valuing employee's attitudes and opinions.
- Getting information from market surveys.
- Freely disseminating market information.
- Disseminating knowledge on-the-job.
- Using techniques such as quality circles, mentoring and coaching.
- Preferring written communication to disseminate knowledge.
- Responding to knowledge about customers
- Responding to technology about competitors.
- Having a well-developed marketing function'

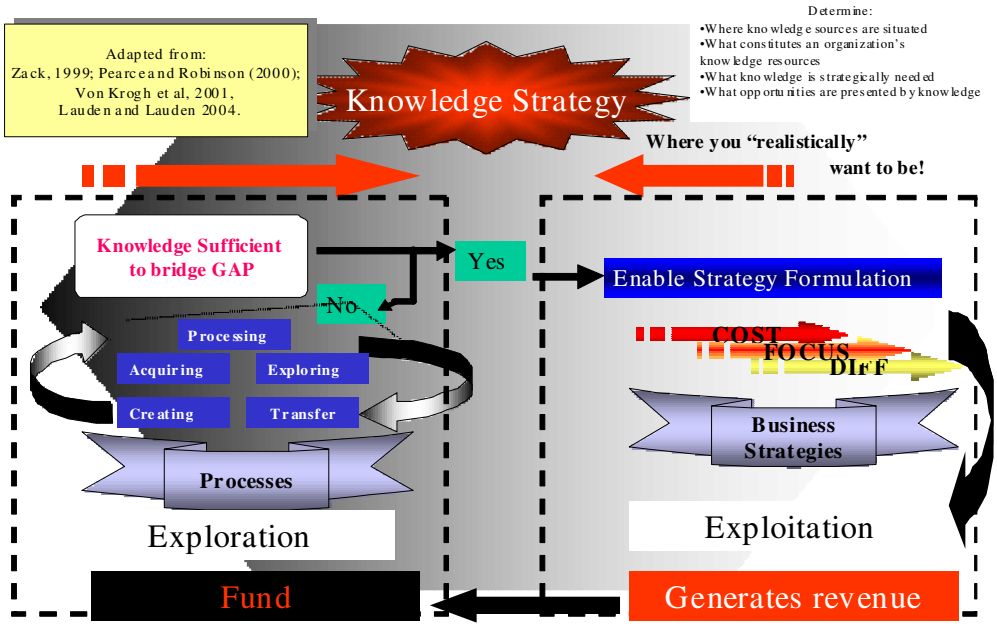
Darroch and McNaughton's (2002:217)

they all differ with regard to the end product produced. The end product of strategies to acquire knowledge is normally encapsulated in something tangible (a report, a document, etc.), leading to something tangible (some form of innovation), whereas the end products of strategies to disseminate knowledge for the most part remain intangible (disseminated knowledge for the most part simply stays in the heads of the members of the targeted audience). What is of major importance is that Darroch and McNaughton (2002:217) acknowledge this phenomenon and argue that: 'this does not mean that knowledge dissemination practice should be deemed unimportant. What is more plausible is that knowledge dissemination becomes part of the strategic architecture of a firm and provides indirect support to outcomes such as innovation'. The research conducted by Darroch and McNaughton (2002), although aimed at proving a relationship between knowledge management and innovation, in the end, ended up emphasizing the interdependency between knowledge management, business and strategy. Like the notion by Zack (1999) that the power of knowledge management does not only reside in the ability to positively influence strategy but also in the ability (via strategy formulation) to exploit the power of knowledge, the findings of Darroch and McNaughton (2002) prove that certain endeavours in knowledge management (exploration leading to exploitation via the strategic management process), lead to something tangible (innovation), while others only provide indirect support to outcomes such as innovation, for the most part continuing to be part and parcel of the strategic architecture of the organization, arguably remaining intangible. Speculating on the managerial implications of their research, these authors (Darroch and McNaughton, 2002:217) proposed that: 'Firms need to strike a balance and develop some incremental and some radical innovations – the former meet immediate market needs, while the latter preserve the future'. It would seem that the study conducted by Darroch and McNaughton (2002) in a sense negates the assumption of perfect order, or stated differently, in relating endeavours in knowledge management to different forms of innovation, Darroch and McNaughton proved that there is not necessarily a direct relationship between cause (knowledge management) and effect (innovation). This proposition is therefore similar to the statement by Kurtz and Snowden (2003:03), questioning the 'universality of basic assumptions'. These authors argue that: 'What all of these approaches and perceptions do not accept is that there are situations in

which the lack of order is not a matter of poor investigation, inadequate resources or lack of understanding, but is *a priori* in the case – and not necessarily a bad thing, either'. In essence what Darroch and McNaughton (2002) emphasize is that in order to ensure innovative output, different processes (or strategies - as proposed by Zack (1999) and Snyman and Kruger, (2004) need to be institutionalized, some cyclical in nature addressing a strategic perspective (arguably negating a direct relationship between cause and effect), and some relating more to an innovative perspective (arguably providing a direct relationship between cause and effect).

The conclusion reached by Darroch and McNaughton (2002), is therefore similar to the findings of earlier research conducted by Zack (1999). Zack suggests that knowledge exploitation and exploration are not mutually exclusive, and the ideal state would be to maintain a balance between knowledge exploitation and exploration (refer to Figure 5.1). In defending this proposition, Zack (1999:133) argues that: 'exploration provides the knowledge capital to propel the company into new niches while maintaining the viability of existing ones, while exploitation of knowledge provides the financial capital to fuel successive rounds of innovation and exploration'.

Figure 5.1: The interdependency between knowledge exploration and knowledge exploitation



Zack (1999:133), however, adds another dimension to this line of reasoning and stresses that: 'exploration without exploitation cannot be economically sustained in the long run unless it is subsidized or directly generating a revenue stream'. Zack (1999) therefore maintains that in order to be of value, endeavours in knowledge management must in the long run lead to profitability. In agreement with the statement made by Zack (1999), Ndlela and du Toit (2001) suggest that for knowledge management to be of value, it should help to decrease cost or increase revenue. In a sense what these authors are proposing is that in assessing the value of knowledge management, all endeavours must be brought into context with the organizational quest to sustain profitability.

Ndlela and du Toit (2001), however, in following the line of reasoning that certain endeavours in knowledge management lead to something tangible, while others in support of such endeavours remain intangible, argue that in assessing the value of knowledge management both these entities must be taken into account**.** In their argument Ndlela and du Toit (2001), specifically emphasise the value of 'intangible knowledge' in creating business value. In a similar fashion Gallager and Hazlett (2004) maintain that in

order to justify expenditure on knowledge management, an integrated approach is needed, an approach to ensure that the right things are done at the right time, for the right reasons, in the most effective manner possible. The arguments advanced by Ndlela and du Toit (2001), and Gallager and Hazlett (2004), are therefore similar to propositions made earlier by Scheraga (1998). Building primarily on the work of Seemann (1996), Scheraga (1998) is emphasising that all endeavours in knowledge management must be measured in both a qualitative (and tangible), and quantitative[49] manner. It is therefore argued that the same practices that are used to determine the value of other parts of the business should also be employed to determine the value of knowledge management. Arguably, if the above-mentioned propositions are summarised, the conclusion would be similar to a proposition made by Ndlela and du Toit (2001), suggesting that in order to determine whether or not endeavours in knowledge management are worthwhile, their performance should be compared with the objectives and measures that determine the overall efficiency and effectiveness of the enterprise.

5.3 Criteria to determine the efficiency and effectiveness of an organization

According to Pearce and Robinson (2005), one of the most important yardsticks for assessing the efficiency and effectiveness of an organization within its industry is financial analysis. These authors are of the opinion that in the quest to determine the profitability of an organization, emphasis should be placed on financial ratios that determine how effectively the total organization is being managed. In order to assist in such endeavours, Pearce and Robinson (2005) assert that the Du Pont system of financial analysis has proved to be of great value. However, Pearce and Robinson warn that in assessing the performance of a firm, not only should financial ratios be scrutinized to determine whether there is improvement or deterioration in the firm's performance over time, but such ratios should also be compared with the financial condition of similar firms. Pearce and Robinson (2005) therefore feel that only if ratios are brought into relation with industry averages over the same period of time, can sufficient insight be gained into the firm's relative financial condition and performance. Pearce and Robinson,

[49] Arguably qualitative measurement can be of a tangible or even an intangible nature.

like Scheraga (1998) who says that managerial endeavours[50] must be measured both in qualitative (or tangible), and quantitative (tangible and intangible) ways, argue that even though financial ratios supply insight into the profitability of a firm, in order to assess the total performance of a firm, soft and other intangible issues must also be taken into account.

In Chapter 2 (section 2.4) it was argued that the goal of all organizations is to supply stakeholders with value continuously. The performance of a firm should therefore be correlated with the satisfaction of stakeholders, especially if the firm intends to survive for a number of years. As stated in Chapter 2 (section 2.4) shareholders/owners are not the only stakeholders of an organization, and Pearce and Robinson (2000, 2005) rightly argue that the value of a firm cannot only be assessed as a derivative of financial ratios (i.e. tangible criteria primarily focusing on the needs of shareholders). However, it can be argued that whatever strategy is decided upon to satisfy the needs of stakeholders, it always boils down to an attempt to grow (internally as well as externally) and/or transform input into output in an effective and efficient manner. Unfortunately, according to Pearce and Robinson (2000), assessing growth[51] is not an easy task. The problem that arises is that organizational growth has both implicit and explicit dimensions that need to be addressed. Pearce and Robinson (2005) are therefore of the opinion that certain types of growth are extremely difficult (if not impossible) to determine[52].

In challenging the universality of basic assumptions with regard to organizational knowledge exchange, decision making, strategy and policy making, Kurtz and Snowden (2003) add yet another dimension to the line of reasoning by arguing that the prevailing

[50] Scheraga (1998) specifically focused on managerial endeavours with regard to knowledge management.
[51] Growth. 'In this context, the meaning of growth must be broadly defined. Although the product impact market studies have shown that growth in market share is correlated with profitability, other important forms of growth do exist. Growth in the number of markets served, in the variety of products offered, and in the technologies that are used to provide goods and services frequently lead to improvement in a firm's competitive ability. Growth means change, and proactive change is essential in a dynamic business environment' (Pearce and Robinson 2000:32).
[52] A word of caution. It is not the author's intention to refrain from trying to determine the value knowledge management adds to organizational growth. However, it is emphasised that whatever criteria are used, such criteria will never be able to fully address all intangible issues, primarily due to the fact that numerous of these issues are possibly not measurable.

methodology (to formulate general rules and/or hypotheses i.e. create a body of knowledge by studying physical conditions which can be empirically verified), does not hold true under all circumstances.[53] Kurtz and Snowden (2003) give as an example the fact that the exploration of possibilities and generation of ideas are not in themselves tools recommending and leading to courses of action. Kurtz and Snowden (2003) are therefore of the opinion that not all endeavours (strategies) lead to some form of order – they can also easily lead to disorder and even chaos. According to these authors, disorder and chaos are just as important for organizational survival as order, but they are not as distinctive and measurable. However, it can be argued that disorder and even chaos, like order, must in the end lead to some form of output (perceived or real) in order to be of any value. Relating this argument back to the argument proposed by Chandler (1962), in order to be of value, all forms of organizational output must lead to some form of innovation. However, Mintzberg and Lampel (1999:28), building on the work of Chandler (1962), question whether all output is innovation, and argue that although strategy and innovation are intertwined, they form a managerial cycle of spurts of innovation followed by imitation and consolidation. This adds yet another dimension to the line of reasoning. In essence Mintzberg and Lampel (1999) propose that in order for managerial endeavours to be of value, they do not necessarily have to lead to some form of innovation. They can also lead to imitation. For instance, identical vehicles exiting a production line do not necessarily represent any form of growth in innovation, neither does the year-in-and-year-out duplication of the sale of exactly the same commodity to a market, constitute what is normally considered as being innovative. However, even if output represents no form of innovation, such output can lead to profitability. Arguably, in an extremely competitive environment, producing output without being innovative is normally only sustainable for a very short period of time, emphasising the statement made by Pearce and Robinson (2000) that continued organizational survival is dependent on both growth and profitability, or rather spurts of growth and profitability. This once again underlines the fact that in order to be of value to the organization, all endeavours

[53]Refer to the Cynefin framework for collective sense-making as a consequence of discourse (Kurtz and Snowden, 2003).

must in the long run lead to both growth and profitability (tangible, or intangible) - growth and profitability not necessarily relating to any form of innovation.

In bringing all these above-mentioned points of view in relation with one another, the following deductions can be made:

- Strategy in itself means nothing; to be of value strategies must lead to some form of output.

- To add value, output can either be innovative, or if not innovative, imitative in nature.

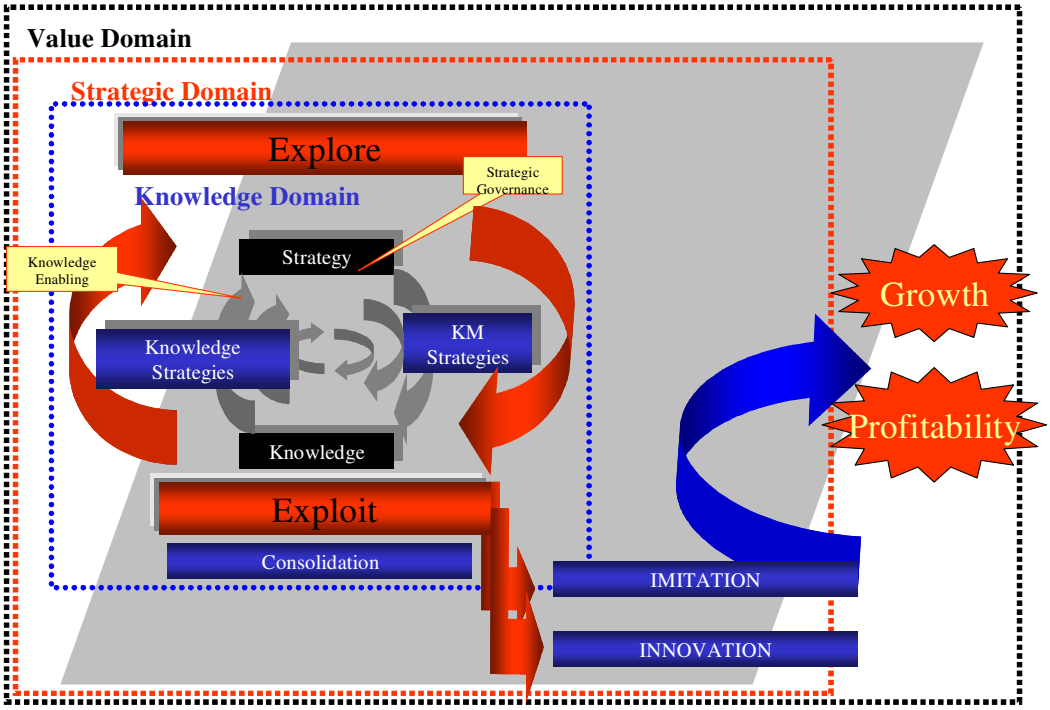
- Output can be ordered, disordered, or even be of a chaotic nature.

- In order to be able to deliver output, within the strategic management process, there needs to be consolidation with regard to assessing the best route to follow and the best strategy to employ.

- In the strategic management process, knowledge is the catalyst and knowledge management the enabler. Knowledge management is capable of dramatically (via knowledge exploration and exploitation) speeding up this evolutionary process of strategy formulation (see section 2.4).

The relationship between strategy formulation, knowledge management (knowledge exploitation and knowledge exploration) is therefore a tightly woven net of decision making (refer to Figure 5.2). Strategy is therefore, as Mintzberg and Lampel (1999:28) rightly state: ‘spurts of innovation (knowledge exploitation) followed by cycles of imitation and consolidation (knowledge exploration)’.

Figure 5.2: The relationship between strategy formulation, knowledge management and knowledge exploitation



5.4 How to assess the efficiency and effectiveness of knowledge management from an organizational perspective

In the attempt to determine how to measure the efficiency and effectiveness of knowledge management in an organizational setting, the prevailing notion about relating endeavours in knowledge management to a specific form of output (i.e. innovation) is therefore questioned. Owing to the complex nature of managing knowledge (especially as a strategic enabler), it cannot be argued that the sum of the input will equal the output gained. This is primarily due to the filtering effect strategy has on knowledge management, i.e. not all endeavours lead directly to some form of output, and it is quite definite that not all endeavours in knowledge management lead to some form of innovation (incremental, technological, or radical). The idea of trying to prove that endeavours in knowledge management lead directly to a specific form of output (i.e. innovation) is therefore rejected. However, in assessing the value that knowledge

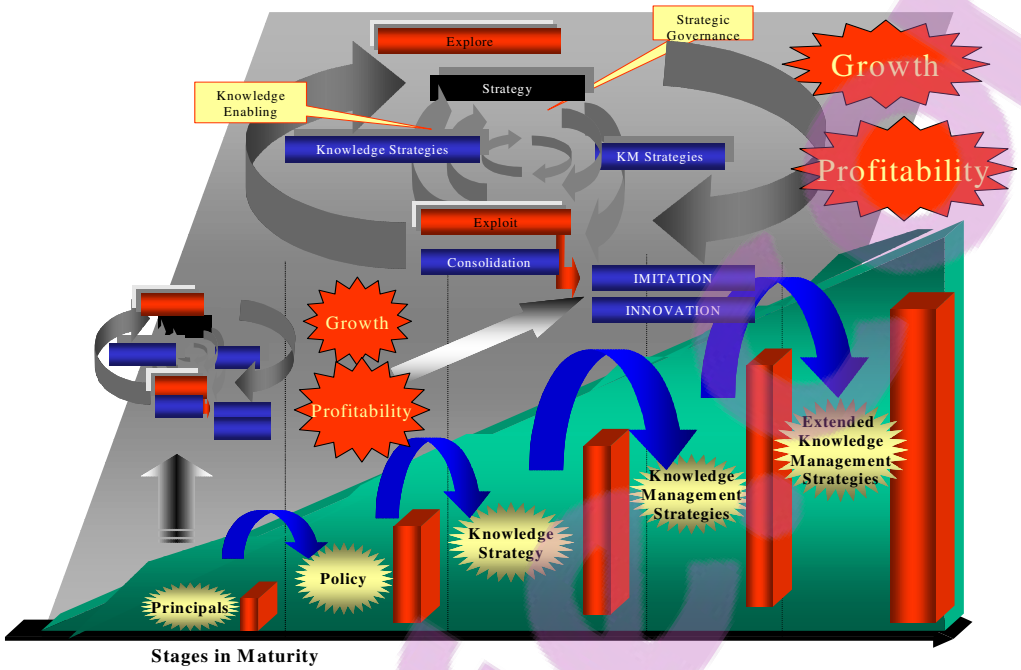
management adds to an organization, it is definitely true that in order to be of value, all endeavours must ultimately lead to growth and profitability, encapsulated as some form of output (imitation or innovation), even of an ordered, disordered or chaotic nature. In following this line of reasoning it is argued that profitability over time is a derivative of the quality of the organization's knowledge management endeavours (knowledge exploration feeding exploitation), whereas growth represents gain in quantitative measures. As argued by Pearce and Robinson (2000), profitability can easily be assessed, primarily via profitability ratios. However, determining organizational growth (since part of it is of an intangible nature) might not be so easy. Therefore, noting that it will probably be a futile exercise to try to formulate criteria to assess the value that knowledge management adds to intrinsic growth, for instance, and also taking care not to step into the same trap as authors such as Darroch and McNaughton (2002) (i.e. proposing a direct correlation between cause and effect), it is proposed that in assessing the value that knowledge management adds to an organization, a more holistic approach needs to be followed. Growth and profitability must be brought into relation with one another. Possibly the only way growth and profitability can be brought into relation with one another is through the intrinsic value both add to stakeholder value (refer to Chapter 2, section 2.4), i.e. organizational sustainability. It is therefore proposed that the value of growth and profitability be assessed as a derivative of output leading to the satisfaction of the different needs of the organization's stakeholders. In this regard profitability continues to be a measure of the ability to satisfy needs in a financially viable manner, i.e. profitability addresses qualitative measures, and growth (as a measure of stakeholder satisfaction) addresses quantitative measures[54].

[54] In this context growth, both explicit and implicit, will be addressed. As an example, growth in market share relates to satisfying the need of shareholders, growth in the number of markets served, addresses the need of both shareholders and customers, growth in the variety of products offered, addresses the needs of customers, and growth in the technologies that are used to provide goods and services frequently leading to improvement in a firm's competitive ability, relates to growth in competencies, the ability to strategise, i.e. satisfying managerial needs.

5.5 The value of knowledge management in relation to knowledge maturity

In Chapter 4 (section 4.4) an evolutionary methodology with regard to the progression of knowledge management in an organizational setting was proposed. It was argued that certain issues, policies and strategies are crucial to effective and efficient knowledge management. The gist of the chapter was the proposition that when knowledge management issues are institutionalised in chronological order, the more strategically evolved organizations become, the more they are able to turn tacit knowledge into explicit knowledge, progressively enabling them to exponentially exploit the power vested in knowledge. As stated earlier, the quest to continually explore and exploit knowledge relates directly to the organization's goal of sustaining survival via growth and profitability. Remaining true to the notion expressed by Gallager and Hazlett (2004:02) to the effect that: 'there is a symbiotic relationship between the notions of measurement and evaluation and the two cannot be examined effectively in isolation', it is argued that progression in knowledge management maturity (from a strategic perspective) should relate directly to an increased ability to speed up the strategic cycle of imitation, consolidation and innovation. It would seem that the ability to explore and exploit the power vested in knowledge more rapidly, will be directly related to a decrease in imitation and an increase in innovation, with successive stages gradually speeding up the evolutionary process of transforming what is incremental into what is technological and then into groundbreaking innovation (refer to Figure 5.3).

Figure 5.3: Progression in knowledge management leading to increased innovation, growth and profitability.



5.6 Summary

Throughout this chapter it has been emphasized that in order to ensure strategic output, different knowledge management processes need to be institutionalized, some cyclical in nature addressing a strategic perspective, and some relating more to an innovative perspective. In the quest to determine how to measure the efficiency and effectiveness of knowledge management in an organizational setting, it was argued that the prevailing notion of relating endeavours in knowledge management to a specific form of output (i.e. innovation) produces distorted results. It was proposed that the key to determining the effectiveness and efficiency of knowledge management therefore does not lie in trying to assess to what extent knowledge management leads to different forms of output, but specifically in determining to what extent strategies built on knowledgeable reasoning lead to organizational growth, profitability and sustainability.

It was argued that the quest to continually explore and exploit knowledge, relates directly to the organization's goals of survival, via growth and profitability. The proposition was made that if knowledge management enables business strategies to be formulated according to sound knowledgeable reasoning, then surely a measure of the success of all strategies is also a measure of the efficiency and effectiveness of knowledge management. It was emphasized that assessment of the efficiency and effectiveness of an organization is unfortunately no easy task, primarily due to the difficulty encountered when determining implicit growth. It was therefore proposed that measures to determine the efficiency and effectiveness of an organization should neither be derivatives of only the amount of growth produced, nor derivatives of only profitability, but a combination of the two. It was argued that even though it might prove impossible to determine all forms of growth, whatever form of growth is experienced would ultimately need to lead to the satisfaction of the different needs of the different stakeholders of the organization. In relating this argument back to knowledge management, it was argued that whatever endeavours in knowledge management are followed, the value of its contribution will, over time, be qualified in the satisfaction of stakeholders needs, and quantified in profitability and also some forms of growth.

CHAPTER 6: METHODOLOGY PROPOSED TO ASSESS THE KNOWLEDGE MANAGEMENT MATURITY OF AN ORGANISATION

6.1 Introduction

As a point of departure, to come to an understanding of the crucial role knowledge and knowledge management play in an organization, a critical review of literature was conducted in chapters 2 and 3. After reporting on the role knowledge plays as a strategic corporate resource and after determining the interdependent role between strategy, knowledge and knowledge management, chapter 3 sets out to answer whether there are any issues/models/methodologies or perspectives available in literature to guide strategists in the quest to effectively manage knowledge. In chapter 4 it is argued that these issues/models/methodologies and perspectives follow a chronological sequence of events, events that need to take place in order to institutionalise knowledge management successfully. In comparing the different knowledge management success factors to one another and in placing them in a chronological sequence, chapter 4 concluded with a knowledge management maturity model. Throughout all of these chapters the selection of sources were driven by the quest to assess knowledge and knowledge management's role in the process of speeding up the business evolutionary process. Appropriate measurement criteria for determining the effectiveness and efficiency of knowledge management was therefore also thoroughly analysed in chapter 5. Unfortunately, all propositions proposed in these chapters centre on purely academic reasoning. Therefore, careful not to fall into the trap of the research being banished to be vested on purely theoretical and/or academic realms, the decision was taken to turn all prepositions made out of the scholarly review into exploratory questions – questions that allow the practical adaptation of all ideas that were put forward.

6.1.1 Aim

Building on the inductive reasoning followed in chapters 2 to 5, the aim of chapter 6 is to bridge the gap between theory and practice and to supply scholars, practitioners and strategists with an instrument that not only successfully institutionalizes knowledge

management, but also to enable the successful measurement of knowledge management maturity, all from within a strategic/managerial rather than from a purely technological perspective.

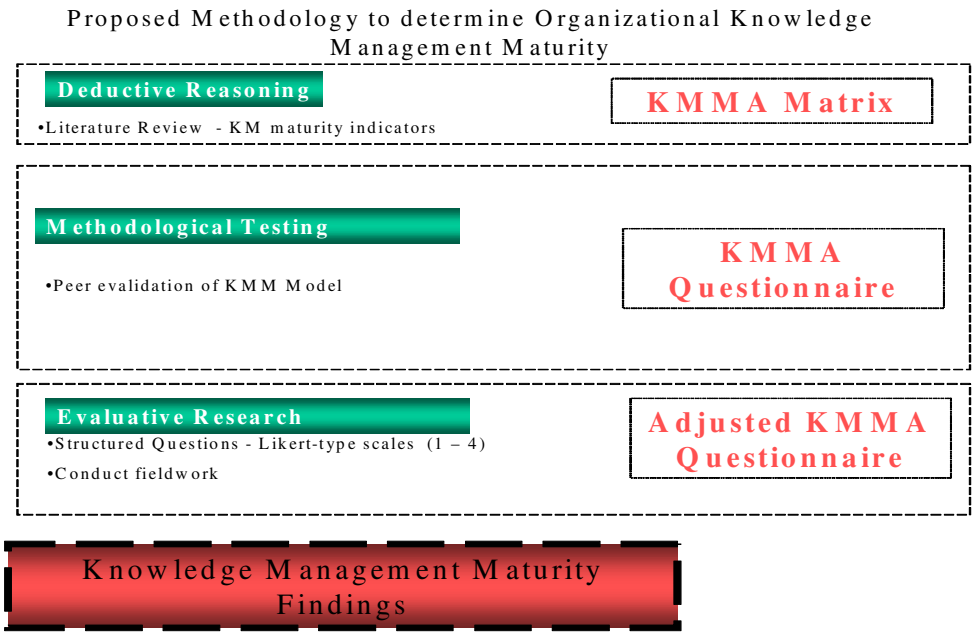
6.1.2 Scope

In attempting to achieve this aim, the following aspects are given prominence:

- Methodology to measure the knowledge management maturity of an organization.
- Formulation of a knowledge management maturity questionnaire

6.2 Methodology to measure the knowledge management maturity of an organization

Figure 6.1: Methodology to assess the knowledge management maturity of an organization



With reference to Figure 6.1, in Chapter 4 (section 4.4) an evolutionary methodology regarding the progression of knowledge management in an organizational setting was

proposed. Through a process of inductive reasoning[55], it was argued that certain issues, policies and strategies are crucial to effective and efficient knowledge management. The main thrust of the chapter was the proposition that when knowledge management issues are institutionalised in chronological order, the institutionalizing entity (in this instance the organization) becomes more strategically evolved. In essence, it was proposed that the process of institutionalization of knowledge management from within a managerial/strategic, rather than from within a technological perspective, aids in the transference of tacit knowledge into explicit knowledge, progressively enabling the exponential exploitation of the power of knowledge. Remaining true to the notion expressed by Gallager and Hazlett (2004:02) that: 'there is a symbiotic relationship between the notions of measurement and evaluation and the two cannot be examined effectively in isolation', it was argued that the level of knowledge management maturity relates directly to increased stakeholder satisfaction with regard to increased growth, profitability and sustainability. This section revisits the knowledge management maturity model formulated in Chapter 4 (section 4.4) and introduces the reader to the line of reasoning followed with regard to assessing the knowledge management maturity of an organization, especially from a managerial/strategic point of view.

In Chapter 4 (section 4.4) it was proposed that before any endeavour in knowledge management commences, as a preliminary phase (phase 1), a certain amount of ICT and information management (as enablers of effective knowledge management) must be present in the organization. In assessing whether or not this preliminary level of proficiency has been reached, and to what extent, the following questions need to be answered (vide Boon, 1990, Gurteen, 1998, Gallager and Hazlett, 2004):

- Are ICT relationships of a sound nature?
- Can the organization arrange, make accessible, protect, store, retrieve, analyse, filter, evaluate, package and dispose of information?

[55] According to Mouton (2001:179): 'A review of literature is essentially an exercise in inductive reasoning, where you work from a "sample" of texts that you read in order to come to a proper understanding of a specific domain of scholarship'.

- Is there an inventory of information entities in the organisation?
- Can the organization organize, plan/design and evaluate an ICT system?
- Is the organization capable of shifting data and information by means of ICT, i.e. is there an ICT infrastructure in place that can support Information management?
- Is the organization capable of determining information needs?
- Are there measures in place to procure information?
- Can the organization determine the value and cost of information?
- Does the organization have an information policy and strategy in place?

Positive answers indicate the capacity to institutionalize formal knowledge management endeavours successfully.

The next phase (phase 2), requires a realisation of the importance of knowledge management as a formal function within the organization, and also associated drives to instill this realisation throughout the organization (refer to Chapter 4, section 4.4). Assessment to determine whether or not this level of maturity has been reached includes the following questions:

- Is the organization aware of the power vested in knowledge, i.e. is knowledge seen as a strategic resource?
- Is there a commitment from top management to the inculcation of a knowledge culture within the organization?
- Is there a commitment from top management to establish a formal knowledge management function?
- Is the organization capable of identifying issues, success factors and elements conducive to the establishment of a culture of knowledge and knowledge management architecture within the organization?

- In order to focus all future knowledge management efforts, are there distinct expressions of the future state of knowledge (the formulation of a knowledge vision) within the organization?

The following phase (phase 3), involves a conscious commitment, especially from business managers, to start embracing endeavours in knowledge management. At this level of maturity, ICT and Information Management (IM) must already be geared towards supporting knowledge management endeavours. Typical questions to determine whether or not this level of maturity has been reached include the following:

- Are ICT and IM capable of going beyond a point of merely supporting the flow of information, to a point of being capable of supporting management decisions and knowledge work?
- Is there an organization-wide knowledge policy in place?
- Is knowledge shared throughout the organization, and are there forums in place to provide governance for knowledge management activities, i.e. is there a working knowledge management function, and/or are knowledge domains established within the organization?
- Do functional owners send employees on formal training programmes, brainstorming sessions, and self-enrichment and learning exercises?

Phase 4 centres around the ability to consciously formulate a strategy (knowledge strategy) about knowledge as a strategic resource. Typically, at this stage of maturity ICT should by now also be geared to support the assimilation and distribution of knowledge in all spheres of the organization. Questions to determine this level of maturity should focus on the following:

- Is the organization capable of conducting a successful knowledge audit?
- Does the organization know what constitutes knowledge resources (both tacit and explicit), where knowledge resources are situated and why resources are strategic?

- Are efficient and effective ICT architectures and knowledge management infrastructures in place (single access points, centralized knowledge management databases, competitive intelligence systems, single enterprise resource planning systems, integrated decision support systems, group and team supporting systems, and possibly even executive support systems)?

Phase 5 deals with the ability to be able to both exploit and explore the power vested in knowledge and knowledge management (formulate knowledge management strategies). The essence of this level of maturity is therefore not only the ability to intentionally enhance strategy formulation, but also to streamline knowledge management processes and procedures. A checklist to determine whether or not this level of maturity has been reached, should focus on the following questions:

- Is the management of knowledge (all knowledge management tools) supplying a direct input to the strategic management process? (Is the Chief Knowledge Officer (CKO), and the knowledge management function an active participant in the strategy formulation process of the organization?)
- Is the organization capable of formulating strategies and plans to further enhance the capabilities of knowledge management, i.e. business strategies that will increase knowledge in a particular area and/or leverage existing knowledge? (According to Snyman and Kruger (2004) these plans must lead to defined Knowledge Management Projects with precise expected results, due dates, priorities and responsibilities – plans to further explore, create, acquire, transfer, capture, codify, share and distribute knowledge in an effective and efficient manner.)
- Do knowledge management strategies lead to efficient and effective plans, capable of transforming the organization's knowledge structure and supporting ICT structure from the 'as is' to the required 'should be' structure?
- Is there a culture conducive to knowledge sharing within the organization?
- Are individuals being evaluated or appraised on the basis of their knowledge capabilities and output?

With reference to Chapter 4 (section 4.4), as soon as organizations are capable of enhancing strategy via knowledge management, the next evolutionary step (phase 6), is the incorporation and utilization of knowledge vested in the organization's value chain and value chain partners. The primary requirement of this level of maturity is the ability to transcend the borders of the organization, e.g. the ability not only to share data and information, but also knowledge and expertise with all stakeholders in the organization's value chain. A checklist to determine whether or not this level of maturity has been reached should focus on the following questions:

- Are trans-organizational forums in place and is knowledge shared among value chain partners?
- Is the organization's ICT architecture capable of transcending the borders of the organization, e.g. capable not only of sharing data and information, but also knowledge and expertise with all stakeholders in the organization's extended value chain?
- Are holistic knowledge management strategies and plans formulated between members of the value chain, plans and projects to further explore and exploit the power vested in knowledge?

The final question (Phase 7) in determining knowledge management maturity has to do with determining to what extent knowledge sharing has been established as a culture within the organization. Finally, participants should also be allowed to propose a clairvoyant perspective of the future of knowledge management within their organizations. This will provide valuable insight into the future evolutionary path that knowledge management needs to follow within the organization.

6.3 Formulation of a knowledge management maturity assessment questionnaire

In following the above-mentioned methodology, a matrix consisting of 7 Phases was constructed (refer to Appendix A: Knowledge Management Maturity Assessment Matrix - KMMAM). Questions proposed in the KMMAM formed the essence of a questionnaire (refer to Appendix B: Knowledge Management Maturity Assessment Questionnaire - KMMAQ) to determine organizational knowledge management maturity. Since these questions, as a by-product, also test the participant's perceptions of a phenomenon (in this case the progression of knowledge management maturity in an organizational setting), this provided an opportunity to follow a research design inclusive of a study of interpretation of perceptions. This meant that any future instrument did not have to be based on a purely evaluative approach, since questions contained in the matrix also rendered possible the testing of aspects of a phenomenological nature.

To assist in achieving all this, proposed questions were benchmarked against a survey developed by the Public Management Service of the OECD (PUMA), originally adapted from work done by Statistics Canada for private firms. The original OECD appealed to the researcher because experts in the fields of knowledge management and public management have reviewed it internationally. Numerous questions contained within this survey are therefore based on questions in the original OECD survey. After revisions were made, before finalization, the questionnaire was once again thoroughly pre-tested and validated by a number of respected scholars in the field of knowledge management.

To ease the capture of data, the questionnaires were adapted for statistical use, both on paper and electronic media. Pre-testing resulted in a number of enhancements and provided the opportunity to verify the validity of questions. In constructing the questionnaire, it became clear that transition between phases is not cast in concrete; discrepancies and divergence between phases is a reality. It was stressed by scholars that phase 1 (ICT and Information management as enablers for knowledge management) should be split, especially due to a certain amount of ICT being a prerequisite for

information management to function optimally (refer arguments proposed in chapter 4, section 4.4.1). It was also forwarded that there might be some misunderstanding of the differences between concepts such as ICT and information management.

In order to shorten the questionnaire and also ease the capture of data, it was proposed that phases 2, 3 and 4 could be combined. After numerous discussions it became apparent that most knowledge management scholars do not agree with the distinction between knowledge strategy and knowledge management strategies. It was therefore decided to refrain from using the term 'knowledge strategy" in the questionnaire. Questions surrounding awareness of the power vested in knowledge were rather incorporated. Also the importance of knowledge as a strategic resource was incorporated under the analysis of knowledge management strategies. However, care was taken not to lose the gist of arguments proposed in chapter 4 (section 4.4). Thus, although sections proposed in the questionnaire differ from the maturity phases proposed in chapter 4, the line of reasoning remains the same. In order to clarify this point, with reference to table 6.1, the following section supplies a brief comparison between the phases forwarded in chapter 4, and the maturity sections included in the KMMAQ.

KMM Model (Chapter 4)	**Questionnaire**
Phase 1: ICT and IM as enablers of KM	Sections 1.1 and 1.2: ICT management (v5 – v9) Sections 2.1 – 2.4: IM management (v10 – v28)
Phase 2: Deciding on KM principles	Section 3.2 (v32 – v38) and section 3.3 (Setting the stage v39 – v45)
Phase 3: Ability to formulate a organization-wide Knowledge Management Policy	Section 3.3, specifically question 3.3.4, (v42) and section 3.4, question 3.4.1 (v46)
Phase 4: Formulation of Knowledge strategy/strategies	Sections 3.1 (v29 - v31), section 3.4, questions 3.4.2 (v47) and 3.4.3 (v48) and section 3.5 (v49 – 52)
Phase 5: Implementation of Knowledge Management Strategies	Section 4 (v53 – v 84).
Phase 6: Ubiquitous knowledge	Section 5 (v85 – 103).

Table 6.1: Comparison between the phases forwarded in chapters 4, and the maturity sections included in the KMMAQ

Questionnaire section 1: ICT management (v5 – v9) and section 2: Information management (v10- v28) addresses Phase 1: ICT and Information management as enablers of knowledge management (chapter 4, section 4.4.1).

Questionnaire section 3: Formulation of knowledge management principles, policies and strategy, specifically section 3.2 (v32 –v38) and 3.3 (v39 – v45) address Phase 2: Deciding on Knowledge Management Issues (chapter 4, section 4.4.2).

Questionnaire sections 3: Formulation of knowledge management principles, policies and strategy, specifically section 3.3, question 3.3.4[56] (v42) and section 3.4, question 3.4.1 (v46) address Phase 3: The ability to formulate an organizational-wide Knowledge Management Policy (chapter 4, section 4.4.3).

Questionnaire sections 3: Formulation of knowledge management principles, policies and strategy, especially sections 3.1 (v29 - v31), 3.4.2 (v47), 3.4.3 (v48) and 3.5 (v49 – 52) address Phase 4: Formulation of knowledge management strategy/strategies (chapter 4, section 4.4.4).

Questionnaire section 4: Implementation of knowledge management, sections 4.1 - 4.7 (v53 – v84)[57] address Phase 5: Implementation of knowledge management strategies (chapter 4, section 4.4.5).

Questionnaire section 5: Ubiquitous knowledge, section 5.1 and 5.2, questions (v85 – v103) address Phase 6: Ubiquitous knowledge (chapter 4, section 4.4.6).

Section 6 of the questionnaire (v104), although not directly related to any knowledge management maturity phase identified in chapters 3, 4, or 6, reflects in a holistic manner

[56] Although question 3.3.4 (question v42) can be regarded as a knowledge management issue it is also a pertinent question with regard to the vesting of a knowledge management policy.
[57] Questions v59 and v61 can be considered knowledge management strategies; however, they are strategies prone towards extending knowledge management beyond organizational boundaries. Findings of questions v59 and v61 are thus discussed under the implementation of knowledge management, as well as under ubiquitous knowledge.

on the growth of knowledge management maturity over the past 5 years. In essence section 6 (assessment of knowledge management growth) can be considered a dependant variable related to sections 1 to 5 as independent variables.

Emphasis was also placed on determining how unambiguous the questions are, their statistical viability, and whether it would be possible for a competent manager and/or a knowledge management practitioner to complete all questions in less than 30 minutes. In order to be able to rank participants' perceptions with regard to knowledge management maturity indicators, Likert-type scales (1 – 4) were used for the most part, to express the degree of agreement with the structured questions.

After numerous revisions and alterations, the final questionnaire consists of six (6) sections, constituting (104) descriptive questions. As mentioned in chapter 1, to expand the research beyond purely theoretical and/or academic value, it was decided to test the usability of the proposed knowledge management maturity questionnaire in industry. Due to restrictions such as sensitivity, confidentiality and availability of information, preliminary research indicated an unwillingness of organizations to participate in the intended research. This problem was overcome by incorporating the research component into the research curriculum of MBA, MIT and MCom students of the University of Pretoria, South Africa[58]. Due to most of these students being active practitioners (97%), thus "senior" with regard to academic achievement as well as work experience, made them extremely suitable candidates to participate in the research effort.

After numerous lectures and discussions dealing with data, information, knowledge, and knowledge management, students were requested (via the use of the proposed KMMAQ) to critically evaluate the Knowledge management maturity of an organization they are familiar with (preferably the organization they are working for). In addition students were also requested to reflect on the usability and applicability of the proposed questionnaire,

[58] The University of Pretoria requires that all research studies that involve human or animal subjects must have prior approval by an Ethics Committee. This is also the case for studies that involve surveys or interviews. It was therefore mandatory to obtain permission before embarking on the study to use students to conduct fieldwork.

specifically with regard to applicability to the environment and industry they are working in. In total 178 practitioners from nine industry groupings participated in the research effort.

At the commencement of research, the researchers thoroughly explained the anonymity of the process, purpose of the study and the importance of providing a true and honest reflection of all findings. Due to a number of restrictions and concerns raised, only volunteering students (and organizations) were allowed to participate in the study. Students were at all times allowed to voice difficulties with regard to the structure of the questionnaire as well as any form of uncertainty encountered in the proposed questions. In order to limit biased opinions, students were instructed to conduct structured interviews among strategic, middle/management as well as operational personnel in their respective organizations. Limited time, logistical limitations and a focus on providing insights rather than generating quantitative results made it impractical and unnecessary to include all personnel. Interviews (434 in total) were therefore purposefully conducted with individuals from different hierarchical levels[59]. The sample chosen was therefore not only representative of the managerial levels present in the organization, but also of all forms of diversity, in order to give a good indication and hence reliable results. After all questionnaires had been returned, students were supplied with a rating system enabling them to critically evaluate and elaborate on all findings and data gathered (refer to appendix C: Knowledge Management Maturity Assessment Rating System - KMMARS). Finally, to conclude the learning experience, an open session was held to elaborate on lessons learned and insight gained.

6.4 Methodology to empirically test the knowledge management maturity of organizations

As proposed in chapter 1, although not directly supportive of the aim, to supply knowledge management practitioners with a baseline of data against which to benchmark

[59] Operational interviews conducted totalled 143, middle management totalled 158 and senior management interviewed totalled 133.

their organizations' knowledge management maturity, it was decided that the knowledge gained from this research conducted in the 86 South African-based organizations, should also be reported upon.

Therefore, in order to be able to extract comparable and meaningful findings from within the data contained within the knowledge management maturity questionnaires, Likert-type scales were being used to express the degree of agreement with the structured questions posed. This necessitates the use of a rating system. With reference to Appendix C (Knowledge Management Maturity Assessment: Rating System), the proposed knowledge management maturity rating system was constructed to enable the calculation of an overall knowledge management maturity score, and also to enable the calculation of scores, as achieved per different maturity section. Expressed as either values or percentages, knowledge management maturity per section was calculated as follows:

- Section 1: ICT Management - questions: V5 to V9 (maximum score achievable = 20)

- Section 2: Information Management - questions: V10 to V28 (maximum score achievable = 76)

- Section 3: Knowledge management issues (principles), policy and strategy - questions: V29 to V52 (maximum score achievable = 88)

- Section 4: Implementation of knowledge management (KMM level 5) - questions: V53 to V84 (maximum score achievable = 94)

- Section 5: Ubiquities knowledge – questions (KMM level 6) - questions V85 to V 103 (maximum score achievable = 76)

- Section 6: Assessment of knowledge management growth (questions: v104: maximum score achievable = 4).

The sum of all scores (overall knowledge management maturity reached) is calculated by adding the scores achieved over all maturity sections together. The maximum score any organization can achieve is the sum of 20 + 76 +88 + 94 + 76 + 4, totalling 358[60].

6.5 Summary

Drawing on the expertise of numerous knowledge management experts, this chapter built upon the inductive reasoning followed in Chapter 4 in particular, and proposed a questionnaire consisting of six (6) sections, constituting one-hundred and one (101) descriptive questions, enabling organizations to test and assess their Knowledge Management Maturity empirically.

[60] Cognisance must be taken that the different maturity sections contribute different weights to the overall score achieved. The contribution of sections 2, 3, 4 and 5 is fairly similar, whereas the contribution of 1 and 6 is significantly lower.

CHAPTER 7: A STUDY OF THE KNOWLEDGE MANAGEMENT MATURITY OF SOUTH AFRICAN INDUSTRY

7.1 Introduction

In the previous chapters it is emphasized that literature dealing with knowledge management not only offers little in the way of practical assistance, but often gives a skew practitioners' perception of knowledge management towards the technological sphere. Careful not to remain encapsulated on purely theoretical propositions, in using the Knowledge Management Maturity Assessment Questionnaire proposed in chapter 6 as a baseline, this chapter reports on an empirical study conducted within 86 South African-based organizations, all to supply insight into the knowledge management maturity of organizations, from within a managerial, rather than from a technological perspective.

7.1.1 Aim

The aim of this chapter is therefore to supply knowledge management practitioners with data against which to benchmark their organizations' knowledge management performance, and also to heighten understanding of factors that play a role in the successful institutionalization of knowledge management.

7.1.2 Scope

In attempting to achieve this aim, the following aspects are given prominence:

- The handling of data.
- Analysis of the knowledge management maturity of organizations, viewed from within a holistic perspective.
- Knowledge Management Maturity according to organizational size.

- Knowledge Management Maturity as a function of different managerial levels.

- Knowledge Management Maturity as a function of different managerial levels within different organizational sizes.

- Assessment of Knowledge Management Maturity per different industry grouping.

Finally, this chapter concludes with a brief summary of the major findings, observations, deductions and conclusions reached.

7.2. The handling of data

Due to the study being interpretive in nature, analysis of data consisted of either standard statistical techniques and/or qualitative methods, as used by the University of Pretoria, South Africa. Data collected by means of the structured Knowledge Management Maturity Assessment Questionnaire was meticulously transferred to the Knowledge Management Maturity Rating System (refer to Appendix C). Finally all data captured was digitalized through keyboard entry. In order to ensure a clean and error-free data set, the process of data capturing was closely monitored to ensure as few entering errors as possible. Newly imported data was checked for capturing errors via standard validation checks as applied by the University of Pretoria[61]. Checks included frequencies, maxima, minima, checks for missing values and checks for range of values. After the verification process had been completed, all data collected was carefully prepared for tabular and graphic presentation, analysis and interpretation. The computer software used for analysis and modelling was SAS version 8.3, from the SAS Institute™. All graphs and figures

[61] All statistical calculations were verified by Statomet. Business Enterprises at the University of Pretoria (Pty) Ltd (BE at UP) offers research and consulting services through its Bureau for Statistical and Survey Methodology (Statomet) a facility that focuses on the scientific design and management of research. Statomet provides statistical advice on all aspects of research design and management, and aims to improve the quality of research by rendering a multidisciplinary service to public and private organisations.

were created using Microsoft Excel (2003). Human understanding and interpretation, both important factors contributing to valid knowledge, meant that the analysis of results had to be done in a more subjective and 'interpretative' manner.

Feedback from the majority (90%) of students conducting the interviews was that the questionnaire served the purpose it was meant for, i.e. the questionnaire covered the key aspects of Knowledge Management Maturity. Furthermore, it was established that the questionnaire was conducive towards conducting the structured interviews.

The analysis that follows consists of the descriptive statistics used for each question. Descriptive statistics involved arranging, summarising and presenting the data in such a way that the meaningful essentials of the data could be extracted and interpreted easily. Statistics used consisted of two parts, firstly establishing the basic statistical measures of the response variable for every question covering aspects pertaining to knowledge management maturity[62] and secondly, hypothesis testing of the relationships between certain response variables. Where the probability of exceeding the norm (p-value) was found to be less than 0.05, the decision rule was to reject the null hypothesis at a 5 % level of significance. In order to test statistically, the following research hypotheses were formulated:

- The mean scores decrease over maturity sections 1 to 5.
- Understanding the importance and role of information management lead to participation in information management.
- Understanding the reasoning and motivation behind establishing formal knowledge management activities lead to commitment to institutionalise knowledge management endeavours.
- Knowledge management endeavours supported by technology are preferred above knowledge management endeavours requiring personal support.

[62] Unless specifically stated, in all instances findings are elaborated upon from within a positive stance (yes, definitely and yes, but not significantly).

- The mean scores achieved over the different maturity sections depend on organizational size.

- The mean scores depend on the different managerial levels.

7.3 Analysis of the knowledge management maturity of organizations, viewed from within a holistic managerial/strategic perspective.

In total, 434 employees in 86 organizations participated in the study. The average knowledge management maturity score obtained by all organizations (86 organizations in nine industry groupings) totalled 175 points (Table 7.1). This constitutes an overall maturity of 49% (175/358). With regard to growth in knowledge management maturity, slightly more than twenty percent (20.28%) of interviewees indicated that their organizations experienced rapid growth in knowledge management maturity, 52.12% is of the opinion that although growth occurred, it was not significant, while 22.17% argued that although no growth took place there will probably be growth within the next five years. Slightly more than five percent (5.43%) were of the opinion that a decline in knowledge management growth occurred over the past five years.

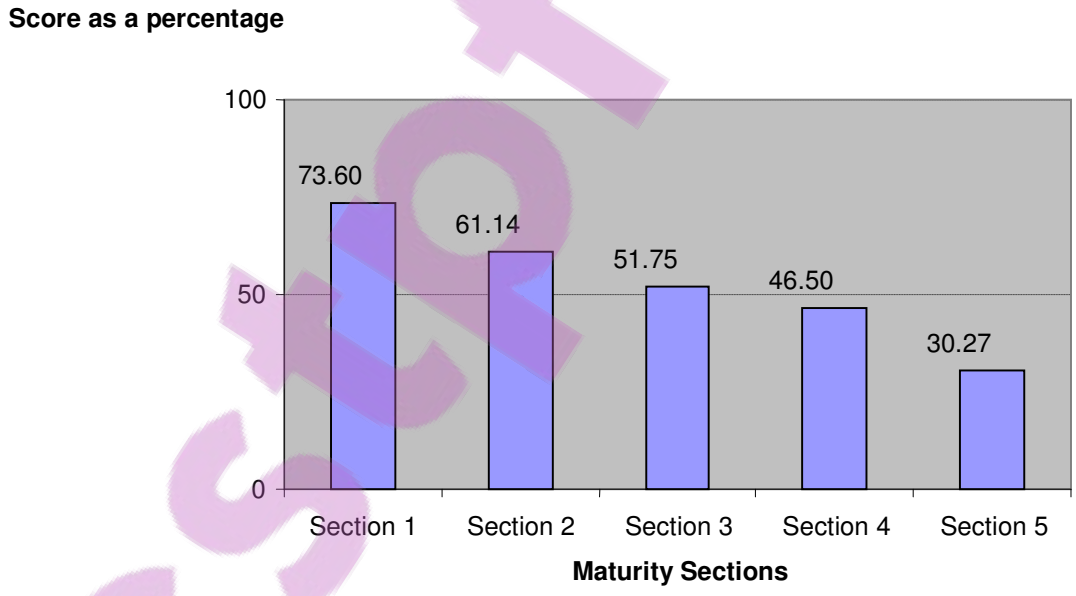
Variable	N	Mean	Mean%	Std Dev	Std Error	Median	Min	Max	Max Possible
Section 1	433	14.72	73.60	4.50	0.21	16	2	20	20
Section 2	434	46.47	61.14	15.85	0.76	47	8	76	76
Section 3	434	45.54	51.75	19.25	0.92	45.5	0	88	88
Section 4	433	43.71	46.50	15.03	0.72	44	9	90	94
Section 5	434	23.01	30.27	12.80	0.61	21.5	0	76	76
Section 6	424	2.07	51.88	1.11	0.05	2	0	4	4
Total All	434	175.36		51.37	2.46	174	47	311	358

Table 7.1: Knowledge management maturity distribution

Note: To facilitate the comparison of sections, all data presented are expressed as percentages (the score achieved per maturity section divided by the maximum score achievable in that section).

The average maturity scores (mean value) obtained per section (maturity sections 1 to 5) gradually slopes downwards dropping by 12.5%, 9.4%, 5.3% with an extreme drop of 16.2% between sections 4 (implementation of knowledge management) and 5 (ubiquitous knowledge) (Figure 7.1). By conducting a Friedman Test (repeated measurements), it could be determined that there is a significant difference between the median values of the different maturity sections. Since the p-value was smaller than 0.05 (p-value = 0.0000), the null hypothesis that the medians of the sections are the same was rejected. In order to determine where specifically the differences lie, a multiple comparison between the different sections was done. It was found that there are significant differences among all sections. In conducting a Pearson Correlation Coefficient[63] on the measure of the linear relationship between the different variables (maturity sections 1 to 5), it was found that there is a significant statistical correlation (r = <0.0001) (noticeable as the declining slope as maturity increase), between all five (5) maturity sections.

Figure 7.1: Knowledge Management Maturity distribution of all questionnaires



***(All maturity scores presented as percentages)**

[63] Correlation between the maturity levels (1 to 5), and the mean scores for each level. Values close to -1/+1 indicate a strong linear relationship and values close to zero indicate a weaker linear relationship. (Section 1 to 2 = 0.474, section 2 to 3 = 0.554, section 3 to 4 = 0.689, section 4 to 5 = 0.390).

The following segment supplies a summary of the major findings of maturity achievements when broken down into the different maturity sections, starting with a perspective on ICT management, as a prerequisite to knowledge management.

7.3.1 ICT Management

The average score obtained for ICT Management was 14.72 out of a maximum score of 20, or 73.60% (Table 7.1). With regard to ICT being an enabler of knowledge management (as suggested by Boon, 1990, Gurteen, 1998 and Gallager and Hazlett, 2004, section 4.4.1), findings suggest that South African industry is well on its way to reaching the preliminary level of aptitude needed to successfully institutionalize knowledge management endeavours.

Section 1 (ICT management) of the questionnaire revealed that most interviewees are positive (yes, definitely and yes, but not significantly) regarding the capability of their organization to evaluate (v5 - 91.44%), design (v6 - 81.21%) and plan (v7 - 90.26%) an ICT system (Appendix D, Table 1). Most of those interviewed were also positive (v8 - 82.68%) regarding the effectiveness of their organization's ICT infrastructure.

Unfortunately, even though most respondents agreed with the statement that ICT is an enabler of knowledge management (v9 - 78.69%), an alarming number of respondents are still under the impression that ICT is knowledge management (v9 - 21.31%).

7.3.2 Information management

The average score obtained for this maturity section was 46.47 out of a maximum score of 76, or 61.14% (Table 7.1). Answers indicated that organizations are comfortable regarding information management activities (Appendix D, Table 2). Information management tools and services are also for the most part successfully institutionalised. The majority of interviewees answered positively (yes, definitely, and yes, but not significantly) with regard to those questions regarding the identification of information needs (v16 - 81.11%), acquisition of information (v17 - 86.34%), information storage

(v18 - 84.30%), information distribution (v19 - 78.34%), information retrieval (v20 - 80.88%), protection of information (v22 - 77.88%), information management systems (v25 - 77.88%) and the management of databases (v26 - 85.25%).

When posed the question whether their organization had a clearly defined information policy (v10 - 69.35%) and strategy (v11 - 70.97%) in place, nearly the same number of respondents, as those that agreed that information management is a prerequisite for knowledge management (v28 - 69.65%), responded positively (yes, definitely and yes, but not significantly). By conducting a Proc Frequency Test of Variables[64] and also a Chi-square Test of Independence[65], it was established that there is indeed a correlation between a clearly defined information management policy and strategy and the understanding of information management being a prerequisite for knowledge management. Yet, of those that agreed that their organization does have an information policy and an information strategy in place, half of the respondents were of the opinion that it is not significantly institutionalised.

Respondents indicated in a positive manner (yes, definitely, and yes, but not significantly) that they understood "which" information resources are crucial to their businesses (v12 - 88.94%). They are also clear about which managers are accountable for information resources (v13 - 80.18%). Also, key information is easily available (v14 - 76.27%). However, endeavours such as the training of employees to access sources of information relevant to their jobs (v15 - 65.21%), the disposal of information (v21 - 68.20%) and determining the value and cost of information (v23 - 59.12%), all achieved lower scores.

[64] Proc Frequency test of Variables: Drawing a table of questions v10 and v11 by v28. Of the respondents that answered "yes" in v10, 73.38% also answered "yes" in v28. Of the respondents that answered "yes" in v28, 72.64% also answered "yes" to v10. In a similar manner 73.42% of respondents that said "yes" to v11 also said "yes" to v28 and 74.66% saying "yes" to v28 also said "yes" to v11.

[65] Chi-square test of Independence. Hypothesis proposed: Ho: v10 and v28 are independent, Ha: v10 and v28 are dependent. P-value = 0.0127 <0.05 thus Ho was rejected. v10 and v28 was found to be "dependent". Hypothesis proposed: Ho: v11 and v28 are independent, Ha: v11 and v28 are dependent. P-value = 0.0084 <0.05 thus Ho was rejected. v11 and v28 was found to be "dependent".

Findings revealed that endeavours in information management, for the most part directly supported by ICT, are easier to implement and/or better managed and institutionalised, than information management endeavours that require human intervention and/or a human component to succeed. Endeavours such as the training of employees to access sources of information relevant to their jobs (v15 - 65.21%), the disposal of information (v21 - 68.20%), determining the value and cost of information (v 23 - 59.12%), and the institutionalisation of an information service/library (v27 - 66.82%), that is all endeavours requiring human intervention and dedicated commitment to succeed, scored considerably lower (by 10% to 20%) than endeavours such as the institutionalization of information management systems (v25 - 77.88%) and Databases (v26 - 85.25%). Of interest is that the identification of information needs (v16), also requiring human intervention, received a high score of 81.11%. Possibly, this is due to identification of information needs being a prerequisite to the building of databases and the institutionalisation of information systems.

Analysis of the difference in the mean score of questions that test the importance of understanding the value of information resources (v12 - 88.94%), accountability for information resources (v13 - 80.18%), whether key information is easily available (v14 – 76.27%), the training to access sources of information relevant to their jobs (v15 - 65.21%), information disposal (v21 - 68.20%), determining the value and cost of information (v23 - 59.12%) and the institutionalisation of an information service/library (v27 – 66.82%) indicated that there is a significant difference in scores between endeavours that require understanding, compared to endeavours that require active participation[66].

[66] Questions v15, v21, v23 and v27, all scored considerably lower than endeavours analysed in questions v12 – v14. Tests for Normality (Shapiro-Wilk Test) revealed that the data is not normal. However tests for Location (Wilcoxon Signed Rank) at a p value < 0.001 rejected the null hypothesis that Ho: Mean understanding = Mean participation (the average calculated for v12 – v14 and the average calculated for v15, v21, v23 and v27 were compared), and accepted the stance that Ha: Understanding ≠ Participation, i.e. There is statistically significant differences between the scores achieved in "Understanding' information management and "participating" in information management.

Of interest is that protection of information (v22 - 77.88%), scored considerably higher than information disposal (v21 - 68.20%) and determining the value and cost of information (v23 - 59.12%). A possible explanation for this could be that protection of information is governed by South African laws such as the South African Electronic Communications and Transactions Act (SA ECT Act) and the South African Public Finance Management Act (SA PFM Act). Arguably, due to the above-mentioned acts there is a stronger emphasis on the protection of information than on information disposal and cost estimation.

7.3.3 Knowledge management issues (principles), policies and strategy

The average score obtained for this maturity section was 45.54 out of a maximum score of 88, or 51.75% (Table 7.1). Organizations are not only aware of the power of knowledge (knowledge is seen as a strategic corporate resource) (v29 - 83.83%), but, knowledge management is also regarded as one of the top five internal priorities of organizations (v30 - 64.20%). Slightly more than half of interviewees (v31 - 53.94%) went as far as to indicate that knowledge management is supplying a direct input to the strategic management process, although not yet of a significant nature (Appendix D, Table 3).

Improving work efficiency and/or productivity by sharing knowledge within organizations (v32 - 84.76%), decentralization of authority (v33 - 67.90%), releasing information more rapidly and making it more widely available to staff (v34 - 79.91%), promoting life long learning (v35 - 79.91%), improving transparency (v36 - 75.29%), and relationships and trust (v37 - 77.19%), and making up for loss of knowledge (v38 - 68.36%), are regarded by most (yes, definitely and yes, but not significantly) to be important goals in motivating the establishment of formal knowledge management practices.

Most respondents (v40 - 75.29%) positively indicated (yes, definitely and yes, but not significantly) that there is agreement within their organizations for hybrid knowledge management environments that include technology and people. Organizations have taken a conscious decision to invest in knowledge management (v39 - 69.75%). Unfortunately, there is only moderate commitment from top management to establish formal knowledge management functions (v42 - 57.91%), identify high ranking knowledge champions (v41 - 53.81%), improve work processes (v44 - 56.71%), and gaining involvement from employees regarding knowledge sharing exercises (v45 - 53.47%).

When posed with the question whether the decision was taken by top management to judge people according to their ability to share knowledge (v43), most respondents argued negatively, with only 8.35% arguing Yes, definitely, and 25.52% arguing that although such a decision was taken, the decision was not taken at a significant level.

In contrast to the high number of organizations in possession of an information policy and an information strategy, only 44.24% (v47) of respondents indicated that their organizations do have a knowledge management strategy in place. Similarly, only 42.86% (v46) of respondents have a clearly defined knowledge management policy in place. Thirty-one point three four percent (v48 – 31.34%) are under the impression that it is has been communicated to staff. Of the 192 respondents who answered Yes, definitely and yes, but not significantly about having a clearly defined knowledge management strategy, eighty-five point two eight percent (v49 – 85.28%) indicated that their knowledge management strategy includes information management aspects, 80.52% (v50) that it includes ICT aspects, 71.00% (v51) that it incorporates human resource aspects and 61.80% (v52) that it includes organizational aspects such as communities of practice, decentralization of authority and networks.

There is a strong suggestion that organizations are slow in starting off and driving knowledge management. Using the Friedman Test followed by Multiple Comparison Testing indicated that there is a statistically significant difference between understanding the power of knowledge and the reasoning and motivation behind establishing formal

knowledge management activities (as indicated by the answers supplied to questions v29, v32 to v39 and v42); and the institutionalisation of knowledge management endeavours (as indicated by the answers supplied to questions v53 to v61[67] (as discussed in the next section – Implementation of knowledge management).

7.3.4 Implementation of knowledge management

The average knowledge management score for this maturity section was 43.71 out of a possible score of 94, or 46.50% (Table 7.1). Questions such as the opening up of bureaucratic divisions (v53 - 48.03%), the creation of a central coordinating unit for knowledge management (v54 - 43.72%), the appointment of a chief knowledge officer with executive status (v55 - 25.00%), and the establishment of incentive schemes for knowledge sharing (v60 - 21.76%) all hinted towards the negative (Appendix D, Table 4).

Endeavours such as reorganization of offices (v56 - 51.27%), the establishment of informal networks (v57 - 57.34%), the institutionalisation of training and mentoring programmes (v58 - 68.36%), and communication with suppliers (v61 - 67.76%) all achieved positive scores, while findings hinted at these endeavours not yet being of a significant nature.

Although small in percentage, most respondents (v62 - 39.67%) are under the impression that the overall responsibility for knowledge management resides with top management. Twenty-three point four seven percent (v62 - 23.47%) believe that the responsibility for knowledge management resides with the information technology team while 19.25% is of the opinion that the responsibility resides with a special knowledge management unit. Eight point six nine percent (v62 - 8.69%) is of the opinion that the responsibility for knowledge management resides with the human resources management team, while eight

[67] Friedman Test Statistics. If t = sum (v29, v32 to v39 and v42)*100/48 (representing an understanding of the power of knowledge management) and h = sum (v53 to v61)*100/36 (representing the institutionalization of knowledge management), then the Friedman test was used to test the null hypothesis that the mean of t is equal to the mean of h. Since the p-value at 0.0000 was smaller than 0.05 the null hypothesis that the mean of h and t are indeed the same was rejected.

point nine two percent (v62 - 8.92%) believe it resides with some "other" organizational group.

When faced with the question "In your organization staff members spend an increased amount of time on the following activities", answers hinted at technology-enabled endeavours such as information sharing by electronic devices (v66 - 87.44%) and the presentation of projects and activities, (v65 - 71.23%) being preferred above endeavours such as information meetings (v63 - 68.82%), peer review/quality reviews (v64 - 50.69%), or the building of databases (v67 - 60.09%).

The majority of respondents indicated that good work practices have been outlined and updated on a regular basis in organizational guidelines and training manuals (v70 – 66.82% and v68 - 60.79%). However, only 48.25% are of the opinion that best practices (v69) have been outlined and updated on a regular basis.

Responses were indifferent concerning whether factors such as focusing more strongly on information and communications technology than on people and organizational matters (v78 - 46.64%), resistance of certain groups against knowledge management (v80 - 50.23%), the making available of documents spontaneously (v81 - 51.29%), and access to sensitive and/or confidential information (v83 - 50.00%), contribute to difficulties in implementing knowledge management practice. Respondents, however, indicated that lack of time or resources to concretely share knowledge on a day-to-day basis (v79 - 74.71%) and difficulty in capturing an employee's undocumented knowledge (know-how) (v82 - 82.52%) strongly contribute to experiencing difficulty in implementing knowledge management practices.

Regarding the implementation of a knowledge-sharing culture, slightly more than half (v75 - 53.36%) of all interviewed indicated that they consider the sharing of knowledge to be good for their careers, with 50.12% indicating that documents are made available spontaneously (v77). Only 35.03% of all respondents indicated that staff members

spontaneously organize knowledge events such as meeting with staff from other divisions/departments (v76).

Organizations scored low with regard to measuring the progress made in the implementation of knowledge management practices in organizations. Only 24.71% of all interviewed indicated that their organization makes use of indicators to assess the implementation of knowledge management practice (v71), 29.63% use scorecards (v72), while 41.40% use written or oral feedback from staff on achievement in knowledge management (v73). Only 37.96% indicated that comparisons are made between their and peer organizations (v74).

Findings suggest that there is an element of "testing the ground" before full engagement in knowledge management. Examples of this can be found in answers supplied to section 4.1 of the questionnaire where the establishment of incentive schemes (v60 - 21.767%), the appointment of a Chief knowledge officer (v55 - 25.00%) and the opening of bureaucratic divisions (v53 - 48.03%) faired lower than endeavours such as the establishment of informal networks (v57 - 57.34%), institutionalisation of training and mentoring programs (v58 - 68.36%) and reorganization of offices (v56 - 51.27%). This strongly hints at endeavours that require large changes to organizational structures and real and dedicated commitment from top management being less supported than endeavours that require smaller changes to organizational structures, less commitment and fewer resources. The above-mentioned argument is strongly supported by the finding of question v79, where 74.71% of all interviewed was of the opinion that there is a lack of time and resources to concretely share knowledge on a day-to-day basis.

Lack of genuine commitment from top management's side, and/or inability of top management to successfully sell the benefits of knowledge management impacted negatively on the establishment of a knowledge sharing culture within organizations. As mentioned, only about half (53.36%) of all interviewees indicated that they consider the sharing of knowledge to be good for their careers (v75), and only 50.12% indicated that documents are made available spontaneously (v77). In emphasis of this point, slightly

more than half (50.23%) of all interviewees also indicted that there is resistance in certain groups of staff to the implementation of knowledge management practices (v80).

There is a definite preference to share information by electronic devices (v66 - 87.44%), above the sharing of knowledge in a personal manner. When it comes to the domain of personal knowledge sharing, "presentations of project and activities" scored the highest (v65 - 71.23%), "informal meetings" came in second (v63 - 68.82%) with peer review/quality reviews being the least preferred method (v64 - 50.69%). Capturing employees' undocumented knowledge (v82 - 82.52%) was perceived to be the most difficult with regard to the implementing of knowledge management practice. In comparing the difference in the mean score of questions v63 to v65 (people orientated) with scores obtained in questions v66 and v67 (technology orientated), it was found that that there is a definite inclination towards using technology rather than sharing knowledge and information in a personal manner[68].

Findings indicated that knowledge management activities between organizations and its customers (v59 - 81.71%) scored higher than internal knowledge sharing endeavours such as opening up bureaucratic divisions (v53 - 48.03%), the creation of a central co-ordinating unit for knowledge management (v54 - 43.72%), the appointment of a chief knowledge officer (v55 - 25.00%), reorganization of offices (v56 - 51.27%), establishment of informal networks (v57 - 57.34%), institutionalization of training and mentoring programmes (v58 - 68.36%) and the establishment of incentive schemes (v60 - 21.76%). A possible explanation for this phenomenon could be that interviewees considering endeavours such as communication with customers to strongly depend on e-commerce and/or ICT initiatives. As indicated earlier many organizations are more comfortable with applying ICT and technology than to embark on endeavours heavily dependent on the culture set by top management, and/or the satisfaction of intangible

[68] In using the Univariate Procedure the difference in mean score between People (p) = mean (v63+v64+v65)/3, and Technology (t) = mean (v66+v67)/2 were determined. A Signed Rank Test for location was done. With a p Value < .0001 this test indicated that there is a statistically significant difference between the means of "people" and "technology". Finally DIFFTP Analysis (DIFFTP = t - p) indicated a (stronger) inclination towards "technology" than towards "People" since the mean of the DIFFTP (t-p) was 0.412, i.e. positive.

criteria. This line of reasoning is supported by the finding of v84 where 42.89% of respondents indicated that knowledge and information management is not a top priority in the modernization programme of their organization.

7.3.5 Ubiquitous knowledge

The average score for this maturity section was 23.01 out of a possible 76 points, or 30.27% (Table 7.1). Findings indicated that organizations do indeed rely on outside knowledge to carry out their daily activities. Findings, however, hinted at such endeavours, especially reliance on knowledge contained within trade unions (v92 - 33.41%) and local government (v86 - 48.38%), not being of a significant nature. Unfortunately, organizations do not yet encourage the sharing of knowledge beyond organizational borders. Responses to questions were consistently negative, indicating that the vast majority of organizations do not yet take up positions in local government (v95 - 10.51%), peer organizations (v96 - 21.08%), universities/research centres (v97 - 21.55%), supplier organizations (v98 - 14.52%), customer organizations (v99 - 21.50%), consulting firms (v100 - 17.10%) and trade unions (v101 - 11.90%). Nor does organizations second staff to other organizations (v103 - 31.85%).

7.4 Knowledge management maturity according to organizational size[69]

In order to determine if size plays a role in the maturity score achieved by organizations, it was decided to group organizations into four (4) categories. Organizations with 100 and less employees were grouped into the "small organization" category. Organizations with between 101 and 2000 employees were grouped into "medium-sized" organizations, 2001 to 25000 employees into "large organizations" and 25001 and the above grouped into "extra-large organizations (refer table 7.2).

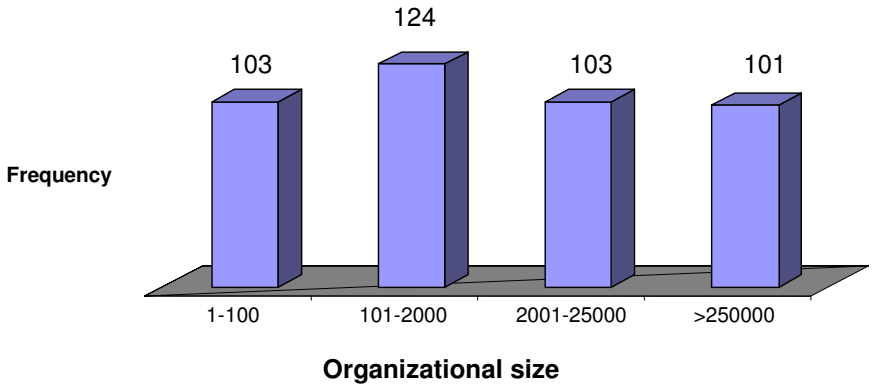
[69] Information obtained via mandatory background information (refer Chapter 6 and Appendix B)

Category (Number of employees)	Number of organizations per category	Percentage
Small (1-100)	21	24.42%
Medium (101 – 2000)	24	27.90%
Large (2001 – 25000)	21	24.42%
Extra-Large (25001 and above)	20	23.26%

Table 7.2: Number of organizations per organizational category

Dividing organizations according to the number of employees employed resulted in a fairly even distribution, simplifying all statistical comparisons that followed (refer figure 7.2).

Figure 7.2: Distribution of organizational sizes according to the number of employees employed



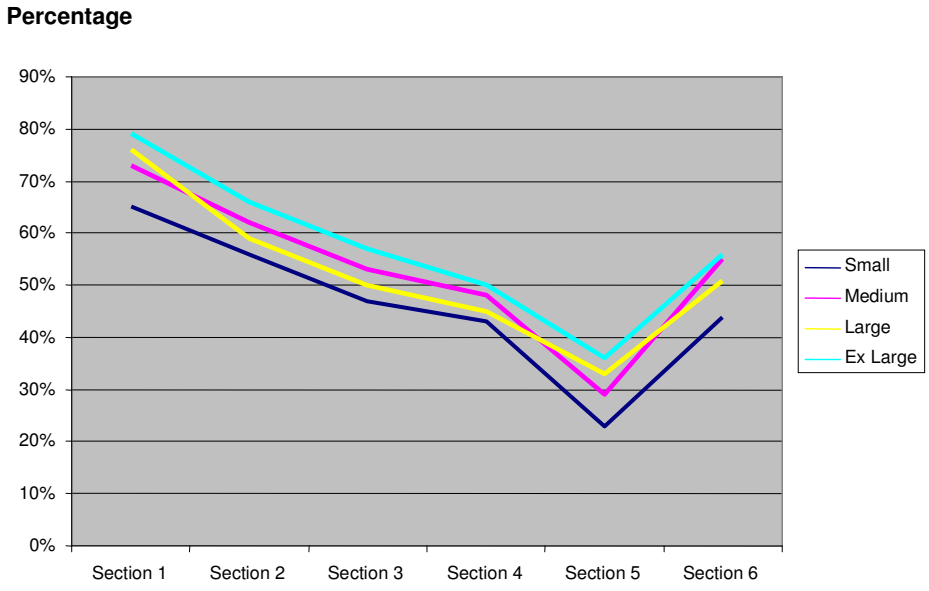
As a point of departure it was established if there is indeed a statistically significant difference between the mean scores achieved in different size organizations, especially regarding different maturity sections (refer figure 7.3 and table 7.3)[70]. Multiple comparisons (Least Squares Means) identify that the biggest differences occur between small and all other organization sizes. Medium-sized organizations achieved similar

[70] ANOVA (Analysis of variance). Ho: means of different company sizes are the same. Ha: some means differ.

scores (5% and less than 5%) to large and extra-large organizations, except for maturity section 1 (ICT management) and section 5 (Ubiquitous knowledge) where the mean scores of medium-sized organizations were significantly lower (more than 5% lower), than the scores of extra-large organizations. Scores of large organizations were similar (5% and less than 5%) to other organizations' scores, except for sections 1 (ICT management) and 5 (Ubiquitous knowledge), where it was significantly higher (more than 5% difference), than small organizations' scores. Over all maturity sections, extra-large organizations scores' were significantly higher (5% and more difference) than the scores achieved by small organizations. There was also a significant difference of more than 5% in scores achieved by extra-large organizations, compared to large organizations in section 2 (Information management), and between extra-large and medium-sized organizations in section 5 (Ubiquitous knowledge). In essence small and extra-large organizations yielded significantly different scores, with medium and large organizations forwarding similar scores.

Note: To facilitate with the comparison of data, all data presented is expressed as percentages (the score achieved per maturity section divided by the maximum score achievable in that section). As an example the score achieved by small organizations in section 1 of the questionnaire was 13.07/20 or 65.38%. With reference to chapter 6, section 6.4, the **sum of all scores** (the overall knowledge management maturity score achieved) is therefore calculated by adding the scores achieved over the six maturity sections together. The maximum score any organization can achieve is therefore the sum of 20 + 76 +88 + 94 + 76 + 4, totalling 358. In the example of small organizations the **Total (Sum of all scores)** achieved by small organizations was therefore calculated by adding the scores achieved per maturity section together, i.e. 13.07 + 42.25 + 41.19 + 40.29 + 17.22 + 1.74 totalling 155.76 or 43.51% (155.76/358).

Figure 7.3: Distribution of maturity according to organizational size



Viewed holistically, organizations with 100 and less employees (small organizations) achieved a maturity score of 43.51%. Organizations with between 101 and 2000 employees (medium-sized organizations) achieved a score of 50.03%. Large organizations (between 2001- 25000 employees) scored a bit lower than medium-sized organizations totalling a score of 48.87%. Organizations with more than 25000 employees (extra-large organizations) consistently outperformed all other organizations, on average scoring 53.75%.

	Section 1 (Mean)	**Section 2 (Mean)**	**Section 3 (Mean)**	**Section 4 (Mean)**	**Section 5 (Mean)**	**Section 6 (Mean)**	**Total (Sum of all scores)**
Small	65.38% (13.07/20)	55.59% (42.25/76)	46.81.% (41.19/88)	42.87% (40.29/94)	22.66% (17.22/76)	43.68% (1.74/4)	43.51% (155.76)
Medium	73.91%	62.78%	53.47%	47.80%	29.53%	55.24%	50.03%
Large	76.01%	59.75%	50.38%	45.40%	33.39%	51.78%	48.87
Ex Large	79.10%	66.71%	56.58%	50.04%	36.29%	56.25%	53.75%

Table 7.3: Distribution of maturity achievements per organizational category

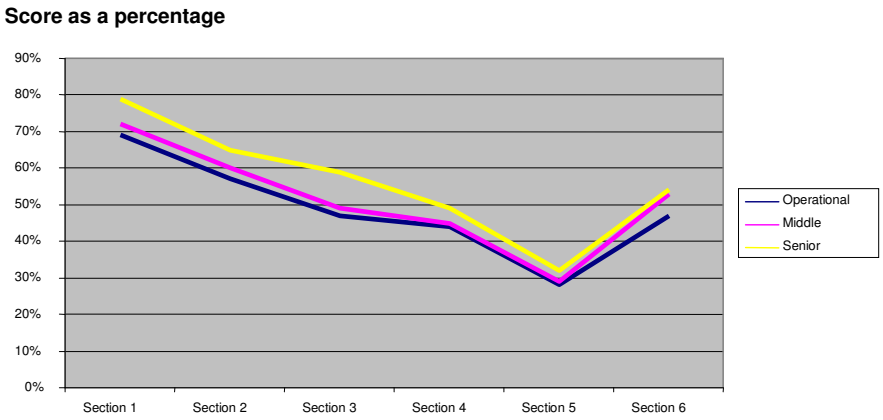
Findings hint that extra-large organizations are at an advantage when it comes to the institutionalisation of formal knowledge management practice over all maturity sections. However, of interest is that although large organizations outperformed smaller organizations (small- and medium-sized organizations), in sections 1 (ICT management) and 5 (ubiquitous knowledge) of the questionnaire they were outperformed by medium-sized organizations when it comes to the management of information (section 2), the formulation of knowledge management issues, policy and strategy (section 3), and the institutionalisation of knowledge management practice (sections 4).

As a rule extra-large organizations do have access to considerably more resources than smaller sized organizations, possibly explaining why extra-large organizations (25000+ employees) obtained higher scores over all maturity levels, than all other organization sizes. Due to legal and mandatory requirements, extra-large organizations are more mature with regard to implementing policies and strategies. The lower scores achieved by large organizations compared to the scores achieved by medium-sized organizations, especially in maturity sections 2, 3 and 4 suggests that there could be a "break even point" between resources available and the successful institutionalisation of knowledge management. This argument necessitated that for analysis purposes a more holistic stance needed to be taken. Note had to be taken of not only the achievement of organizations according to size, but also of the achievements in relation to the different managerial levels present within organizations. Specifically, analysis needed to include a study of the diffusion, (the spread in score between the different managerial levels), of knowledge management in different organizational sizes and organizational settings.

7.5 Knowledge management maturity as a function of different managerial levels

With reference to Figure 7.4 and Table 7.4, senior managers scored maturity at 53.48%, middle managers forwarded a figure of 47.89% and operational personnel forwarding a figure of 46.00%. This constitutes an overall difference in scores between senior management and operational personnel of 7.5%.

Figure 7.4: Knowledge management maturity plotted as a function of different managerial levels (v4)



With reference to table 7.4, it is of interest that the difference between the scores of senior managers and middle managers, is consistently higher[71] than the difference in scores forwarded by middle managers and operational personnel. An interesting observation is that there is about a 10% discrepancy between the scores allocated by senior - and middle managers to section 3 of the questionnaire which deals with the formulation of knowledge management issues, policies and strategies.

	Section 1 (Mean)	Section 2 (Mean)	Section 3 (Mean)	Section 4 (Mean)	Section 5 (Mean)	Section 6 (Mean)	Total
Operational	69.79%	57.80%	47.10%	44.38%	28.62%	47.69%	46.00%
Middle	72.15%	60.32%	49.59%	45.94%	29.65%	53.22%	47.89%
Senior	79.46%	65.72%	59.33%	49.46%	32.79%	54.88%	53.48%

Table 7.4: Knowledge management maturity as a function of different managerial levels

[71] Senior managers consistently rated the maturity of the different sections higher than middle and operational personnel did. Also the difference in scores allocated by middle and operational personnel is consistently smaller then the difference in scores between senior and middle management.

Analysis of variances (ANOVA)[72] indicated that there is indeed a statistical difference between the score forwarded by the different managerial levels over maturity sections 1 to 4. However, scores forwarded for maturity sections 5 and 6 were found not to differ significantly between the different managerial levels. In order to determine where specifically difference occurred[73], it was established that within section 2 (Information management), section 3 (Knowledge management issues, policy, and strategy), and section 4 (Implementation of knowledge management) differences were vested primarily between the values forwarded by operational and senior managers and middle and senior managers. The values forwarded by operational personnel and middle managers were however found not to be significantly different. This indicates at an over-estimation, or difference in perception by senior managers, regarding; (1) the success of implementation of information management; (2) the efficiency and effectiveness of knowledge management issues, policies and strategies; and (3) sufficient support given to the institutionalization of knowledge management endeavours.

Middle and especially operational personnel are not sharing the same sentiment regarding the success of knowledge management as senior management. This quandary is supported, although not statistically proven, by the fact that operational personnel rate the growth of knowledge management over the past five years lower than middle and senior managers.

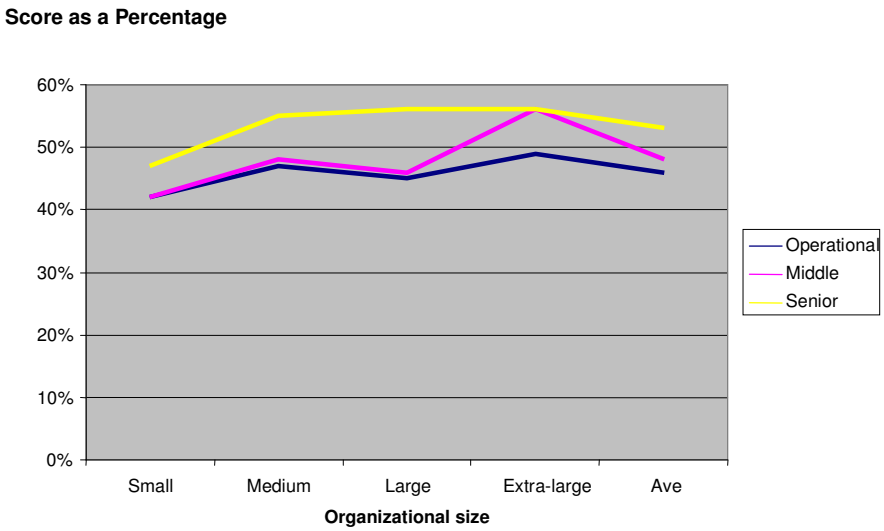
7.6 Knowledge management maturity as a function of different managerial levels within different organizational sizes

When differences in opinion with regard to knowledge management maturity, as forwarded by the different managerial levels, are viewed from within the perspective of different organizational sizes, the picture changes dramatically (refer Figure 7.5 and Table 7.5). As a point of departure, an Analysis of Variances (2 way ANOVA), was done

[72] ANOVA (Analysis of variance). Ho: means of different managerial levels are the same, Ha: means differ. With a p Value < .0001 this test indicated that there is statistically significant difference between the means of the different managerial levels.
[73] The GLM procedure (Least Squares Means) was used to determine where specifically difference occurred.

to determine if there is indeed a difference between the score achieved per organization size and the scores forwarded per managerial level. Again it was confirmed that the mean values forwarded by the different managerial level and organizational size are statistically different.

Figure 7.5: Knowledge management maturity ratings as a function of different managerial levels within different organizational sizes



In comparing the totals forwarded by operational, middle and senior personnel to one another, by means of a GLM Procedure - Least Square Means, it was confirmed that the scores forwarded by operational personnel and middle managers are similar in small, medium and large organizations. However, scores forwarded by operational personnel and middle managers in extra-large organizations were different. Also, within extra-large organizations, the scores forwarded by senior managers were found to be similar to the scores forwarded by middle management.

	Small	**Medium**	**Large**	**Ex-large**	**Ave**
Operational	41.94%	47.55%	45.18%	49.45%	46.00%
Middle	42.27%	48.34%	46.08%	55.62%	47.89%
Senior	47.10%	54.83%	55.67%	56.26%	53.48%

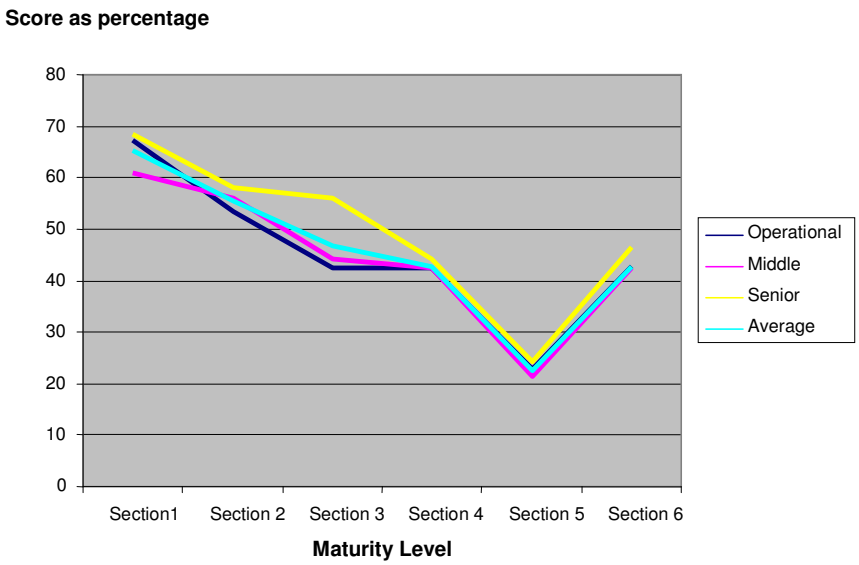
Table 7.5: Knowledge management maturity ratings as a function of different managerial

levels within different organizational sizes

With reference to Figure 7.5, excluding small organizations, senior managers scored knowledge management maturity fairly even over all maturity sections. In contrast, middle managers within extra-large organizations scored maturity considerably higher than middle managers in other organizations. Of interest is that the decline in score between senior and middle managers is the smallest within extra-large organizations, and the largest within large organizations. In contrast, the difference in score between middle and operational personnel is the smallest within large- and medium-sized organizations, and the largest in extra-large organizations. These findings again indicate that the size of the organization does play a role in the diffusion of knowledge management between the different managerial levels.

7.6.1 The distribution of scores in small organizations

Figure 7.6: Distribution of scores in small organizations



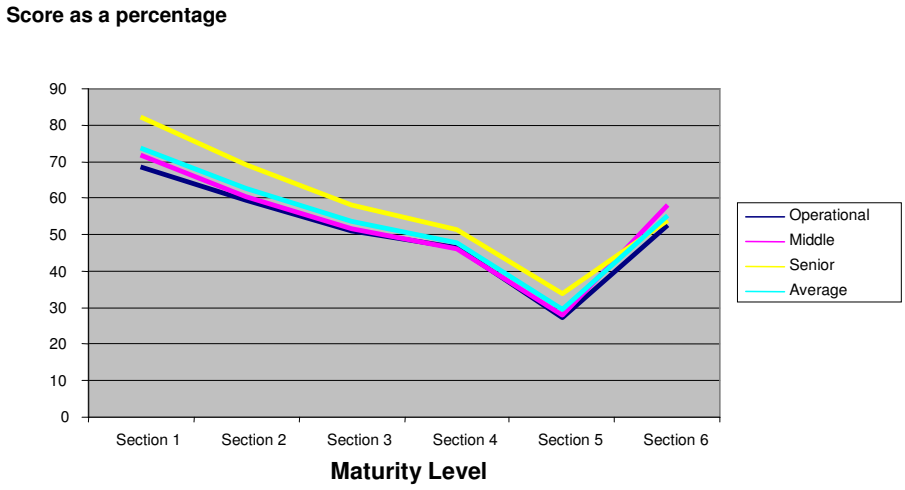
Within small organizations, operational personnel rated knowledge management maturity at 41.94%, middle management scored maturity basically the same at 42.27%, while senior managers forward a maturity score of 47.10%. The difference in score between top and operational personnel, at 5.2%, is also the lowest of all organization sizes analysed.

Of interest is that within small organizations there is a fairly even distribution between the overall scores attributed to senior, middle, and operational personnel with regard to maturity in sections 2, 4, 5, and 6. However, in section 3 senior managers' consistently allocated scores higher than those forwarded by interviewees from middle and operational personnel, hinting that middle and operational personnel within small organizations view the vesting and institutionalization of knowledge management issues, policies and strategies to be less successful than senior managers do.

7.6.2 The distribution of scores in medium-sized organizations

In contrast to small organizations, scores attributed to senior managers were at 54.83%, consistently higher over all maturity sections than the scores forwarded by middle and operational personnel totalling 48.34% and 47.55% respectively. Scores forwarded by middle and operational personnel are nearly identical over all sections. Viewed holistically, over all maturity sections there is a difference of about 7% between the scores forwarded by senior managers on the one hand, and middle and operational personnel on the other hand (refer figure 7.7).

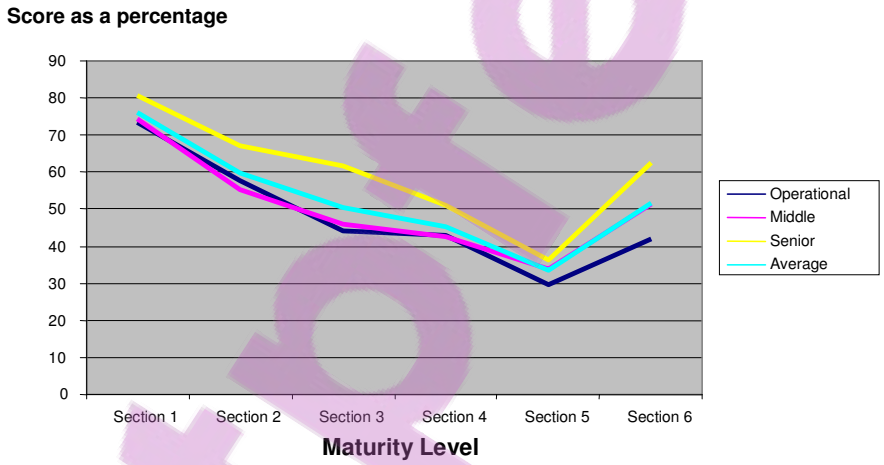
Figure 7.7: Distribution of scores in medium-sized organizations



7.6.3 The distribution of scores in large organizations

Scores attributed to senior managers were at 55.67% considerably higher than the scores attributed to middle 46.08%, and operational personnel, 45.18% (Figure 7.8). Scores forwarded by middle and operational personnel were again nearly identical over all maturity sections. The disparity of about 10% between the scores attributed to senior and middle management is mostly attributed to differences in scores in section 2 (Information management), section 3 (Formulation of knowledge management issues, policy and strategy), and section 4 (Implementation of knowledge management) of the questionnaire.

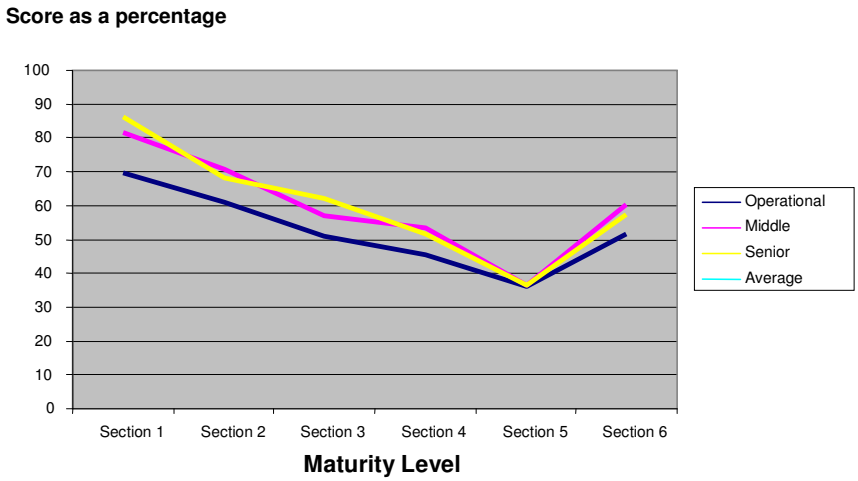
Figure 7.8: Distribution of scores in large organizations



7.6.4 Distribution of scores in extra-large organizations

Apart from section 5, scores attributed to senior (56.26%) and middle managers (55.62%) are significantly higher, and smaller in difference, than the scores forwarded by operational personnel (49.45%) (Figure 7.8). In some instances scores forwarded by middle managers were even slightly higher than the scores forwarded by senior managers (sections 2 - information management and 4 - implementation of knowledge management).

Figure 7.9: Distribution of scores in extra-large organizations



7.7 Assessment of the knowledge management maturity per industry grouping

Due to the structure of the questionnaire used, captured data also enabled the analysis of knowledge management maturity for different organizational types, as applicable to South African Industries.

Allowing respondents to add to already specified organizational types led to the identification of 19 different organizational types (14 organization types initially specified, and 5 types added by respondents). However, in order to simplify statistical comparisons, it was decided to group similar organizational types into similar organizational categories or sectors (refer table 7.6). The decision to select organizational sectors were guided by the organizational sectors as prescribed by the Johannesburg Stock Exchange (JSE) and guidelines provided by McGregor BFA[74].

[74]McGregor BFA supplies real-time and historical fundamental information on South African listed companies, top unlisted companies, local and international economic data as well as international financial indicators and currency exchange data.

In essence the Automotive industry was added to the Transport industry (Auto), Banks to Insurance (Financials); Chemicals to Pharmaceuticals (Pharm); Technology to Telecommunications (TT); Construction and Building materials to Mining (Resources); Consulting and Auditing to Service delivery (Service); and Consumer goods to Utilities (Goods). Due to the number of respondents working in the educational sector and also Government departments (National, provincial and local), it was decided to evaluate Education and Government as unique entities. No respondents indicating that they worked within the Capital goods or Media sector, thus it was decided to disregard these types of organizations altogether.

Type	Abbreviation	Percentage
Automobiles/Transport	Auto/Trans	4.38%
Banks and Insurance	Fin	10.14%
Chemicals, Pharmaceuticals	Pharma	6.68%
Construction, building materials to mining	Resources	6.22%
Consumer goods to utilities	Goods	13.36%
Technology to Telecommunications	TT	17.05%
Education	Educ	10.83%
Consulting to auditing, to service delivery	Service	12.90%
Government	Gov	18.43%

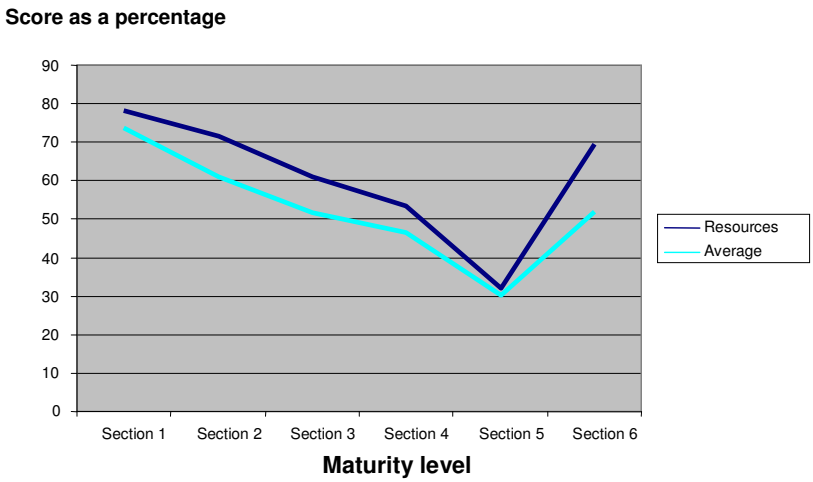
Table 7.6: Grouping of organizations

With reference to table 7.6, the distribution of questionnaires according to the different industry categories or sectors chosen, led to a fairly even distribution of the total population under research with government representing the highest population (18.43%), and automotive and transport (Auto/Tran) representing the smallest population (4.38%).

7.7.1 Resources grouping

The industry sector that achieved the highest overall knowledge management maturity score was the Resources sector, with a total score of 199.33/358 or 55.67% (Figure 7.10). Resource organizations not only recorded the highest growth in maturity over the past five years (69.44%), but also achieved the highest percentages in sections 2, 3, and 6 of the questionnaire. Also, in sections 1 and 5, their scores were not significantly lower than the highest scores forwarded.

Figure 7.10: Maturity achievements in the resources grouping

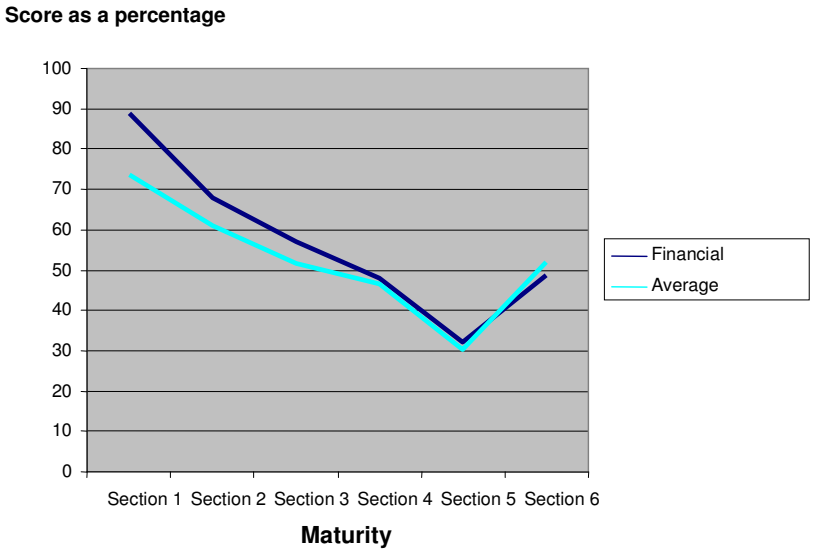


Forty eight percent indicated that they work for extra-large organizations, 22% work for large organizations and 30% for medium-sized organizations. At 57.5% medium-sized organizations achieved the highest overall score, with large and extra-large organizations both scoring slightly lower at 54.8% respectively.

7.7.2 Financial grouping

The organization type that achieved the second highest overall score was the financial sector with a total score of 190.79/358 or 53.29%. In comparison to other industries, the financial industry obtained relatively high scores in sections 2 and 3 with slightly above average scores in sections 4 and 5. The Financial sector, however, significantly outperformed all other organizational types regarding the management of ICT (section 1). An interesting finding is that the maturity growth of these organizations is perceived to be extremely moderate, achieving only a sixth place with an average score of 49% (Figure 7.11).

Figure 7.11: Maturity achievements in the financial grouping

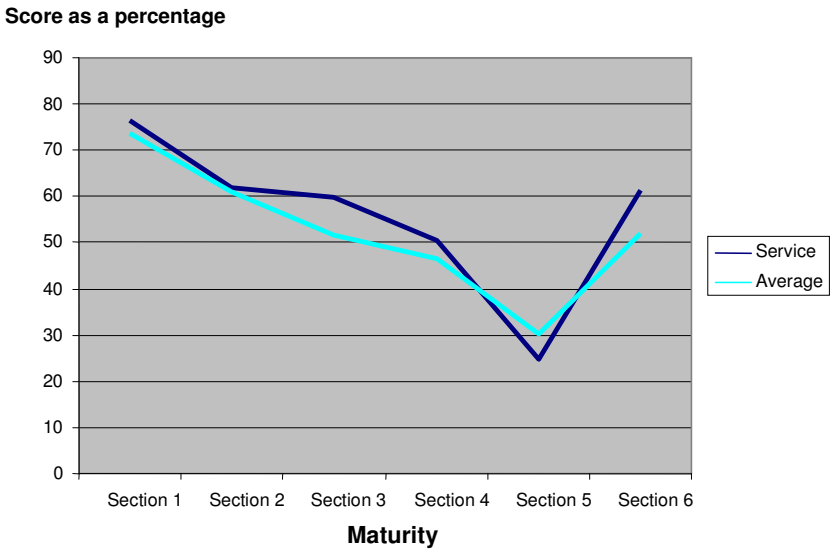


Most respondents (62%) indicated that they work for extra-large organizations, 19% work for large organizations, and 19% for medium-sized organizations. Extra-large organizations within the financial sector achieved a score of 201/358 or 56.2%, large organizations achieved a score of 151/358 or 42.1%, while medium-sized organizations again achieved the highest score at 207/358 or 57.8%. Closer scrutiny of results revealed that the low score achieved by large organizations was primarily the result of low score awarded to sections 2, 3, and 4 of the maturity questionnaire.

7.7.3 Service grouping

The third highest score was achieved by organizations in the Service delivery grouping with an overall score of 183.64/358 or 51.22%. These organizations received high scores in sections 3, 4 and 6, moderate scores in sections 1, and 2, and extremely low scores in section 5 of the maturity questionnaire (Figure 7.12).

Figure 7.12: Maturity achievements in the service grouping



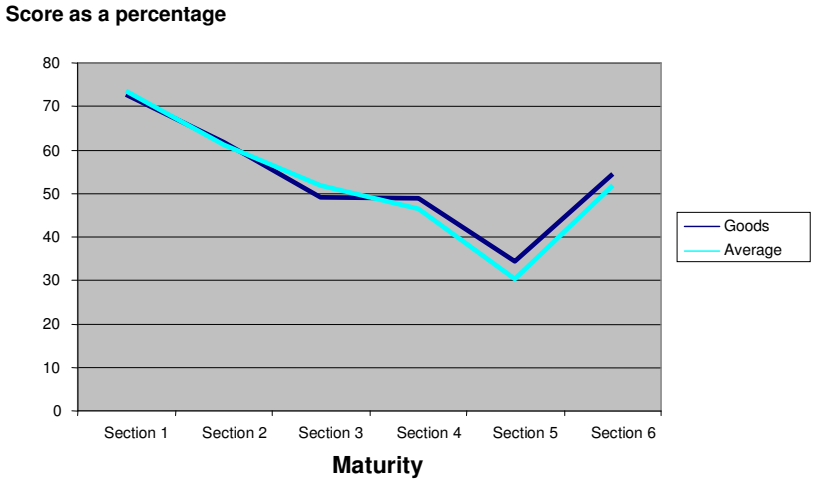
Fifty-five percent of respondents indicated that they work for small organizations while 45% indicated that they work for medium-sized organizations. Medium-sized organizations at 56.5% achieved the highest overall maturity score, with small organizations in this industry obtaining a score of only 47.7%.

7.7.4 Goods grouping

Organizations within the Goods grouping received the fourth highest maturity score, obtaining an average score of 178.55/358 or 49.87%. Most respondents indicated that they work for either large (38%) or extra-large (43%) organizations, with 10% working for medium-sized and 9% working for small organizations. Extra-large organizations at 52.4% outperformed both large and medium-sized organizations at 51.0% and 43.7% respectively. At 38.9% small organizations recorded the lowest overall score of all organizations interviewed within this industry.

Although organizations in this sector achieved just above average to just below average scores in sections 1, 2, 3, and 4 of the maturity questionnaire, they received the third highest score in section 6 and the second highest score in section 5.

Figure 7.13: Maturity achievements in the goods grouping

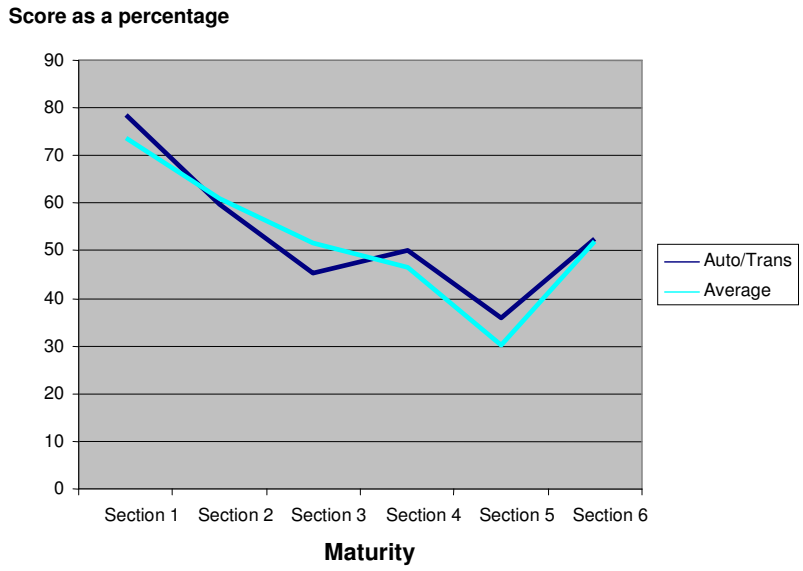


7.7.5 Automobiles/Transport grouping

Automobiles/Transport organizations received the fifth highest score, totalling an average score of 177.52/358 or 49.58% (Figure 7.14). An interesting finding is that these organizations scored the lowest average score in section 3, formulation of knowledge management issues, policies and strategies. In comparison scores achieved in sections 1 and 4 are moderate, with the highest score obtained in section 5 (Ubiquitous knowledge) for all sectors covered.

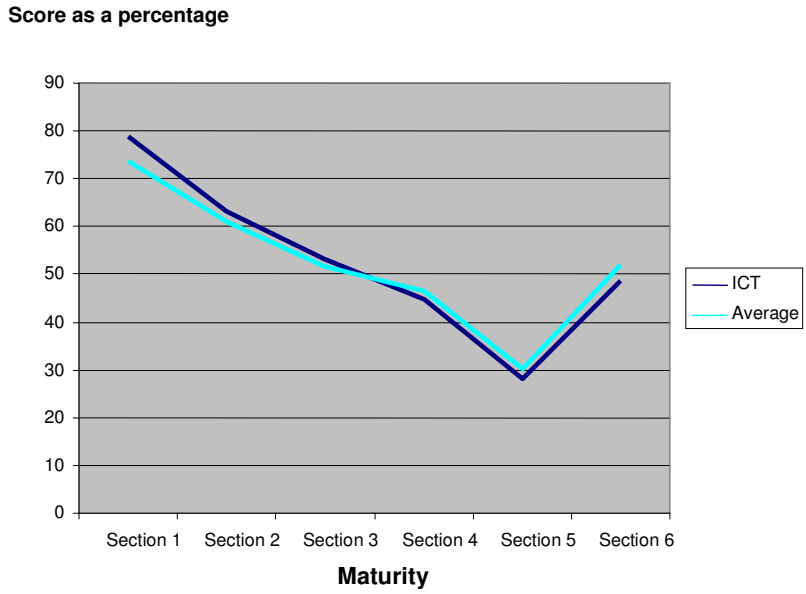
Maturity growth for Auto/Tranport organizations is moderate at 52.63%. Most respondents (53%) indicated that they work for extra-large organizations, with an equal number of employees working in smaller organizations (16%). An interesting observation is that medium and large organizations at 60.5% and 59.0% respectively, outperformed both extra-large and small organizations at 44.1% and 47.2%.

Figure 7.14: Maturity achievements in the Automobiles/Transport grouping



7.7.6 Technology and telecommunications (TT) grouping

Figure 7.15: Maturity achievements in the TT grouping



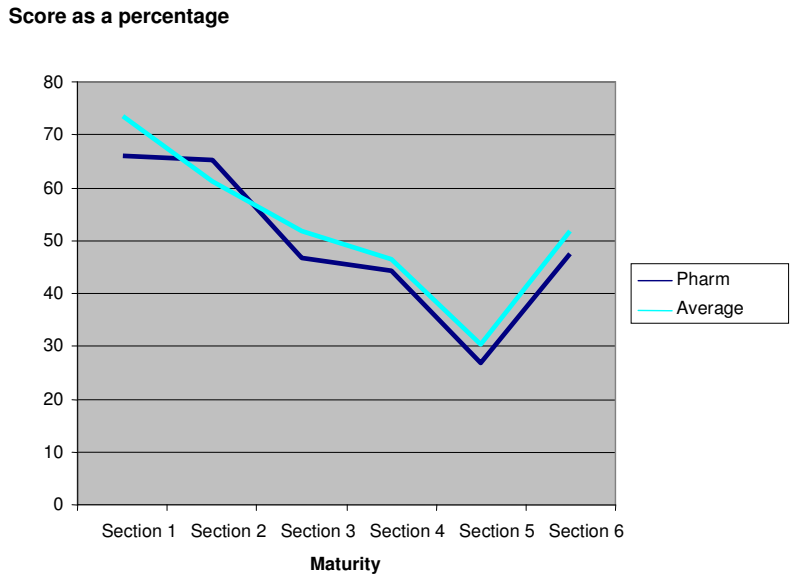
The TT grouping seems to follow the average trend most closely than other groups. Arguably, due to the nature of their business, TT organizations scored extremely high in section 1 (ICT management) of the questionnaire, achieving an average score of 78.85%. Subsequent maturity levels follow a trend similar to the average maturity score achieved by all industries, become incrementally smaller as the level of maturity increases (Figure 7.15). At 58.6% and 55.6% extra-large and large organizations outperformed all other organizational sizes. Medium-sized and small organizations forwarded considerably lower scores of 44.3% and 37.5% respectively. Although small and medium-sized organizations scored relatively high in section 1 (ICT management) of the questionnaire, they achieved only moderate scores in section 2 and 3 of the questionnaire.

Top managers in TT organizations, at 60.0%, rated the overall maturity to be considerably higher than the rating attributed to middle management (46%) and operational personnel (43%). Of interest is that the bulk of the differences in scores between top, middle and operational personnel are vested primarily in the scores allocated to sections 2, 3 and 4 of the questionnaire, i.e. information management, formulation of knowledge management issues, policies and strategies and the implementation of knowledge management.

7.7.7 Chemical and Pharmaceutical (Pharm) grouping

Chemical and Pharmaceutical organizations achieved an overall maturity score of 168.00/358 or 46.9% (Figure 7.16). Apart from section 2 (Information management) scores achieved in all sections of the questionnaire are lower than the average score achieved per maturity section by all organizational groupings interviewed. Maturity growth over the last five years is 47% and is also below the average score of 51%. This is only slightly better than the lowest score achieved by the worst performer (the educational industry) at 42%.

Figure 7.16: Maturity achievements in the chemical and pharmaceutical grouping



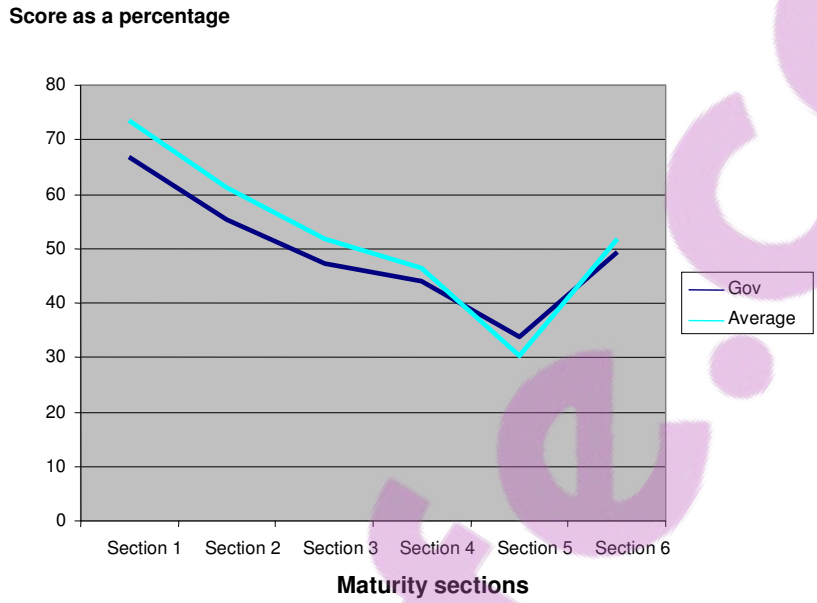
Respondents indicated that they either work for small organizations (65%) or extra-large organizations (35%), with extra-large organizations achieving an overall score of 50.6%, and small organizations a score of 44.9%. An interesting observation is that although senior managers in this industry scored the overall maturity at 55%, operational personnel at 44% rated the overall maturity slightly higher than middle management did at 43%. The low score attributed to middle management is primarily due to middle managers perceiving level 3 (formulation of knowledge management issues, policies and strategies) to be inadequate. Apart from maturity section 2 (Information management) organizations in the Pharm grouping achieved lower than average scores over all maturity sections.

7.7.8 Government grouping

The governmental sector achieved an overall maturity score of 166.11/358 or 46.39% (Figure 7.17). Most respondents indicated that they work for medium-sized Government Departments. Large departments within this sector on average achieved a maturity score of 52.5%, with medium and extra-large departments achieving scores of 47.2% and

47.4% respectively. Small departments fared considerably worse achieving scores of only 41.7%.

Figure 7.17: Maturity achievements in the government grouping



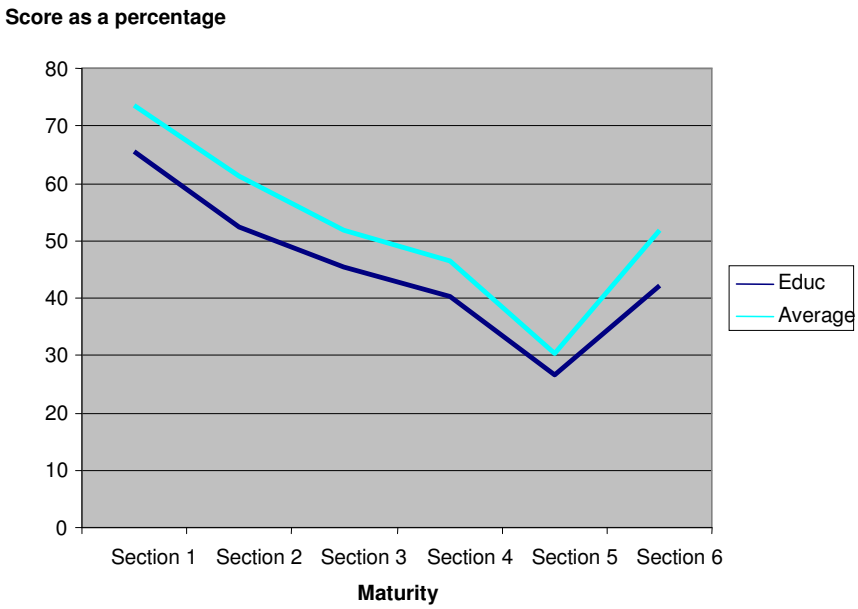
Government departments achieved scores over all maturity levels (except section 5) considerably lower than the average score obtained by all participating organizations. However, an interesting finding is that growth of maturity over the past 5 years at 49% are moderate compared to other groupings.

When findings are broken down to reveal the scores allocated by the different managerial levels within the different organizational sizes that made up the Government departments, it was found that the difference in score between the different managerial levels within large Government departments take on an extremely interesting dimension with senior and middle management rating maturity the same at 56%. This is considerably higher than the score attributed to operational personnel at 42%. Within extra-large departments the picture changes drastically with middle managers rating maturity at 39%. This is considerably lower than the scores attributed to senior management at 48% and operational management at 56%.

7.7.9 Educational grouping

Educational institutions not only received the lowest maturity score of all groupings interviewed (152/358 or 42,45%), but also forwarded the lowest maturity scores over nearly all maturity levels (Figure 7.18). Growth of maturity over the past five year was also the lowest of all organizational sectors interviewed, receiving a score of 42.02%. Most interviewees (76%) indicated that they work for large organizations, while 13% work for small institutions, and 11% work for medium-sized organizations. Medium-sized organizations at 45.9% outperformed both large and small organizations at 41.8% and 43.9% respectively.

Figure 7.18: Knowledge management maturity distribution of educational institutions.



Senior managers rated the overall maturity at 47%, middle management at 41% and operational personnel at 39%. The relatively low score attributed to middle management could be traced to middle managers scoring levels 2 (Information management) significantly lower than any other maturity sections.

7.8. Summary of the major findings with regard to the knowledge management maturity of South African industry.

Findings indicated that enablers to knowledge management (ICT and Information management) are fairly well-institutionalised within South African industry (Sections 7.3.1 and Section 7.3.2). Unfortunately, there is a strong indication that a large number of South African industries still consider ICT, and especially Information management, to be knowledge management. Most organizations understand the concepts and issues surrounding Knowledge management (Section 7.3.3), and even though most agree to the benefits of Knowledge management (Section 7.3.4 and Section 7.3.5), there seem to be an element of testing the ground, before full commitment and implementation of knowledge management endeavours (Section 7.3.3 and Section 7.3.4) occur. In essence there is statistical support that organizations start with endeavours that are technologically supported and/or easy to implement, before moving to endeavours that require greater human intervention to succeed.

Analysis of knowledge management maturity as it relates to different organizational sizes reveals that there is statistical differences between the score forwarded by small, medium, large and extra-large organizations (Section 7.6). In essence small and extra-large organizations yielded different scores, with medium and large organizations forwarding similar scores over most maturity sections.

Viewed holistically, much larger organizations are at an advantage with regard to the institutionalisation of knowledge management practice over most maturity levels, especially with regard to the sharing of knowledge beyond organizational boundaries. Of interest is that although large organizations (**please note**: not extra-large organizations) outperformed medium-sized organizations in sections 1 (ICT management) and 5 (ubiquitous knowledge) of the questionnaire, they were often outperformed by medium-sized organizations with regard to the management of information (Section 2), the vesting of knowledge management issues, policy and strategy (Section 3), and the institutionalisation of formal knowledge management endeavours (Sections 4).

With reference to Section 7.5, analysis of knowledge management performance, as it relates to scores forwarded by senior, middle and operational personnel revealed that there are statistical differences between the score forwarded by the different managerial levels present within organizations. Findings revealed that differences occurred primarily between the scores forwarded by operational and senior managers and middle and senior managers, especially with regard to maturity in information management (Section 2), the identification of knowledge management issues, policy, and strategy (Section 3), and the implementation of knowledge management (Section 4).

	Resources	Fin	Services	Goods	Auto/ Tran	ICT	Pharma	Gov	Edu	Ave	
Operational			47%	41%	32%	36%	42%	41%	52%	42%	Small
Middle			47%	41%	46%	32%	44%	43%	39%	42%	
Senior			49%	37%	63%	51%	51%	40%	41%	47%	
Operational	53%	54%	53%	42%	50%	44%		44%	50%	47%	Medium
Middle	56%	65%	60%	39%	58%	33%		47%	32%	48%	
Senior	62%	54%	55%	49%	73%	55%		51%	65%	55%	
Operational		40%		54%	41%	49%		42%	38%	45%	Large
Middle	58%	41%		45%	59%	53%		56%	41%	46%	
Senior	51%	56%		55%	76%	63%		56%	48%	56%	
Operational	53%	50%		49%	39%	47%	54%	56%		49%	Ex-Large
Middle	58%	58%		53%	52%	60%	41%	39%		56%	
Senior	55%	60%		55%	42%	48%	59%	48%		56%	

Top achievers in Industry

1st runners up in industry

2nd runners up in industry

Table 7.8: Comparison of scores per organizational grouping broken down per organizational sizes and managerial level

Findings suggest that the South African industry not only struggles with the successful institutionalization of formal knowledge management endeavours beyond their borders but, also gains “buy in” and real commitment from operational personnel.

Findings indicated that organizations in the Resources, Financial, Services and Consumer goods and utilities groupings, are the leaders regarding knowledge management maturity. Organizations in the Automobiles/Transport, and ICT groupings achieved scores on a par with the average knowledge management maturity score achieved. In contrast organizations in the Chemicals and Pharmaceuticals, Government and Educational sectors all recorded below average scores.

In the Resources grouping scores were consistently higher than average over all maturity sections. In the Financial grouping scores were higher than average regarding ICT management, information management and the formulation of knowledge management issues, policy and strategy. In Service organizations scores were high regarding the formulation of knowledge management issues, policy and strategy, the implementation of knowledge management and the sharing of knowledge beyond organizational boundaries.

Viewed holistically, irrespective of organizational size and industry, commitment and diffusion of knowledge management, especially between senior and middle management are cardinal to the success of knowledge management endeavours. There is a strong indication that middle management (supported by senior management) holds the key to successful implementation of knowledge management. In top achievers, middle manager's scores were on average similar or slightly higher than senior managers (Table 7.8).

Findings confirm that leading knowledge management maturity organizations have sound ICT management practices in place. Medium-sized organizations in both the Financial and Resources industries are typical examples in case (Sections 7.7.1 and 7.7.2). However, even with strong ICT support and having sufficient knowledge management policies and strategies in place, insufficient Information management was also found to negatively impact on the overall ability to institutionalise knowledge management successfully. The dramatic decline in knowledge management maturity in the latter stages of large financial organizations' scores, primarily due to insufficient information management, proved to be a definite point in case.

Insufficient and/or immature ICT and Information management lead to problems with regard to supporting knowledge management endeavours beyond organizational borders. Findings indicated that even though Services organizations know how to formulate and implement knowledge management issues, policies and strategies successfully, they struggle with coming to grips with managing knowledge situated outside the borders of their organizations. Similarly, the below average performance in ICT management (66% compared to an average score of 73%), achieved in the Pharmaceutical organizations filtering through to successive maturity levels. This again strongly hints at the enabling role of ICT being insufficient. The relatively low score achieved in the Educational industry, primarily due to middle managers perceiving information management to be inadequate, strengthening the argument that Information management, similar to ICT is a prerequisite to successful institutionalization of knowledge management.

Explanations regarding knowledge management maturity spanning beyond and across organizational borders must be seen in conjunction with the findings of Section 7.3. Not only did findings indicate that South African organizations are not mature in extending knowledge management beyond organizational borders, but there seem to be a perception that extending knowledge management beyond organizational borders impact negatively on knowledge management maturity. Possibly, this explains why most South African organizations are not actively encouraging or driving knowledge management endeavours beyond the borders of their country.

CHAPTER 8: CONCLUSIONS AND RECOMMENDATIONS

8.1 Introduction

In the knowledge-networked economy the success of an organisation will be determined by the ability of the organization to combine knowledge with business strategy. In combining business strategy with the management of knowledge resources through technology, an organisation can perform efficiently and effectively. The shift in the strategic role that knowledge plays in business is forcing business managers to actively participate, if not lead, knowledge management for decision making. It is therefore not surprising to find business managers increasingly relied upon to play a leadership role in the management of knowledge. Managers, therefore, need to know the technology plus have business leadership and knowledge management experience. Without question, a sound understanding of the formulation of business strategy is crucial in the formulation of an efficient and effective knowledge management strategy, and vice versa. Unfortunately there is no generic model or even guidelines for incorporating the management of knowledge into business and especially business strategy formulation, from within a managerial/strategic rather than from a purely technological perspective. This leads to business managers considering knowledge management as being separate from business, leading to an inability to align knowledge management goals with corporate goals.

The aim of the study was to investigate the interdependencies between knowledge, knowledge management and business from within a managerial/strategic perspective rather than from a technological perspective. This was done to supply practitioners and managers with guidelines to not only successfully institutionalize and manage knowledge as a managerial/strategic enabler, but also to assess the level of knowledge management maturity already reached.

By drawing together the results from the previous chapters, the main findings will be highlighted here in chapter eight. Connections will be drawn between the results obtained in Chapter 7, and the literature review conducted in Chapters 1 to 5, relating the broader

fields of knowledge -, business - and strategic management. Finally, this chapter ends with recommendations to fill the gaps and uncertainties that will lead to further study.

This final chapter gives a summary of all the chapters from 1 to 7. The aim is to summarise all facts, arguments and conclusions presented in this thesis and give responses to all of the arguments proposed.

Emphasis is therefore placed on the following topics:

- Summary of methodology used.
- Main findings of the thesis
- Anomalies and surprising results
- Larger relevance of the study
- Recommendations regarding further research

8.2 Summary of methodology used

Because the study is interpretive in nature, a combination of non-empirical and empirical (quantitative and qualitative) research was used. In Chapter's 2 to 5, the literature was analyzed in order to understand the:

- critical role knowledge and knowledge management plays in any organization,
- issues involved in knowledge management implementation and maturity, and
- why knowledge management success is measured in an organizational context.

In chapter 4, using the grounded theory approach of analogical and inductive reasoning plus model building, a new perspective in terms of knowledge management's maturity was formulated.

In order to test these theoretical insights, the model proposed in Chapter 4 was used as the basis for a questionnaire. This questionnaire was pre-tested by a number of scholars

and knowledge management practitioners with regard to applicability and usability[75] (Section 6.2). After multiple revisions, the questionnaire was used to determine a baseline for knowledge management maturity of 86 organizations. Each organization competes within different organizational groupings in the South African industrial environment (Section 7.3).

In the assessment of organizations knowledge management maturity, Likert type scales[76] were used. In all cases, analysis of data consisted of the use of either standard statistical techniques and/or qualitative methods, as determined by the standards of the University of Pretoria, South Africa.

8.3 Main findings of the research

In Chapter 1, it was argued that although knowledge is regarded as a strategic resource it is not managed accordingly. In questioning why knowledge is not well managed, it was found to be primarily due to not understanding the relationship between knowledge, knowledge management, business and strategy. It was proposed that the failure of knowledge management is the result of treating knowledge management as a technology. It was therefore concluded that managers are in need of guidelines to aid in the successful institutionalization of knowledge management, from within a strategic/managerial perspective rather than from a technological perspective.

[75] Through a process of methodological study, to determine if knowledge management maturity does indeed enhance organizational performance, i.e. "Studies aimed to develop new methods (such as questionnaires, scales and tests) of data collection and sometimes also validating a newly developed instrument through a pilot study" (Mouton 2001:173).
[76] To determine and express knowledge management maturity over five maturity sections as a percentage – refer to Appendix D: Knowledge management maturity rating system.

In order to achieve this goal of supplying managers with guidelines to aid in the successful institutionalization of knowledge management, from within a strategic/managerial perspective rather than from a technological perspective, research focused on:

Objective 1: Heightening awareness of the critical role knowledge plays as a strategic corporate resource.

In Chapter 2 (Sections 2.2, 2.3 and 2.4), the complexity and strategic importance of knowledge was addressed. Special emphasis was also placed on the major impact knowledge has on corporate strategy and organizational success. It was found that there is a constant reassessment of the way in which strategy is perceived. Also, different strategy formulation models follow the same general path, which is based on researching answers to satisfy stakeholder needs (Section 2.4). In focusing on the evolution of strategy, it was determined that knowledge has played an enabling role in the formulation of strategies. It was therefore proposed that the evolution of strategy will continue not by replacing previous notions, but rather by building knowledgeably upon previous thought.

Objective 2: Determine the issues/models/methods and perspectives available, to guide strategists in the quest to efficiently and effectively manage knowledge, within a strategic/managerial perspective.

Chapter 3 focused on identifying issues, policies and strategies to guide strategists to effectively and efficiently manage knowledge. It was found that these fields of study overlap. The principles proposed by Davenport (1998), the elements proposed by Taylor Small et al,. (2000), the knowledge management "schools" proposed by Earl (2001), and the success factors proposed by Logan (2001) all address the same issues and concerns (Section 3.4). Unfortunately, even though it was found that issues pertinent to the success of knowledge management are well documented, very little is revealed on how to successfully institutionalise these issues.

The main finding of chapter 3 is that even though knowledge drives strategy (as argued in chapter 2) strategy in turn drives the institutionalisation of knowledge management. Thus, the proposition was made that in order to set the stage for the successful institutionalization of knowledge management, organizations should decide upon issues that are proven to lead to the implementation of a knowledge management culture. In order to ensure uniformity in the institutionalizing of these issues, it was proposed that not only should issues be encapsulated within policy, but also that the strategic management process be used to determine the priority of issues (Section 3.5). In debating how these issues relate to one another, Chapter 3 concluded that there is a chronological sequence of events that need to take place if knowledge management is to be institutionalized successfully.

Objective 3: Elucidate the progression of knowledge management maturity from a strategic/managerial perspective.

Chapter 4 elaborated on the argument that certain knowledge management issues, due to their reoccurring nature within literature, is deemed to be of such importance that they could be used as a baseline in the quest to successfully institutionalize knowledge management (Section 4.2). However, it is also revealed that the successful institutionalization of knowledge management is dependent on the implementation of knowledge management maturity within the organization (Section 4.3). Chapter 4 therefore demonstrated that maturity models could aid in the successful institutionalization of knowledge management issues, policy and strategy from a strategic/managerial, rather than from a technological perspective.

An in-depth review of knowledge management maturity models revealed that most models are derived from the Software Engineering Institute's Capability Maturity Model (Section 4.4). Thus, it was found that there are numerous similarities between models, especially with regard to the progression of stages in maturity (i.e., initiate, be aware, manage and optimize). It was also found that there are major disagreements in what

specifically constitute areas of importance within the different maturity levels. Findings strongly indicated that most models based on software and ICT theoretical concepts, over-estimate the role of ICT. Therefore, it was concluded that most models neglect to emphasize the enabling role that strategy plays in knowledge management maturity. Current knowledge management models were therefore found to be unsuitable. In placing knowledge management issues, policies and strategies, as identified in chapter 3, in a chronological order, a new maturity model was formulated to reflect the progression of knowledge management endeavours from within a strategic/managerial perspective. An outcome of chapter 4 is the proposal of an evolutionary methodology with regard to knowledge management maturity.

Objective 4: Investigate knowledge management's performance in relation to the objectives and measures that determine the overall efficiency and effectiveness of an organization.

Chapter 5 returned to questions surrounding "how to measure the value of knowledge management from within an organizational perspective". Differences in opinion with regard to innovation's role as measurement criteria for knowledge management were critically reviewed in Section 5.2. It was found that although numerous authors support a link between knowledge management and innovation, empirical evidence is not supportive. It was argued that the link between knowledge management and innovation is blurred, primarily due to the interdependency between knowledge, strategy and knowledge management. This link was neglected in most arguments (Chapter 2, Section 2.4 and Chapter 3, Section 3.3). The prevailing notion of relating endeavours in knowledge management to a specific form of output (i.e., innovation) was therefore strongly rejected (Section 5.4). Owing to the complex nature of managing knowledge as a strategic enabler, the argument was proposed that the sum of the input will not equal the output. It was therefore proposed that knowledge management enables strategists to formulate winning strategies, of which innovative strategies are but one. Therefore, a yardstick for the success of strategy is also a yardstick for the value of knowledge management. Chapter 5 emphasises that the key to determining the value of knowledge

management lies in the extent to which knowledgeable reasoning leads to organisational growth, profitability and sustainability (Section 5.5) and not purely within the amount of innovation it sparks.

Objective 5: Formulate guidelines to aid practitioners and strategists to successfully institutionalize and assess the knowledge management maturity of their respective organizations.

In chapter 6 it is argued that unless theory develops usable tools, contributions made by knowledge management scholars will be of little value to organizations embarking on knowledge management endeavours. Building on the inductive reasoning in the previous chapters, a questionnaire of six sections, constituting 101 descriptive questions, was developed and thereafter tested as a knowledge management maturity measurement tool in industry. Feedback was that the questionnaire served the purpose for which it was meant, i.e. the questionnaire covered the key aspects of Knowledge Management Maturity. Furthermore, it was established that the questionnaire was conducive towards conducting structured interviews.

As a lesser objective, to supply knowledge management practitioners with a baseline of data to benchmark their organizations' knowledge management maturity upon, data and insight gained from the process of conducting structured interviews in the industry, were also included in this thesis.

Objective 6: Baseline data upon which to benchmark knowledge management maturity.

Chapter 7 reported on the results and findings deduced from the empirical research conducted within the 86 South African organizations interviewed. With regard to the level of knowledge management maturity reached by organizations, it was found that:

- ICT and Information management are fairly well institutionalised within the South African industry (Sections 7.4.1 and Section 7.4.2).

- A large number of South African organizations still consider ICT, and especially Information management, to be knowledge management (Section 7.4.1 and Section 7.4.2).

- Most organizations understand the concepts and issues surrounding Knowledge management (Section 7.4.3).

- Most organizations agree to the benefits of Knowledge management (Section 7.4.4 and Section 7.4.5).

- There is an element of testing the ground, starting with endeavours that are "hard" and tangible in nature, before full commitment and implementation of "softer" knowledge management endeavours (Section 7.4.3 and Section 7.4.4).

- There are differences between the score forwarded for small, medium, large and extra-large organizations (Section 7.5).

- There are differences between the score forwarded by the different managerial levels present within organizations.

- Organizations in general struggle with the successful institutionalization of formal knowledge management endeavours beyond their borders. This was indicated by maturity section 5 that dealt with ubiquitous knowledge.

- All organizations, irrespective of the organizational type and organizational size struggled to get "buy in" from operational personnel.

- There is a strong indication that middle management (supported by senior management) holds the key to successful implementation and diffusion of knowledge management.

- Knowledge management maturity achievements seem to be more dependent on a deliberate, conscious and calculated managerial effort, than on factors such as organizational size, the industry competing within, number of managerial levels present and resources such as ICT, available.

8.4 Anomalies and surprising results

The findings in section 7.3 indicate that most South African organizations are not mature in extending knowledge management beyond organizational boundaries. There seems to be a perception that extending knowledge management beyond organizational borders impacts negatively on knowledge management maturity. Most South African organizations are therefore not actively encouraging, or driving, knowledge management endeavours to span their organizational borders.

Another surprising result was that even with strong ICT support and sufficient knowledge management policies and strategies in place, insufficient information management was consistently found to negatively impact on the overall ability to institutionalise knowledge management successfully.

Arguably, the most surprising result obtained from the empirical study conducted was the finding that Educational institutions achieved the lowest overall knowledge management maturity scores of all organizations interviewed. Educational institutions not only received the lowest scores over nearly all maturity levels, but growth of maturity over the past five years was also the lowest of all organizational groupings interviewed. Possibly, the low score attributed to maturity Section 2 (Information management) carried through to the subsequent maturity sections. Another explanation could be the hoarding culture associated with academics resulted in the guarding of knowledge as a strategic differentiator.

8.5 Larger relevance of the study (gaps and uncertainties)

The contribution of the study to the literature and Knowledge management body of knowledge provides insight into:

- The important role knowledge plays in organizations as a strategic corporate resource and that knowledge management plays as a managerial enabler (Chapter 2).

- Issues, policies and strategies that are pertinent to the effective management of knowledge (Chapter 3).

- The progression of knowledge management maturity within an organizational setting from within a strategic/managerial rather than from within a technological perspective (Chapter 4).

- Knowledge management's performance in relation to the overall performance of an organization (profitability, growth and sustainability) (Chapter 5).

To expand this research beyond purely theoretical and/or academic value, the research also provided a practical "toolkit" for managers to assess their organizations' knowledge management maturity through the knowledge management maturity questionnaire and rating system (Appendix B, C).

The study not only comments on the knowledge management maturity of the 86 South African-based organizations, but also identifies the extent to which South African organizations and industry groupings are mature. This maturity is in regard to the institutionalisation of formal knowledge management endeavours, especially beyond their organizational borders.

Organizations in the Resources (Construction, building materials and mining), Financial (Banks and Insurance), Services (Consulting, Auditing, and Service delivery) and Goods (Consumer goods and utilities) groupings were found to be the leaders regarding knowledge management maturity. In the Resources grouping scores were consistently higher than average over all maturity sections. In the Financial grouping scores were higher than average over mainly sections 1 (ICT Management), 2 (Information management) and 3 (Formulation of knowledge management issues, policy and strategy) of the questionnaire. In the Services grouping, scores were mainly higher than average in sections 3 (Formulation of knowledge management issues, policy and strategy), 4 (Implementation of knowledge management) and 5 (Ubiquitous knowledge). As expected TT organizations were found to be the most mature regarding ICT management. An interesting finding was that Chemical and Pharmaceutical organizations achieved high scores in Information management, while Government departments and Automotive and Transport companies achieved higher than average scores in the sharing of knowledge beyond their borders.

Score differences between groupings could mainly be attributed to consistency in achievement over all maturity sections. Especially, it was noted that leaders all achieved higher than average scores over all maturity sections, and in particular over sections 1 (ICT Management), 2 (Information management) and 3 (Formulation of knowledge management issues, policy and strategy) of the questionnaire. In contrast, even though companies in the Chemical and Pharmaceutical and government sectors achieved high scores in certain maturity sections, score hikes were for the most part isolated. On average organizations that did not fare as well as leaders, achieving below-average scores over especially maturity sections 1, 2 and 3 of the knowledge management maturity questionnaire.

8.6 Recommendations regarding further research

Most of the essential aspects needed to successfully manage knowledge were covered in the proposed questionnaire, but the practical applications and testing indicated that

further research is needed. This is especially true regarding the implementation of knowledge management and the assessment of knowledge management maturity in non-profit, as well as small and micro organizations. It must be acknowledged that the management of knowledge, in all its complexity, constitutes much more than the issues, principles and policies identified in this research. As the body of knowledge evolves, the model and associated questionnaire must be updated and revised on a regular basis. Another area for further study would be to critically analyse the diffusion of knowledge management between managerial levels within an organization. Arguably, the diffusion of knowledge management between senior, middle and operational levels, encompasses yet another dimension to the management of knowledge.

The use of scales, such as the Likert-type, used in the knowledge management maturity questionnaire, may not appropriately have captured data. Of interest would be to repeat the experiment and change the description of the incision points used, and/or alter the number of incision points used. The study may therefore be viewed as a “pilot study” to provide insights. To take into account the (1) historical nature of performance measurement, (2) time it takes for knowledge management endeavours to impact on organizational performance and (3) differences regarding organizational sizes and industries, more research is needed before determining the true value knowledge adds to an organization. Such a study should span a number of years and be inclusive of additional industries, within different managerial and strategic settings.

Appendix A:

Knowledge Management Maturity Assessment Matrix (KMMAM)

Phase 1: ICT and Information management as enablers of knowledge management	**Adapted from Sources**
Are ICT related relationships of a sound nature?	Boon (1990), Gurteen (1998), Applegate McFarlen and McKenny (1999), Kazimi Dasgupta and Natarajan (2004); Kochikar (2004) and Kruger and Snyman (2005).
Can the organization arrange, make accessible, protect, store, retrieve, analyse, filter, evaluate, package and dispose of information?	
Is there an inventory of information entities in the organisation?	
Can the organization organise, plan/design and evaluate an ICT system?	
Is the organization capable of shifting data and information by means of ICT, i.e. is there an ICT infrastructure in place that can support Information management?	
Is the organization capable of determining information needs?	
Are there measures in place to procure information?	
Can the organization determine the value and cost of information?	
Does the organization have an information policy in place?	
Phase 2: ***Deciding on Knowledge Management Issues***	
Is the organization aware of the power vested in knowledge, and/or the importance of knowledge as a strategic resource?	Davenport (1998), Mitre cited in Taylor, Small and Tatalias (2000), Gartner in Logan (2001) and Kruger and Snyman (2005).
Is there a commitment from top management towards bestowing a knowledge culture within the organization?	
Is there a commitment from top management for the establishment of a formal knowledge management function?	
Is the organization capable of identifying issues, success factors, and elements prone to vesting knowledge culture and knowledge management architecture within the organization?	
In order to focus all knowledge management efforts, are there distinct expressions of the future state of knowledge (the formulation of a knowledge vision) within the organization.	
Phase 3: ***The ability to formulate an organization-wide Knowledge Policy***	.
Are ICT systems capable of going beyond a point of merely supporting operations to a point of being capable of supporting management decisions, and knowledge work?	Davenport (1998), Gurteen (1998), Mitre
Is there an organizational-wide knowledge management policy in	

place? Is knowledge shared throughout the organization, and are there forums in place to provide governance to knowledge management activities, i.e. is there a working knowledge management function, and/or are knowledge domains established within the organization? Do functional owners send employees on formal training programs, brainstorming sessions, self enrichment- and learning exercises?	cited in Taylor, Small and Tatalias (2000); Gartner in Logan (2001) Laudon and Laudon, (2004) and Kruger and Snyman (2005).
Phase 4: ***Building knowledge strategy/strategies***	
Does the organization know what constitutes knowledge resources (both tacit and explicit), where knowledge resources are situated, and why resources are strategic? Is the organization capable of conducting a successful knowledge audit? Are there efficient and effective ICT architectures and knowledge infrastructures in place?	Orna (1998), Zack (1999); Bater (1999); Ndlela and du Toit (2001) Kazimi Dasgupta and Natarajan (2004) and Gallagher and Hazlett (2004) and Kruger and Snyman (2005).
Phase 5: ***Formulation of knowledge management strategies***	
Is the management of knowledge (all knowledge management tools) supplying a direct input to the strategic management process (Is the Chief Knowledge Officer (CKO), and the knowledge management function an active participant in the strategy formulation process of the organization)? Is the organization capable of formulating knowledge management strategies, and are these strategies prone to increasing knowledge in a particular area and/or leverage existing knowledge? Do knowledge management strategies lead to efficient and effective plans, capable of transforming the organization's knowledge structure and supporting ICT structure from the "as is" to the required "should be" structure? Are individuals being evaluated or appraised on his/her knowledge capabilities and output? Is there a culture conducive to knowledge sharing in your organization?	Zack (1999); Bater (1999), Pearce and Robinson (2000); Von Krogh, Nonaka, and Aben (2001), Lauden and Lauden (2004) and Kruger and Snyman (2005)
Phase 6: ***Ubiquitous knowledge***	
Is knowledge shared among value chain partners (Are trans-organizational forums in place)? Are there holistic knowledge management strategies and plans formulated between members of the value chain, plans and projects to further explore and exploit the power vested in knowledge? Is the organization's ICT architecture capable of transcending the borders of the organization, e.g. capable not only of sharing data and information, but also knowledge and expertise with all stakeholders in the organization's extended value chain?	Applegate McFarlen and McKenny (1999), Kochikar (2004) and Kruger and Snyman (2005).
Phase 7*: The future* Supply a clairvoyant perspective on the future evolution of knowledge management	

Appendix B:

Knowledge Management Maturity Assessment Questionnaire (KMMAQ)

For Office Use 203

Knowledge Management Maturity Assessment Questionnaire

V1 | | | | 1

Student Number:								

GENERAL INSTRUCTIONS

Please answer the questions by drawing a circle around an appropriate number in a shaded box or by writing your answer in the shaded space provided.
***Unless specifically instructed otherwise, please answer* ALL questions, one answer per item.**

1. What is the name of the organization on whose behalf you are answering this Questionnaire?

V2 | | | | 4

2. What is the type of organization being assessed?

V3 | | 7

Automobiles/Transport	**1**
Banks	**2**
Capital Goods	**3**
Chemicals	**4**
Construction, Building, Materials and Steel	**5**
Consumer Goods	**6**
Insurance	**7**
Media	**8**
Oil and Gas	**9**
Pharmaceuticals	**10**
Technology	**11**
Telecom Services	**12**
Utilities	**13**
Retailers and Distributors	**14**
Other (Please specify below)	**15**

2. Please specify the level of management being assessed?

V4 | | 8

Operational level	**1**
Middle management	**2**
Senior management	**3**

SECTION 1 ICT Management

Please use the code:

1	=	***Y**es definitely*	***Y***
2	=	*Yes, but not **s**ignificantly*	***S***
3	=	*No, but **p**robably within the next 5 years*	***P***
4	=	***N**o*	***N***

1.1 To what extent do your organization's Information and Communications Technology (**ICT**) activities comply with the following statements:

		Y	S	P	N			
1	The organization is capable of **evaluating** an ICT system	**1**	**2**	**3**	**4**	V5		9
2	The organization is capable of **designing** an ICT system	**1**	**2**	**3**	**4**	V6		10
3	The organization is capable of **planning** an ICT system	**1**	**2**	**3**	**4**	V7		11
4	The organization has an **effective** ICT infrastructure	**1**	**2**	**3**	**4**	V8		12

1.2 The organization regards **ICT** and the management thereof as … (Please mark only **one** answer)

an enabler of knowledge management	**1**	V9		13
knowledge management	**2**			

SECTION 2 Information Management

Please use the code:

1	=	***Yes definitely***	***Y***
2	=	*Yes, but not **s**ignificantly*	***S***
3	=	*No, but **p**robably within the next 5 years*	***P***
4	=	***No***	***N***

2.1 To what extent does your organization **comply** with the following statements?

		Y	S	P	N			
1	The organization has a clearly defined information management (IM) policy	**1**	**2**	**3**	**4**	V10		14
2	The organization has a clearly defined information management (IM) strategy	**1**	**2**	**3**	**4**	V11		15
3	The organization understands which information resources are crucial to the business	**1**	**2**	**3**	**4**	V12		16
4	It is clear which managers are accountable for information resources	**1**	**2**	**3**	**4**	V13		17
5	Key information is easily available	**1**	**2**	**3**	**4**	V14		18
6	All employees are trained to access sources of information relevant to their job	**1**	**2**	**3**	**4**	V15		19

2.2 Is your organization **proficient** in the following Information Management activities?

		Y	S	P	N			
1	Identification of information needs	**1**	**2**	**3**	**4**	V16		20
2	Acquisition of information	**1**	**2**	**3**	**4**	V17		21
3	Information storage	**1**	**2**	**3**	**4**	V18		22
4	Information distribution	**1**	**2**	**3**	**4**	V19		23
5	Information retrieval	**1**	**2**	**3**	**4**	V20		24
6	Information disposal	**1**	**2**	**3**	**4**	V21		25
7	Protection of information	**1**	**2**	**3**	**4**	V22		26
8	Determination of the value and cost of information	**1**	**2**	**3**	**4**	V23		27

2.3 In your organization, the following Information management **tools and services** have been institutionalized:

		Y	S	P	N			
1	Inventory of information entities	**1**	**2**	**3**	**4**	V24		28
2	Information management systems	**1**	**2**	**3**	**4**	V25		29
3	Databases	**1**	**2**	**3**	**4**	V26		30
4	Information service / Library	**1**	**2**	**3**	**4**	V27		31

2.4 The organization regards Information Management (**IM**) as … (Please mark only **one** answer)

a prerequisite for knowledge management	**1**	V28	32
knowledge management	**2**		

SECTION 3 Formulation of Knowledge management principles, policy and strategy

Please use the code:

1	=	***Yes definitely***	***Y***
2	=	*Yes, but not **s**ignificantly*	***S***
3	=	*No, but **p**robably within the next 5 years*	***P***
4	=	***No***	***N***

3.1 How would you **rate** the following statements?

		Y	S	P	N			
1	Your organization is aware of the power vested in knowledge, i.e. knowledge is seen as a strategic resource	**1**	**2**	**3**	**4**	V29		33
2	Good knowledge management is one of the top five (5) internal priorities of your organization	**1**	**2**	**3**	**4**	V30		34
3	The management of knowledge is supplying a direct input to the strategic management process i.e. the Chief Knowledge Officer is an active participant in the formulation of business strategy	**1**	**2**	**3**	**4**	V31		35

3.2 Are the following goals important in **motivating** the establishment of knowledge management **practices** in your organization?

		Y	S	P	N			
1	Improving work efficiency and/or productivity by producing and sharing knowledge more rapidly within your organization	**1**	**2**	**3**	**4**	V32		36
2	Decentralization of authority	**1**	**2**	**3**	**4**	V33		37
3	Releasing information more rapidly and making it more widely available to staff	**1**	**2**	**3**	**4**	V34		38
4	Promoting life-long learning	**1**	**2**	**3**	**4**	V35		39
5	Improving transparency	**1**	**2**	**3**	**4**	V36		40
6	Improving working relations and trust within your organization	**1**	**2**	**3**	**4**	V37		41
7	Making up for loss of knowledge (due to staff turnover, retirements, etc.)	**1**	**2**	**3**	**4**	V38		42

Please use the code:

1	=	***Y**es definitely*	***Y***
2	=	*Yes, but not **s**ignificantly*	***S***
3	=	*No, but **p**robably within the next 5 years*	***P***
4	=	***N**o*	***N***

3.3 In your organization, the following **initiatives** have been taken to manage knowledge

		Y	S	P	N			
1	There is a conscious decision to invest in knowledge management	**1**	**2**	**3**	**4**	V39		43
2	It is agreed upon that there is a need for hybrid knowledge management environments, i.e. technology and people	**1**	**2**	**3**	**4**	V40		44
3	High-ranking knowledge champions are identified	**1**	**2**	**3**	**4**	V41		45
4	There is a commitment from top management to the establishment of a formal knowledge management function	**1**	**2**	**3**	**4**	V42		46
5	A decision was taken by top management to judge people according to their ability to share knowledge	**1**	**2**	**3**	**4**	V43		47
6	A decision was taken by top management to constantly improve knowledge work processes	**1**	**2**	**3**	**4**	V44		48
7	There is a conscious drive to get all employees involved in knowledge sharing exercises	**1**	**2**	**3**	**4**	V45		49

3.4 To what extent does your organization **comply** with the following statements?

		Y	S	P	N			
1	The organization has a clearly defined knowledge management (KM) policy	**1**	**2**	**3**	**4**	V46		50
2	The organization has a clearly defined Knowledge Management (KM) strategy	**1**	**2**	**3**	**4**	V47		51
3	The KM strategy has been communicated widely to staff	**1**	**2**	**3**	**4**	V48		52

3.5 If your organization already has a knowledge management (KM) strategy/strategies, which key element does it include?
(If your organization **does not have** a KM strategy, please continue with **Question 4** below)

		Yes	No			
1	Information management	**1**	**2**	V49		53
2	Information technology aspects	**1**	**2**	V50		54
3	Human resources management aspects (incentives, recruitment, training, mentoring, etc.)	**1**	**2**	V51		55
4	Organizational aspects (communities of practice, decentralizing authority, networks, etc.)	**1**	**2**	V52		56

Section 4 continues on the next page

Section 4 Implementation of Knowledge Management

Please use the code:

1	=	***Y**es definitely*	***Y***
2	=	*Yes, but not **s**ignificantly*	***S***
3	=	*No, but **p**robably within the next 5 years*	***P***
4	=	***N**o*	***N***

4.1 In your organization, the following **initiatives** have been taken and organizational **arrangements** made.

		Y	S	P	N			
1	Opening up bureaucratic divisions	**1**	**2**	**3**	**4**	V53		57
2	The creation of a central co-ordinating unit for Knowledge Management	**1**	**2**	**3**	**4**	V54		58
3	The appointment of a Chief Knowledge Officer (CKO) with executive status	**1**	**2**	**3**	**4**	V55		59
4	Reorganization of offices (e.g. open plan offices)	**1**	**2**	**3**	**4**	V56		60
5	Establishment of informal networks (e.g. Communities of practice - groups of practitioners working on the same topic but not on the same project, and regularly sharing knowledge)	**1**	**2**	**3**	**4**	V57		61
6	Institutionalization of training and mentoring programmes	**1**	**2**	**3**	**4**	V58		62
7	Communication with customers	**1**	**2**	**3**	**4**	V59		63
8	Establishment of incentive schemes for knowledge sharing	**1**	**2**	**3**	**4**	V60		64
9	Communication with suppliers	**1**	**2**	**3**	**4**	V61		65

4.2 Which of the following groups has the **overall** responsibility for knowledge management in your organization?
(Please mark only **one** answer)

Human resources management team	**1**	V62		66
Information technology team	**2**			
Special knowledge management unit	**3**			
Top managers	**4**			
Other	**5**			

4.3 In your organization, **staff** members spend an increasing amount of time on the following **activities**:

		Y	S	P	N			
1	Informational meetings	**1**	**2**	**3**	**4**	V63		67
2	Peer reviewing/quality reviews	**1**	**2**	**3**	**4**	V64		68
3	Presentations of projects and activities	**1**	**2**	**3**	**4**	V65		69
4	Information sharing by electronic device (e-mail, etc.)	**1**	**2**	**3**	**4**	V66		70
5	Building databases	**1**	**2**	**3**	**4**	V67		71

4.4 In your organization, good work practices have been outlined and updated on a regular basis, in **documents** such as:

		Yes	No			
1	Training manuals	1	2	V68		72
2	Best practices	1	2	V69		73
3	Guidelines	1	2	V70		74

4.5 Which follow-ups are conducted to assess the progress made in **implementing** knowledge management practices in your organization?

		Yes	No			
1	The use of indicators to assess the implementation of knowledge management practices	1	2	V71		75
2	Use of scorecards	1	2	V72		76
3	Written/oral feedback from staff on achievements in knowledge management	1	2	V73		77
4	Comparisons are made between your organization and other organizations in your industry	1	2	V74		78

4.6 Do you consider that the **culture** of your organization has changed, in the following ways:

		Yes	No			
1	Staff now consider that sharing knowledge will be good for their career in your organization	1	2	V75		79
2	Staff spontaneously organize knowledge events such as meeting with staff from other divisions/departments	1	2	V76		80
3	Staff make documents available to others more spontaneously	1	2	V77		81

4.7 Has your organization experienced **difficulties in implementing** knowledge management practices, because of the following factors?

		Yes	No			
1	Your organization has put a strong focus on information and communication technology, rather than on people or organizational matters	1	2	V78		82
2	Lack of time or resources to concretely share knowledge on a day-to-day basis	1	2	V79		83
3	Resistance of certain groups of staff	1	2	V80		84
4	Staff do not make documents available to others spontaneously	1	2	V81		85
5	Difficulty in capturing employee's undocumented knowledge (know-how)	1	2	V82		86
6	Concern that other organizations/general public would be able to access sensitive/confidential information	1	2	V83		87
7	Knowledge and information management is not a top priority in the modernization programme of your organization	1	2	V84		88

Section 5: Ubiquitous knowledge

Please use the code:

1	=	***Y**es definitely*	***Y***
2	=	*Yes, but not **s**ignificantly*	***S***
3	=	*No, but **p**robably within the next 5 years*	***P***
4	=	***N**o*	***N***

5.1 Does your organization increasingly rely on **outside knowledge** coming from the following entities/organizations to carry out its activities?

		Y	S	P	N			
1	Between departments in your organization	**1**	**2**	**3**	**4**	V85		89
2	Local governments	**1**	**2**	**3**	**4**	V86		90
3	Peer organizations	**1**	**2**	**3**	**4**	V87		91
4	Universities/Research centers	**1**	**2**	**3**	**4**	V88		92
5	Suppliers	**1**	**2**	**3**	**4**	V89		93
6	Customers	**1**	**2**	**3**	**4**	V90		94
7	Consulting firms	**1**	**2**	**3**	**4**	V91		95
8	Trade Unions	**1**	**2**	**3**	**4**	V92		96
9	Other	**1**	**2**	**3**	**4**	V93		97

5.2 **Staff** is encouraged to take up positions in:

		Y	S	P	N			
1	Other departments in your organization	**1**	**2**	**3**	**4**	V94		98
2	Local government	**1**	**2**	**3**	**4**	V95		99
3	Peer organizations	**1**	**2**	**3**	**4**	V96		100
4	Universities/Research centers	**1**	**2**	**3**	**4**	V97		101
5	Supplier organizations	**1**	**2**	**3**	**4**	V98		102
6	Customer organizations	**1**	**2**	**3**	**4**	V99		103
7	Consulting firms	**1**	**2**	**3**	**4**	V100		104
8	Trade Unions	**1**	**2**	**3**	**4**	V101		105
9	Other	**1**	**2**	**3**	**4**	V102		106
10	Secondees* from other organizations are frequently accepted (*Secondees: staff who are lent by one organization to another one - remain paid by their parent organization - for a limited amount of time)	**1**	**2**	**3**	**4**	V103		107

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SECTION 6 Assessment of Knowledge Management Growth

Please use the code:

1	=	***Y**es, rapid growth (3+ maturity levels)*	***Y***
2	=	*Yes, but not **s**ignificantly (1-2 maturity levels)*	***S***
3	=	*No growth, **p**robably within the next 5 years*	***P***
4	=	***N**o growth, or decline in growth*	***N***

		Y	S	P	N			
6.1	Please reflect on the growth of knowledge management in your organization over the past 5 years	**1**	**2**	**3**	**4**	V104		108

BACKGROUND INFORMATION ON RESPONDENT

Date of survey completion: _____

1. Background information on your organisation

Please indicate:

The total number of staff in your organisation | | | | | | |

2. Please provide contact details for the person completing this survey:

Title: _____

Name: _____

Address: _____

_____

_____

Telephone _____

Facsimile _____

E-mail _____

4. Please indicate how long it took you to complete this questionnaire

_____ hours _____ minutes

Your response is very much appreciated.
Thank you for participating.

Knowledge Management Maturity Assessment Questionnaire: Rating System Capturing Sheet

SECTION 1 ICT Management

Section 1.1: Points allocated:

Y(1) -Yes, definitely – add 4 points.
S(2) - Yes, but not **S**ignificantly – add 2 points
P(3) -No, but **P**robably within the next 5 years – add 1 point.
N(4) - No – no points awarded

1.1		Y	S	P	N			
1	The organization is capable of **evaluating** an ICT system	1	2	3	4	V5		9
2	The organization is capable of **designing** an ICT system	1	2	3	4	V6		10
3	The organization is capable of **planning** an ICT system	1	2	3	4	V7		11
4	The organization has an **effective** ICT infrastructure	1	2	3	4	V8		12

Section 1.2: Points allocated:

(1) An enabler of knowledge management – add 4 points
(2) Knowledge management – no points awarded

an enabler of knowledge management	1	V9		13
knowledge management	2			

Total section 1.1 (add v5 – v8):	**16**		
Total section 1.2 (add v9):	**4**		

Total section 1: (add section 1.1 and section 1.2)	**20**		

SECTION 2 Information Management

Section 2.1; 2.2; 2.3: Points allocated:

Y(1) -Yes, definitely – add 4 points.
S(2) - Yes, but not **S**ignificantly – add 2 points
P(3) -No, but **P**robably within the next 5 years – add 1 point.
N(4) - No – no points awarded

2.1		Y	S	P	N			
1	The organization has a clearly defined information management (IM) policy	1	2	3	4	V10		14
72	The organization has a clearly defined information management (IM) strategy	1	2	3	4	V11		15
3	The organization understands which information resources are crucial to the business	1	2	3	4	V12		16
4	It is clear which managers are accountable for information resources	1	2	3	4	V13		17
5	Key information is easily available	1	2	3	4	V14		18
6	All employees are trained to access sources of information relevant to their job	1	2	3	4	V15		19

2.2		Y	S	P	N			
1	Identification of information needs	1	2	3	4	V16		20
2	Acquisition of information	1	2	3	4	V17		21
3	Information storage	1	2	3	4	V18		22
4	Information distribution	1	2	3	4	V19		23
5	Information retrieval	1	2	3	4	V20		24
6	Information disposal	1	2	3	4	V21		25
7	Protection of information	1	2	3	4	V22		26
8	Determination of the value and cost of information	1	2	3	4	V23		27

2.3		Y	S	P	N			
1	Inventory of information entities	1	2	3	4	V24		28
2	Information management systems	1	2	3	4	V25		29
3	Databases	1	2	3	4	V26		30
4	Information service / Library	1	2	3	4	V27		31

Section 2.4: Points allocated:

(1) A prerequisite for knowledge management - add 4 points
(2) Knowledge management – no points awarded

a prerequisite for knowledge management	1	V28		32
knowledge management	2			

Total section 2.1 (add v10 – v15):	24
Total section 2.2 (add v16 – v23):	32
Total section 2.3 (add v24 –v27)	16
Total section 2.4(add v28)	4
Total section 2: (add sections 2.1 to 2.4)	76

SECTION 3 Formulation of Knowledge management principles, policy and strategy

Section 3.1 – 3.4: Points allocated:

Y(1) -Yes, definitely – add 4 points.
S(2) - Yes, but not **S**ignificantly – add 2 points
P(3) -No, but **P**robably within the next 5 years – add 1 point.
N(4) - No – no points awarded

3.1		Y	S	P	N			
1	Your organization is aware of the power vested in knowledge, i.e. knowledge is seen as a strategic resource	1	2	3	4	V29		33
2	Good knowledge management is one of the top five (5) internal priorities of your organization	1	2	3	4	V30		34
3	The management of knowledge is supplying a direct input to the strategic management process i.e. the Chief Knowledge Officer is an active participant in the formulation of business strategy	1	2	3	4	V31		35

3.2		Y	S	P	N			
1	Improving work efficiency and/or productivity by producing and sharing knowledge more rapidly within your organization	1	2	3	4	V32		36
2	Decentralization of authority	1	2	3	4	V33		37
3	Releasing information more rapidly and making it more widely available to staff	1	2	3	4	V34		38
4	Promoting life-long learning	1	2	3	4	V35		39
5	Improving transparency	1	2	3	4	V36		40
6	Improving working relations and trust within your organization	1	2	3	4	V37		41
7	Making up for loss of knowledge (due to staff turnover, retirements, etc.)	1	2	3	4	V38		42

3.3		Y	S	P	N			
1	There is a conscious decision to invest in knowledge management	1	2	3	4	V39		43
2	It is agreed upon that there is a need for hybrid knowledge management environments, i.e. technology and people	1	2	3	4	V40		44
3	High-ranking knowledge champions are identified	1	2	3	4	V41		45
4	There is a commitment from top management to the establishment of a formal knowledge management function	1	2	3	4	V42		46
5	A decision was taken by top management to judge people according to their ability to share knowledge	1	2	3	4	V43		47
6	A decision was taken by top management to constantly improve knowledge work processes	1	2	3	4	V44		48
7	There is a conscious drive to get all employees involved in knowledge sharing exercises	1	2	3	4	V45		49

3.4		Y	S	P	N			
1	The organization has a clearly defined knowledge	1	2	3	4	V46		50

	management (KM) policy						
2	The organization has a clearly defined Knowledge Management (KM) strategy	**1**	**2**	**3**	**4**	V47	51
3	The KM strategy has been communicated widely to staff	**1**	**2**	**3**	**4**	V48	52

Section 3.5: Points allocated:

(1) Yes - add 2 points
(2) No – no points awarded

3.5		**Yes**	**No**		
1	Information management	**1**	**2**	V49	53
2	Information technology aspects	**1**	**2**	V50	54
3	Human resources management aspects (incentives, recruitment, training, mentoring, etc.)	**1**	**2**	V51	55
4	Organizational aspects (communities of practice, decentralizing authority, networks, etc.)	**1**	**2**	V52	56

Total section 3.1 (add v29– v31	**12**
Total section 2.2 (add v32– v38:	**28**
Total section 2.3 (add v39–v45	**28**
Total section 2.4(add v46– v48	**12**
Total section 2.5 (add v49– v52	**8**

Total section 3: (add sections 3.1 to 3.5)	**88**

Section 4 Implementation of Knowledge Management

Section 4.1 and 4.3: Points allocated:

Y(1) -Yes, definitely – add 4 points.
S(2) - Yes, but not **S**ignificantly – add 2 points
P(3) -No, but **P**robably within the next 5 years – add 1 point.
N(4) - No – no points awarded

4.1		Y	S	P	N			
1	Opening up bureaucratic divisions	1	2	3	4	V53		57
2	The creation of a central co-ordinating unit for Knowledge Management	1	2	3	4	V54		58
3	The appointment of a Chief Knowledge Officer (CKO) with executive status	1	2	3	4	V55		59
4	Reorganization of offices (e.g. open plan offices)	1	2	3	4	V56		60
5	Establishment of informal networks (e.g. Communities of practice - groups of practitioners working on the same topic but not on the same project, and regularly sharing knowledge)	1	2	3	4	V57		61
6	Institutionalization of training and mentoring programmes	1	2	3	4	V58		62
7	Communication with customers	1	2	3	4	V59		63
8	Establishment of incentive schemes for knowledge sharing	1	2	3	4	V60		64
9	Communication with suppliers	1	2	3	4	V61		65

Section 4.2 Points allocated:

(1) Human resource management team – add 2 points
(2) Information technology team – add 2 points
(3) Special knowledge management unit – add 2 points
(4) Top managers – add 4 points
(5) Other – add 1 point

4.2

Human resources management team	1	V62	66
Information technology team	2		
Special knowledge management unit	3		
Top managers	4		
Other	5		

4.3		Y	S	P	N			
1	Informational meetings	1	2	3	4	V63		67
2	Peer reviewing/quality reviews	1	2	3	4	V64		68
3	Presentations of projects and activities	1	2	3	4	V65		69
4	Information sharing by electronic device (e-mail, etc.)	1	2	3	4	V66		70
5	Building databases	1	2	3	4	V67		71

Section 4.4 – 4.6 Points allocated:

(1) Yes add 2 points
(2) No – add no points

4.4 In your organization, good work practices have been outlined and updated on a regular basis, in **documents** such as:

		Yes	No			
1	Training manuals	1	2	V68		72
2	Best practices	1	2	V69		73
3	Guidelines	1	2	V70		74

4.5		Yes	No			
1	The use of indicators to assess the implementation of knowledge management practices	1	2	V71		75
2	Use of scorecards	1	2	V72		76
3	Written/oral feedback from staff on achievements in knowledge management	1	2	V73		77
4	Comparisons are made between your organization and other organizations in your industry	1	2	V74		78

4.6		Yes	No			
1	Staff now consider that sharing knowledge will be good for their career in your organization	1	2	V75		79
2	Staff spontaneously organize knowledge events such as meeting with staff from other divisions/departments	1	2	V76		80
3	Staff make documents available to others more spontaneously	1	2	V77		81

Section 4.7 Points allocated:

(1) Yes – **no** points awarded
(2) No – add **2** points.

4.7		Yes	No			
1	Your organization has put a strong focus on information and communication technology, rather than on people or organizational matters	1	2	V78		82
2	Lack of time or resources to concretely share knowledge on a day-to-day basis	1	2	V79		83
3	Resistance of certain groups of staff	1	2	V80		84
4	Staff do not make documents available to others spontaneously	1	2	V81		85
5	Difficulty in capturing employee's undocumented knowledge (know-how)	1	2	V82		86
6	Concern that other organizations/general public would be able to access sensitive/confidential information	1	2	V83		87
7	Knowledge and information management is not a top priority in the modernization programme of your organization	1	2	V84		88

Total section 4.1 (add v53 – v61	36	
Total section 4.2 (add v62):	4	
Total section 4.3 (add v63–v67	20	
Total section 4.4(add v68– v70	6	
Total section 4.5 (add v71 v74	8	
Total section 4.6 (add v75– v77	6	
Total section 4.7 (add v78– v84	14	

Total section 4: (add sections 4.1 to 4.7)	**94**

Section 5: Ubiquitous knowledge

Section 5.1 and 5.2: Points allocated:

Y(1) -Yes, definitely – add 4 points.
S(2) - Yes, but not **S**ignificantly – add 2 points
P(3) -No, but **P**robably within the next 5 years – add 1 point.
N(4) - No – no points awarded

5.1		Y	S	P	N			
1	Between departments in your organization	1	2	3	4	V85		89
2	Local governments	1	2	3	4	V86		90
3	Peer organizations	1	2	3	4	V87		91
4	Universities/Research centers	1	2	3	4	V88		92
5	Suppliers	1	2	3	4	V89		93
6	Customers	1	2	3	4	V90		94
7	Consulting firms	1	2	3	4	V91		95
8	Trade Unions	1	2	3	4	V92		96
9	Other	1	2	3	4	V93		97

5.2		Y	S	P	N			
1	Other departments in your organization	1	2	3	4	V94		98
2	Local government	1	2	3	4	V95		99
3	Peer organizations	1	2	3	4	V96		100
4	Universities/Research centers	1	2	3	4	V97		101
5	Supplier organizations	1	2	3	4	V98		102
6	Customer organizations	1	2	3	4	V99		103
7	Consulting firms	1	2	3	4	V100		104
8	Trade Unions	1	2	3	4	V101		105
9	Other	1	2	3	4	V102		106
10	Secondees* from other organizations are frequently accepted (*Secondees: staff who are lent by one organization to another one - remain paid by their parent organization - for a limited amount of time)	1	2	3	4	V103		107

Total section 5.1 (add v85– v93:	36
Total section 5.2 (add v94– v103:	40

Total section 5: (add sections 5.1 and 5.2)	**76**

SECTION 6 Assessment of Knowledge Management Growth

Section 6.1: Points allocated:

Y(1) Yes, rapid growth (3+ maturity levels)- add 4 points.
S(2) Yes, but not significantly (1-2 maturity levels)- add 2 points.
P(3) No growth, probably within the next 5 years - add 1 point.
N(4) No growth, or decline in growth- no points awarded.

		Y	S	P	N			
6.1	Please reflect on the growth of knowledge management in the organization over the **past 5** years	**1**	**2**	**3**	**4**	V104		108

Total section 6.1 (add v104)	4	

Overall score achieved:

Add sections 1 to 6

Total section 1 (v3 – v7):	20	
Total section 2 (v8 – v26):	76	
Total section 3 (v27 – v50)	88	
Total section 4 (v51 – v82)	94	
Total section 5 (v83 – v103)	76	
Total section 6 (v104)	4	

Total all sections: (add sections 1 to 6)	**358**	

Appendix D

Knowledge Management Maturity Findings

Table1: Section 1 - ICT management

QUESTION	FREQUENCY	PERCENTAGE	CUMULATIVE PERCENTAGE
v5: Evaluating an ICT system			
1. Yes, definitely	259	59.95	59.95
2. Yes, but not significantly	136	31.48	91.44
3. No, but probably within the next 5 years	25	5.79	97.22
4. No	12	2.78	100.00
v6: Designing an ICT system			
1. Yes, definitely	226	52.44	52.44
2. Yes, but not significantly	124	28.77	81.21
3. No, but probably within the next 5 years	47	10.90	92.11
4. No	34	7.89	100.00
v7: Planning an ICT System			
1. Yes, definitely	263	61.02	61.02
2. Yes, but not significantly	126	29.23	90.26
3. No, but probably within the next 5 years	33	7.66	97.91
4. No	9	2.09	100.00
v8: Effective ICT Infrastructure.			
1. Yes, definitely	196	45.27	45.27
2. Yes, but not significantly	162	37.41	82.68
3. No, but probably within the next 5 years	53	12.24	94.92
4. No	22	5.08	100.00
v9: ICT is regarded as:			
An enabler of knowledge management	336	78.69	78.69
Knowledge management	91	21.31	100.00

Table 2: Section 2 - Information management

QUESTION	FREQUENCY	PERCENTAGE	CUMULATIVE PERCENTAGE
v10: Clearly defined IM policy			
1. Yes, definitely	163	37.56	37.56
2. Yes, but not significantly	138	31.80	69.35
3. No, but probably within the next 5 years	92	21.20	90.55
4. No	41	9.45	100.00
v11: Clearly defined IM strategy			
1. Yes, definitely	158	36.41	36.41
2. Yes, but not significantly	150	34.56	70.97
3. No, but probably within the next 5 years	92	21.20	92.17
4. No	34	7.83	100.00
v12: Understand which information resources are crucial to the business			
1. Yes, definitely	229	52.76	52.76
2. Yes, but not significantly	157	36.18	88.94
3. No, but probably within the next 5 years	36	8.29	97.24
4. No	12	2.76	100.00
v13: Is it clear which managers are accountable for information resources			
1. Yes, definitely	171	39.40	39.40
2. Yes, but not significantly	177	40.78	80.18
3. No, but probably within the next 5 years	56	12.90	93.09
4. No	30	6.91	100.00
v14: Key information is easily available			
1. Yes, definitely	134	30.88	30.88
2. Yes, but not significantly	197	45.39	76.27
3. No, but probably within the next 5 years	72	16.59	92.86
4. No	31	7.14	100.00
v15: Employees are trained to access sources of information			
1. Yes, definitely	104	23.96	23.96
2. Yes, but not significantly	179	41.24	65.21
3. No, but probably within the next 5 years	115	26.50	91.71
4. No	36	8.29	100.00
v16: Identification of information needs			
1. Yes, definitely	177	40.78	40.78
2. Yes, but not significantly	175	40.32	81.11
3. No, but probably within the next 5 years	68	15.67	96.77
4. No	14	3.23	100.00

v17: Acquisition of information			
1. Yes, definitely	159	36.81	36.81
2. Yes, but not significantly	214	49.54	86.34
3. No, but probably within the next 5 years	47	10.88	97.22
4. No	12	2.78	100.00
v18: Information storage			
1. Yes, definitely	201	46.42	46.42
2. Yes, but not significantly	164	37.88	84.30
3. No, but probably within the next 5 years	62	14.32	98.61
4. No	6	1.39	100.00
v19: Information distribution			
1. Yes, definitely	139	32.03	32.03
2. Yes, but not significantly	201	46.31	78.34
3. No, but probably within the next 5 years	77	17.74	96.08
4. No	17	3.92	100.00
v20: Information retrieval			
1. Yes, definitely	152	35.02	35.02
2. Yes, but not significantly	199	45.85	80.88
3. No, but probably within the next 5 years	69	15.90	96.77
4. No	14	3.23	100.00
v21: Information disposal			
1. Yes, definitely	98	22.58	22.58
2. Yes, but not significantly	198	45.62	68.20
3. No, but probably within the next 5 years	104	23.96	92.17
4. No	34	7.83	100.00
v22: Protection of information			
1. Yes, definitely	180	41.47	41.47
2. Yes, but not significantly	158	36.41	77.88
3. No, but probably within the next 5 years	76	17.51	95.39
4. No	20	4.61	100.00
v23: Determining the value and cost of information			
1. Yes, definitely	101	23.33	23.33
2. Yes, but not significantly	155	35.80	59.12
3. No, but probably within the next 5 years	131	30.25	89.38
4. No	46	10.62	100.00
v24: Inventory of information entities			
1. Yes, definitely	137	31.57	31.57
2. Yes, but not significantly	156	35.94	67.51
3. No, but probably within the next 5 years	85	19.59	87.10
4. No	56	12.90	100.00
v25: Inventory management systems			
1. Yes, definitely	182	41.94	41.94
2. Yes, but not significantly	156	35.94	77.88
3. No, but probably within the next 5 years	69	15.90	93.78
4. No	27	6.22	100.00

v26: Databases			
1. Yes, definitely	230	53.00	53.00
2. Yes, but not significantly	140	32.26	85.25
3. No, but probably within the next 5 years	47	10.83	96.08
4. No	17	3.92	100.00
v27: Information services/Library			
1. Yes, definitely	157	36.18	36.18
2. Yes, but not significantly	133	30.65	66.82
3. No, but probably within the next 5 years	105	24.19	91.01
4. No	39	8.99	100.00
V28: Information management is regarded as:			
1. A prerequisite for knowledge management	296	69.65	69.65
2. Knowledge management	129	30.35	100.00

Table 3: Section 3 - Formulation of knowledge management principles, policy and strategy

QUESTION	FREQUENCY	PERCENTAGE	CUMULATIVE PERCENTAGE
v29: Aware of the power of knowledge			
1. Yes, definitely	251	57.97	57.97
2. Yes, but not significantly	112	25.87	83.83
3. No, but probably within the next 5 years	51	11.78	95.61
4. No	19	4.39	100.00
v30: KM is one of the top five internal priorities			
1. Yes, definitely	148	34.18	34.18
2. Yes, but not significantly	130	30.02	64.20
3. No, but probably within the next 5 years	109	25.17	89.38
4. No	46	10.62	100.00
v31: KM is supplying a direct input to strategic management			
1. Yes, definitely	112	25.93	25.93
2. Yes, but not significantly	121	28.01	53.94
3. No, but probably within the next 5 years	125	28.94	82.87
4. No	74	17.13	100.00
v32: Improving work efficiency			
1. Yes, definitely	237	54.73	54.73
2. Yes, but not significantly	130	30.02	84.76
3. No, but probably within the next 5 years	55	12.70	97.46
4. No	11	2.54	100.00
V33: Decentralization of authority			
1. Yes, definitely	114	26.33	26.33
2. Yes, but not significantly	180	41.57	67.90
3. No, but probably within the next 5 years	70	16.17	84.06
4. No	69	15.94	100.00
V34: Releasing info more rapidly and making information widely available			
1. Yes, definitely	195	45.03	45.03
2. Yes, but not significantly	151	34.87	79.91
3. No, but probably within the next 5 years	74	17.09	97.00
4. No	13	3.00	100.00
v35: Promoting life long learning			
1. Yes, definitely	214	49.42	49.42
2. Yes, but not significantly	132	30.48	79.91
3. No, but probably within the next 5 years	63	14.55	94.46

4. No	24	5.54	100.00
V36: Improving transparency			
1. Yes, definitely	174	40.18	40.18
2. Yes, but not significantly	152	35.10	75.29
3. No, but probably within the next 5 years	81	18.71	94.00
4. No	26	6.00	100.00
v37: Improving working relations			
1. Yes, definitely	190	43.78	43.78
2. Yes, but not significantly	145	33.41	77.19
3. No, but probably within the next 5 years	69	15.90	93.09
4. No	30	6.91	100.00
v38: Making up for loss of knowledge			
1. Yes, definitely	164	37.88	37.88
2. Yes, but not significantly	132	30.48	68.36
3. No, but probably within the next 5 years	96	22.17	90.53
4. No	41	9.47	100.00
v39: Decision to invest in KM			
1. Yes, definitely	158	36.49	36.49
2. Yes, but not significantly	144	33.26	69.75
3. No, but probably within the next 5 years	95	21.94	91.69
4. No	36	8.31	100.00
v40: Need for hybrid KM environments			
1. Yes, definitely	176	40.65	40.65
2. Yes, but not significantly	150	34.64	75.29
3. No, but probably within the next 5 years	72	16.63	91.92
4. No	35	8.08	100.00
v41: High ranking knowledge champions are identified			
1. Yes, definitely	91	21.02	21.02
2. Yes, but not significantly	142	32.79	53.81
3. No, but probably within the next 5 years	132	30.48	84.30
4. No	68	15.70	100.00
v42: Commitment to establish a formal KM function			
1. Yes, definitely	116	26.98	26.98
2. Yes, but not significantly	133	30.93	57.91
3. No, but probably within the next 5 years	108	25.12	83.02
4. No	73	16.98	100.00
v43: Decision to judge people according to their ability to share knowledge			
1. Yes, definitely	36	8.35	8.35
2. Yes, but not significantly	110	25.52	33.87
3. No, but probably within the next 5 years	152	35.27	69.14
4. No	133	30.86	100.00

v44: Decision to constantly improve work processes			
1. Yes, definitely	96	22.22	22.22
2. Yes, but not significantly	149	34.49	56.71
3. No, but probably within the next 5 years	123	28.47	85.19
4. No	64	14.81	100.00
v45: Drive to get all employees involved in knowledge sharing exercises			
1. Yes, definitely	81	18.75	18.75
2. Yes, but not significantly	150	34.72	53.47
3. No, but probably within the next 5 years	126	29.17	82.64
4. No	75	17.36	100.00
v46: Clearly defined KM policy			
1. Yes, definitely	68	15.67	15.67
2. Yes, but not significantly	118	27.19	42.86
3. No, but probably within the next 5 years	157	36.18	79.03
4. No	91	20.97	100.00
v47: Clearly defined KM strategy:			
1. Yes, definitely	76	17.51	17.51
2. Yes, but not significantly	116	26.73	44.24
3. No, but probably within the next 5 years	154	35.48	79.72
4. No	88	20.28	100.00
v48: KM strategy communicated to staff:			
1. Yes, definitely	29	6.68	6.68
2. Yes, but not significantly	107	24.65	31.34
3. No, but probably within the next 5 years	161	37.10	68.43
4. No	137	31.57	100.00
KM strategy include::			
V 49: Information management			
1. Yes	197	85.28	85.28
2. No	34	14.72	100.00
V 50: ICT aspects			
1. Yes	186	80.52	80.52
2. No	45	19.48	100.00
V 51: HR aspects			
1. Yes	164	71.00	71.00
2. No	67	29.00	100.00
V 52: Other organizational aspects			
1. Yes	144	61.80	61.80
2. No	89	38.20	100.00

Table 4: Section 4 - Implementation of knowledge management

QUESTION	FREQUENCY	PERCENTAGE	CUMULATIVE PERCENTAGE
v53: Opening up bureaucratic divisions			
1. Yes, definitely	78	18.10	18.10
2. Yes, but not significantly	129	29.93	48.03
3. No, but probably within the next 5 years	115	26.68	74.71
4. No	109	25.29	100.00
v54: The creation of a central co-ordinating unit for Knowledge Management			
1. Yes, definitely	86	20.00	20.00
2. Yes, but not significantly	102	23.72	43.72
3. No, but probably within the next 5 years	125	29.07	72.79
4. No	117	27.21	100.00
v55: The appointment of a Chief Knowledge Officer (CKO) with executive status			
1. Yes, definitely	58	13.43	13.43
2. Yes, but not significantly	50	11.57	25.00
3. No, but probably within the next 5 years	135	31.25	56.25
4. No	189	43.75	100.00
v56: Reorganization of offices (e.g. open plan offices)			
1. Yes, definitely	122	28.18	28.18
2. Yes, but not significantly	100	23.09	51.27
3. No, but probably within the next 5 years	94	21.71	72.98
4. No	117	27.02	100.00
v57: Establishment of informal networks			
1. Yes, definitely	93	21.68	21.68
2. Yes, but not significantly	153	35.66	57.34
3. No, but probably within the next 5 years	114	26.57	83.92
4. No	69	16.08	100.00
v58: Institutionalization of training and mentoring programmes			
1. Yes, definitely	116	26.79	26.79
2. Yes, but not significantly	180	41.57	68.36
3. No, but probably within the next 5 years	93	21.48	89.84
4. No	44	10.16	100.00
v59: Communication with customers			
1. Yes, definitely	180	41.67	41.67
2. Yes, but not significantly	173	40.05	81.71
3. No, but probably within the next 5 years	56	12.96	94.68

4. No	23	5.32	100.00
v60: Establishment of incentive schemes for knowledge sharing			
1. Yes, definitely	29	6.71	6.71
2. Yes, but not significantly	65	15.05	21.76
3. No, but probably within the next 5 years	163	37.73	59.49
4. No	175	40.51	100.00
v61: Communication with suppliers			
1. Yes, definitely	121	28.07	28.07
2. Yes, but not significantly	171	39.68	67.75
3. No, but probably within the next 5 years	86	19.95	87.70
4. No	53	12.30	100.00
v62: Which of the following groups has the overall responsibility for knowledge management in your organization?			
1. Human resources management team	37	8.69	8.69
2. Information technology team	100	23.47	32.16
3. Special knowledge management unit	82	19.25	51.41
4. Top managers	169	39.67	91.08
5. Other	38	8.92	100.00
v63: Staff members spend an increasing amount of time on informational meetings			
1. Yes, definitely	119	27.48	27.48
2. Yes, but not significantly	179	41.34	68.82
3. No, but probably within the next 5 years	66	15.24	84.06
4. No	69	15.94	100.00
v64: Staff members spend an increasing amount of time on peer reviewing/quality reviews			
1. Yes, definitely	67	15.51	15.51
2. Yes, but not significantly	152	35.19	50.69
3. No, but probably within the next 5 years	127	29.40	80.09
4. No	86	19.91	100.00
v65: Staff members spend an increasing amount of time on presentations of projects and activities			
1. Yes, definitely	119	27.61	27.61
2. Yes, but not significantly	188	43.62	71.23
3. No, but probably within the next 5 years	80	18.56	89.79
4. No	44	10.21	100.00
v66: Staff members spend an increasing amount of time on Information sharing by electronic device (e-mail, etc.)			
1. Yes, definitely	213	49.53	49.53
2. Yes, but not significantly	163	37.91	87.44

3. No, but probably within the next 5 years	38	8.84	96.28
4. No	16	3.72	100.00
v67: Staff members spend an increasing amount of time on building databases			
1. Yes, definitely	102	23.67	23.67
2. Yes, but not significantly	157	36.43	60.09
3. No, but probably within the next 5 years	98	22.74	82.83
4. No	74	17.17	100.00
Good work practices have been outlined and updated on a regular basis, in documents such as:			
v68: Training manuals			
1. Yes	262	60.79	60.79
2. No	168	38.98	100.00
v69: Best practices			
1. Yes	207	48.25	48.25
2. No	221	51.52	100.00
v70: Guidelines			
1. Yes	288	66.82	66.82
2. No	143	33.18	100.00
v71: The use of indicators to assess the implementation of knowledge management practices			
1. Yes	107	24.71	24.71
2. No	326	75.29	100.00
v72: Use of scorecards			
1. Yes	128	29.63	29.63
2. No	304	70.37	100.00
v73: Written/oral feedback from staff on achievements in knowledge management			
1. Yes	178	41.40	41.40
2. No	252	58.60	100.00
v74: Comparisons are made between your organization and other organizations in your industry			
1. Yes	164	37.96	37.96
2. No	268	62.04	100.00
v75: Staff consider that sharing knowledge is good for their careers			
1. Yes	230	53.36	53.36
2. No	201	46.64	100.00
v76: Staff spontaneously organize knowledge events such as meeting with staff from other divisions/departments			
1. Yes	151	35.03	35.03
2. No	280	64.97	100.00

v77: Staff make documents available to others more spontaneously			
1. Yes	216	50.12	50.12
2. No	215	49.88	100.00
Difficulties in implementing knowledge management practices, because of:			
v78: A strong focus on information and communication technology, rather than on people or organizational matters			
1. Yes	201	46.64	46.64
2. No	230	53.36	100.00
v79: Lack of time or resources to concretely share knowledge			
1. Yes	322	74.71	74.71
2. No	109	25.29	100.00
v80: Resistance of certain groups of staff			
1. Yes	215	50.23	50.23
2. No	213	49.77	100.00
v81: Staff do not make documents available to others spontaneously			
1. Yes	219	51.29	51.29
2. No	208	48.71	100.00
v82: Difficulty in capturing employee's undocumented knowledge (know-how)			
1. Yes	354	82.52	82.52
2. No	75	17.48	100.00
v83: Concern that other organizations/general public would be able to access sensitive/confidential information			
1. Yes	215	50.00	50.00
2. No	215	50.00	100.00
v84: Knowledge and information management is not a top priority in the modernization programme of your organization			
1. Yes	184	42.89	42.89
2. No	245	57.11	100.00

Table 5: Section 5 - Ubiquitous knowledge

QUESTION	FREQUENCY	PERCENTAGE	CUMULATIVE PERCENTAGE
Organizations increasingly relying on outside knowledge coming from the following entities/organizations to carry out their activities			
v85: Between departments in your organization			
1. Yes, definitely	197	45.50	45.50
2. Yes, but not significantly	161	37.18	82.68
3. No, but probably within the next 5 years	21	4.85	87.53
4. No	54	12.47	100.00
v86: Local governments			
1. Yes, definitely	89	20.60	20.60
2. Yes, but not significantly	120	27.78	48.38
3. No, but probably within the next 5 years	59	13.66	62.04
4. No	164	37.96	100.00
v87: Peer organizations			
1. Yes, definitely	87	20.09	20.09
2. Yes, but not significantly	157	36.26	56.35
3. No, but probably within the next 5 years	70	16.17	72.52
4. No	119	27.48	100.00
v88: Universities/Research centres			
1. Yes, definitely	75	17.36	17.36
2. Yes, but not significantly	141	32.64	50.00
3. No, but probably within the next 5 years	95	21.99	71.99
4. No	121	28.01	100.00
v89: Suppliers			
1. Yes, definitely	120	27.78	27.78
2. Yes, but not significantly	160	37.04	64.81
3. No, but probably within the next 5 years	73	16.90	81.71
4. No	79	18.29	100.00
v90: Customers			
1. Yes, definitely	165	38.37	38.37
2. Yes, but not significantly	171	39.77	78.14
3. No, but probably within the next 5 years	51	11.86	90.00
4. No	43	10.00	100.00
v91: Consulting firms			
1. Yes, definitely	138	31.87	31.87
2. Yes, but not significantly	157	36.26	68.13
3. No, but probably within the next 5 years	49	11.32	79.45
4. No	89	20.55	100.00
v92: Trade Unions			
1. Yes, definitely	53	12.30	12.30
2. Yes, but not significantly	91	21.11	33.41
3. No, but probably within the next 5 years	62	14.39	47.80

4. No	225	52.20	100.00
v93: Other			
1. Yes, definitely	68	19.43	19.43
2. Yes, but not significantly	61	17.43	36.86
3. No, but probably within the next 5 years	27	7.71	44.57
4. No	194	55.43	100.00
Staff is encouraged to take up positions in:			
v94: Other departments in your organization			
1. Yes, definitely	108	25.06	25.06
2. Yes, but not significantly	121	28.07	53.13
3. No, but probably within the next 5 years	60	13.92	67.05
4. No	142	32.95	100.00
v95: Local government			
1. Yes, definitely	19	4.44	4.44
2. Yes, but not significantly	26	6.07	10.51
3. No, but probably within the next 5 years	53	12.38	22.90
4. No	330	77.10	100.00
v96: Peer organizations			
1. Yes, definitely	27	6.32	6.32
2. Yes, but not significantly	63	14.75	21.08
3. No, but probably within the next 5 years	53	12.41	33.49
4. No	284	66.51	100.00
v97: Universities/Research centres			
1. Yes, definitely	23	5.39	5.39
2. Yes, but not significantly	69	16.16	21.55
3. No, but probably within the next 5 years	80	18.74	40.28
4. No	255	59.72	100.00
v98: Supplier organizations			
1. Yes, definitely	16	3.75	3.75
2. Yes, but not significantly	46	10.77	14.52
3. No, but probably within the next 5 years	66	15.46	29.98
4. No	299	70.02	100.00
v99: Customer organizations			
1. Yes, definitely	28	6.54	6.54
2. Yes, but not significantly	64	14.95	21.50
3. No, but probably within the next 5 years	60	14.02	35.51
4. No	276	64.49	100.00
v100: Consulting firms			
1. Yes, definitely	24	5.62	5.62
2. Yes, but not significantly	49	11.48	17.10
3. No, but probably within the next 5 years	60	14.05	31.15
4. No	294	68.85	100.00
v101: Trade Unions			
1. Yes, definitely	19	4.52	4.52
2. Yes, but not significantly	31	7.38	11.90
3. No, but probably within the next 5 years	40	9.52	21.43

4. No	330	78.57	100.00
v102: Other			
1. Yes, definitely	20	5.54	5.54
2. Yes, but not significantly	27	7.48	13.02
3. No, but probably within the next 5 years	36	9.97	22.99
4. No	278	77.01	100.00
v103: Secondees from other organizations			
1. Yes, definitely	64	15.80	15.80
2. Yes, but not significantly	65	16.05	31.85
3. No, but probably within the next 5 years	52	12.84	44.69
4. No	224	55.31	100.00

Table 6: Section 6 - Assessment of knowledge management growth

QUESTION	FREQUENCY	PERCENTAGE	CUMULATIVE PERCENTAGE
v104: Growth of knowledge management over the past 5 years			
1. Yes rapid growth (3+ maturity levels)	86	20.28	20.28
2. Yes, but not significantly (1-2 maturity levels)	221	52.12	72.41
3. No growth, probably within the next 5 years	94	22.17	94.58
4. No growth, or decline in growth	23	5.42	100.00

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