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Executives' Perspectives on Knowledge Management

Warren Paul Porteous

A research report submitted to the Faculty of Management, University of the Witwatersrand, in partial fulfilment of the requirements for the degree of Master of Business Administration.

February, 2000

Abstract

Garvin (1993) argues that discussions on knowledge management are held on a philosophical `high ground` and are removed from the daily details of practice. This research report had two main objectives: firstly, to assess the state of knowledge management amongst middle to senior level executives in South Africa and secondly, to compare the results with those of a similar study undertaken in America and Europe.

In order to achieve this the research questionnaire included four categories for investigation:

- The reasons for executives' management of knowledge
- Identification of the levers that executives use in the management of knowledge
- Identification of the challenges that executives need to overcome in order to manage knowledge successfully
- The extent and nature of knowledge management projects

The study revealed that executives in both studies hold similar views on the need for levers in management and on the challenges of knowledge management. One of the main findings was that respondents, in both studies, believed knowledge management to be a forum for the creation of sustainable strategic advantage.

Declaration

I declare that this research report is my own, unaided work. It is submitted in partial fulfilment of the requirements of the degree of Master of Business Administration in the University of the Witwatersrand, Johannesburg. It has not been submitted before for any degree or examination in any other university.

Warren Paul Porteous

4th February, 2000.

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1 Introduction

Firms have always been oriented toward the accumulation and application of knowledge to create economic value and competitive advantage (Davenport & Prusak, 1998). An automatic increase in knowledge and an incentive to search for new knowledge are incorporated into the very nature of a firm's entry into markets and a firm's possession of amounts of entrepreneurial resources (Denison, 1985). Denison (1985) argues that a fundamental shift is occurring in that knowledge is becoming increasingly more important as a contributor to a country's success in industrial competition. He further argues that education and advances in knowledge are at least as important as capital in contributing to economic growth. Scholars and practitioners are realising the importance of the role of knowledge and innovation in competitive success (Ruggles, 1997).

Teece in Cohen (1998, p11) notes that, "the fundamental bases of wealth creation are changing. Intellectual capital is the key to creating and appropriating wealth". Prusak (1998, p25) believes that "there is an emerging new theory of the firm, one that recognises the growing complexity of work, products, and organisations, and concludes that the only sustainable competitive advantage comes from what you know and how fast you can put it to use".

The knowledge society (Masuda, 1980) requires changes within the organisation both in terms of its inner workings (the business processes) and its roles and responsibilities (Drucker, 1988). As recognition of the importance of knowledge grew so did the recognition that it needs to be treated more explicitly and systematically and that it needs to be made more visible and tangible to be amenable to management.

1.1 Problem definition

Garvin (1993) argues that many discussions on knowledge and learning organisations are held on the philosophical `high ground` encompassing impractical themes and metaphors rather than dealing with the details of practice. This study represents an effort to understand the practical details being encountered in the workplace.

1.1.1 The importance of knowledge management

Hamel & Prahalad (1990) believe that the nature of competitive strategy is changing. Structural competitive strategy, according to Porter (1980, 1985), with its emphasis on economies of scale, scope factor costs, brand strength, location and proprietary technology, is being recognised as the "first few hundred yards of a marathon" (Hamel & Prahalad, 1990, p83).

With regard to the new paradigm replacing "raw" structural strategy, Stern & Stalk (1998) suggest that a new capabilities based strategy has

emerged. This is seen to add to structural strategy through a corporate focus on issues such as innovation, responsiveness, speed, cross-organisational effectiveness and the development of the ability to learn.

The new paradigm (Kuhn, 1962) replacing the old is seen as; the age of unreason (Handy, 1989), the information society (Masuda, 1980), and the knowledge society (Naisbitt, 1982). The emphasis has thus shifted from what is done to how it is done (Stern & Stalk, 1998).

Davenport, De Long & Beers (1998) recognise that the management of knowledge is an essential element of the shift in paradigm but state that "knowledge management is neither panacea nor bromide; it is one of many components of good management" (1998, p12). They go on to acknowledge the importance of sound planning, intelligent marketing, high quality products and services, attention to customers, and the efficient structuring of work. They also state, however, that in a competitive business environment, the effective management of knowledge may well make the competitive difference between organisations.

Drucker (1994) argues that the large numbers of knowledge workers in the increasingly serviced-based economy of the United States is an indication of the change in fundamental management style. He argues that the `command-and-control` managerial concept is being replaced by

one where the emphasis is to “make knowledge productive” (Drucker, 1994: p72).

The concept of knowledge management is becoming popular (Ruggles, 1998). In a recent survey of American and European executives, 87% percent of executives felt their environment was “knowledge intensive” and 94% believed knowledge was key to competitive advantage (Ruggles, 1998).

1.1.2 The South African context

The nature of competition and its effect on corporate decision-making processes, management structures and work processes is changing (Evans & Wurster, 1997, Drucker, 1988). Historically South African business has suffered from isolation and a high level of protectionism, which lead towards inwardly focussed corporate strategies. The South African government’s Growth Employment and Redistribution strategy required increased international economic interaction in order to stimulate and sustain local economic growth (The Economist, 1997).

According to the 1997 World Competitiveness Report, South African management ranks 37th position out of 46. The 1998 Africa Competitiveness Report shows that economies with solid export bases and well-managed economies perform well. It is argued that South Africa

could benefit from increased export activity and improved management practices.

It is also commonly argued (e.g. The Economist, 1997) that the South Africa economy needs to achieve growth rates that are greater than 1997 growth rates, in order to satisfy local development demands.

Kim & Mauborgne (1996) argue that the key separation factor between high growth companies and others is the “way managers make sense of how they do business” (1996: p103). It is clear that South African companies need to alter their strategic logic to stimulate innovation, responsiveness, speed, cross-organisational effectiveness and the development of the ability to learn.

Numerous authors suggest that these factors are the benefits of successful knowledge management (e.g. Ruggles, 1998, Thurbin, 1994, Davenport & Prusak, 1998, Leonard-Barton, 1995, Nonaka, 1991, Nonaka & Takeuchi, 1986, Nonaka & Takeuchi, 1995).

1.2 Rationale/Purpose for conducting the research

The purpose of the study is to assess the state of knowledge management in South Africa, both within the local context and relative to

American and European managers. This would generate insights into the relative standing of knowledge management in South Africa.

1.3 Definition of the research scope

The scope of this research project is to assess the state of knowledge management, amongst middle to senior level managers in South Africa and to compare findings with those of an international study undertaken in Europe and the United States. This has been achieved through the application of a survey developed and undertaken by Ernst & Young's Center for Business Innovation and Business Intelligence in both the US and Europe.

1.4 Objectives of the research study

The first objective is to determine whether executives in South African organisations are attempting to manage knowledge more deliberately, and if so, what forms such management is taking. In so doing, the following sub-objectives are as follows:

- The reasons for executives' management of knowledge
- Identification of the levers that executives use in the management of knowledge
- Identification of the challenges that executives need to overcome in order to manage knowledge successfully

- The extent and nature of knowledge management projects
- To investigate the extent and nature of South African knowledge management projects.
- To compare the results of the South African survey with those of an international survey.

1.5 Importance of the research

South African management has not been rated highly in the World Competitiveness Report since 1993, and was rated 37th out of 46 in 1997. In addition to numerous other variables, it could be asked whether the management of knowledge is another area in which South African executives are lacking. This research project sought to identify key knowledge management issues and furthermore to measure the extent to which management recognises the existence of these issues. An international comparison of the results will also be undertaken in order to gauge if, and in which areas, South African managers are lagging, in the international arena.

The study also intended to provide insight regarding the relative differences in the prevalence and nature of the management of knowledge in the South African context compared with those of an international study. This may well provide a platform for identifying key knowledge management issues that would have a South African flavour

and therefore may be worthy of further research. It would also determine in which areas, if any, South African executives compare favourably with world leaders.

1.6 Structure of the report

Chapter 1 has contained the background to the research, the importance of the research and the research objectives. Chapter 2 contains an overview of knowledge management based on a review of the literature. Chapter 3 outlines the methodology used for the research study. Chapter 4 details the findings of the research and Chapter 5 evaluates and discusses the research findings. Chapter 6 contains the highlights of the research, including how the objectives were met, and makes recommendations for managers and suggestions for further research.

2 Literature review

This section provides a summary of the literature on knowledge management, and is specifically related to the research objectives.

2.1 The knowledge management context

Cohen (1998) argues that it is imperative that researchers who work within a newly emerging discipline such as knowledge management should strive to set as solid a ground to work from as possible. It is suggested that this be achieved through the use of mental models and a common vocabulary. This section therefore provides the context within which this research occurred.

Background definitions of knowledge management are provided, as well as an outline of popular knowledge management models. The purpose of knowledge management is identified and the chapter concludes with an illustration of working definitions to guide this research.

2.1.1 Knowledge management definitions

In an effort to identify the purpose of knowledge management, Murray & Myers (1998) loosely define knowledge management as the collection of processes that govern the creation, dissemination and use of knowledge to fulfil organisational objectives.

Ruggles (1997b) believes that knowledge management comprises the management of the various forms in which knowledge arises. Ruggles (1997b) states that knowledge arises in many forms; namely process knowledge (i.e. how to), catalogue knowledge (i.e. what is), and experiential knowledge (i.e. what was). It is in the context of the management of these elements that Ruggles (1997b) believes knowledge can be managed.

Authors have used numerous theoretical constructs in order to define and articulate the management of knowledge. These include the following:

- The management of competencies (Leonard-Barton, 1995)
- Flows of knowledge (von Krogh & Roos, 1996)
- Knowledge markets (Davenport & Prusak, 1998)
- The management of the learning organisation (Thurbin, 1994, Senge, 1990)
- The management of intangibles (Sveiby, 1997)

The aim of knowledge management however is to “create a new (task related) knowledge, disseminate it throughout the organisation and embody it in products, services and systems” (Nonaka & Takeuchi, 1995, p7).

2.1.2 Frequently cited knowledge management models

2.1.2.1 Knowledge creation through Nonaka’s spiral of knowledge

Nonaka (1991) argues that the reason for the difficulty in managing knowledge is that managers fail to grasp the “true nature of the knowledge-creating company” (1991, p3), i.e. managers misunderstand what knowledge is and how it may be exploited. Knowledge creation is understood as a process of making tacit knowledge explicit. The “spiral of knowledge” model in Figure 1 is shown in order to assist in this understanding is the (1991, p4).

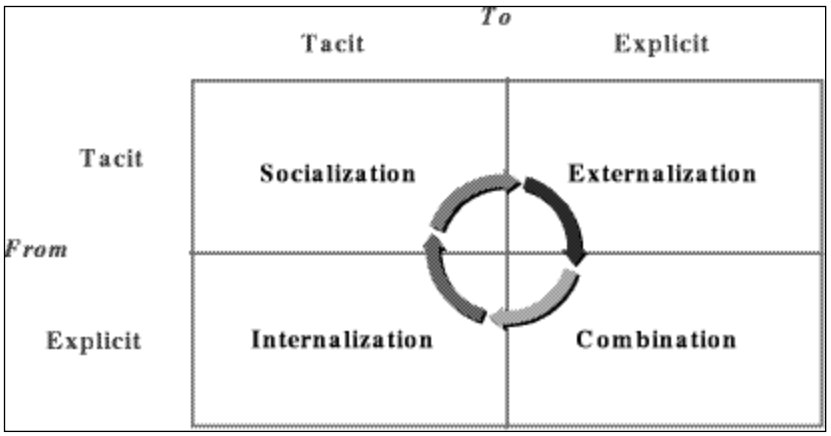


Figure 1: Nonaka's spiral of knowledge

In Nonaka's (1991) spiral of knowledge, knowledge passes through a process of four stages as follows:

- Socialisation (which is tacit to tacit) - the transferral of tacit knowledge from one individual to another (for example, when a craft is taught through mentorship)
- Articulation (which is tacit to explicit) - tacit knowledge, residing within the individual, is communicated to others, thereby creating explicit knowledge (for example the craft is then explained to others)
- Combination (which is explicit to explicit) - explicit knowledge is then standardised and recorded (for example, the craft is then recorded in a manual)
- Internalisation (which is explicit to tacit) - explicit knowledge is then internalised (for example, the manual is read and the craft is learnt)

It is further argued that the management of this process requires the inclusion of organisational redundancy to help create "common cognitive ground" (1991: p7). It is in the management of these processes that knowledge is managed.

2.1.2.2 Nonaka's *Ba*: the environment required for knowledge creation

Nonaka & Konno (1998) offer the concept of *ba* in explanation of an element of knowledge management, namely the management of

knowledge creation and sharing. The concept of *ba* is applied to each of the four quadrants of the spiral of knowledge and defines the environment required to support knowledge transfer.

2.1.2.3 Knowledge creation: Von Krogh's concept of care

Von Krogh (1998) introduces the concept of 'care' in knowledge creation. He characterises care as attentive enquiry, accessibility, a propensity to help, lenience (or acceptance of errorr), and symmetry or reciprocity. 'Low care' situations typically are lacking in these qualities and in a sufficient knowledge creation environment. In these situations workers retain knowledge, seizing what they need and hoarding what they have) Low care groups attempt to reduce transactional risk of knowledge exchanges. Von Krogh's (1998) findings reinforce Nonaka's research in showing that connection, co-operation and emotional attachment contribute to the creation of knowledge. High care groups are typically ones in which the individual bestows rather than seizes knowledge, openly sharing with and responding to others.

2.1.2.4 Knowledge management: Leonard's sources of innovation

Leonard (1995) focuses on knowledge creation. Her analysis of the sources of successful innovation supports Nonaka's. She investigated

processes within and between groups of people, rather than at the individual creativity or the manipulation of knowledge objects. She recognised that sharing tacit knowledge is a social process and an essential feature of a knowledge-creating environment. Leonard (1995) identifies the following techniques or practices as important for creating collective tacit knowledge during innovation:

- Direction setting through the use of shared concepts and metaphors
- Ideation (including brainstorming, totemics and visualisation)
- Empathic design (that is observing customer behaviour to obtain access to their tacit or pre-conscious knowledge of the products and services they need)
- Active apprenticeship (that is, learning and teaching by doing)
- Emergent understanding (which is gained through social co-participation, legitimate peripheral participation, story telling, and sense making).

Leonard's (1995) ideation, empathic design, apprenticeship, and emergent understanding involve people working together to share and develop tacit knowledge. Her recognition of the importance of concepts, and especially metaphors, set a common direction suggests the need to find ways to align or connect the knowledge of individuals without forcing them into a constricting, uncreative unity of thought.

Leonard (1995) observes that innovation comes from the appropriate combination of cohesiveness (that is shared context, ideas, and language) and diversity. Diversity without cohesiveness leads to disorder. Cohesiveness without diversity results in groupthink. The right balance of the two produces what she calls “creative abrasion”, where minds meet on common ground to explore and negotiate their differences, generating new ideas in the process (1995, p23).

2.1.2.5 Davenport & Prusak’s knowledge markets

Davenport & Prusak (1998) attribute the existence of their knowledge market to the natural human tendency to retain and trade items of value. They explain, however, that in the knowledge market the value of the item is personally constructed. Within the knowledge market exist knowledge buyers, sellers and brokers. They suggest, however, that the efficiency of the knowledge market relies on the freedom to trade as dictated by organisational culture. Cultural factors which Davenport & Prusak (1998) suggest are inhibitive to knowledge transfer are as follows:

- Lack of trust
- Different cultures, vocabularies and frames of reference
- Lack of time and meeting places and a narrow idea of productive work
- The belief that status and rewards go to knowledge owners
- The ‘not invented here’ syndrome
- Intolerance of mistakes or of the need for help

2.1.2.6 Japanese versus western knowledge management theory

Cohen (1998) draws attention to contrasts in emphasis between eastern and western practitioners' perspectives with regard to the appropriate emphasis on knowledge management. Knowledge management is seen as a process through which individual knowledge can be converted into organisational knowledge. The Japanese view on how to accomplish this task is a very human on and is based on socialisation, the individual and the tacit to tacit transfer of knowledge.

In the US most knowledge practice focuses on collecting, distributing, re-using, and measuring existing codified knowledge and information. Use of information technology is often made in the capture and distribution of explicit knowledge.

In the east, however, knowledge creation receives more attention, with an emphasis on developing conditions that favour the exchange of tacit knowledge between individual knowledge owners.

The measures of success between east and west differ too. Westerners tend to measure success according to financial measures such as the return on investment. Easterners, however, tend to measure success according to long term capacity for success through innovation.

Table 1 summarises the key differences between the eastern and western knowledge management approaches (Cohen, 1998).

West	East
Focus on Explicit knowledge	Focus on Tacit knowledge
Re-Use	Creation
Knowledge projects	Knowledge cultures
Knowledge markets	Knowledge communities
Management and measurement	Nurturing and love
Near term gains	Long-term advantage

Table 1: East vs West characteristics

2.1.3 The fundamental purpose of knowledge management

The above contrasts lead to the fundamental question of what the purpose of knowledge management is. The authors referenced above argue in favour of practicality and theory, showing differences between eastern and western approaches. It is therefore necessary to solidify the positioning of this research report through the selection of working definitions.

The aim of knowledge management, however, is to “create a new (task related) knowledge, disseminate it throughout the organisation and

embody it in products, services and systems" (Nonaka & Takeuchi, 1995, p7).

This research report focuses on what executives are doing to achieve the above aim. This perspective, however, lies in Cohen's (1998) western focus regarding knowledge management. This study originates in the work of Ruggles (1998), in conjunction with Ernst & Young, who argue that the study involves an attempt to move beyond definitions of knowledge management and to assess the state of knowledge management.

The emphasis therefore has little to do with issues of culture and context but rather on a process based view of the identification, utilisation and transfer of knowledge.

2.1.4 Working definitions

The following definitions of data, information and knowledge were selected for this study.

A 'working definition' of knowledge, as espoused by Davenport & Prusak (1998), was selected. For practical purposes, their working definitions were limited to *data*, *information* and *knowledge*. It was recognised that other researchers refine these concepts by expanding knowledge to

include wisdom, insight, resolve, and action. However, Davenport & Prusak's (1998) perspective on knowledge aggregates wisdom and insight into knowledge, and defines resolve, and action as "things you do with knowledge." (Davenport & Prusak, 1998, p2)

Data is defined as "a set of discrete, objective facts about events" (Davenport & Prusak, 1998, p2). Data does not reveal its own importance or relevance, but is still important to organisations, as it is the essential "raw material of information" (Davenport & Prusak, 1998, p3).

Information is likened to a message (either audible or visible). The message requires both a sender and receiver. The context from which the sender passes the message is not conveyed to the receiver, and is described as a combination of judgement and behaviour. Therefore, the receiver decides whether the contents of the message are data or information.

Knowledge is defined as "a fluid mix of framed experience, values, contextual information, and expert insight that provides a framework for evaluating and incorporating new experiences and information. It originates and is applied in the minds of 'knowers'. In organisations, it often becomes embedded not only in documents or repositories but also in organisational routines, processes, and norms" (Davenport & Prusak, 1998, p5).

Ruggles (1997b) supports Davenport & Prusak (1998) by defining knowledge as “a fluid mix of contextual information, values, experiences, and rules. It comes in many forms, including process knowledge (how to), catalogue knowledge (what is) and experiential knowledge (what was). All of these types of knowledge are similarly generated, codified and transferred” (Ruggles, 1997b, p2).

The above definitions attempt to explain knowledge in a context similar to that of the original researchers. Ruggles (1998) states that the point of the study was not to attempt to redefine knowledge but to “push past definitions of knowledge” (Davenport & Prusak, 1998: p81) by focusing on a process based view of the firm. By focussing on *how* knowledge is managed from a process perspective it is claimed that the survey generates insights into *what* knowledge is being managed. This provides a platform to understand the *role* of knowledge in the organisation.

The author has found it necessary to further define knowledge and its management. Firms have always been oriented toward accumulating and applying knowledge to create economic value and competitive advantage. However Leonard (1995) and Armstrong & Novins (1998) argue that knowledge is of value only when it is embodied in organisational processes and systems. The ease with which knowledge is embodied into

organisational processes however depends on the characteristics of the knowledge.

Novins & Armstrong (1998) describe knowledge as a continuum between the tacit and the explicit. It is along this continuum that knowledge changes from being complex, intangible and difficult to teach to being simple, measurable, and easy to teach. In support of this observation Brown & Duguid (1998) introduce a further continuum describing the inherent “stickiness” of knowledge. Knowledge stickiness is described as an indication of the cost of transfer ranging from low (slippery) to high (sticky). It is their contention that competitive advantage is gained through the incorporation of sticky knowledge (that is knowledge that is difficult to grasp, replicate and transfer) into organisational processes.

Novins & Armstrong (1998) introduce a matrix with axes that describe the applicability of knowledge as being either local or global. Local knowledge applies to a limited set of conditions, dependent of physical and/or geographical situation, complex knowledge. Global knowledge is general, and widely applicable across the boundaries of business, crossing processes and technical and cultural areas. The transferability of knowledge is being either programmable or unique. Programmable knowledge is rule based, can be applied multiple times, is strongly repetitive, and explains the past. Unique knowledge is context sensitive, judgement based, forward looking and predictive.

The character of knowledge described above shows its variability within different contexts, and hence explains the difficulty involved in managing its capture, distribution and replication.

2.2 The case for managing knowledge

Drucker (1994, p76) asserts that in order “to remain competitive – maybe even to survive – businesses will have to convert themselves into organisations of knowledgeable specialists”. He contends that knowledge has become the key resource in the world economy. This implies that the world economy, rather than national economy, is under control. He believes that every country, industry, and business will be in an increasingly competitive environment and that the competitive standing of its knowledge resources will have to be considered in the formation of its strategic decisions.

Given the changing nature of global competition (Evans & Wurster, 1997) and its effect on corporate decision making processes, management structures and work processes (Drucker, 1988) knowledge should assume a dominant role in companies and jobs (Stewart, 1996). Kaplan & Norton (1996, p3) point out that the “ability of a company to mobilise and exploit its intangible or invisible assets has become far more decisive than investing and managing physical, tangible assets”.

2.2.1 The knowledge intensive business

Davenport & Prusak (1998: p52) posit that “all healthy organisations” are knowledge intensive. It is argued that, in their interaction with their

environments, organisations absorb information, turn it into knowledge, and then act on it. Research by Davenport & Prusak (1998) considered case studies in 39 companies and numerous industries, which emphasises the importance of knowledge in different industries.

Leonard-Barton (1995) suggests that knowledge is required and created within “activities pursued in the course of developing new products and processes” (p5), and that it is in these activities that groupings of core capabilities are created. She believes that these bodies of knowledge require management in the same that tangible assets do. Leonard-Barton’s (1995) research focus in the global manufacturing sector indicates that knowledge is applied very broadly.

Ruggles (1997b) states that the reliance of competitive advantage on knowledge is not new. Product innovations, he argues, are the result of a group’s knowledge of unserved markets and efficient operations, too come from shared knowledge of how things should and could work. Ruggles (1997b) argues that although knowledge has always been a critical factor of production it is only recently that managers have identified the need to manage it explicitly.

Sveiby (1997) argues that shareholders’ perceptions of the value of intangible assets can be measured in the same way as the difference between market capitalisation and book value for listed service

companies. Sveiby (1997) feels that intangible assets rely on individual and corporate knowledge, and divides the value of these intangible assets in to three dimensions, as follows:

- Employee competence: the capacity of employees to act in a wide variety of situations
- Internal structure: the value of patents, concepts, models and information technology and administrative systems; and
- External structure: the value of supply chain relationships including brand names, trademarks and corporate repute.

Sveiby (1997) identifies a measure of the value and recognition of the importance of knowledge, which can be applied across industries and countries.

2.2.2 The question of whether knowledge can be managed

Garvin (1993) argues that since knowledge was necessary for researchers to put forward models to communicate their findings. The management of knowledge, he argues, also requires models to communicate principles and techniques.

Leonard-Barton (1995) equates bodies of knowledge to strategic core competencies and proposes that they can be managed in the same way as tangible assets. Her three-tier structure indicates differing levels of strategic importance of competencies. It is her argument that by focusing

on the different strategic levels knowledge management activities can be prioritised. Additionally, she identifies the necessary knowledge management perspective required within each of the tiers.

Aadne, von Krogh & Roos (1996) argue that the management of knowledge is a key managerial responsibility. The perspective from which they approach the subject is that of the management of strategic alliances (specifically knowledge links). They argue that managing a knowledge link is a process of learning, creating, sharing, and controlling knowledge. The flows of knowledge in this context are said to occur in a co-operative context. Efficiency of flows within the co-operative context therefore depends on the degree of *openness* between organisations. Further, the flow of knowledge between the co-operative context and the organisation depends on the *motives* for entering into the knowledge link. Finally, the utilisation of knowledge within the organisation depends on the manager's ability to *internalise* knowledge. It is argued that managers have the ability to manage the flows of knowledge by influencing *openness*, *motive* or *internalisation*.

Nonaka (1991) argues that the reason for the difficulty in managing knowledge is that managers fail to grasp the "true nature of the knowledge-creating company" (1991: p3), i.e. managers misunderstand what knowledge is and how it may be exploited. Nonaka (1991) suggests that knowledge creation should be seen as a process of rendering tacit

knowledge explicit. The model he describes in order to assist in this understanding is the “spiral of knowledge” (1991: p4).

Nonaka’s (1991) spiral of knowledge is made up of a process whereby knowledge passes through four stages, namely:

- Socialisation (which is tacit to tacit) - the transferral of tacit knowledge from one individual to another (for example, when a craft is taught through mentorship)
- Articulation (which is tacit to explicit) - tacit knowledge, residing within the individual, is communicated to others, thereby creating explicit knowledge (for example the craft is then explained to others)
- Combination (which is explicit to explicit) - explicit knowledge is then standardised and recorded (for example, the craft is then recorded in a manual)
- Internalisation (which is explicit to tacit) - explicit knowledge is then internalised (for example, the manual is read and the craft is learnt)

It is further argued that the management of this process requires the inclusion of organisational redundancy to help create “common cognitive ground” (1991: p7). It is through the management of these processes that knowledge is managed.

2.2.3 Competitive advantage through the management of knowledge

Leonard-Barton (1995) suggests that core or strategic capabilities are required in order for the organisation to create a strategic advantage (or at the very least, strategic equilibrium) over the competition. She identifies three levels of technological capability with varying levels of strategic importance to the organisation. Firstly, *supplemental* capabilities are identified as those that add value to the core capabilities but that could be copied. Secondly, *enabling* capabilities are those capabilities required to compete in the market place (such as ISO quality control, motor vehicle safety standards). Thirdly, *core* capabilities comprise a competitive advantage for the firm. This requires expertise and cannot be easily imitated.

Leonard-Barton (1995) argues that the processes required to manage capabilities effectively depends on the management of the interaction between knowledge creating activities and the capabilities themselves. She suggests that the knowledge required within the knowledge creating activities can be broken down into three dimensions, namely: public (scientific) knowledge, industry specific knowledge and firm specific knowledge. These ‘forms’ of knowledge can be considered to be of increasing strategic value as firm specific knowledge is approached. The firm specific, therefore, is more likely to drive the organisation’s core capabilities, or strategic competitive advantage.

Nonaka (1998) argues that the successful management of knowledge is intangible and sticky. This leads to sustainable competitive advantage in that it is a type of knowledge that is difficult to replicate.

In support of Leonard-Barton's argument, Stalk, Evans & Schulman (1992) identify Wal-Mart's success as being capability based and representative of a "new conception of corporate strategy that we call capabilities based competition" (1992, p83). Wal-Mart was identified as having created a logistics technique known as 'cross-docking'. The system leveraged insights into aspects of firm specific warehousing operations to reduce inventory and handling costs. Stalk, Evans & Schulman (1992) go on to mention that the true difficulty in replicating "cross-docking" is because it is supported by an intricate web of managerial systems (enabling capabilities). Through the interaction of the enabling capabilities the core capability is created and supported, thus generating competitive advantage. In effect, the management of technological capabilities (knowledge embodied in processes) resulted in competitive advantage.

Von Krogh & Roos (1996), in their book aimed at the understanding of the role of knowledge and knowledge transfer in organisational co-operation and competition, argue that the usefulness of knowledge and its management in strategic knowledge links with external parties, can be viewed as co-operative (repetition or interaction) or one of imitation. With

respect to the internal effect of knowledge links, the processes are argued, primarily, to be of conceptual change (competence development) or organisational change (restructuring or knowledge-based strategic change). They proceed to demonstrate the contribution of knowledge to competitive advantage within the above contexts. It is in the management of these strategic links that competitive advantage is created.

Von Krogh & Roos (1996) emphasise the importance of identifying knowledge created externally to the organisation in the selection of strategic knowledge links. Porter (1985) coined the term “intangible interrelationships” to describe the sharing of ‘know-how’ between similar value activities. The sharing of ‘know-how’ is seen as strategically important if it is “significant to improving the efficiency of the activity” (1985, p78).

2.2.4 The benefits of knowledge management

Stalk & Shulman (1992) argue that the management of knowledge based insights into Wal-Mart’s logistics led to an innovative technique known as ‘cross docking’. This resulted in increased responsiveness to customers.

Grey (1996) argues that knowledge management leads to improvement of quality of and access to relevant knowledge, thereby improving the quality of decision making in an organisation. This, he argues, led to quicker,

higher quality decisions being made by empowered staff lower in the organisation.

Leonard-Barton (1995) views the benefits of knowledge management as being the development and fostering of organisations as sites of learning and information transfer rather than simply being physical or financial entities. She claims that the result of the management of four fundamental knowledge-creating processes is the creation of a workforce that is able to process and manipulate knowledge in addition to carrying out normal functional skills. She argues that this leads to innovative application of knowledge through cross fertilisation and creative chaos within the organisation.

2.3 The levers of knowledge management

Nonaka & Takeuchi (1995, p7) argue that the aim of knowledge management is to “create new (task related) knowledge, disseminate it throughout the organisation and embody it in products, services and systems”. However, Garvin (1993) suggests that theoretical models created in order to conceptualise the management of knowledge are not sufficient in terms of providing insight into what exactly to do. He claims that the goals are well defined but that the managerial processes are not. Therefore, how managers can best conceptualise and effect the management of knowledge needs to be investigated.

2.3.1 Knowledge management processes

Ruggles (1998) purports that in order to grasp the management of an intangible, such as knowledge practitioners should alter their focus from what constitutes knowledge, to how knowledge is used. He suggests that a process perspective be assumed when dealing with issues in the management of knowledge. Ruggles (1998) divides knowledge management into three concepts: the management of knowledge generation, knowledge codification and knowledge transfer.

Similarly, Duffy (1997) explains that knowledge management activities comprise identification, storage, access, distribution, application and

destruction. His argument is that a focus on the process of knowledge management lends greater insight to managers.

In an earlier work Ruggles (1997b) divides generation processes into creation, acquisition, synthesis, fusion, and adaptation. Codification is categorized as capture and representation, while transfer is reduced to knowledge structure and absorption.

Marshall, Prusak & Schpliberg (1996) identify six knowledge management processes that are key to the management of knowledge in the financial services industry:

- The transfer of knowledge to decision makers
- The improvement of access to existing knowledge
- The improvement of representation of knowledge
- The embedding of knowledge into controls and processes
- The testing of organisational knowledge, and
- The generation of new knowledge

It is argued that these knowledge management processes are tangible and therefore manageable.

Nonaka's (1991) spiral of knowledge can be viewed from a process perspective by which the model passes through four stages, namely socialisation, articulation, combination, and internalisation.

In the management of these processes knowledge is managers. Cohen (1998) points out, however, that Nonaka's (1991) spiral deals primarily with the management of knowledge in a fashion that is not directly measurable and therefore does not provide direct assistance to practioners in the design and control of knowledge management processes.

Garvin (1993) supports Cohen (1998) in suggesting that Nonaka's (1991) spiral of knowledge does not provide sufficient insight into exactly what to do. He finds that the goals are well defined but the managerial processes are not. He suggests that by "creating systems and processes that support five main activities (systematic problem solving, experimentation with new approaches, learning from experience and past history, learning from the experiences and best practices of others, and transferring knowledge quickly and efficiently through the organisation) and integrating them into the fabric of daily operations, companies can manage their learning more effectively" (Garvin, 1993, p81).

Knowledge management theory reviewed here does not clearly define the business processes required in its management. Garvin (1998) argues that practical arguments and esoteric arguments are at opposite ends of the continuum.

2.3.2 Organisational culture as a lever

Cohen (1998) argues that one of the key differences in knowledge management practice between eastern and western theorists and practitioners resides in the placing of emphasis on human factors. Nonaka (1991), Duffy (1997), Herbert (1964) and Dreyfus & Dreyfus (1986) agree that people are the most important element of knowledge management because they are responsible for the generation, acquisition and application of knowledge.

Nonaka's (1991) knowledge spiral (Figure 1) identifies how knowledge is transferred through four stages, and shows its change from tacit to explicit. The concept of *ba* (Nonaka & Konno, 1998) describes the cultural environment that facilitates transfer through the four stages.

Senge (1990) argues that in order to create a learning environment the leader's work is to facilitate a shift in mindset from adaptive to generative using creative tension as well as new roles, new skills, and new tools. Leaders are often disappointed to discover that staff tend to be resistant to the exploration of personal and organisational changes that are required to alter their attitudes.

Senge (1990) notes that adaptive learning focuses on solving current problems. Adaptive organisations focus on incremental improvements,

and these are often based on a track record of success. The fundamental assumptions that underlie the existing ways of working are not questioned. Generative learning, however, is about creating. It requires systemic thinking, shared vision, personal mastery, team learning, and creative tension. Essentially, generative learning requires a new way of looking at the world. This, Senge (1990) argues, requires a new managerial style and organisational culture to foster. The organisation that does not embrace generative learning confines itself to mediocre performance in that it is less likely to improve beyond other organisations. This requires ‘out of the box’ thinking and ‘break throughs’ in perception. Organisational cultures that do not embrace these values will find it difficult to implement and gain from knowledge management initiatives (Senge, 1990).

Wiig (1997) describes cultures that are accepting of knowledge management as progressive. He recognises the need for openness, honesty, trust, and membership as positive driving forces of knowledge management initiatives. For him, retarding forces including knowledge hoarding and responsibility avoidance, are destructive to knowledge management initiatives.

Davenport, Marshall & Prusak (1998) found that where an organisational culture was not conducive to knowledge management projects then no amount of technology, excellence of knowledge, or good project

management would make the effort successful. They argue that people involved in knowledge management projects should have a positive orientation to knowledge, and should be described as intelligent, intellectually curious, willing and free to explore, and that the should be encouraged to create and use knowledge, and should feel uninhibited in sharing knowledge. Cohen (1998) argues that initiatives that place cultural demands typically within the 'Japanese' type philosophy of knowledge management, while the 'Western' philosophy would be less rigid regarding cultural issues.

Mullin (1996) argues that all forms of knowledge management require a high level of information sharing. If this is not present, then it is difficult to create. He claims that a knowledge sharing environment or culture is critical to knowledge management initiatives. He believes that the key to this is a decentralised management structure that respects and encourages individual creativity (Mullin, 1996).

Cultures that are conducive to the management of knowledge have been described as open, honest and populated with individuals who are intellectually curious and thirsty for knowledge. It has also been recognised that the retention of knowledge is a source of power for individuals, and that in order to facilitate the creation of organisational knowledge incentive schemes are to be used.

2.3.3 Knowledge management enabling technology

The purpose of knowledge management technology is to facilitate the codification and transfer of knowledge within the organisation (Ruggles, 1998). Although each knowledge management system has a place in the broader knowledge management architecture (Burghoff & Pareschi, 1998) it is inappropriate to think of any single one in isolation as a knowledge management solution (Sveiby, 1997).

Bair, Bosik, Brenthenoux, Fenn, & Hunter (1997) describe information technologies that are used in the knowledge management architecture as follows:

- Collaborative Technologies
    - Intranet
    - Internet
    - Extranet
    - Email
    - GroupWare
    - Video conferencing
- Knowledge Retrieval Technologies
    - Knowledge sharing structures
    - Yellow pages
    - Knowledge maps
- Knowledge Based Systems

- Expert systems
- Knowledge miners

Burghoff & Pareschi (1998) posit that the fundamental goal of information technology architecture to support knowledge management is the facilitation the “flow of knowledge” (Burghoff & Pareschi, 1998, p5). In particular, the information technology architecture should be designed to support the communication and generation of tacit knowledge (Burghoff & Pareschi 1998, p8). These authors identify two further components of their knowledge management architecture as comprising knowledge repositories (libraries) and knowledge cartography (maps). Knowledge repositories primarily comprise of digital documents, which can be searched intelligently and also comprise directories of links. Knowledge cartography presents users of the knowledge management architecture with the means to identify and access information as required. The architecture, as presented above, is in place primarily to illustrate Burghoff & Pareschi’s (1998) final aspect of the knowledge management architecture: communities of knowledge workers.

2.4 Challenges to overcome

Davenport, DeLong & Beers (1998) argue that knowledge management concerns the change of attitudes, mindsets, cultures and processes in organisations to include a knowledge focus. Davenport & Prusak (1998) caution that although knowledge management initiatives are to be encouraged they are difficult to implement due to the degree of organisational change that typically will accompany such an initiative. They argue that effective knowledge management cannot take place "without extensive behavioural, cultural and organisational change" (Davenport & Prusak, 1998, p142). It is their argument that knowledge management initiatives will and have to overcome challenges in the areas that it forces change.

Lloyd (1996) believes that knowledge management presents significant organisational and technical challenges, as it requires the integration of an effective human network with a wide range of new technological opportunities. He believes that in order to overcome these challenges management will need to redefine what is currently believed to be effective management, and to employ new skills, mindsets and models.

Ruggles (1998) identifies three major categories of challenges to knowledge management. Firstly, the effectiveness of transfer of knowledge can be reduced by cultural, organisational and technological

factors. Secondly, problems in the management of knowledge and knowledge management projects are identified and, finally, issues in the measurement of knowledge are identified. The three categories have been used as a guide for this section of the literature review.

2.4.1 Impediments to knowledge transfer

2.4.1.1 Organisational processes

Nonaka (1991) argues that deeply engrained in western management practices and philosophies is the view that the organisation is an information processing machine. This relies on the use of quantifiable data and codified procedures. Thus the metrics used to measure the performance of the companies are typically tangible or hard. Nonaka (1991) argues that a change in focus is appropriate. This change in focus encompasses the recognition that creating new knowledge is not simply a matter of processing objective information. Rather, it depends on identifying tacit and often highly subjective insights, intuitions and hunches of individual employees, and making these available for testing and use by the company in the broader context. This therefore requires a shift from the use of quantifiable means of management to the unquantifiable.

Nonaka's (1991) argument relies on the assumption that a company is not a machine but a living organism. Much like an individual, it can have a collective sense of identity and fundamental purpose. In this respect Nonaka (1991) argues that the knowledge creating company is as much about ideals as it is about ideas. The management and harnessing of these ideas is what fuels innovation or the recreation of the world to a particular vision. It is therefore necessary to design organisational processes that allow for the creation and management of new knowledge.

In support of Nonaka (1991), von Krogh & Roos (1996) argue that current business processes are traditionally based on the grouping of similarly functioning departments. They posit, though, that knowledge management demands the introduction of variability through increased cross-functional and cross-boundary interaction.

Vicari, von Krogh, Roos & Mahnke (1997) describe the differences between organisational states and their impact on the knowledge development and exploitation process. It is the new responsibility of managers to create a balance between order and disorder so as to benefit from knowledge development and knowledge exploitation. Hibbard & Carillo (1998) anticipate that organisations will have to redesign organisational processes to incorporate knowledge capture and sharing. This will be in an effort to overcome the effects of knowledge hoarding.

Leonard-Barton (1995) too, argues that organisational processes typically do not allow for experimentation and innovation. She recognises that committed staff continually experiment in their work functions but argues that experimentation, which crosses functional boundaries, is of the greatest value. This is required in order to avoid becoming trapped in core rigidities (Leonard-Barton, 1995).

2.4.1.2 Senior management

The introduction and success of knowledge management in organisations relies on well-articulated senior management support (Cohen & Levinthal, 1990). Hamel (1991) notes that knowledge transfer is rare if senior management does not clearly communicate a learning motive.

Senior management need, therefore, to communicate and motivate the importance of knowledge management. This, however, is not enough: as Schrage (1997) notes, without financial incentives it is unlikely that knowledge management will gain acceptance.

Davenport & Prusak (1998) note that, historically, people have used knowledge to gain advantage, and that for them now to enter into knowledge sharing environments will take much encouragement from senior management. It is their thesis that this encouragement should take

the form of large financial incentives and clear senior management support.

Thurbin (1994) and Davenport & Prusak (1998) make it clear that the success of knowledge management endeavours depends on a clear, well-articulated and common understanding of the objectives. Collins (1995) believes that a common understanding will allow for the overcoming of difficulties in the understanding of knowledge management in terms of it referring to tacit versus explicit knowledge and their application.

2.4.1.3 Organisational culture

Leonard-Barton (1995) notes that the skills and knowledge embodied within people and managerial systems all exhibit particular characteristics depending on what is valued in the organisation. She argues that the corporate values become part of the organisation and of the way in which business is undertaken. Specifically, it is noted that success of knowledge management interventions requires the cultural acceptance of those principles.

Organisational culture is seen to impact on knowledge transfer. Davenport & Prusak (1998) note that knowledge brokers will enter into a knowledge transfer transaction only where some reward is identified.

Garvin (1993) suggests, however, that if an organisational culture does not support knowledge sharing and creation then management can compensate through incentive schemes.

With reference to the interaction of people in knowledge management initiatives, Wiig (1997) argues that some organisations suffered from cultural impediments to knowledge transfer. These are listed as follows:

- Knowledge hoarding
- Responsibility and work avoidance
- The 'not invented here' syndrome (that is the avoidance of the utilisation of others' work as it is not original), and
- Lack of time to communicate issues

Davenport & Prusak (1998) note that there are many cultural factors that inhibit knowledge transfer. The following factors diminish or resist the transfer of knowledge through an organisation:

- Lack of trust
- Different cultures, vocabularies, frames of reference
- Lack of time and meeting places
- Status and rewards go to knowledge owners
- Lack of absorptive capacity in recipients
- 'Not invented here' syndrome
- Intolerance of mistakes or need for help

Davenport & Prusak (1998) argue that knowledge markets in which the sellers, buyers and brokers without reciprocity, repute, altruism and trust who act are subject to knowledge transfer impediments, in the following situations:

- Reciprocity – this is a situation in which a seller will co-operate in the expectation that buyers and will be willing sellers at a later date.
- Repute – this refers to a situation where a seller wants to be known as a knowledgeable person with valuable expertise.
- Altruism – in this situation knowledge sharers are motivated in part by a love of their subject and in part altruism, whether for the good of the firm or based on a natural impulse to help others.
- Trust – this is necessary since without trust knowledge initiatives will fail, regardless of other factors.

Leonard-Barton (1995) argues that organisations intending to absorb or import knowledge must scan broadly, provide for continuous interaction, nurture technological gatekeepers, nurture boundary spanners, and oppose the ‘not invented here’ syndrome.

Sanchez & Heene (1996) suggest that negative feedback ‘command and control’ processes in firms limit the ability of managers to identify strategically valuable new intangible resources. They suggest that positive feedback managerial processes increase the ability of managers to identify knowledge assets and to transfer them.

2.4.1.4 Technological constraints

Hibbard & Carillo (1998) argue that the usefulness of information technology in knowledge management is as an enabler. Its usage is in supporting and assisting the creation of an appropriate corporate mindset by providing the means with which to collaborate.

Hibbard & Carillo (1998) suggest that information technology is significantly useful in the capture, storage and distribution of explicit knowledge. The great challenge, they argue, is in the method of capture and distribution of tacit knowledge. It is their argument that tacit knowledge cannot be stored, but that its mobility can be enhanced through the implementation of collaborative technologies.

Sveiby (1997) too argues that the challenge facing knowledge management initiatives with an information technology focus is that the focus tends to reside in the storage of explicit knowledge. It is Sveiby's (1997) argument that knowledge of this nature is easily copied and the information systems architectures are easily replicated, resulting in a vulnerable corporate strategy. Sveiby (1997) argues that once tacit knowledge is made explicit it is highly vulnerable; that information technology can serve well in organisations where the knowledge management emphasis is on facilitating corporate collaboration or supporting innovation.

Borghoff and Pareschi (1998) agree that the role of a knowledge management information technology is to facilitate the flow of knowledge. They believe that this is achieved in four ways. Firstly, information technology must contribute to the knowledge flow, thus facilitating its conversion both from tacit to explicit and explicit to tacit. Knowledge secondly, information technology needs to support the storage and distribution of explicit knowledge within the organisation. Thirdly, collaborative technology selection showed focus on the facilitation of interaction within the organisation, leading to the exchange and enhancement of tacit knowledge. Finally, information technology showed support whatever explicit knowledge the organisation has about itself and its environment.

The above arguments centre on the representation and storage of explicit knowledge and the support of collaboration in the transfere of tacit knowledge. Information technology can be seen only as a mechanism to support knowledge management initiatives and warning that information technology should not be seen as a means through which to introduce and drive knowledge management initiatives.

2.4.2 Difficulties in managing knowledge

Knowledge management requires the introduction of altered perspectives and attitudes regarding ways in which the organisation competes in the marketplace (Leonard-Barton, 1995, Ruggles, 1997, Nonaka, 1991). The differences imply that management has to modify current techniques in order to leverage knowledge effectively.

2.4.2.1 Organisational design

Managers in knowledge based organisations will have to manage situations with an increased degree of interaction between functional silos (Grenier & Metes, 1992). These managers have been described as intelligent (Quinn, 1992), adhocratic (Mintzberg, 1979) and learning (Senge, 1990).

Nonaka (1991) argues that executives need to learn to design their organisations around the concept of the creation of knowledge. He believes that the spiral of knowledge is a model to help in understanding the processes required to shift knowledge from tacit to explicit. Nonaka (1991) notes that management's task is to build redundancy into the work lives of employees to allow the creation and dissemination of knowledge. He argues that the strategic rotation of staff coupled with free access to

company information and close internal rivalry are important in the creation of a common cognitive ground and the progression of knowledge in the spiral.

Bair, Bosik, Brethenoux, Fenn, & Hunter (1998) argue that traditional organisational structures do not lend themselves to the efficient management of knowledge. The challenge, they argue, is to create a common cognitive space using information technology as the underlying driver. Three mechanisms through which this can be achieved are put forward. These are by way of notices on bulletin boards, according to a decentralised model, where business units are responsible for the creation, codification and distribution of knowledge within their business unit, and according to a centralised model, where knowledge management is seen as centralised task, and a business unit is established to identify and distribute knowledge appropriately.

Tichy & Sherman (1996) quote General Electric's Chief Executive Officer, Jack Welch, as saying that competitiveness for General Electric would be enhanced through the management of the links within and between organisational skill silos. Tichy & Sherman (1996) believe in the creation of an environment were there is openness and trust for the sharing of ideas in a willing debate, with an agreement to use. It is argued that the reduction of organisational boundaries will facilitate interaction and knowledge flow, and lead to innovation.

2.4.2.2 Knowledge workers

The employees in knowledge based organisations are highly educated workers (Drucker, 1993), “illoyal new individualists” (Leinberger & Tucker, 1991, p92) and members of Generation X (Coupland, 1991). Sveiby (1997) argues that knowledge workers are at the ‘front line’ of the organisation and deal directly with members of the corporate value chain (Porter, 1985).

In the information age it is argued the nature of the contract between management and employees is changing. This is because knowledge, unlike capital, has the greatest value when it is controlled and used by the ‘front line’ workforce (Bartlett & Ghoshal, 1995). Therefore ‘front line’ employees are strategic assets of the company. This calls for a greater degree of interaction between management and the workforce. Bartlett & Ghoshal (1995) argue that behind de-layering and downsizing interactions there is a recognition by managers of the diversity of human skills and the unpredictability of the human spirit. This makes it possible to incorporate initiative, creativity and entrepreneurship in the workplace. Bartlett & Ghoshal’s (1995) argue that the purpose of management is to create such an organisation.

Sveiby (1997) argues that the work of knowledge workers is primarily the conversion of information to knowledge using their own competencies and the assistance of knowledge specialists. Bartlett & Ghoshal (1995) argue that since knowledge is of most use in the hands of 'front line' workers that they are empowered in this sense. Leonard-Barton (1995) perceives that knowledge workers are given greater decision making authority and responsibility in knowledge based environments.

Managers of knowledge based organisations will have to use innovate methods to attract (Ruggles, 1997a), utilise (Davenport & Prusak, 1998, Ruggles, 1997) and retain (Leonard-Barton, 1995, Ruggles, 1997) knowledge workers.

2.4.2.3 Knowledge based difficulties

Managers in Knowledge based organisations need to answer the following questions (Ruggles, 1998):

- What knowledge is to be managed?
- How is knowledge identified?

Leonard-Barton (1995) believes that three tiers of capabilities (that is supplemental, enabling and core), and continuum of knowledge types (that is public, industry specific and firm specific) can be used to prioritise the management of knowledge. Ruggles (1997b) explains that the

classification of knowledge into categories of importance to competitive advantage is a prerequisite for effective management. Duguid & Seely Brown (1998) observe that the transfer of 'sticky' (that is hard to transfer) knowledge often leads to involuntary transfers which may lead to knowledge creation. It is in knowledge generation from sticky transfers that competitive advantage resides. The authors cited above agree that knowledge which is held to most tightly within an organisation, leads to higher quality knowledge which could be transformed into products and services.

Greco (1993) identifies the nature of knowledge as a source of great confusion in knowledge management projects. Managers authorise the implementation of expensive knowledge management applications without completely understanding the impact of the nature of knowledge on technology selection. As an example Greco (1993), points out the difficulty and inappropriateness of storing tacit knowledge in databases rather than implementing collaborative technologies.

Garvin (1993) argues that the emphasis of knowledge management initiatives should include:

- Learning from past experience
- Learning from others
- Transferring knowledge

Garvin (1993) contends that learning primarily comes from reflection on and analysis of others' efforts. He states that managers need to emphasise the communication of both success and failures within the organisation and that in this way staff will maximise learning. Garvin (1993) argues that this represents a difficulty to managers because communication of this nature may be seen to compromise the individual's ability to leverage knowledge.

It has been argued that knowledge itself represents difficulties to managers in that transfer can be difficult and that employees will not necessarily gain personally from its communication.

2.4.2.4 Information technology difficulties

The limitations of information technology in knowledge management lie between Herbert's (1964) argument that technological tools have the ability to capture, replicate and generate knowledge, and Dreyfus & Dreyfus's (1986) argument that computers lack the ability to incorporate 'know-how' into 'know-what' and therefore can be no more than conduits of human intelligence.

Hansen, Nohria & Tierney (1999) argue that an organisation's strategy dictates its reliance on information technology within the organisation. It is their hypothesis that strategies which involve the production and large-

scale reuse of knowledge are served well in the investment in information technologies that serve to capture and distribute codified knowledge. Strategies, however, that revolve around highly specific once off applications rely to a smaller extent on information technology. The focus of information technology in collaborative or personalised environments should facilitate high quality communication between participants.

Michael Schrage is quoted by Hildebrand (1996) as suggesting that more employees are competent to deal with technical issues and that the implementation of knowledge management supporting technology is generally suitable, and it is simply utilisation that is lacking. Davenport (1997) estimates that only 10 percent of collaborative system implementations fully employ its collaborative functions. The primary purpose of installation is under-utilised due to lack of recognition of knowledge management comprising more than information technology only.

2.4.3 Knowledge management metrics

Garvin (1993) argues that the management adage that states, “if you cannot measure it, you cannot manage it” is true of knowledge management as it is of any other corporate objective. Traditionally the solution the management metrics has taken the form of “learning curves” and “manufacturing progress functions” (Garvin 1993). It is necessary to

know whether management metrics are of importance for knowledge management initiatives.

Nonaka (1991) suggests that measuring is not the point and Garvin (1993) suggests that measurement should not be focused on the process itself but on the output. Garvin (1998) further argues that since the effects of knowledge capital management on the enterprise are complex and inherently difficult to measure, most enterprises that invest heavily in knowledge capital management are driven by culture and belief and do not try to measure return on investment (ROI). Instead, they allow internal and external demand for services to drive the level of investment.

Kaplan & Norton (1996) argue that due to the shift in the focus of organisations regarding competition from that in the industrial age to that in the information age, it is no longer appropriate to judge performance according to scales and measures used in the industrial age. These older measures were developed, refined and were appropriate in the industrial due to the importance of structural factors (Stern & Stalk, 1998) of competition. Kaplan & Norton (1996) argue that due to the increased competition and the need for organisations to compete based on their intangible and invisible assets, it has become necessary to measure the performance of these assets.

Kaplan & Norton (1996) developed a model for the measurement of business performance in the information age. Their ‘balanced scorecard’ was intended to translate business strategy into operational terms, thereby providing a tangible measure of mission and strategy. The scorecard balances outcome measures with past results and future performance. Furthermore the scorecard adds three additional perspectives to the traditional means of measurement: customer, internal business process, and learning and growth.

The customer perspective seeks to measure what the customers’ needs are, how well they are satisfied, and what element of the service or product was of most value to the client. Internal business process identifies the critical processes that drive the day to day business functionality and were critical to superior customer value creation. Innovation and learning was introduced to measure future success in terms of the ability of the organisation to add value to products or services.

Skyrme & Amidon (1998) report that the balanced scorecard is useful in that it explicitly identifies links between different organisational factors and it forces recognition of the trade-offs between them. Use of the scorecard is useful for knowledge management initiatives in that recognition is paid to intangible or ‘soft’ factors of success.

Davenport & Prusak (1998) argue that since economic returns on knowledge have always been difficult to quantify, general indications of success must be relied upon. The measures of success of knowledge management projects are similar to those of other types of business change projects. The attributes that a define knowledge management project success are as follows:

- Growth in resources attached to project, including staffing and budgets,
- Growth in the volume of knowledge content and usage,
- The likelihood that the project becomes an organisational initiative and not just an individual project,
- Organisational acceptance of the knowledge management projects, and
- Some measure of financial return. However it is put forward that this linkage need not be rigorously specified and may only be perceptual.

2.5 Summary

This section has investigated and explained the essence of referenced literature to describe the phenomena of knowledge management. The literature was reviewed in light of the research objectives outlined in section 1.3 of this report, and has been used in the formulation of research questions.

3 Research methodology

This chapter outlines the methodological approach taken in this study. The research questions, that meet the research objectives described in Chapter 1, are stated. The research methodology and analysis methods are also detailed.

3.1 Research questions

The literature reviewed indicated reasons for the need to manage knowledge, the levers of managing knowledge and the challenges involved in managing knowledge. The first objective of this study is to assess the state of knowledge management in South Africa. It is proposed that this be achieved through assessment by South African managers in four aspects of knowledge management.

1. Assessment of executives' perspectives on the notion of knowledge management in South Africa.

    1.1 Is the management of knowledge important?

        1.1.1 Are organisations knowledge intensive?

        1.1.2 Can knowledge be managed?

        1.1.3 What types of knowledge contribute to competitiveness?

1.1.4 What are the benefits of knowledge management?

1.1.5 What is the most important benefit of knowledge management?

1.2 What levers can be used in the management of knowledge?

1.2.1 How do executive rate their performance in the management of knowledge?

1.2.2 What percentage of managerial effort should be focused on people, process and technology?

1.2.3 What technology tools offer potential in the management of knowledge?

1.2.4 Are current organisational cultures conducive to the management of knowledge?

1.2.5 Should knowledge management roles be formalised?

1.3 What do executives believe to be the greatest managerial challenges in the management of knowledge?

1.3.1 What are the main impediments to knowledge transfer?

1.3.2 Would the deliberate management of knowledge overcome the impediments?

1.3.3 What are the difficulties in the management of knowledge?

1.3.4 What are the most useful metrics in tracking the progress of knowledge management efforts?

1.3.5 What are the risks inherent in the management of knowledge?

1.4 What is the nature of current knowledge management projects?

1.4.1 What is the nature of current knowledge management projects?

1.4.2 Who is leading knowledge management projects?

1.4.3 What are the difficult aspects of the projects?

1.4.4 How is performance being measured?

1.4.5 What projects are current, planned or envisaged?

2. The second objective is to determine whether there are significant differences between the surveys reflecting the state of knowledge management between South African and International (American and European) executives.

2.1 What are the significant differences between the South African and International (Ernst & Young) surveys, in the above questions?

The questions and respective measurement tools used to collect data and assess answers are listed in Table 3 below.

3.2 Research methodology

This study sets out to replicate and compare results with a study undertaken by Ernst & Young's Center for Business Innovation and Business Intelligence. The stated aim of the study was the determination of the state of knowledge management in American and European markets (Ruggles, 1998). The research instrument used was a self-completion questionnaire aimed at "middle to senior level managers" across a wide range of industries.

A primary objective of this study was to replicate the Ernst & Young study in such a way that the data were comparable. Ernst & Young's research methodology was therefore followed as closely as possible. In addition it must be noted that the ordinal scale used in questions 2, 3, 6, 8, and 10 have been retained, in the interests of comparability.

3.2.1 Population

The population under consideration was South African middle to senior level executives across a broad range of industries. Ernst & Young commissioned Matrix Marketing to provide a list of 500 randomly chosen executives from different categories of work function including Chief Executive, GM, Managing Director, Marketing Director, Operations Director, HR Director, Regional Director, IT/IS/Computing senior

management. The names and contact details of the individuals concerned were retrieved from their database.

Leonard-Barton (1995) indicates that knowledge management can be easily undertaken within small organisations without the need for formalised processes and information technology architectures. This, she argues, is primarily because of the comparative ease with which people can collaborate and communicate.

The International survey designed the instrument for completion by senior level management in the same categories as for the national survey. Companies targeted were listed in Fortune Magazines top 500 and a European equivalent index. The South African survey targeted executives from the selected work functions in the Matrix Marketing database.

3.2.2 Sample size and method of sampling

The number of responses received for the International study was 431, of which 300 were US based executives and 131 were European based. The list of potential respondents was generated in the same way as in South Africa in that a database management concern was approached for respondents' details in both the US and Europe. From this list categories of senior managers were selected and a random sample chosen.

In the South African survey 500 questionnaires were posted by Ernst & Young. Returned questionnaires were received at Ernst & Young's Johannesburg office by both mail and fax. Over a two-month period between mid November 1998 and late January 1999 a total of 65 responses were received. This represented a response of 13%, which is within the expected range for an instrument of this nature.

It was felt, however, that 65 responses were not sufficient to allow a valid statistical analysis. It was felt that a significance level of less than 10% was acceptable, therefore a further 50 questionnaires were printed and distributed. These were handed directly to respondents with a covering letter and collected one week later. In this manner a further 32 responses were generated, bringing the total number of responses to 97.

3.2.3 Method of data collection

The questionnaire used consisted of five sections. Sections 1 to 4 involved questions pertaining to the research questions and were similar to those used in the original survey, in the interests of comparability of the data. Section 5 comprised demographic questions. Slight modifications were made to the questions in order to tailor the instrument to local needs for example revenue breakdowns and currency.

The following table outlines the respective sections, question numbers and data collection tool.

Section	Question number	Observational tool
1	1	Nominal (yes/no) scale
	2	5 Point ordinal scale
	3	5 Point ordinal scale
	4	Nominal scale
	5	Ordinal ranking
2	6	5 Point ordinal scale
	7	Nominal (percentile) scale
	8	3 Point ordinal scale
	9	Open ended
	10	5 Point ordinal scale
3	11	Linear weighted scale
	12	Open ended
	13	Linear weighted scale
	14	Linear weighted scale
	15	Open ended
4	16	Open ended
	17	Limited open ended
	18	Linear weighted scale
	19	Open ended
	20	Ordinal ranking

Table 2: Question and respective observational tool

In order to undertake the comparison a copy of the aggregate results for the international studies was secured from Ernst & Young's Center for Business Innovation and Business Intelligence.

3.2.4 Methods of data analysis

The statistical realm of the instrument and its consequent analysis is that of parametric descriptive statistics. Appendix A contains a consistency matrix that includes details regarding analyses to be performed on the data and the allocation of question numbers to research objectives.

Table 3 summarises the analyses to be performed for the various research objectives:

No.	Observational tool	Data level	Local Analysis	Comparative Analysis
			Dispersion	Comparison
1	Nominal (yes/no) scale	Nominal	Percentage	Chi-square test of independence
2	5 Point scale	Ordinal	Percentage	Two-sample t-test.
3	5 Point scale	Ordinal	Percentage	Two-sample t-test.
4	Nominal scale	Nominal	Percentage	Chi-square test of independence
5	Ordinal ranking	Ordinal	Percentage	Chi-square test of independence
6	5 Point scale	Ordinal	Percentage	Two-sample t-test.
7	Nominal (Percentile) scale	Nominal	Percentage	Chi-square test of independence
8	3 Point scale	Ordinal	Percentage	Chi-square test of independence
9	Open ended	Nominal	Percentage	Chi-square test of independence
10	5 Point scale	Ordinal	Percentage	Two-sample t-test.
11	Ordinal ranking	Ordinal	Linear weighted scale	Spearmans rank order correlation.
12	Open ended	Nominal	Percentage	Chi-square test of independence
13	Ordinal ranking	Ordinal	Linear weighted scale	Spearmans rank order correlation.
14	Ordinal ranking	Ordinal	Linear weighted scale	Spearmans rank order correlation.
15	Open ended	Nominal	Percentage	Descriptive statistics.

No.	Observational tool	Data level	Local Analysis	Comparative Analysis
			Dispersion	Comparison
16	Open ended	Nominal	Percentage	Descriptive statistics.
17	Open ended	Nominal	Percentage	Descriptive statistics.
18	Ordinal ranking	Ordinal	Linear weighted scale	Spearmans rank order correlation.
19	Open ended	Nominal	Percentage	Descriptive statistics.
20	Ordinal ranking	Ordinal	Percentage	Chi-square test of independence

Table 3: Methods of analysis

3.3 Statement of the null hypothesis

Table 4 states the null hypothesis for each of the statistical tests performed on the data. The following hypotheses will be tested to a 10% level of significance.

Statistical test	Null hypothesis (Ho)
Chi square test of independence	The South African and International samples are independent.
Spearmans rank order correlation	There is no correlation between the South African and International samples.
Two-sample t-test	Location (i.e. South African and International) is not a predictor of the secondary variable.

Table 4: Hypothesis definition

3.4 Limitations

The research is aimed at determining executives' perspectives on the management of knowledge in the organisation. The emphasis is on determining the extent of the understanding of knowledge management and associated issues. The research therefore sets out to determine the state of knowledge management in South Africa in comparison to an International study. The research will not delve in to the underlying reasoning behind differences between studies.

Further limitations are as follows:

- Low response rate (typically about 15%) that accompanies a self-completion methodology.

- The sampling method does not yield a sample that can be considered representative of South African executives.

- Inaccurately or incomplete questionnaires, although with careful editing and callbacks, this was rectified as far as possible.

- It cannot be ensured that the person who was sent the questionnaire actually completed it.

- One does not know why people either responded or did not respond. It is fair to assume, however, that a fair degree of self-selection bias exists (i.e. people with an awareness of and interest in knowledge

management would have been more likely to respond). In addition, in order to achieve the required level of significance it was necessary to distribute the questionnaire amongst respondents that were chosen by the author. It is therefore apparent that this action may affect the reliability of the sample.

4 Research results

The questionnaire was posted to executives in 500 organisations at the beginning of November 1998. Sixty-five responses were returned *via* mail or fax to Ernst & Young's Johannesburg offices between mid November 1998 and late January 1999. The 65 responses represented a 13% response rate, which was to be expected for an instrument using the self-completion methodology. The number of responses, however, was considered to be too low, and therefore another 50 questionnaires were distributed to individually targeted members of the survey population. Of the 50 questionnaires distributed, 32 were returned, bringing the total number of completed and returned questionnaires to 97.

It must be noted that the two aspects of the South African survey data collection, a degree of bias was introduced that obviates the extrapolation of the results to the greater population. It was decided, however, that this was acceptable due the nature of the instrument and the total size of the population.

The data from the international survey were secured from Ernst & Young's Center for Business Innovation between January 1999 and July 1999. The process of data collection was lengthy due to changes in Ernst & Young's staffing and the author's inability to follow up on agreed dates, due to alternative commitments. The international data, too, were not fully

complete. Raw data for questions 5, 9, 10, 15, 16 and 19 were not fully available. For the above questions the results of the analysis were available but the data from which the results were derived was nto. In these instances, the lack of data led to a limited comparison of International and South African results.

A number of the South African questionnaires were not fully completed initially but were later modified through telephonic contact with respondents for clarification or completion of outstanding responses.

The data were analysed using a number of software programmes. Responses were initially tabulated using Microsoft Excel. Microsoft Word was used to tabulate and sort data. Number Cruncher Statistical System (NCSS) was used for the Chi-square and Two-sample t-tests.

The results of the data analysis on both the International and South African studies are detailed below.

4.1 Demographics

This section was dedicated to the collection of demographic data. Respondents were requested to indicate the their title, industry reporting line, and organisation size in revenues

The results of this section are detailed below.

4.1.1 Respondent titles

What is your title?

4.1.1.1 South African survey

South African respondents tended to be of senior rank as indicated in Table 5 below:

Title / Designation	Percentage of Respondents
Managing Director	34.02%
Director (Financial, Human Resources, Operations and Information technology)	29.90%
General Manager	13.40%
Chief Executive Officer	7.22%
Other	15.46%

Table 5: Titles of South African respondents

4.1.1.2 International survey

International respondents also tended to be of senior rank, as listed in Table 6 below.

Title / Designation	Percentage of Respondents

Senior Management	6.00%
Vice President, Executive Vice President, Senior Vice President	56.00%
Director/General Manager	15.00%
Other	23.00%

Table 6: Titles of International respondents

4.1.2 Respondent industry

Please list the primary industry in which you compete.

4.1.2.1 South African survey

Table 7 lists the primary industries and percentage response for both surveys.

Industry	International Survey	South African Survey
Aerospace	2.00%	0.00%
Banking	6.00%	8.25%
Chemicals	5.00%	1.03%
Computers/Software/Electronics	5.00%	4.12%
Consumer Goods	3.00%	3.09%
Health Care	3.00%	1.03%
Insurance	9.00%	1.03%
Manufacturing	13.00%	27.84%
Media/Entertainment	2.00%	11.34%

Industry	International Survey	South African Survey
Mining	5.00%	1.03%
Paper/ Forest Products	2.00%	3.09%
Pharmaceuticals	3.00%	3.09%
Retail/ Wholesale	6.00%	12.37%
Telecommunications	5.00%	1.03%
Transportation Services	3.00%	4.12%
Utilities	6.00%	0.00%
Other	23.00%	17.53%

Table 7: Industry representation

4.1.3 Respondent's organisation size

Please indicate the size of your organisation according to revenues.

4.1.3.1 South African survey

Table 8 below outlines the rand revenue breakdown of the respondents' organisations.

Revenue Category	Percentage
< R100m	26.80%
R100m ¬ R249m	28.87%
R250m ¬ R499m	9.28%
R500m ¬ R 749m	11.34%
R750m ¬ R999m	7.22%
>R1bn	16.49%

Table 8: Size of South African respondents organisations according to revenues

4.1.3.2 International survey

Table 9 below outlines the dollar revenue break down of the respondents' organisations.

Revenue Category	Percentage
< $249m	18.00%
$250m ¬ $499m	7.00%
$500m ¬ $749m	6.00%
$750m ¬ $999m	5.00%
$1bn ¬ $2.5bn	20.00%
>$2.5bn	42.00%

Table 9: Size of International respondents organisations according to revenues

4.1.4 Respondents reporting line

To whom do you report?

4.1.4.1 South African survey

Table 10 lists the parties to whom South African respondents reported.

Title	Percentage
Board	10.31%
CEO	49.48%
Chairman	15.46%
Director	17.53%
General Manager	7.22%

Table 10: South African respondents reporting line

4.1.4.2 International survey

Table 11 lists the parties to whom international respondents reported.

Title	Percentage
President/ Chief Executive Officer	41.00%
Functional Vice President	35.00%
Chief Financial Officer	11.00%
Chief Operations Officer	8.00%

Title	Percentage
Director/ General Manager	2.00%
Manager	2.00%
Other	1.00%

Table 11: International respondents reporting line

4.2 The case for managing knowledge

In this data to answer research questions 1.1 and 2.1 as outlined in Chapter 3 is analysed.

4.2.1 Question 1

Are you in what you consider to be a “knowledge-intensive business”?

4.2.1.1 International and South African survey results

Table 12 presents the international and South African responses to question 1.

Response	International Survey	South African Survey
Yes	86.00%	89.69%
No	14.00%	10.31%

Table 12: Knowledge intensive business

4.2.1.2 Comparison - Chi-Square test of independence

Table 13 lists the Chi-square result summary for question 1.

Question	Chi-square	Probability	Decision
1.	0.898205	0.343264	Accept Ho

Table 13: Question 1 Chi-square summary

4.2.2 Question 2

Please indicate your level of agreement with the following statement: “It would be possible, through more deliberate management, to leverage the knowledge existing in my organisation to a higher degree.”

4.2.2.1 International and South African survey results

Table 14 indicates the percentage response to question 2 for both international and South African surveys.

Construct	International Survey	South African Survey
Disagree Strongly	1.00%	0.00%
Disagree	1.00%	0.00%
Neutral	2.00%	5.15%
Agree	42.00%	58.76%
Agree Strongly	54.00%	36.08%

Table 14: Perceived degree of influence, of management, over knowledge performance

4.2.2.2 Comparison – Two-sample t-test

Table 15 outlines key decisions in the Two-sample t-test for question 2.

T Statistic	Decision (10%)	Assumptions		Decision (10%)
		Normality	Equal Variance	Kolmogorov Smirnov
2.2885	Reject Ho	Reject	Reject	Reject Ho

Table 15: Two-sample t-test

4.2.3 Question 3

What types of knowledge are critical to your competitiveness?

4.2.3.1 South African survey results

Table 16 reflects the percentage response to each of the nine types of knowledge for the South African survey.

Knowledge Type	Not at all Important	Not Very Important	Somewhat Important	Very Important	Extremely Important
a). Knowledge about emerging economies	3.09%	4.12%	21.65%	30.93%	40.21%
b). Knowledge about competitors	2.06%	5.15%	12.37%	51.55%	28.87%
c). Knowledge about customers	2.06%	2.06%	2.06%	22.68%	71.13%
d). Knowledge about best practices/effective processes	1.03%	6.19%	13.40%	41.24%	38.14%
e). Knowledge about supply chain partners	5.15%	11.34%	19.59%	42.27%	21.65%
f). Knowledge about emerging market trends	0.00%	7.22%	21.65%	35.05%	36.08%

Knowledge Type	Not at all Important	Not Very Important	Somewhat Important	Very Important	Extremely Important
g). Knowledge about regulation/legislation	0.00%	0.00%	9.28%	40.21%	50.52%
h). Knowledge about our own competencies and capabilities	0.00%	0.00%	9.28%	40.21%	50.52%
i). Knowledge about our own products and services	0.00%	4.12%	4.12%	28.87%	62.89%

Table 16: Importance of types of knowledge for South African respondents

4.2.3.2 International survey results

Table 17 reflects the percentage response to each of the nine types of knowledge for the International survey.

Knowledge Type	Not at all Important	Not Very Important	Somewhat Important	Very Important	Extremely Important
a). Knowledge about emerging economies	0.00%	4.00%	26.00%	35.00%	34.00%
b). Knowledge about competitors	0.00%	3.00%	15.00%	43.00%	39.00%
c). Knowledge about	1.00%	0.00%	3.00%	20.00%	76.00%

Knowledge Type	Not at all Important	Not Very Important	Somewhat Important	Very Important	Extremely Important
customers					
d). Knowledge about best practices/effective processes	1.00%	1.00%	12.00%	55.00%	32.00%
e). Knowledge about supply chain partners	2.00%	8.00%	35.00%	38.00%	16.00%
f). Knowledge about emerging market trends	0.00%	1.00%	14.00%	49.00%	34.00%
g). Knowledge about regulation/legislation	0.00%	2.00%	12.00%	41.00%	45.00%
h). Knowledge about our own competencies and capabilities	0.00%	2.00%	12.00%	41.00%	45.00%
i). Knowledge about our own products and services	0.00%	2.00%	12.00%	46.00%	39.00%

Table 17: Importance of types of knowledge for International respondents

4.2.3.3 Comparison – Two-sample t-test

Table 18 outlines key decisions in the Two-sample t-test for question 3.

No.	t Statistic	Decision (10%)	Assumptions		Non Parametric Test	Decision (10%)
			Normality	Equal Variance		
a	0.1011	Accept Ho	Reject	Reject	Kolmogoro v Smirnov	Accept Ho
b	1.9510	Reject Ho	Reject	Cannot Reject	Mann Whitney U	Reject Ho
c	2.1307	Reject Ho	Reject	Reject	Kolmogoro v Smirnov	Accept Ho
d	0.5907	Accept Ho	Reject	Reject	Kolmogoro v Smirnov	Accept Ho
e	-0.0769	Accept Ho	Reject	Reject	Kolmogoro v Smirnov	Accept Ho
f	2.4136	Reject Ho	Reject	Reject	Kolmogoro v Smirnov	Accept Ho
g	-5.6719	Reject Ho	Reject	Reject	Kolmogoro v Smirnov	Reject Ho
h	-1.9398	Reject Ho	Reject	Reject	Kolmogoro v Smirnov	Accept Ho
i	-3.1469	Reject H0	Reject	Cannot Reject	Mann Whitney U	Reject Ho

Table 18: Two-sample t-test

4.2.4 Question 4

What benefits do you believe your organisation could gain from more active management of its knowledge?

4.2.4.1 South African survey results

Table 19 reflects the percentage response to each of the benefits listed in question 4, for the South African survey.

Benefit	Percentage of respondents indicating benefit
Increased responsiveness to customers	82.47%
Quality Improvement: not repeating mistakes	81.44%
Improved decision-making	79.38%
Flexibility: ability to change and adapt to change more rapidly	77.32%
Innovation: more consistent success in designing new products/services and processes	76.29%
Efficiency: increased productivity of knowledge workers	76.29%

Benefit	Percentage of respondents indicating benefit
Empowerment: ability to support decision-making at lower levels in the organisation	68.04%
Reduction in duplication of effort	54.64%

Table 19: South African benefits of knowledge management

4.2.4.2 International survey results

Table 20 reflects the percentage response regarding each of the benefits listed in question 4, for the international survey.

Benefit	Percentage of respondents indicating benefit.
Efficiency: increased productivity of knowledge workers	84.00%
Increased responsiveness to customers	84.00%
Innovation: more consistent success in designing new products/services and processes	83.00%
Improved decision-making	83.00%
Flexibility: ability to change and adapt to change more rapidly	82.00%
Quality Improvement: not repeating mistakes	71.00%
Reduction in duplication of effort	69.00%
Empowerment: ability to support decision	62.00%

Benefit	Percentage of respondents indicating benefit.
making at lower levels in the organisation	

Table 20: International benefits of knowledge management

4.2.4.3 Comparison – Chi-Square test of independence

Table 21 lists the summary of results of the Chi-square test of independence for question 4.

Question	Chi-square	Probability	Decision
4.	366.077942	0.000000	Reject Ho

Table 21: Chi-square result summary

4.2.5 Question 5

Of the benefits listed in question 4 above, which would be most important to your organisation's success?

4.2.5.1 South African survey results

Table 22 list the percentage of respondents indicating the listed benefits as the most useful, for the South African survey.

Benefit	Percentage of respondents indicating benefit
Innovation: more consistent success in designing new products/services and processes	22.68%
Increased responsiveness to customers.	19.59%
Flexibility: ability to change and adapt to change more rapidly	17.53%
Efficiency: increased productivity of knowledge workers	16.49%
Improved decision-making.	7.22%
Quality Improvement: not repeating mistakes	7.22%
Empowerment.	4.12%

Benefit	Percentage of respondents indicating benefit
Reduction in duplication of effort.	3.09%

Table 22: Benefit for South African respondents

4.2.5.2 International survey results

Table 23 lists the percentage of respondents indicating the listed benefits as the most useful, for the international survey.

Benefit	Percentage of respondents indicating benefit
Innovation: more consistent success in designing new products/services and processes	23.00%
Flexibility: ability to change and adapt to change more rapidly	16.00%
Increased responsiveness to customers	10.00%
Improved decision making	9.00%
Efficiency: increased productivity of knowledge workers	9.00%
Reduction in duplication of effort	0.00%
Empowerment	0.00%

Benefit	Percentage of respondents indicating benefit
Quality Improvement: not repeating mistakes	0.00%

Table 23: Greatest benefit for International respondents

4.2.5.3 Comparison – Spearmans rank correlation

Spearmans rank	0.8
T crit	2.132
Standard Errorr	0.3
T statistic	2.6666667
Decision	**Reject Ho**

Table 24: Spearmans rank correlation

4.3 The levers of knowledge management

This section is dedicated to the analysis of data to answer research questions 1.2 and 2.1 as outlined in Chapter 3.

4.3.1 Question 6

Listed below are eight major knowledge processes. Please note for each your impression of your organisation's current performance.

4.3.1.1 South African survey results

Table 25 indicates respondents, impressions of performance for the eight knowledge processes for the South African survey.

Construct	Very Poor	Poor	Average	Good	Excellent
a). Generating new knowledge	0.00%	11.34%	48.45%	37.11%	3.09%
b). Accessing valuable knowledge from external sources	3.09%	11.34%	44.33%	38.14%	3.09%
c). Representing knowledge in documents, databases, software, etc.	4.12%	32.99%	32.99%	25.77%	4.12%
d). Embedding knowledge in processes, products and/or	3.09%	12.37%	54.64%	27.84%	2.06%

Construct	Very Poor	Poor	Average	Good	Excellent
services					
e). Transferring existing knowledge to other parts of the organisation	3.09%	34.02%	45.36%	15.46%	2.06%
f). Using accessible knowledge in decision making	2.06%	15.46%	52.58%	25.77%	4.12%
g). Facilitating knowledge growth through culture and incentives	6.19%	36.08%	37.11%	20.62%	0.00%
h). Measuring the value of knowledge assets and/or impact of knowledge management	10.31%	57.73%	27.84%	4.12%	0.00%

Table 25: Knowledge process assessment for the South African survey

4.3.1.2 International survey results

Table 26 indicates respondents' impression of performance for the eight knowledge processes for the International survey.

Construct	Very Poor	Poor	Average	Good	Excellent
a). Generating new	1.00%	11.00%	40.00%	37.00%	10.00%

knowledge.					
b). Accessing valuable knowledge from external sources.	2.00%	17.00%	47.00%	30.00%	4.00%
c). Representing knowledge in d). documents, databases, software, etc.	3.00%	27.00%	43.00%	24.00%	3.00%
d). Embedding knowledge in processes, products and/or services.	2.00%	23.00%	44.00%	28.00%	2.00%
e). Transferring existing knowledge to other parts of the organisation.	6.00%	38.00%	44.00%	11.00%	1.00%
f). Using accessible knowledge in decision making.	1.00%	19.00%	50.00%	29.00%	2.00%
g). Facilitating knowledge growth through culture and incentives.	8.00%	37.00%	36.00%	17.00%	2.00%
h). Measuring the value of knowledge assets and/or impact of knowledge management.	27.00%	41.00%	26.00%	4.00%	1.00%

Table 26: Knowledge process assessment for the International survey

4.3.1.3 Comparison – Two-sample t-test

Table 27 outlines key decisions in the Two-sample t-test for question 6.

No.	T Statistic	Decision (10%)	Assumptions		Non Parametric Test	Decision (10%)
			Normality	Equal Variance		
a	1.5766	Accept Ho	Cannot Reject	Reject	Mann Whitney U	Accept Ho
b	-1.0185	Accept Ho	Reject	Cannot Reject	Mann Whitney U	Accept Ho
c	-0.0891	Accept Ho	Reject	Reject	Kolmogoro v Smirnov	Accept Ho
d	-0.6950	Accept Ho	Reject	Cannot Reject	Mann Whitney U	Accept Ho
e	-3.8269	Reject Ho	Reject	Reject	Kolmogoro v Smirnov	Accept Ho
f	-0.4077	Accept Ho	Reject	Cannot Reject	Mann Whitney U	Accept Ho
g	-0.3876	Accept Ho	Reject	Cannot Reject	Mann Whitney U	Accept Ho

No.	T Statistic	Decision (10%)	Assumptions		Non Parametric Test	Decision (10%)
			Normality	Equal Variance		
h	1.3522	Accept Ho	Reject	Reject	Kolmogorov Smirnov	Reject Ho

Table 27: Two-sample t-test

4.3.2 Question 7

4.3.2.1 International and South African survey results

7a). Does your organisation's ability to compete based on knowledge depend more upon people, process or technology issues

Emphasis	International Survey	South African Survey
People	50.00%	51.01%
Process	25.00%	22.00%
Technology	25.00%	26.99%

Table 28: Required emphasis

7b). Is this the relative emphasis being placed by your organisation?

Answer	International Survey	South African Survey
Yes	38.00%	65.75%
No	62.00%	34.25%

Table 29: Is the required emphasis being applied

7c). If no, what is the relative emphasis that your organisation currently places on people, process and technology issues?

Emphasis	International Survey	South African
People	40.00%	44.49%
Process	28.00%	26.48%
Technology	32.00%	29.30%

Table 30: Current emphasis

4.3.2.2 Comparison

Question	Chi-square value	Probability	Decision
7a).	0.531681	0.766561	Accept Ho
7b).	38.464662	0.000000	Reject Ho
7c).	0.676540	0.713003	Accept Ho

4.3.3 Question 8

What technology tools do you believe offer the greatest potential for enhancing your organisation's knowledge base?

4.3.3.1 South African survey results

Table 31 reflects respondents' impression of the potential of six knowledge management technology tools, for the South African survey.

Technology Tool	Some Potential	Moderate Potential	Great Potential
GroupWare	23.71%	45.36%	30.93%
Data Warehouses	11.34%	37.11%	51.55%
Decision support tools	15.46%	44.33%	40.21%
Internet access	24.74%	43.30%	31.96%
Intranet	22.68%	27.84%	49.48%
Directories of resident experts	27.84%	42.27%	24.74%

Table 31: Use of knowledge management technology for the South African survey

4.3.3.2 International survey results

Table 32 reflects the respondents' impressions of the potential of six knowledge management technology tools, for the international survey.

Technology Tool	Some Potential	Moderate Potential	Great Potential
GroupWare	16.00%	40.00%	37.00%
Data Warehouses	14.00%	37.00%	42.00%
Decision support tools	14.00%	36.00%	44.00%
Internet access	24.00%	47.00%	23.00%
Intranet	10.00%	35.00%	50.00%
Directories of resident experts	35.00%	41.00%	25.00%

Table 32: Utilisation of knowledge management technology for the international survey

4.3.3.3 Comparison – Chi-square tests of independence summary

Table 33 presents the result summary for the result comparison.

Technology Tool	Chi-Square	Probability	Result
GroupWare	6.560305	0.037623	Reject Ho
Data Warehouses	0.499717	0.778911	Accept Ho

Technology Tool	Chi-Square	Probability	Result
Decision support tools	3.220910	0.199797	Accept Ho
Internet access	0.504219	0.777160	Accept Ho
Intranet	12.041681	0.002428	Reject Ho
Directories of resident experts	3.786522	0.150580	Accept Ho

Table 33: Chi-Square result summary

4.3.4 Question 9

Please comment on the culture of your organisation and its impact on knowledge.

4.3.4.1 South African survey

Table 34 reflects respondents' opinions as to whether their organisation's culture is conducive to knowledge management, or not.

Construct	Percentage Response
Conducive	41.94%
Not conducive	58.06%

Table 34: Impact of culture on knowledge management

Table 35 outlines reasons given as to why organisational culture was not conducive to knowledge management.

Construct	Percentage Response
Knowledge hoarding	58.07%
Low absorptive capacity of users	30.04%
Culture is process focused	30.04%

Construct	Percentage Response
Singular silo organisational structure	24.03%
Lack of understanding of importance	14.02%

Table 35: Aspects of culture not conducive to knowledge management

Table 36 outlines reasons as to why organisational culture is conducive to knowledge management.

Construct	Percentage Response
Employees are “knowledge thirsty”	69.32%
The identification of knowledge is important	47.14%
The culture is flexible to new initiatives	27.73%
The culture involves sharing of knowledge	11.09%
Culture accepts knowledge changing constantly	5.55%

Table 36: Aspects of culture conducive to knowledge management

4.3.4.2 International survey

The international survey results did not provide the same level of extraction of data as did the South African results. The only available results were the following rankings.

1. Culture encourages knowledge hoarding.
2. Culture is generally not conducive to knowledge management.
3. Culture is conducive to knowledge management.

4.3.5 Question 10

Do you think it is or would be valuable to have a formal role of “Chief Knowledge Officer” (or equivalent) in your organisation?

4.3.5.1 International and South African survey results

Table 37 indicates respondents’ impressions of the value of a Chief Knowledge Officer (or equivalent) for both the International and South African surveys.

Construct	International Survey	South African Survey
Not at all valuable	14.00%	15.46%
Not very valuable	31.00%	27.84%
Somewhat valuable	29.00%	23.71%
Very valuable	18.00%	23.71%
Extremely valuable	5.00%	9.28%

Table 37: Perceived value of the Chief Knowledge Officer

Table 38 summarises responsibilities of Chief Knowledge Officers according to those answering Somewhat Valuable, Very Valuable or Extremely Valuable.

Construct	Percentage Response
Facilitation Knowledge Transfer	48.21%
Enabling knowledge	44.64%
Leveraging knowledge	39.29%
Making knowledge visible	25.00%
Introduce knowledge management	8.93%

Table 38: Responsibilities of the Chief Knowledge Officer

The international survey results did not provide the level of extraction of data as in the South African results. The only available results were the following rankings.

1. Making knowledge visible (i.e. gaps/establish priorities)
2. Leverage knowledge
3. Enabling knowledge

4.4 Challenges to overcome

In this section the analysis of data is presented that answers research questions 1.3 and 2.1 as outlined in chapter 3.

4.4.1 Question 11

What are the biggest current impediments to knowledge transfer in your organisation?

Both the international and South African survey used linear weighted scales to rank the constructs presented in question 11. The international results, however, were reduced in magnitude by some factor, which is unknown to the author. This required the use of Spearmans rank correlation method to compare the two sets of results.

4.4.1.1 South African survey results

Table 39 presents the ranking of impediments to knowledge transfer using a linear weighted scale index.

Construct	Index
Lack of shared understanding of strategy or	253

Construct	Index
business model	
Culture	214
Non-standardised processes	195
Lack of ownership of the problem	182
Information/communications technology constraints	160
Top management's failure to signal its importance	136
Incentive system	97
Organisational structure	80
Staff turnover	60
Configuration/physical features of work spaces	33

Table 39: South African impressions of impediments to knowledge transfer

4.4.1.2 International survey results

Table 40 presents the international ranking of impediments to knowledge transfer.

Impediment	Index
Culture	55
Top management's failure to signal its importance	32
Lack of shared understanding of strategy or business model	30
Organisational structure	29
Non-standardised processes	27
Lack of ownership of the problem	27
Information/communications technology constraints	21
Incentive system	20
Staff turnover	8
Configuration/physical features of work spaces	5

Table 40: International impressions of impediments to knowledge transfer

4.4.1.3 Comparison – Spearmans rank correlation

Table 41 presents the results summary for the Spearman rank correlation calculations.

Spearmans rank	0.684848
T crit	1.86
Standard Errorr	0.230431
T statistic	2.972038
Decision	**Reject Ho**

Table 41: Spearmans rank correlation result summary

4.4.2 Question 12

Reflecting on what you consider to be the largest obstacle, please comment on the degree to which it could be overcome by more deliberate management.

4.4.2.1 International and South African survey results

Table 42 presents international and South African respondents' impressions of the ability of deliberate management to overcome obstacles.

Construct	International Survey	South African Survey
Can be overcome	67.00%	62.89%
Can't be overcome	4.00%	22.68%
Don't know	2.00%	14.43%
Other	27.00%	0.00%

Table 42: Deliberate management overcoming impediments to knowledge transfer

4.4.2.2 Comparison – Chi-Square test of independence

Table 43 presents the Chi-square results for question 12.l

Question	Chi-square value	Probability	Decision
12	94.228553	0.000000	Reject Ho

Table 43: Question 8 - Chi-Square statistic

4.4.3 Question 13

What do you think would be (or are) the biggest difficulties in managing knowledge in your organisation?

Both the international and South African survey involved the use of linear weighted scales to rank the constructs presented in question 13. The international results however were reduced in magnitude by some factor unknown to the author. This required the use of Spearmans rank correlation method for the comparison of the two sets of results.

4.4.3.1 South African survey results

Table 44 presents South African rankings of difficulties in knowledge management.

Construct	Index
Changing people's behaviour	235
Determining what knowledge should be managed	227
Measuring the value and performance of knowledge assets	121
Mapping the organisation's existing knowledge	113
Defining standard processes for knowledge	245

work	
Identifying the right team leader/team for knowledge initiatives	173
Setting the appropriate scope for knowledge initiatives	118
Overcoming technological limitations	87
Justifying the use of scarce resources for knowledge initiatives	119
Attracting and retaining talented people	16
Making knowledge available	1

Table 44: South African difficulties in knowledge management

4.4.3.2 International survey results

Table 45 presents the international rankings of difficulties in knowledge management.

Construct	Index
Changing people's behaviour	56
Measuring the value and performance of knowledge assets	43
Determining what knowledge should be managed	41

Construct	Index
Justifying the use of scarce resources for knowledge initiatives	34
Mapping the organisation's existing knowledge	27
Defining standard processes for knowledge work	24
Setting the appropriate scope for knowledge initiatives	24
Making knowledge available	15
Overcoming technological limitations	14
Identifying the right team leader/team for knowledge initiatives	12
Attracting and retaining talented people	9

Table 45: International difficulties in knowledge management

4.4.3.3 Comparison- Spearmans rank correlation

Spearmans rank	0.745455
T crit	1.812
Standard errorr	0.200974

T statistic	3.709203
Decision	**Reject Ho**

Table 46: Spearmans rank correlation results

4.4.4 Question 14

If you were to track the knowledge performance of your organisation over time, what do you believe would be the most useful to measure?

Both the International and South African survey involved the use of linear weighted scales to rank constructs presented in question 14. The international results, however, were reduced in magnitude by some factor which is unknown. This required the use of Spearmans rank correlation method for the comparison of the two sets of results.

4.4.4.1 South African survey results

Table 47 presents South African respondents rankings of measures of knowledge management.

Construct	Index
Revenue generated by new ideas	165
Employee awareness of knowledge sources	136
Quality of decisions	136
Collaboration levels in key initiatives	116
Percentage of revenue from new products	116
Productivity of knowledge workers	112

Construct	Index
Return on investment in knowledge management projects	105
Increase in value of intellectual capital	96
Delegation/distribution of decision making	82
Withdrawals from central knowledge repositories	77
Employee's skill levels	72
Knowledge-based products/services launched	62
Submissions to central knowledge repositories	44
New patents, copyrights, products brought to market	37
Per capita expenditure on training	31
R&D expenditure	17
Employee attrition rates	11

Table 47: South African ranked measures of knowledge management

4.4.4.2 International survey results

Table 48 presents international respondents' rankings of measures of knowledge management.

Construct	Index

Construct	Index
Revenue generated by new ideas	34
Collaboration levels in key initiatives	31
Productivity of knowledge workers	27
Quality of decisions	25
Percentage of revenue from new products	23
Return on investment in knowledge management projects	23
Employee awareness of knowledge sources	21
Increase in value of intellectual capital	17
Knowledge-based products/services launched	15
New patents, copyrights, products brought to market	12
Withdrawals from central knowledge repositories	11
Delegation/distribution of decision making	11
Employee's skill levels	9
Submissions to central knowledge repositories	8
Per capita expenditure on training	4
Employee attrition rates	2
R&D expenditure	2

Table 48: International ranked measures of knowledge management

4.4.4.3 Comparison – Spearmans rank correlation

Table 49 presents the Spearmans rank correlation result summary.

Spearmans rank	0.901961
T crit	1.74
Standard errorr	0.104731
T statistic	8.612147
Decision	**Reject Ho**

Table 49: Spearmans rank correlation result summary

4.4.5 Question 15

What do you see as the major risks to managing knowledge in an organisation?

4.4.5.1 South African survey results

Table 50 presents the percentage response indicating the construct as a risk inherent in knowledge management.

Construct	Percentage Response
Insecurity of intellectual assets (loss due to staff turnover)	17.53%
Knowledge overload	16.49%
Lack of metrics	15.46%
Creating a bureaucracy	12.37%
Lack of senior management support	12.37%
No positive return on investment	11.34%
Distraction	11.34%
Not purging old knowledge	7.22%
Introduction of high cost structure	7.22%
Information technology dominating strategy	7.22%

Table 50: Risks in the management of knowledge

4.4.5.2 International survey results

The international survey results did not provide the level of extraction of data as in the South African results. The only available results were the following rankings.

1. Creating a bureaucracy
2. Perpetuating/not purging obsolete knowledge
3. Not achieving a positive ROI
4. Compromising security of intellectual assets
5. Distraction through less focus on work at hand

4.5 Gaining the knowledge advantage

This section presents the analysis of data to answer research questions 1.4 and 2.1, as outlined in chapter 3.

Respondents were required to complete only questions 16, 17, 18 and 19 if they had initiated or completed a knowledge management project. Fifty three of the 97 South African respondents (54.64 %) completed these questions. 248 of the 431 International respondents (57.54%) completed these questions.

4.5.1 Question 16

Please describe briefly a knowledge management project your firm/division/business unit has initiated or completed.

4.5.1.1 South African survey results

Table 51 lists knowledge management projects undertaken by South African respondents.

Construct	Percentage Response
Knowledge repositories	50.00%
Best practices	35.85%
Lessons learned	22.64%

Construct	Percentage Response
Implementing knowledge technology	20.75%
Knowledge map	15.09%
Decision support tools	13.21%
Knowledge audit	7.55%
Knowledge assessment	1.89%

Table 51: South African knowledge management projects

4.5.1.2 International survey results

The international survey results did not provide the level of extraction of data as in the South African results. The only available results were the following rankings.

1. Knowledge repositories
2. Best practices/lessons learned
3. Knowledge audit/mapping/assessment

4.5.2 Question 17

Who led the effort referred to in question 16, above?

4.5.2.1 South African survey results

Table 51 indicates who led South African knowledge management projects.

Project Leadership	Percentage of Total Respondents
General management	47.17%
Information technology	15.09%
Strategy	9.43%
Research and development	9.43%
Logistics	9.43%
Quality control	7.55%
Financial manager	1.89%

Table 52: South African knowledge management project leadership

4.5.2.2 International survey results

Table 52 lists who led the international knowledge management projects.

Project Leadership	Percentage of Total Respondents
Information technology	12.00%

Project Leadership	Percentage of Total Respondents
Senior management	6.00%
Strategy/development/planning	4.00%
Finance	3.00%
Quality	2.00%

Table 53: International knowledge project management leadership

4.5.3 Question 18

What in your opinion were the most difficult aspects of managing that effort?

Both the international and South African survey involved the use of linear weighted scales to rank constructs presented in question 18. The international results, however, were reduced in magnitude by some factor which is unknown to the author. This has required the use of Spearmans rank correlation method for the comparison of the two sets of results.

4.5.3.1 South African survey results

Table 54 presents the responses regarding difficulties experienced in South African knowledge management projects.

Construct	Index
Defining the project's scope	83
Defining standard processes/ Understanding what to do	61
Gaining/Sustaining top management attention and support	55
Assembling an excellent project team	36
Measuring project success	32

Construct	Index
Articulating the business case for the project	22

Table 54: Difficulties experienced in South African knowledge management projects

4.5.3.2 International survey results

Table 55 presents the responses regarding difficulties experienced in International knowledge management projects.

Construct	Index
Defining the project's scope	28
Defining standard processes/ understanding what to do	23
Measuring project success	20
Articulating the business case for the project	18
Gaining/Sustaining top management attention and support	12
Assembling an excellent project team	9

Table 55: Difficulties in managing knowledge management projects

4.5.3.3 Comparison – Spearmans rank correlation

Table 56 presents the results of Spearmans rank correlation calculations.

Spearmans rank	0.542857
T crit	2.132
Standard errorr	0.342857
T Statistic	1.583333
Decision	**Accept Ho**

Table 56: Spearmans rank correlation result summary

4.5.4 Question 19

How did or will management assess the success or failure of the effort?

4.5.4.1 South African survey results

Table 57 presents respondents' measures for the success of knowledge management projects.

Measure of Success	Percentage Response
Don't know	30.19%
Non-financial measures	28.30%
Usage	22.64%
Financial measures	18.87%

Table 57: Measures of success for knowledge management projects

4.5.4.2 International survey results

The international survey results did not provide the level of extraction of data as in the South African results. The only available results were the following rankings.

1. Non-financial measures (e.g. innovation, cycle time, customer satisfaction)
2. Usage (e.g. of repositories)
3. Financial Measures (e.g. revenue increase, cost reduction)

4.5.5 Question 20

All respondents were required to answer this question: What types of knowledge management efforts are underway, are planned, or would make sense for your organisation?

4.5.5.1 South African survey results

Table 58 presents the planning horizon for common knowledge management projects.

Knowledge management initiative	Current	Planned	Should do
Establishing new knowledge roles.	13.40%	15.46%	19.59%
Creating networks of knowledge workers.	11.34%	27.84%	32.99%
Mapping sources of internal expertise.	13.40%	17.53%	28.87%
Data warehouse/creating knowledge repositories.	31.96%	24.74%	15.46%
Implementing decision-support tools.	24.74%	32.99%	11.34%
Implementing GroupWare (e.g. Lotus Notes) to support collaboration.	36.08%	13.40%	15.46%
Creating an intranet.	28.87%	24.74%	12.37%
Launching a new knowledge-based product/services.	15.46%	16.49%	9.28%

Table 58: South African knowledge management projects

4.5.5.2 International survey results

Table 59 presents the planning horizon for common knowledge management projects.

Knowledge management effort	Current	Planned	Should do
Establishing new knowledge roles.	15.00%	9.00%	29.00%
Creating networks of knowledge workers.	24.00%	15.00%	29.00%
Mapping sources of internal expertise.	18.00%	20.00%	34.00%
Data warehouse/creating knowledge repositories.	33.00%	23.00%	18.00%
Implementing decision-support tools.	33.00%	20.00%	17.00%
Implementing GroupWare (e.g. Lotus Notes) to support collaboration.	36.00%	12.00%	7.00%
Creating an intranet.	48.00%	25.00%	8.00%
Launching a new knowledge-based product/services.	13.00%	16.00%	19.00%

Table 59: International knowledge management projects

4.5.5.3 Comparison – Chi-Square test of independence summary

Table 60 presents the Chi-square result summary for question 20.

Construct	Chi-square value	Probability	Decision
Establishing new knowledge roles.	5.921490	0.051780	Reject Ho

Construct	Chi-square value	Probability	Decision
Creating networks of knowledge workers.	2.344421	0.309682	Accept Ho
Mapping sources of internal expertise.	4.358547	0.113124	Accept Ho
Data warehouse/ creating knowledge repositories.	8.818184	0.012166	Reject Ho
Implementing decision-support tools.	9.333708	0.009402	Reject Ho
Implementing GroupWare (e.g. Lotus Notes) to support collaboration.	4.926874	0.085142	Reject Ho
Creating an intranet.	6.968814	0.030672	Reject Ho
Launching a new knowledge-based product/services.	4.370513	0.112449	Accept Ho

Table 60: Chi-square result summary

4.6 Summary

This chapter presented the results of the two questionnaires and comparative calculations undertaken on the data. In chapter 5 the data are interpreted and discussed in light of the research objectives.

5 Evaluation of findings

Chapter 5 discusses the findings of the research results presented in Chapter 4 in light of the research questions posed in Chapter 3.

5.1 Discussion of findings

This section will evaluate the findings in light of research objectives 1 and 2, as defined in chapter 3.

5.1.1 Do executives believe the management of knowledge is important?

This section will consider questions 1 to 5 both in terms of research objective 1 and 2.

5.1.1.1 Question 1

In both studies the majority of respondents indicated that their organisations were knowledge intensive. 89.69% of the South African respondents indicated that their organisations were knowledge intensive, whereas 86% of the international respondents believed that was the case.

Figures 1 and 2 below indicate the percentage response to question 1.

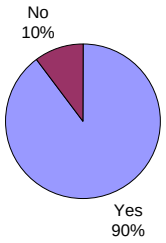


Figure 2: South African results

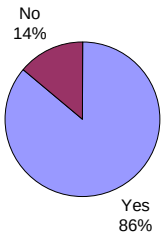


Figure 3: International results

Chi-square tests of independence led to the acceptance of the null hypothesis indicating that an executive's geographic location in no way predicted the response as to whether his/her business was knowledge intensive, or not. This indicated that no significant difference was detected between the South African and international studies with regard to question 1.

5.1.1.2 Question 2

In question 2 respondents were asked to indicate their level of agreement with the following statement: " It would be possible, through more deliberate management to leverage the knowledge existing in my organisation to a higher degree."

In both the international and South African studies the responses tend to skew to the agree and agree strongly end of the five point scale, as depicted in Figure 4and Figure 5 below:

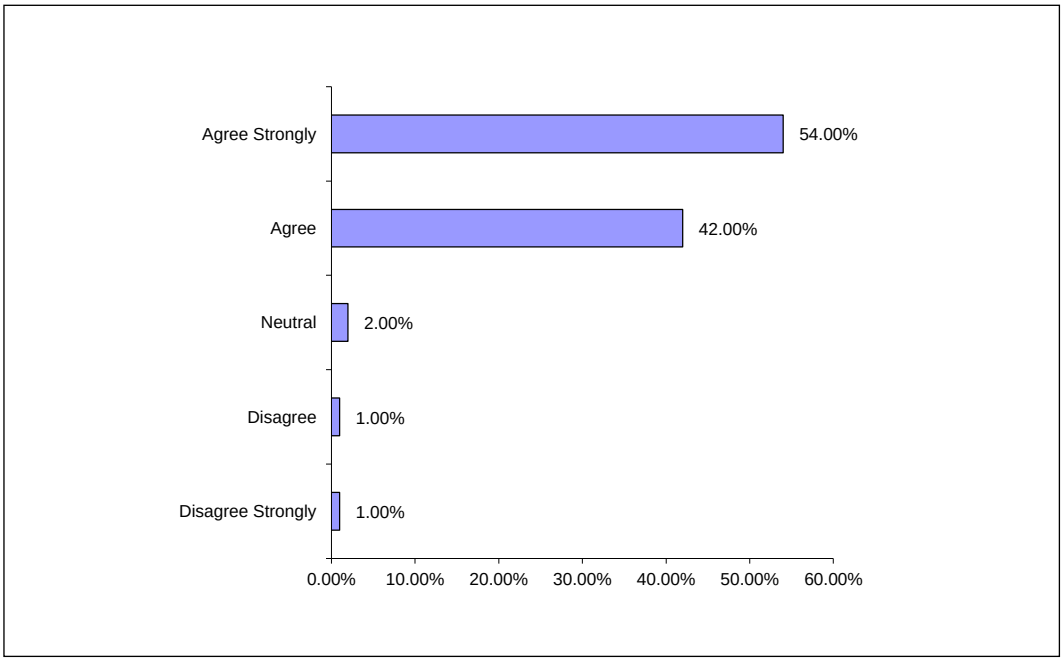


Figure 4: International levels of agreement

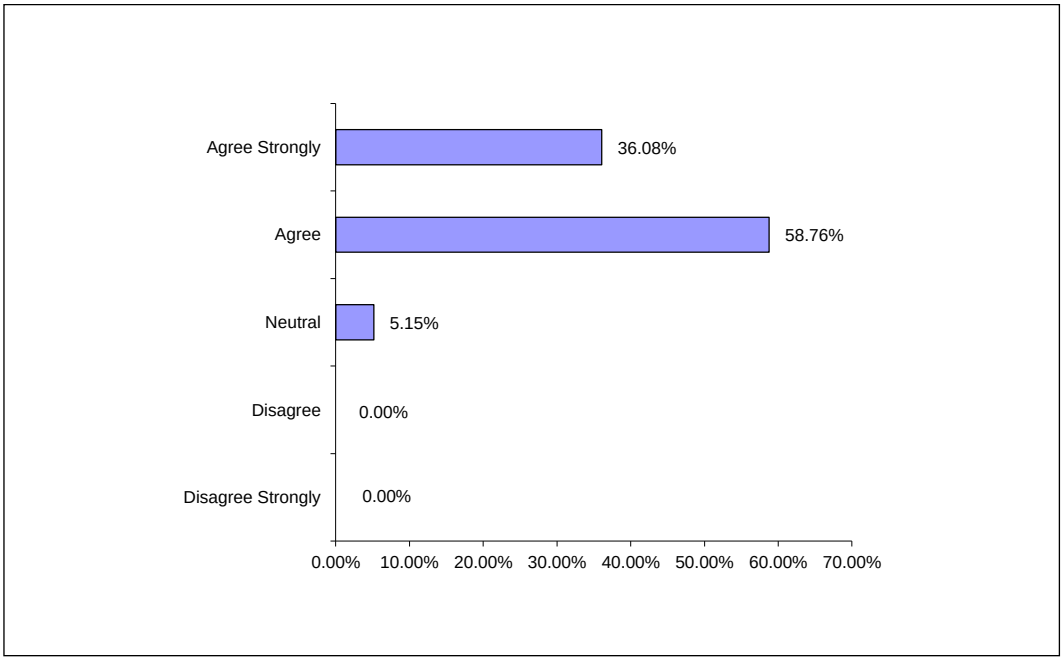


Figure 5: South African levels of agreement

The result of the Kolmorgorov Smirnov test was to reject the null hypothesis thereby indicating that there was a significant difference between the two sets of results. Neither of these calculations led to insight as to what caused the significant difference.

Since 56.00% of international respondents and 36.08% of South African respondents agree strongly with the construct it appears that international respondents were more confident as the to the degree of influence of greater degrees of management over the leverage of knowledge.

5.1.1.3 Question 3

Respondents were requested to rate the level of importance of certain types of knowledge.

This question will be addressed by briefly discussing responses to each of the constructs. Conclusions will then be drawn in a summary section.

5.1.1.3.1 Question 3a

71.01% of the South African respondents and 69.00% of the International respondents rated knowledge about emerging economies either Very Important or Extremely Important.

The Kolmogorov Smirnov test was used to determine whether the difference between distributions was significant. The result of the test having been to accept the null hypothesis one concludes that the distributions are similar within the 10% level of significance.

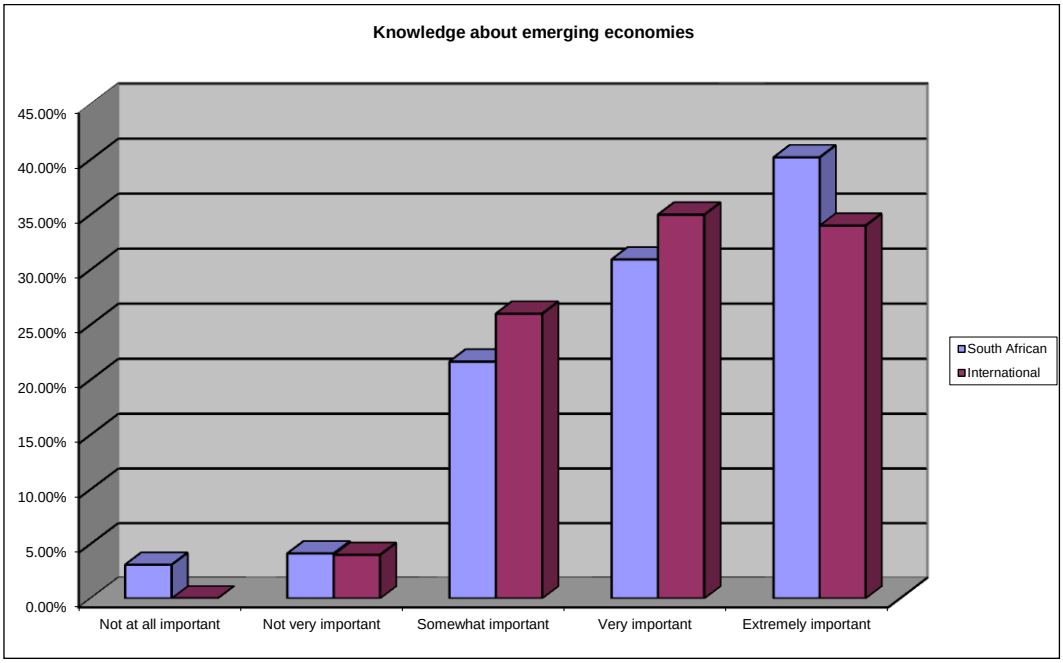


Figure 6: Knowledge about emerging economies

5.1.1.3.2 Question 3b

80.42% of the South African respondents and 82.00% of the International respondents rated knowledge about competitors either Very Important or Extremely Important.

The Mann Whitney U test was used to determine whether the difference between medians was significant. The result of the test having been to reject the null hypothesis one concludes that the means are different within the 10 % level of significance.

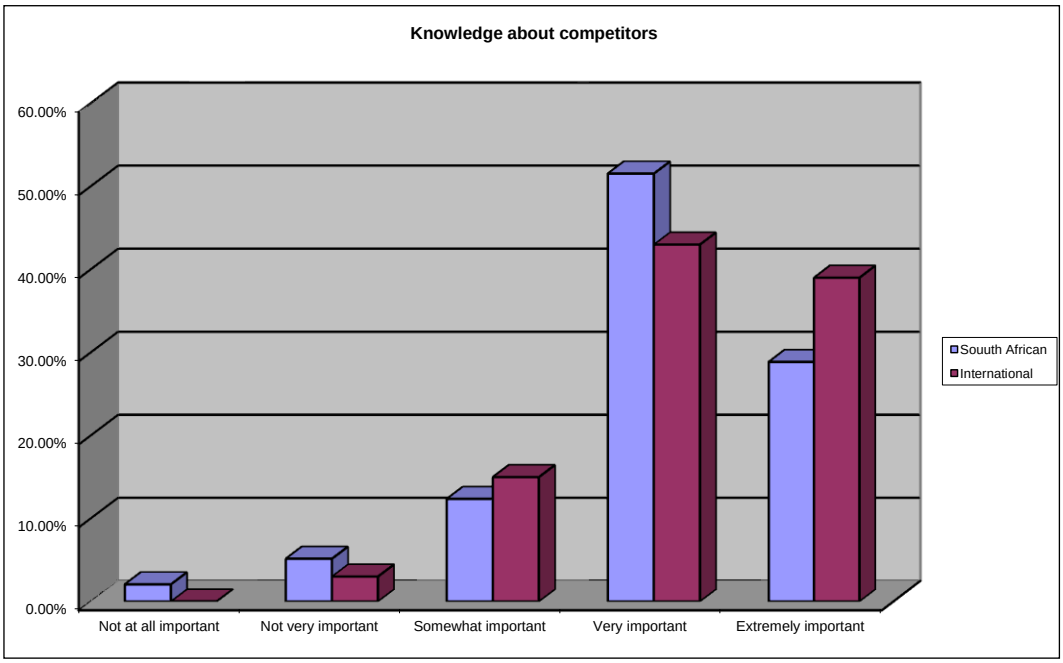


Figure 7: Knowledge about competitors

5.1.1.3.3 Question 3c

93.81% of the South African respondents and 96.00% of the International respondents rated knowledge about customers either Very Important or Extremely Important.

The Kolmogorov Smirnov test was used to determine whether the difference between distributions was significant. The result of the test having been to accept the null hypothesis one concludes that the distributions are similar within the 10 % level of significance.

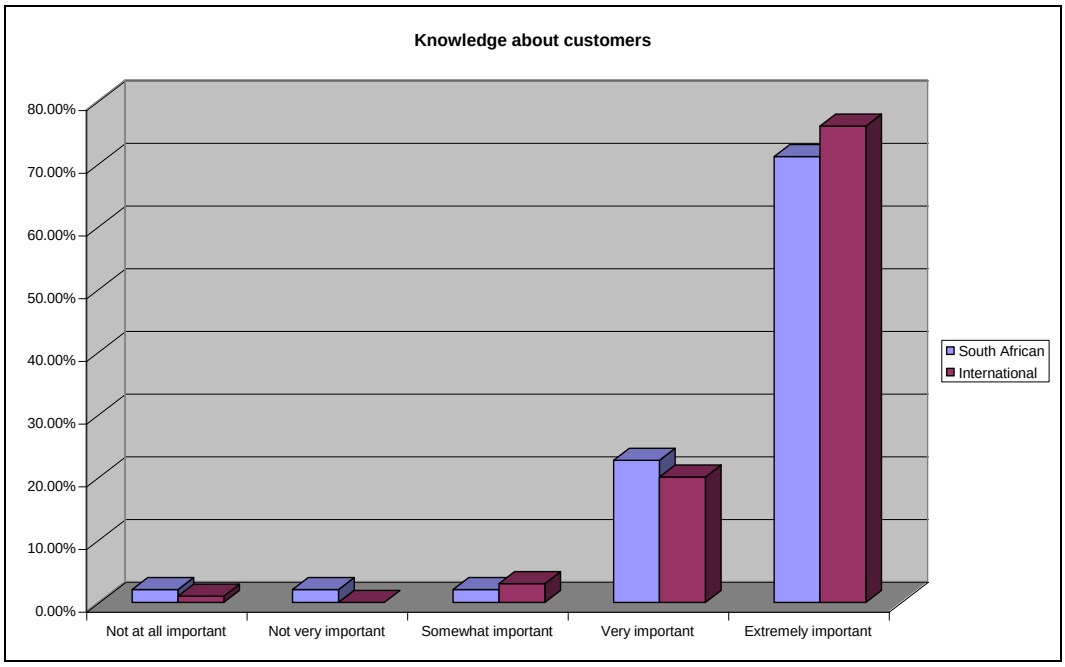


Figure 8: Knowledge about customers

5.1.1.3.4 Question 3d

79.38% of the South African respondents and 87.00% of the International respondents rated knowledge about best practices/ effective processes either Very Important or Extremely Important.

The Kolmogorov Smirnov test was used to determine whether the difference between distributions was significant. The result of the test having been to accept the null hypothesis one concludes that the distributions are similar within the 10 % level of significance.

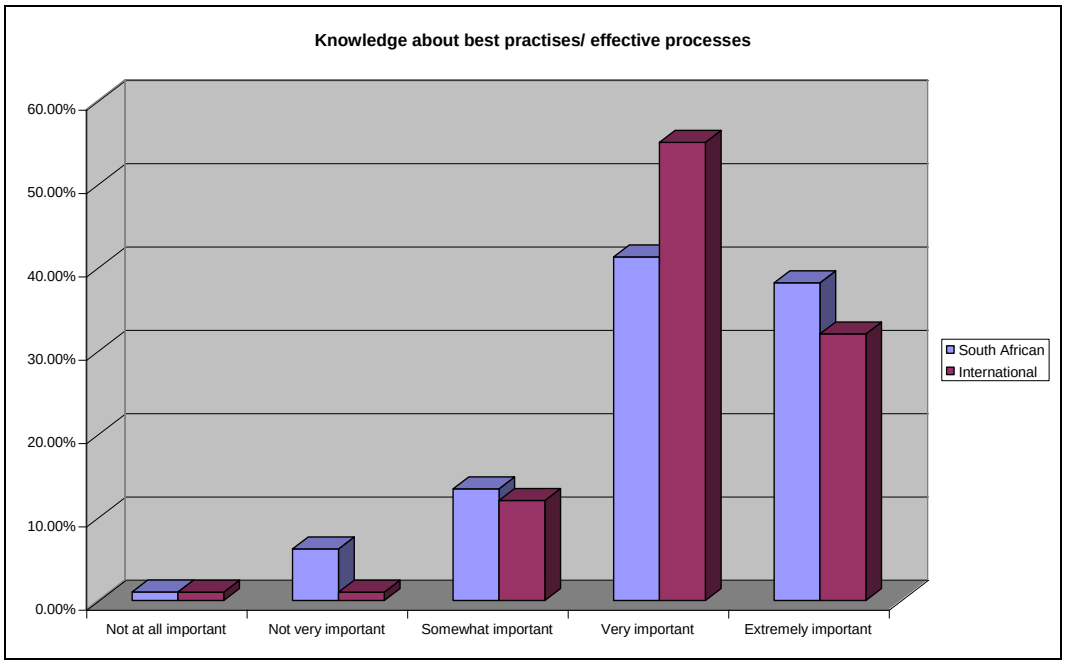


Figure 9: Knowledge about best practices/ effective processes

5.1.1.3.5 Question 3e

63.92% of the South African respondents and 54.00% of the International respondents rated knowledge about supply chain partners either Very Important or Extremely Important. 19.59% of the South African and 35.00% of the International respondents rated knowledge about supply chain partners as Somewhat Important.

The Kolmogorov Smirnov test was used to determine whether the difference between distributions was significant. The result of the test having been to accept the null hypothesis one concludes that the distributions are similar within the 10 % level of significance.

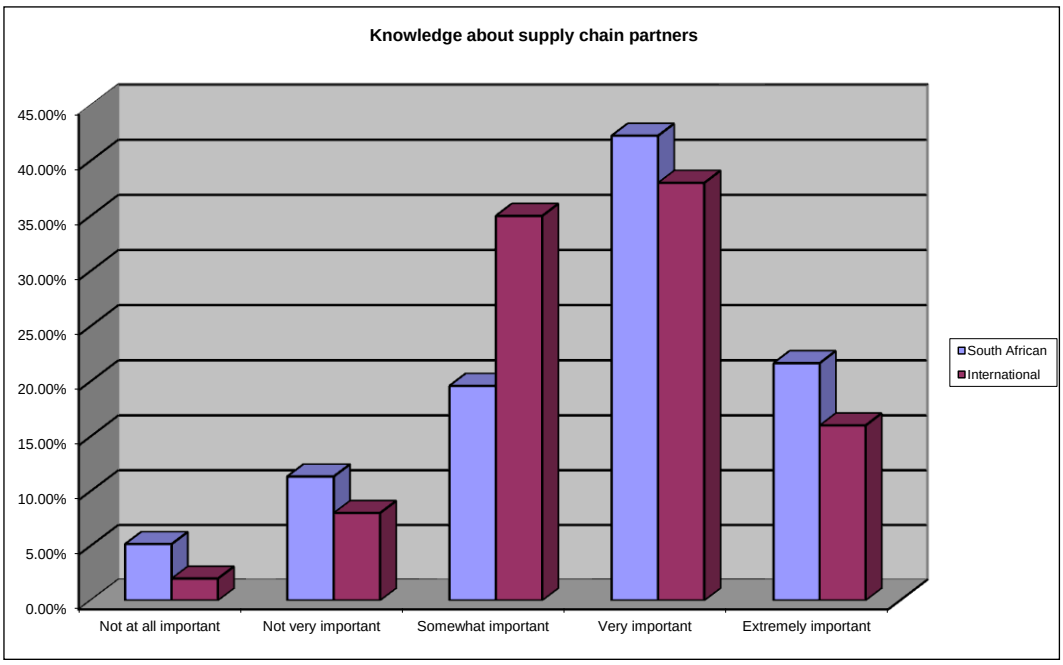


Figure 10: Knowledge about supply chain partners

5.1.1.3.6 Question 3f

71.13% of the South African respondents and 83.00% of the International respondents rated knowledge about emerging market trends either Very Important or Extremely Important.

The Kolmogorov Smirnov test was used to determine whether the difference between distributions was significant. The result of the test having been to accept the null hypothesis one concludes that the distributions are similar within the 10 % level of significance.

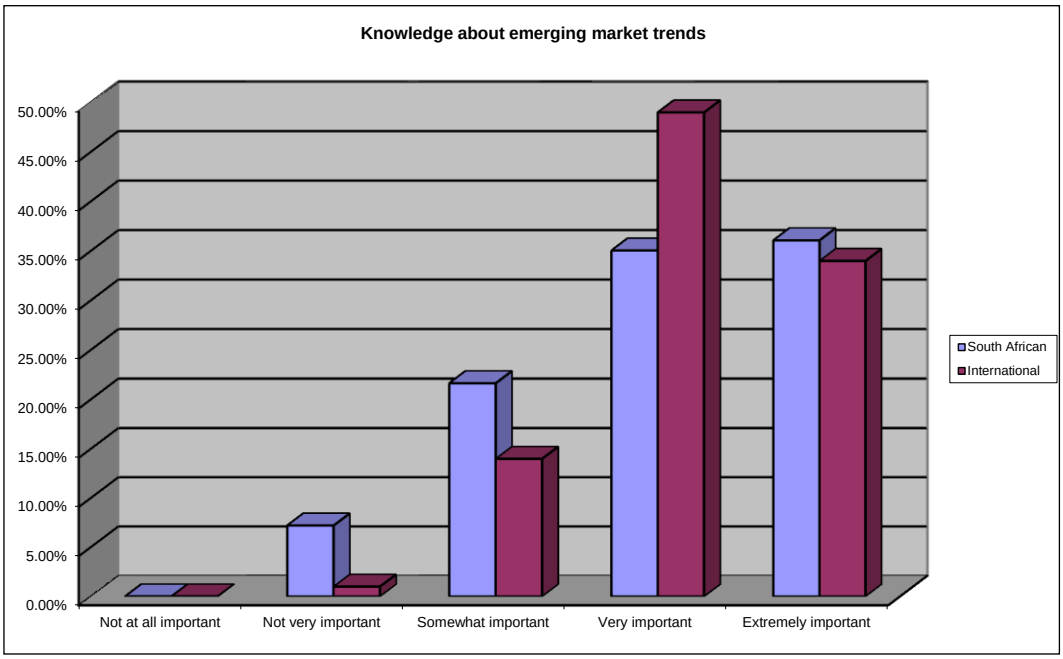


Figure 11: Knowledge about emerging market trends

5.1.1.3.7 Question 3g

60.82% of the South African respondents and 63.00% of the International respondents rated knowledge about regulation/ legislation either Very Important or Extremely Important.

The Kolmogorov Smirnov test was used to determine whether the difference between distributions was significant. The result of the test having been to reject the null hypothesis one concludes that the distributions are different within the 10 % level of significance.

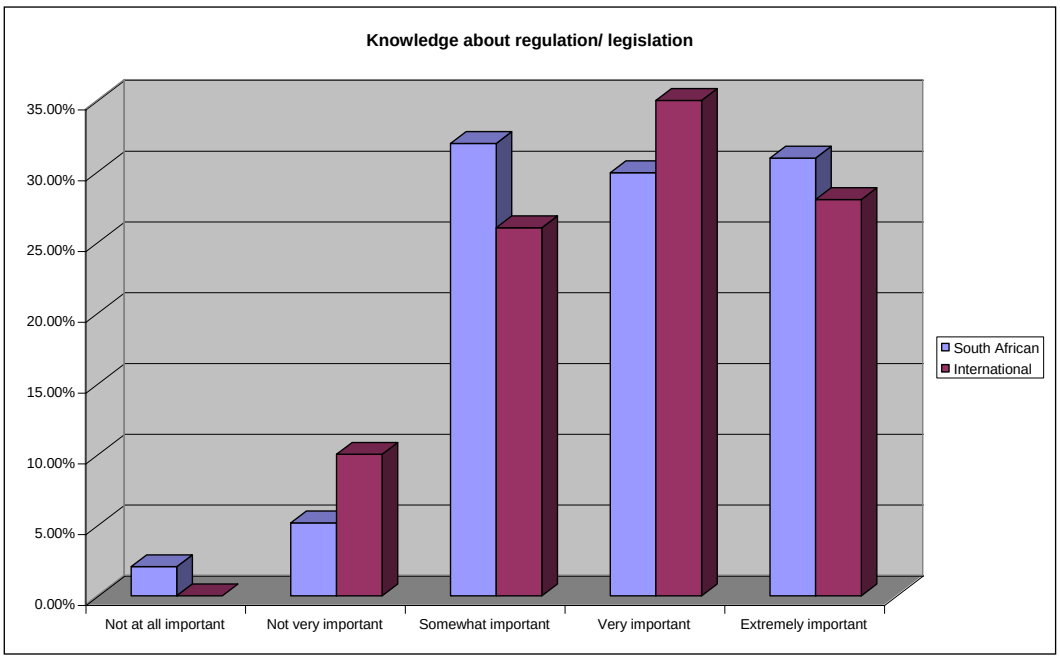


Figure 12: Knowledge about regulation/ legislation

5.1.1.3.8 Question 3h

90.73% of the South African respondents and 86.00% of the International respondents rated knowledge about competencies and capabilities either Very Important or Extremely Important.

The Kolmogorov Smirnov test was used to determine whether the difference between distributions was significant. The result of the test having been to accept the null hypothesis one concludes that the distributions are similar within the 10 % level of significance.

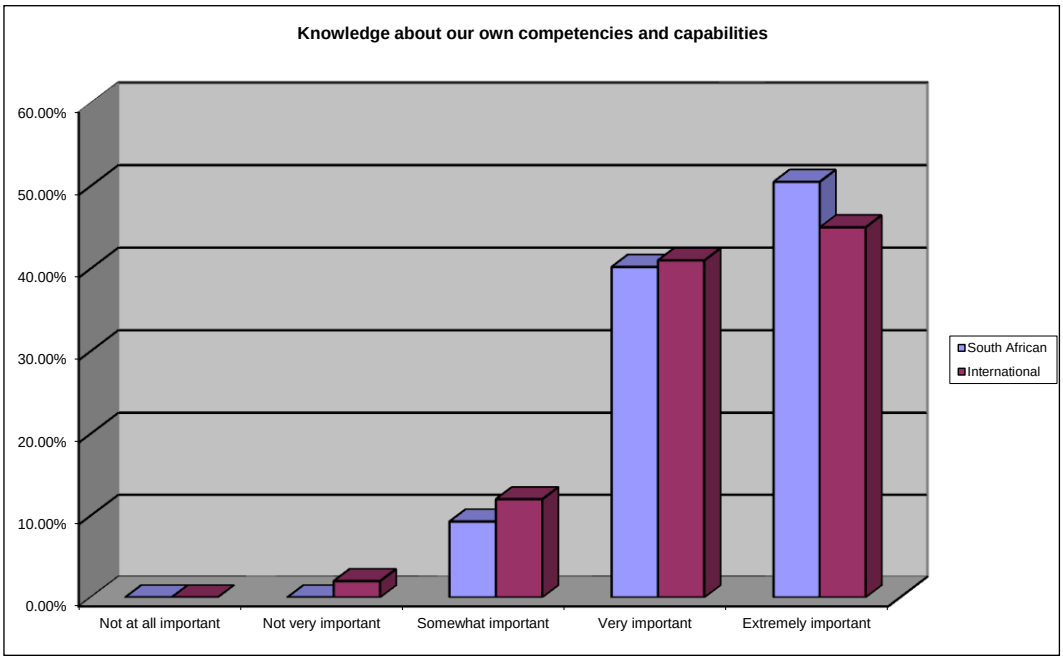


Figure 13: Knowledge about our own competencies and capabilities

5.1.1.3.9 Question 3i

91.76% of the South African respondents and 85.00% of the International respondents rated knowledge about emerging economies either Very Important or Extremely Important.

The Mann Whitney U test was used to determine whether the difference between medians was significant. The result of the test having been to reject the null hypothesis one concludes that the medians are different within the 10 % level of significance.

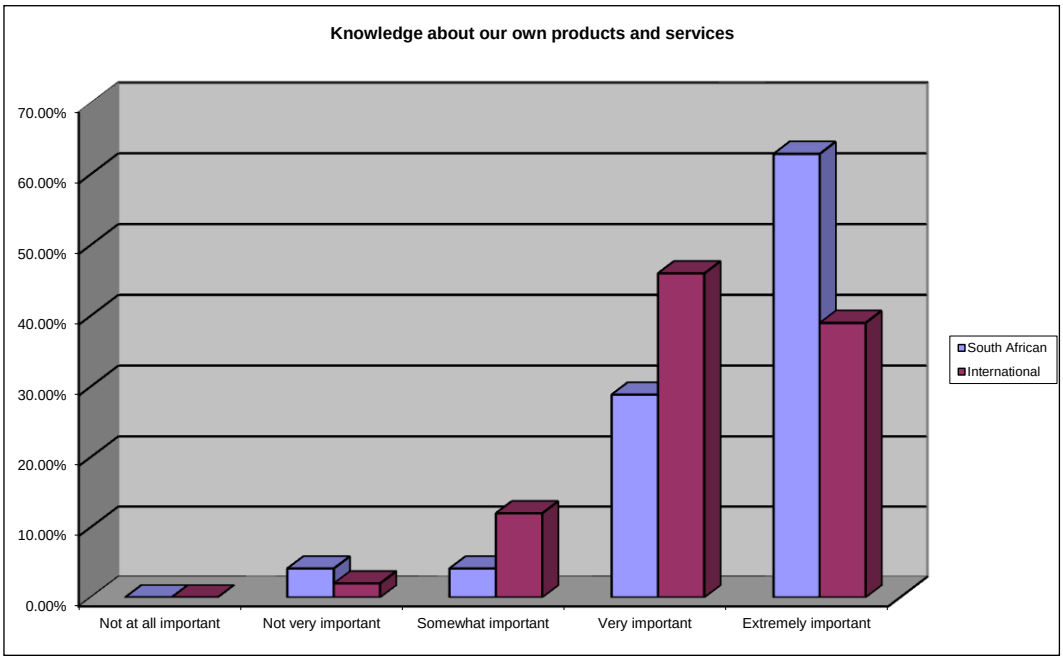


Figure 14: Knowledge about our own products and services

5.1.1.3.10 Question 3 summary

This question addressed the types of knowledge to be managed. Of the nine knowledge type constructs tested in comparison the null hypothesis was accepted for six and rejected for three. This, and the findings in Figure 15 below, indicate that the levels of importance of types of knowledge were similar for both international and South African respondents.

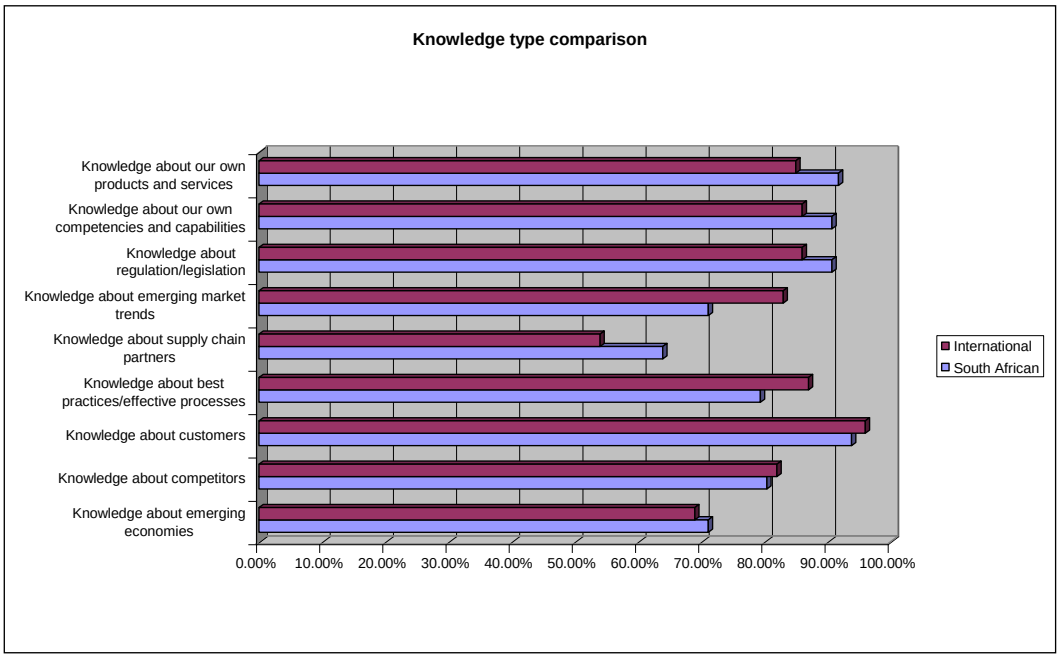


Figure 15: Knowledge type comparison

5.1.1.4 Question 4

South African respondents perceived the greatest benefits of knowledge management to reside in response to customers, quality improvement and improved decision making. Similarly, the international respondents believed that knowledge management would benefit from efficiency, responsiveness to customers, and innovation.

As tested in the Chi-square tests the difference was significant, with a probability of errorr of less than 0.01%. In terms of contribution to the Chi-square statistic the greatest difference between South African and International studies arose from the quality improvement and reduction in duplication of effort constructs.

This result was influenced by the fact that respondents had the option of selecting each and all of the constructs thereby increasing the effective sample size.

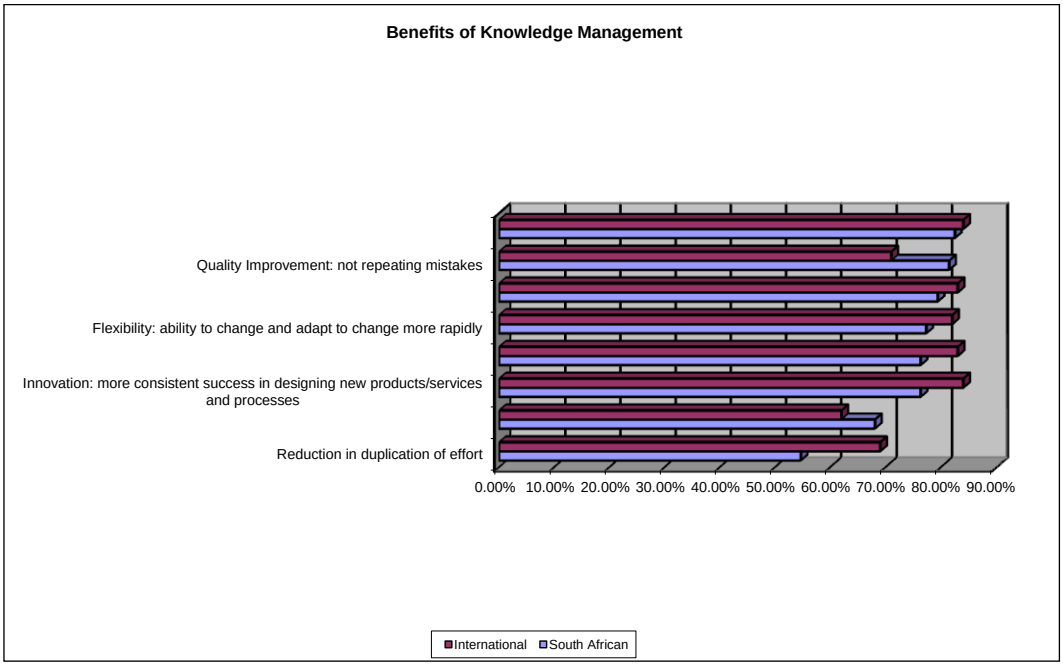


Figure 16: Benefits of knowledge management

5.1.1.5 Question 5

Figure 17 and Figure 18 show the greatest benefits as indicated by respondents in the South African and international studies. Information for the international study was incomplete in that percentage scores were received only for the first 5 (out of 8) constructs.

Spearmans rank correlation indicated a relatively strong positive correlation (0.8) between the constructs that were able to be measured.

Interestingly, the benefit rated highest in both studies was innovation which reflected as more consistent success in the design of new products and services.

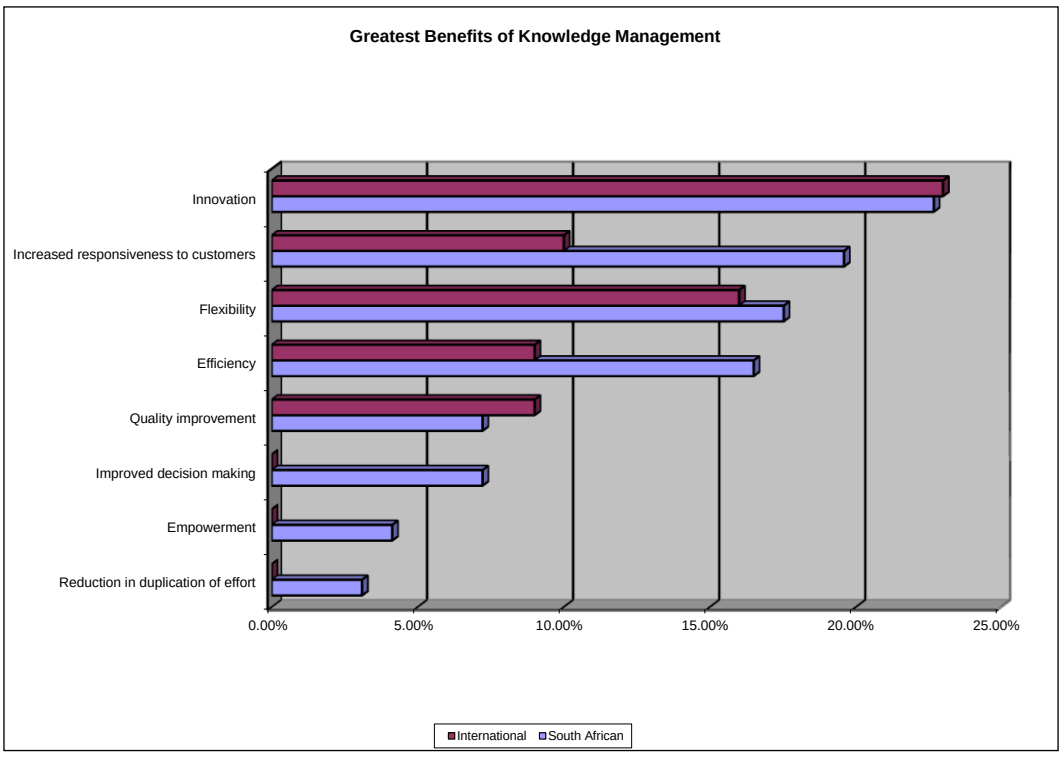


Figure 17: Greatest benefits of knowledge management

5.1.2 What are the levers available to executives in the management of knowledge?

This section will consider questions 6 to 10 both in terms of research objectives 1 and 2.

5.1.2.1 Question 6

The responses to this question will be dealt through individual attention to each of the constructs followed by a brief summary.

5.1.2.1.1 Question 6a

The Mann Whitney U test was used to determine whether the difference between medians was significant. The result of the test having been to accept the null hypothesis one concludes that the medians were similar within the 10 % level of significance.

For both the South African and the international studies, the mean score was greater than the median score of 3. This indicates that executives in both studies believed that their performance in generating new knowledge was better than average. 3.09% of the South African study and 10% of the international study believed that their performance in the management of knowledge was excellent.

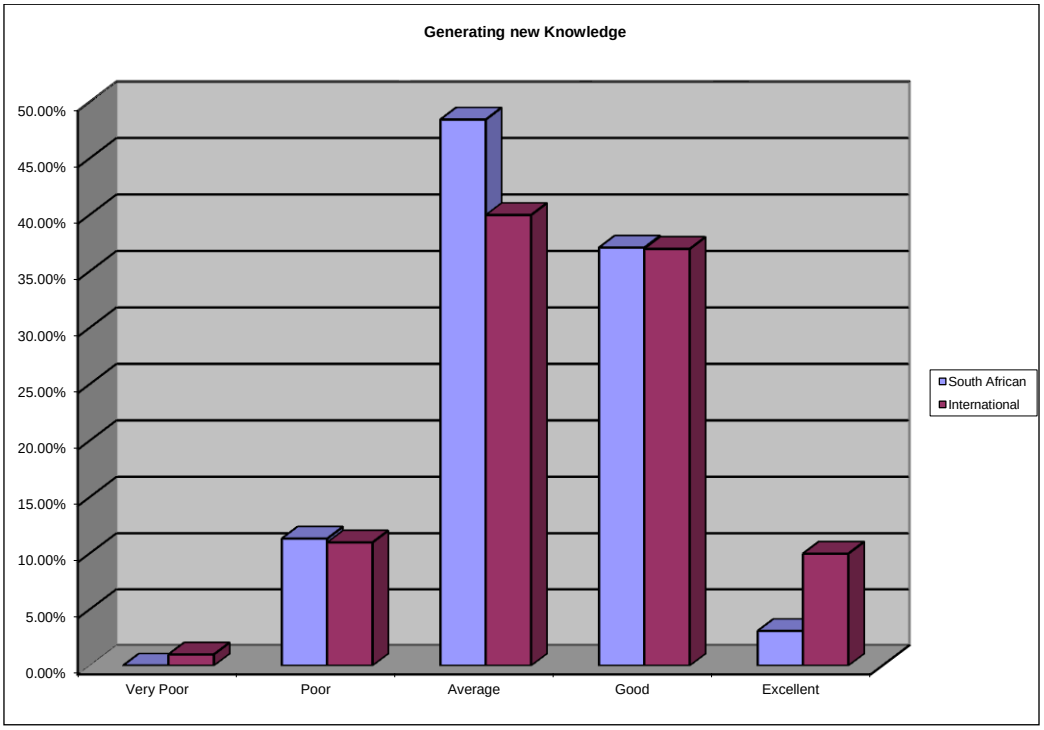


Figure 18: Performance in generating new knowledge

5.1.2.1.2 Question 6b

The Mann Whitney U test was used to determine whether the difference between medians was significant. The result of the test having been to accept the null hypothesis one concludes that the medians are similar within the 10 % level of significance.

For both the South African and the International studies the mean score was greater than the median score of 3. This indicates that executives in both studies believe that their performance in generating new knowledge was better than average. 3.09% of the South African study and 4% of the international study believed that their performance in the management of knowledge was excellent.

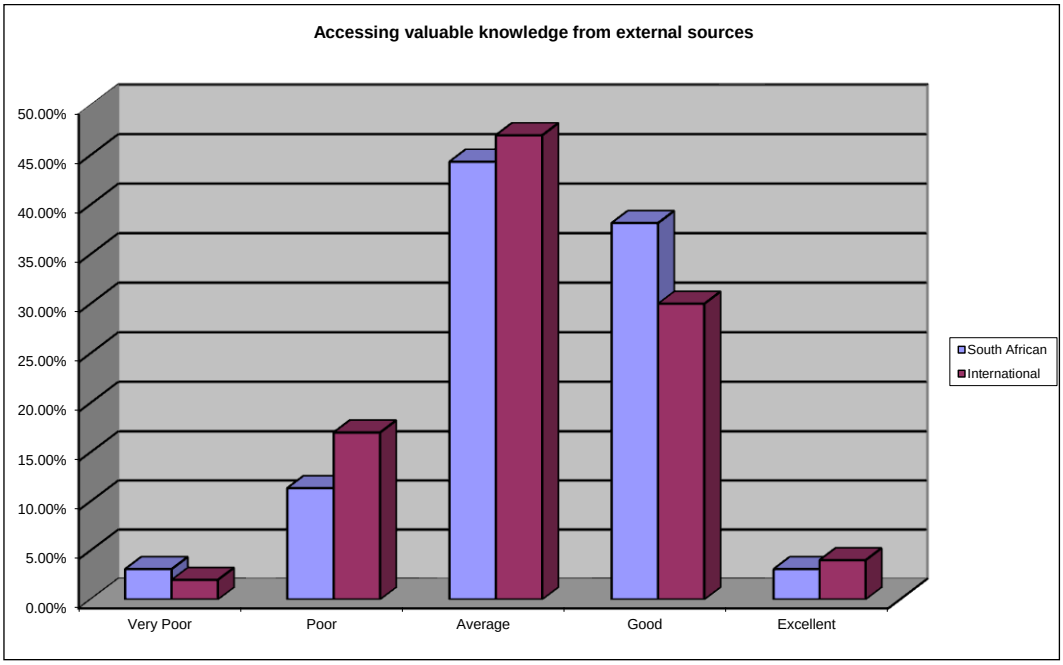


Figure 19: Performance in accessing valuable knowledge from external sources

5.1.2.1.3 Question 6c

The Kolmogorov Smirnov test was used to determine whether the difference between distributions was significant. The result of the test having been to accept the null hypothesis one concludes that the distributions are similar within the 10 % level of significance.

For both the South African and the International studies the mean score was less than the median score of 3. This indicates that executives in both studies believe that their performance in representing new knowledge was lower than average. 4.12% of the South African study and 3% of the international study believed that their performance in the management of knowledge was very poor.

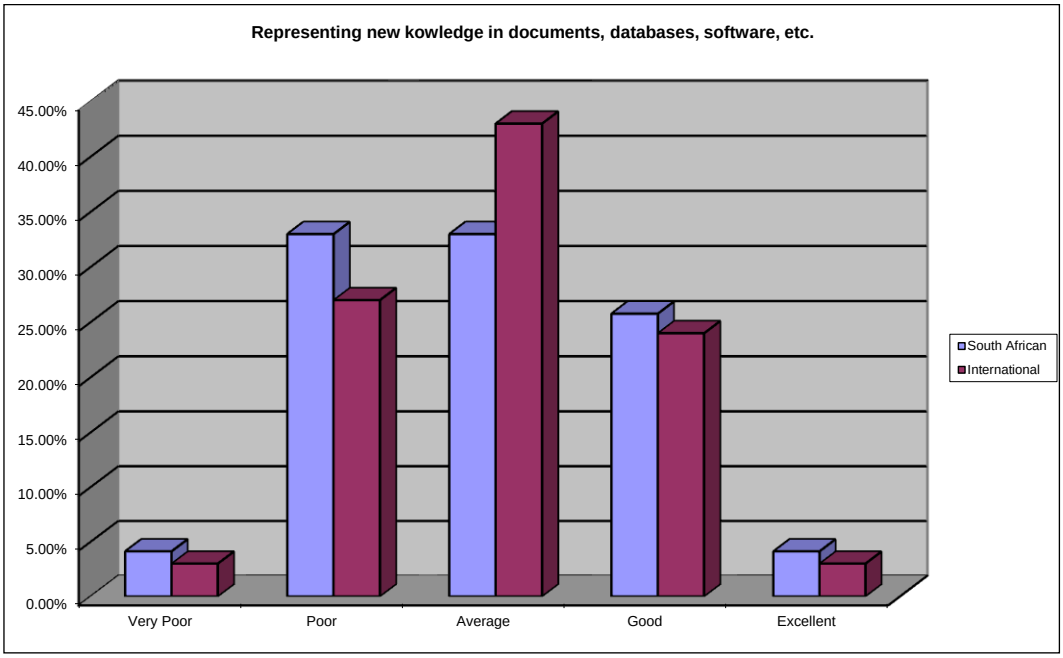


Figure 20: Performance in representing knowledge in documents, databases, software, etc.

5.1.2.1.4 Question 6d

The Mann Whitney U test was used to determine whether the difference between medians was significant. The result of the test having been to accept the null hypothesis one concludes that the medians are similar within the 10 % level of significance.

For both the South African and the International studies the mean score was greater than the median score of 3. Thwas indicates that executives in both studies believe that their performance in generating new knowledge was better than average. 2.06% of the South African study and 2% of the international study believed that their performance in the management of knowledge was excellent.

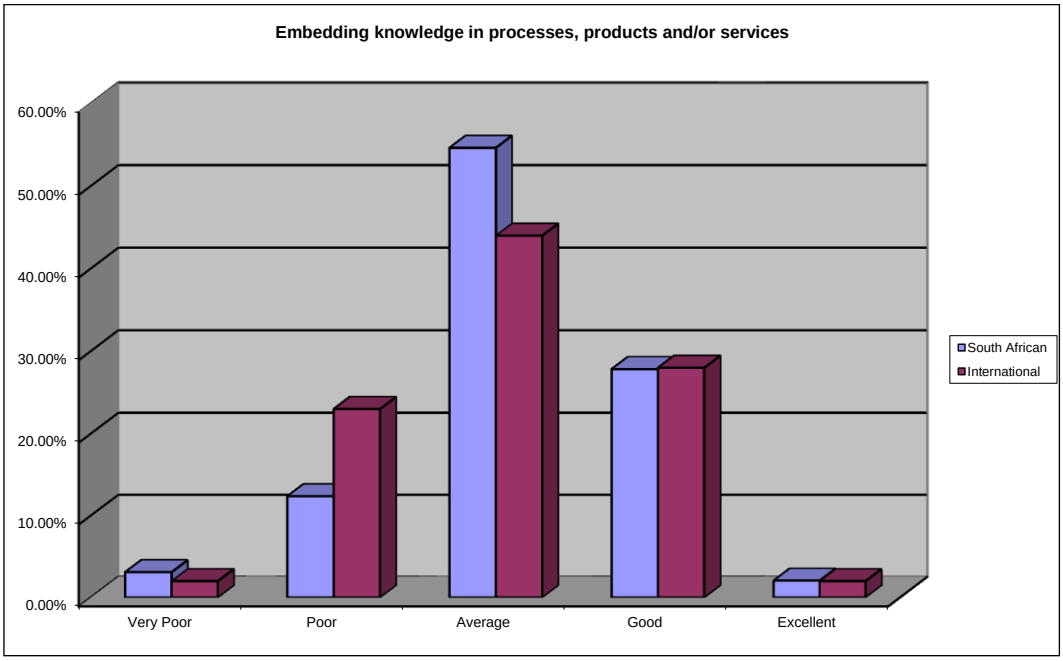


Figure 21: Performance in embedding knowledge in processes, products and/or services

5.1.2.1.5 Question 6e

The Kolmogorov Smirnov test was used to determine whether the difference between distributions was significant. The result of the test having been to accept the null hypothesis one concludes that the distributions are similar within the 10 % level of significance.

For both the South African and the International studies the mean score was less than the median score of 3. This indicates that executives in both studies believe that their performance in representing new knowledge was lower than average. 3.09% of the South African study and 6% of the international study believed that their performance in the management of knowledge was very poor.

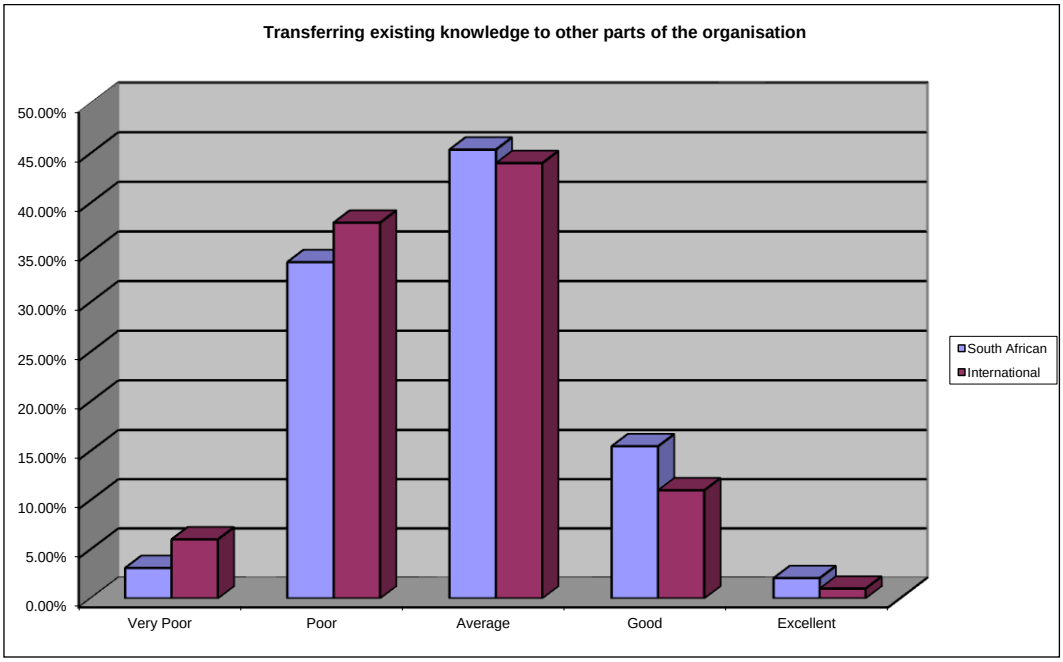


Figure 22: Performance in transferring existing knowledge to other parts of the organisation

5.1.2.1.6 Question 6f

The Mann Whitney U test was used to determine whether the difference between medians was significant. The result of the test having been to accept the null hypothesis one concludes that the medians are similar within the 10 % level of significance.

For both the South African and the International studies the mean score was greater than the median score of 3. This indicates that executives in both studies believe that their performance in generating new knowledge was better than average. 4.12% of the South African study and 2% of the international study believed that their performance in the management of knowledge was excellent.

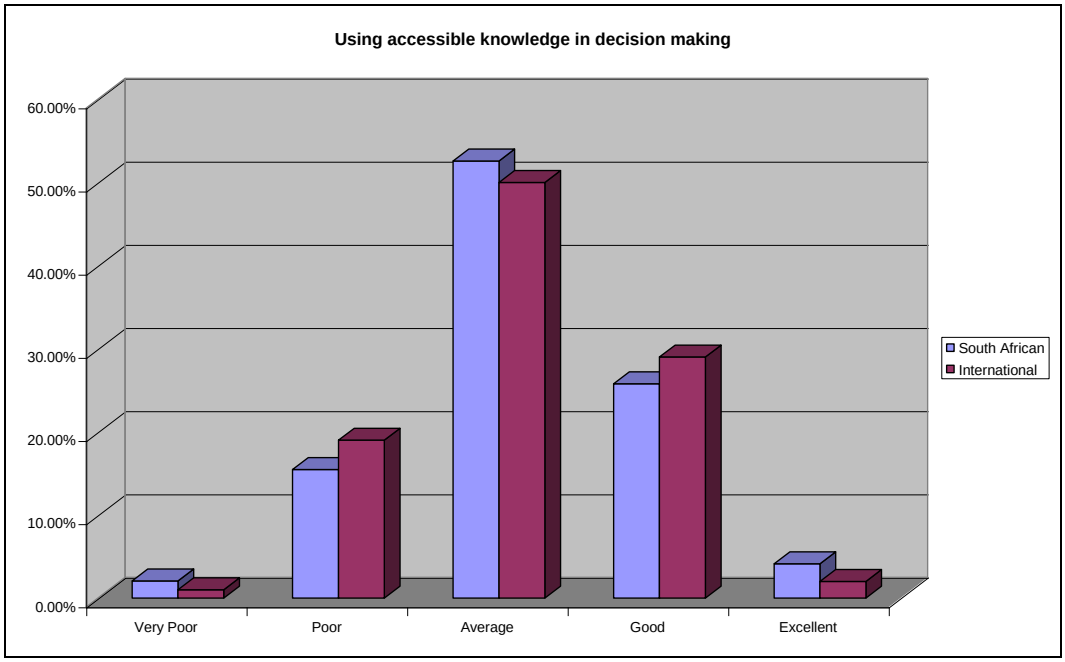


Figure 23: Performance in using accessible knowledge in decision-making

5.1.2.1.7 Question 6g

The Mann Whitney U test was used to determine whether the difference between medians was significant. The result of the test having been to accept the null hypothesis one concludes that the medians are similar within the 10 % level of significance.

For both the South African and the International studies the mean score was less than the median score of 3. This indicates that executives in both studies believe that their performance in generating new knowledge was lower than average. 6.19% of the South African study and 8% of the international study believed that their performance in the management of knowledge was excellent.

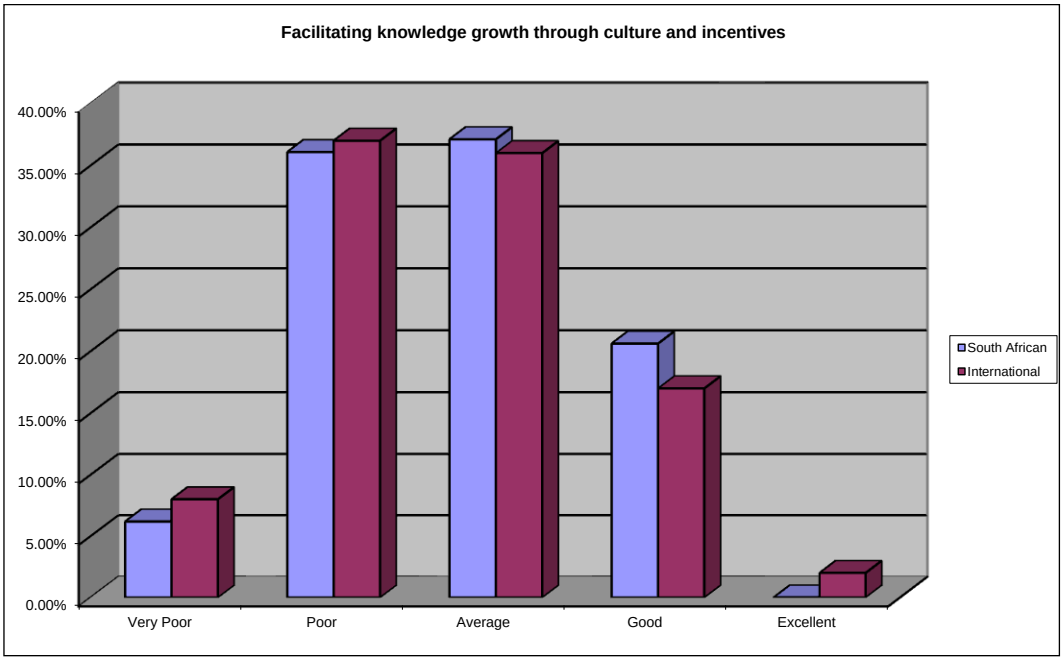


Figure 24: Performance in facilitating growth through culture and incentives

5.1.2.1.8 Question 6h

The Kolmogorov Smirnov test was used to determine whether the difference between distributions was significant. The result of the test having been to reject the null hypothesis one concludes that the distributions are different within the 10 % level of significance.

For both the South African and the International studies the mean score was less than the median score of 3. This indicates that executives in both studies believe that their performance in representing new knowledge was lower than average. 10.31% of the South African study and 27% of the international study believed that their performance in the management of knowledge was very poor.

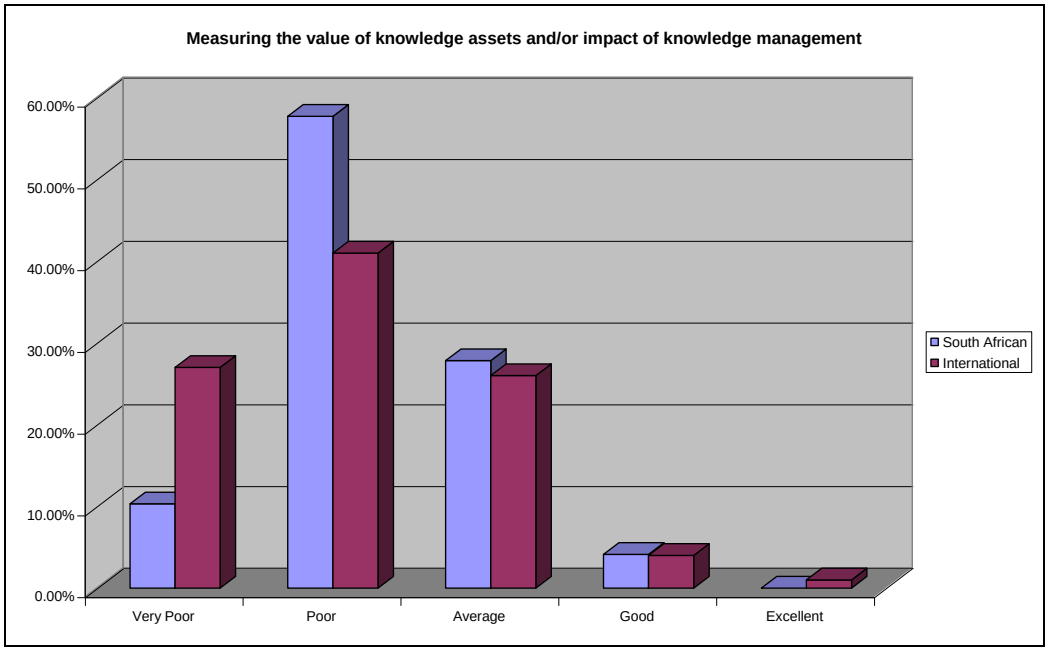


Figure 25: Performance in measuring the value of knowledge assets and/or impact of knowledge management

5.1.2.1.9 Question 6 summary

Executives were asked to rate, on a 5 point scale from Very Poor to Excellent, their impressions of their organisations performance in knowledge management processes. Of the eight processes measured seven were deemed to be not significantly different within a 10% level of significance.

In both studies executives believed their performance was above average in the areas denoted by the following constructs:

a). Generating new knowledge

b). Accessing valuable knowledge from external sources

d). Embedding knowledge in processes, products and/or services

f). Using accessible knowledge in decision making

These were processes for which above average performance are those that have been a normal part of business. It was not, therefore, surprising that executives believed that they had developed competence regarding the processes.

For the following processes executives in both studies believed their performance was below average:

c). Representing knowledge in documents, databases, software, etc.

e). Transferring existing knowledge to other parts of the organisation

g). Facilitating knowledge growth through culture and incentives

h). Measuring the value of knowledge assets and/or impact of knowledge management.

Processes for which a below average performance was rated were those that historically had not been actively pursued in the course of normal business and therefore presented a new challenge to executives.

5.1.2.2 Question 7

Ruggles (1997a) argues that the management has influence over three major categories. It was asked of respondents what the percentage of effort dedicated to each of the three categories should be.

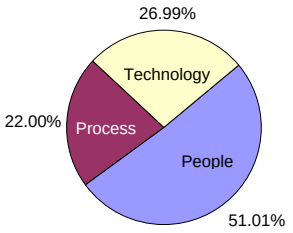


Figure 26: South African results

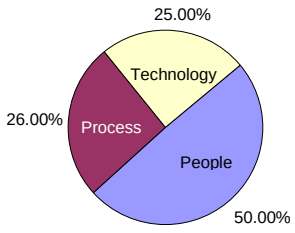


Figure 27: International results

The pie charts above indicate that the emphasis that should be placed on each of the three categories of management was similar for the South African and International studies.

Respondents were then asked whether the above percentage effort was, in fact, being dedicated to each of the three categories.

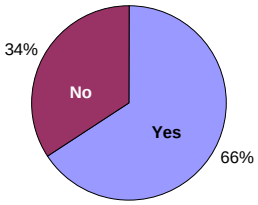


Figure 28: South African results

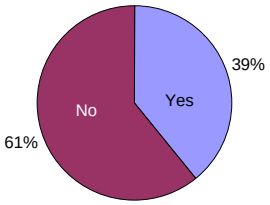


Figure 29: International results

As can be seen, South African respondents were more confident that their managerial efforts placed the appropriate emphasis on each of the three categories.

Finally those respondents who answered no, to the quesion above, were asked what the current emphasis on each of the three categories was.

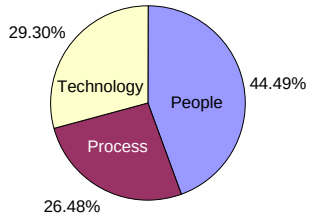


Figure 30: South African results

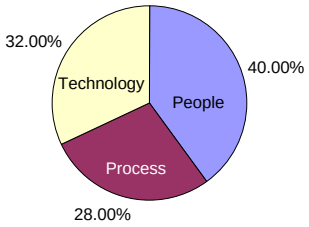


Figure 31: International results

Once again a similar result was achieved for the two studies. International respondents however place lower emphasis on people but higher emphasis on both technology and process.

5.1.2.3 Question 8

Response to this question will be dealt with through individual discussion of each of the knowledge management technologies, followed by a brief discussion.

5.1.2.3.1 Groupware

The Chi-square test of independence was undertaken on the data. The result of the test was to reject the null hypothesis with probability of errorr of 0.038. International and South African respondents therefore differed in their views as to the potential of GroupWare products in enhancing the organisations knowledge base.

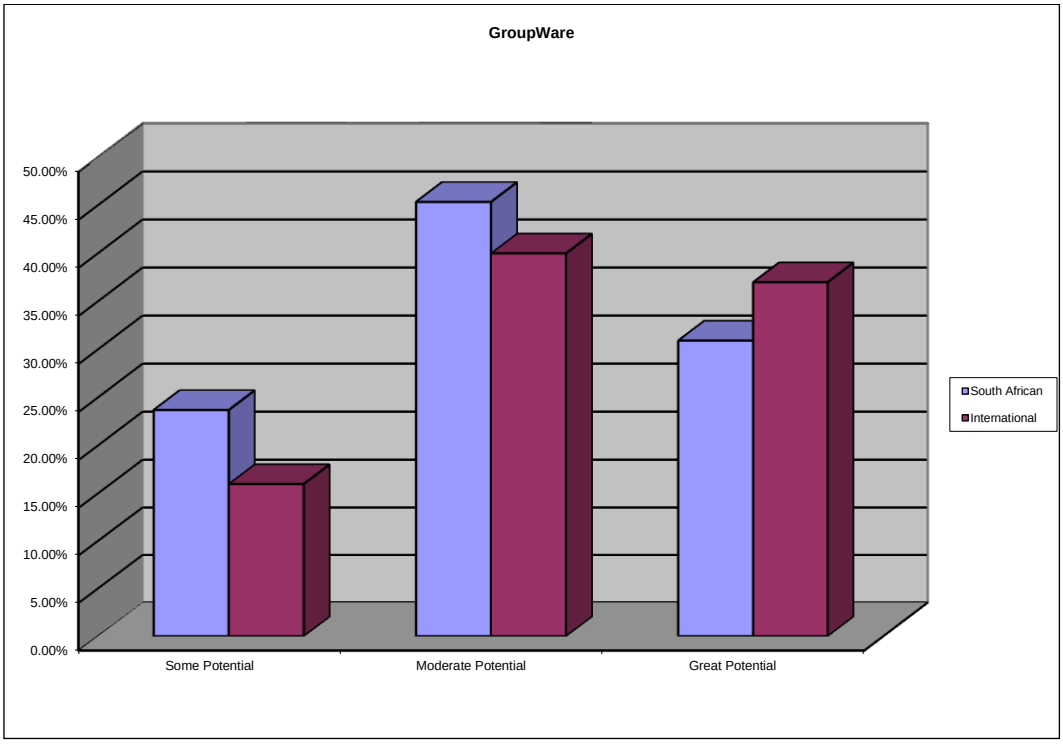


Figure 32: Groupware

5.1.2.3.2 Data warehouse

The Chi-square test of independence was undertaken on the data. The result of the test was to accept the null hypothesis with probability to being in errorr in rejecting the null hypothesis of 0.778. International and South African respondents therefore have similar views as to the potential of Data warehousing products in enhancing the organisations knowledge base.

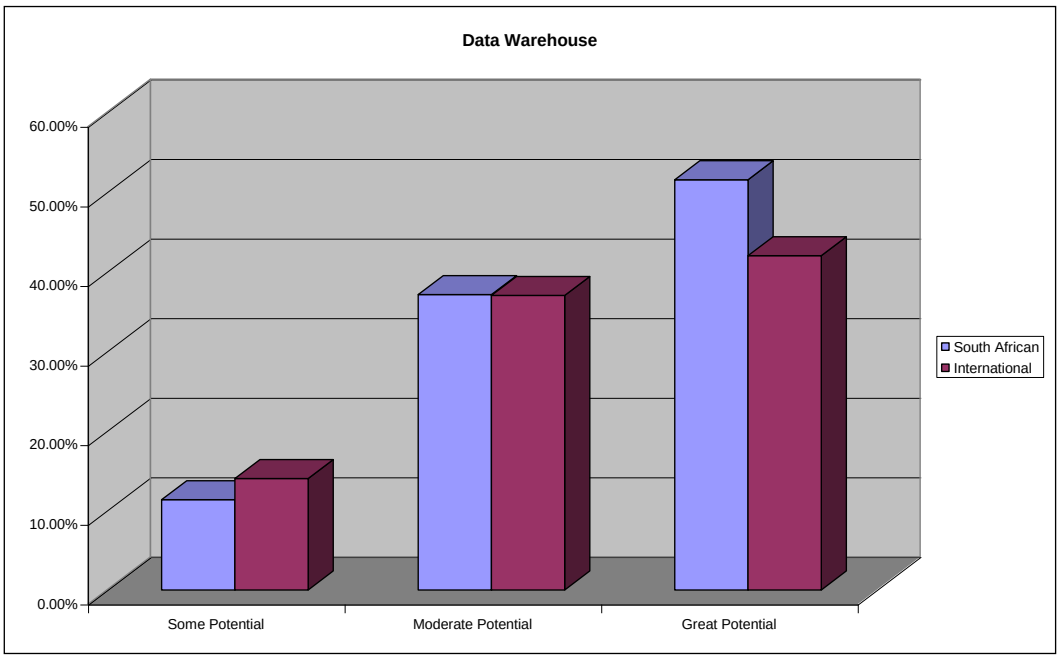


Figure 33: Data warehouse

5.1.2.3.3 Decision support tools

The Chi-square test of independence was undertaken on the data. The result of the test was to accept the null hypothesis with probability to being in errorr in rejecting the null hypothesis of 0.200. International and South African respondents therefore have similar views as to the potential of Decision support tools products in enhancing the organisations knowledge base.

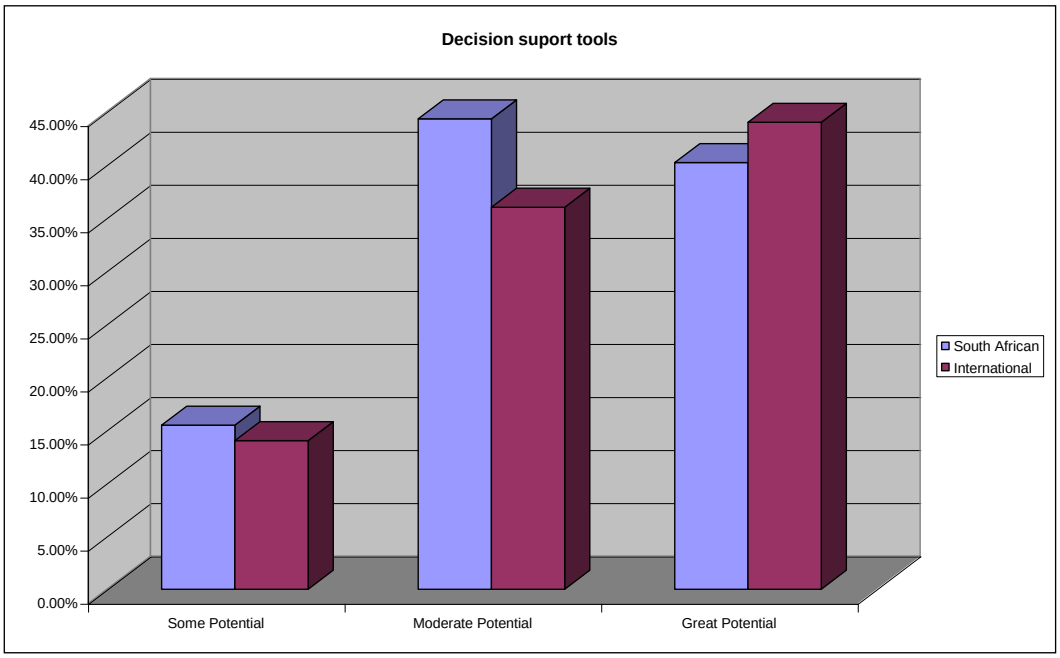


Figure 34: Decision support tools

5.1.2.3.4 Internet access

The Chi-square test of independence was undertaken on the data. The result of the test was to accept the null hypothesis with probability to being in errorr in rejecting the null hypothesis of 0.777. International and South African respondents therefore have similar views as to the potential of Internet access products in enhancing the organisations knowledge base.

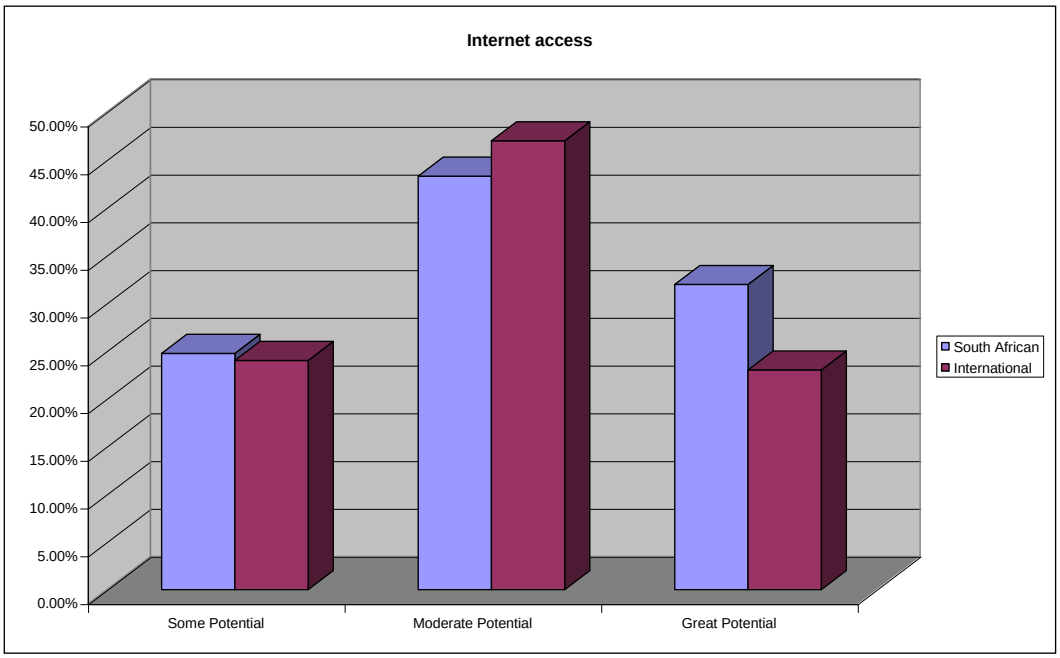


Figure 35: Internet access

5.1.2.3.5 Intranet

The Chi-square test of independence was undertaken on the data. The result of the test was to reject the null hypothesis with probability to being in errorr of 0.002. International and South African respondents therefore differ in their views as to the potential of GroupWare products in enhancing the organisations knowledge base.

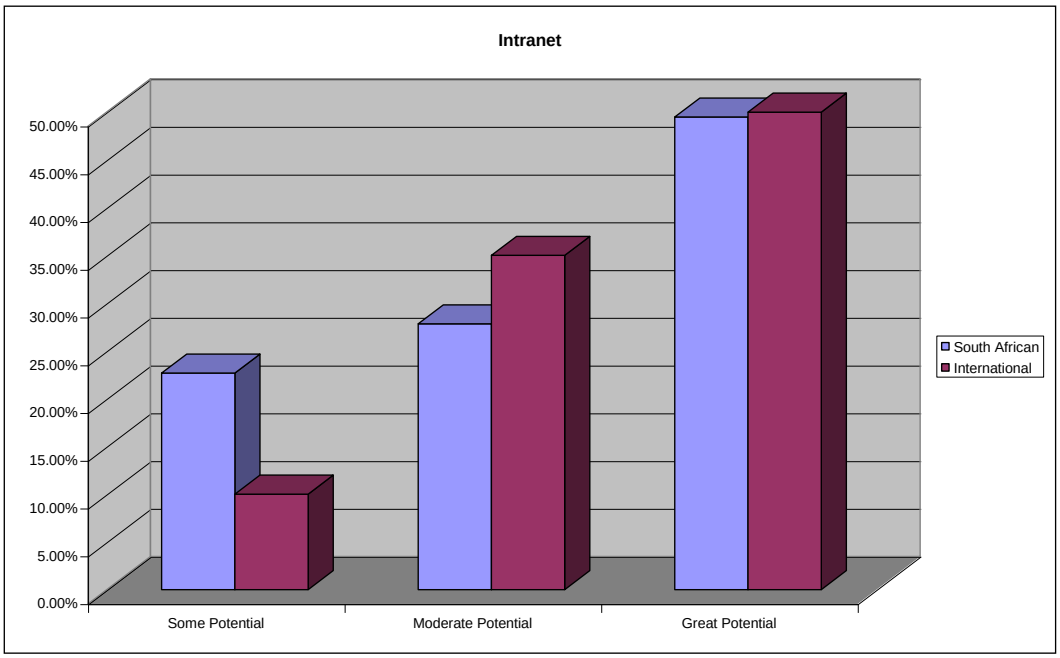


Figure 36: Intranet

5.1.2.3.6 Directories of resident experts

The Chi-square test of independence was undertaken on the data. The result of the test was to accept the null hypothesis with probability to being in errorr in rejecting the null hypothesis of 0.151. International and South African respondents therefore have similar views as to the potential of Internet access products in enhancing the organisations knowledge base.

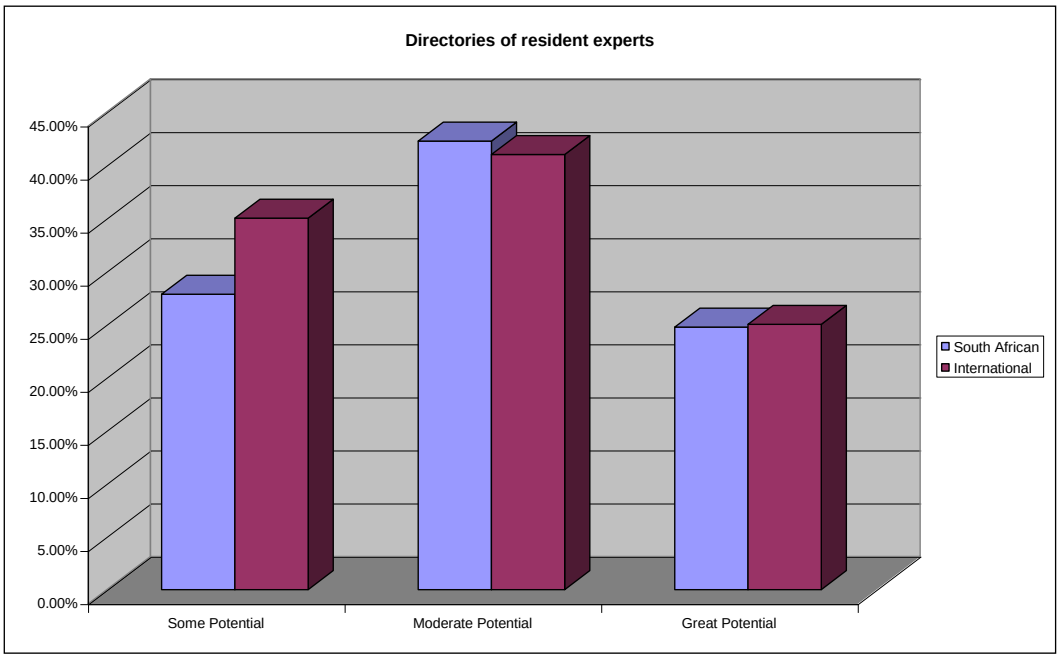


Figure 37: Directories of resident experts

5.1.2.3.7 Question 8 Summary

Figure 38 indicates the percentage score for each technology tool that was rated as having great potential for enhancing an organisation's knowledge base. It can be seen that intranet, decision support tools and data warehouses were believed to offer the greatest potential to the most respondents. Internet access and directories of resident experts, however, offered great potential to the least number of respondents.

Frappaolo & Toms (1999) indicate that both intranet and data warehouses are technology tools most suited to the transfer of explicit knowledge between knowledge provider and knowledge seeker. Decision support tools, they argue, are fundamentally suited to the codification of explicit decision processes. Directories of resident experts, they argue, are suited to support communities of practice, and play a fundamental role in support for the transfer and development of tacit knowledge.

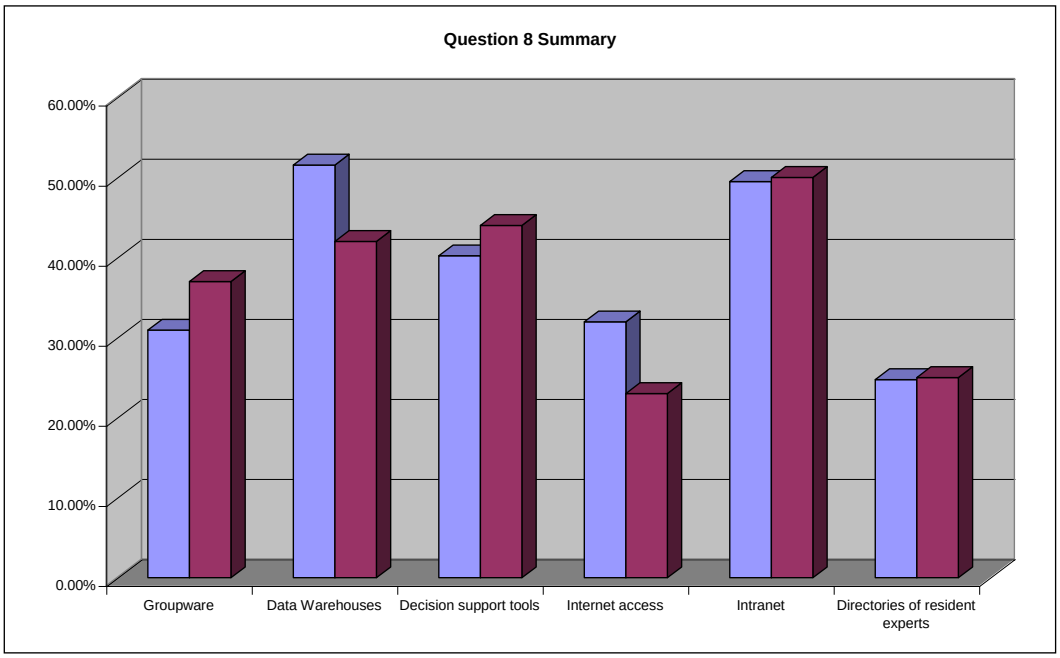


Figure 38: Question 8 summary

5.1.2.4 Question 9

Unfortunately for question 9 it was not possible to undertake any statistical test to generate insights into independence or distributions.

Respondents were asked to comment on the impact of organisational culture on knowledge management. Of the South African respondents 41.94% argued that their culture was conducive to knowledge management. The most common reason (69.32%), amongst South African respondents, given was that employees are enthusiastic to learn or are knowledge thirsty. 47.14% of the respondents indicated that culture was conducive, also indicated that employees saw the identification of knowledge in processes and technology as important. In addition, managers in organisations with a culture conducive to knowledge management described the acceptance of new initiatives (27.73%), the sharing of knowledge (11.09%) and the acceptance of the evolutionary nature of knowledge (5.55%).

58.06% of the South African respondents, however, described their organisation's culture as not conducive to knowledge management due to knowledge hoarding by individuals (58.07%), low absorptive capacity of users (34.04%), a focus on organisational processes (30.04%), well defined silo organisational structures (24.03%) and a common lack of understanding of the importance of knowledge (14.02%).

Davenport & Prusak (1998) argue that the benefit of retaining and gaining personal advantage from knowledge is greater than that of knowledge sharing. It is therefore Davenport & Prusak's (1998) argument that in order to overcome the retention of knowledge, management must be prepared to reward knowledge sharers handsomely. It is Davenport & Prusak's (1998) contention that organisational cultures that share knowledge will be characterised as 'knowledge thirsty' and have a high regard for the importance of knowledge. On the other hand, they argue that cultures that do not share knowledge would be characterised by singular silo structures (Davenport, 1995) and have a strong process focus.

Davenport, et al. (1998) identify two aspects of organisational culture that assist in the definition of a culture that is knowledge friendly. These factors include people having a positive orientation to knowledge in that they are "bright, intellectually curious, willing and free to explore, and where executives encourage their knowledge creation and use" (Davenport, et al., 1998, p99). In addition, people are not inhibited about sharing knowledge.

5.1.2.5 Question 10

The Kolmogorov Smirnov test was used to determine differences in the distribution of both sets of answers. The result of the test was to accept the null hypothesis that the distributions are the same.

The mean for both distributions was less than the mode of 3. Therefore respondents from both studies tended to the low value end of the 5 point scale.

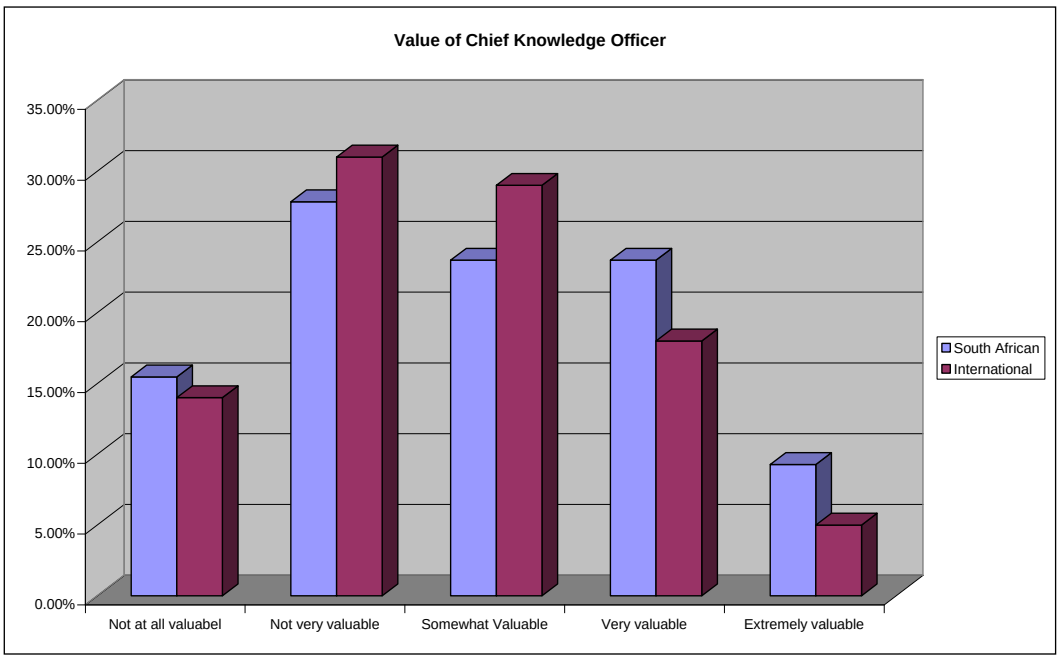


Figure 39: Value of a chief knowledge officer

Kerr (1997) argues that the value of the formalisation of the role of Chief Knowledge Officer is to build a self correcting and self sustaining

organisation. Earl & Scott (1999) argue that the value gained in the appointment of a Chief Knowledge Officer may be the galvanising, directing and co-ordination of knowledge management programme.

South African respondents believe that a Chief Knowledge Officers responsibility is to facilitate knowledge transfer, enable and leverage knowledge, and to introduce knowledge management to the organisation. Similarly International respondents believe that responsibilities should include making knowledge visible, leveraging knowledge and enabling knowledge.

5.1.3 What do executives believe are the greatest managerial challenges in the management of knowledge?

This section will consider questions 11 to 15 both in terms of research objectives 1 and 2.

5.1.3.1 Question 11

Spearmans rank correlation calculations for the 10% confidence interval rejects the null hypothesis thereby indicating that there was no significant correlation between rankings within the South African and International studies.

Figure 40 and Figure 41 below present the results of the ranking exercise using a linear weighted scale. The international results were reduced by some factor that is unknown to the author.

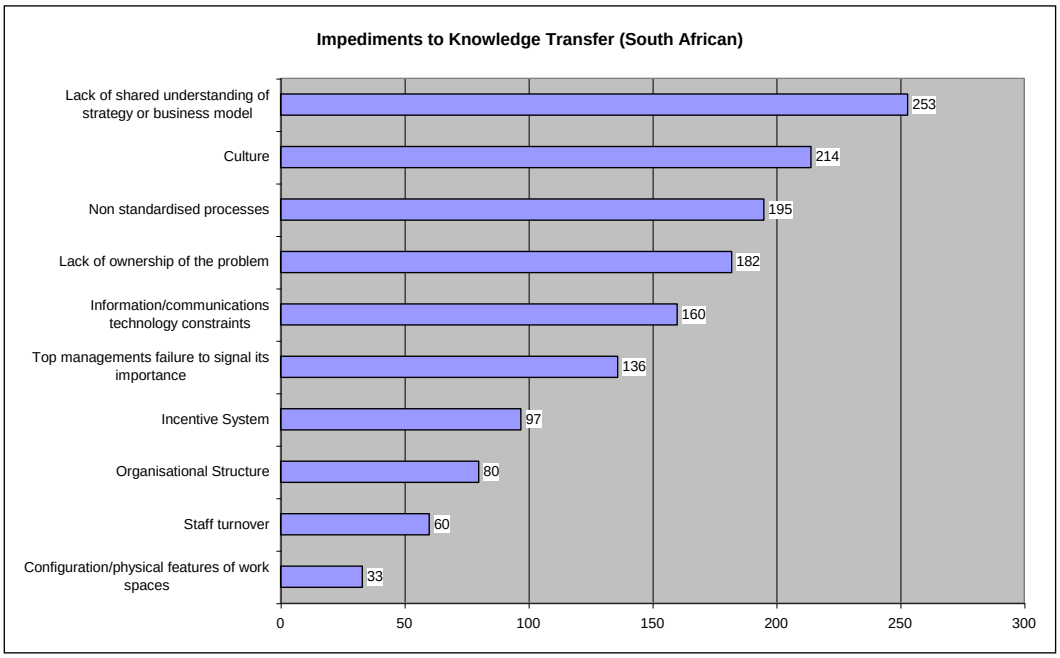


Figure 40: Impediments to knowledge transfer (South African)

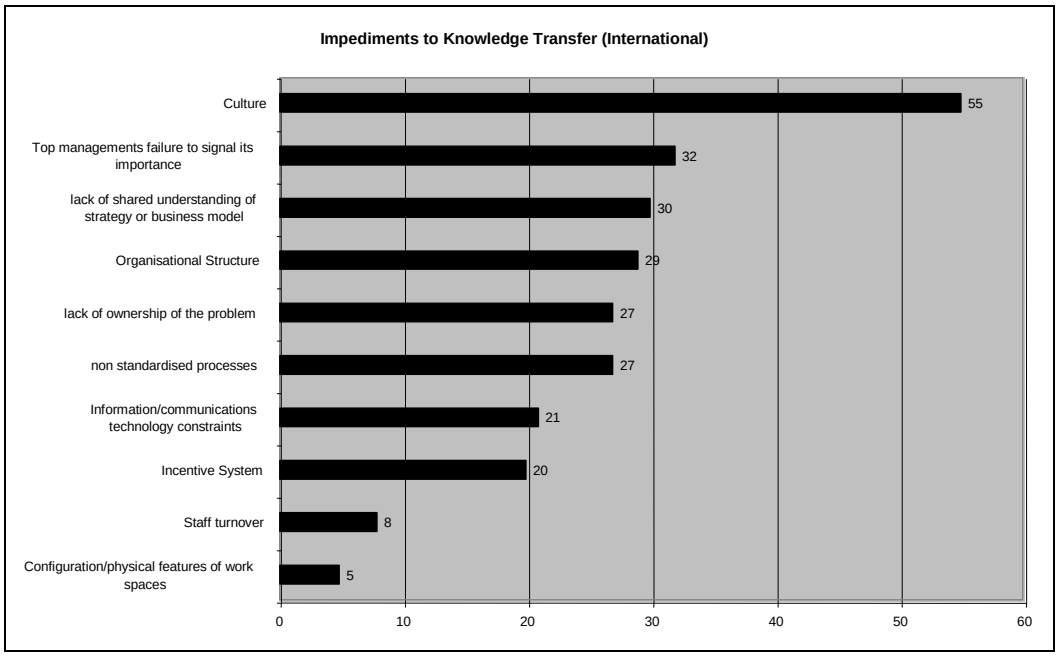


Figure 41: Impediments to knowledge transfer (International)

Culture ranked as the greatest impediment to knowledge transfer in the international study, and as the second greatest impediment in the South African study. Davenport, et al. (1998) identified that an organisational culture must be conducive to knowledge management in order to facilitate its success.

In the South African survey, lack of senior management support (including lack of shared understanding of strategy or business model and top management's failure to signal its importance) support ranked as the greatest impediment to knowledge management. Davenport, et al. (1998) identify senior management support as important in the success of knowledge management projects. Senior management support ranks third in the international study. Both the international and South African surveys therefore shared the need for senior management support in order to facilitate knowledge transfer.

Davenport, et al. (1998), Ruggles (1998) and Leonard (1995) argue that the use of incentive systems be commissioned to facilitate knowledge transfer. The basis of the arguments presented above is that employees to gain most from retaining and using knowledge. This benefit can be overcome through the use of incentive systems to increase the benefit of the sharing and transfer of knowledge. Interestingly in both studies the use of incentive systems to facilitate knowledge transfer was low.

Nonaka (1991) identifies the configurations of work space to be important in the facilitation of knowledge transfer. It is argued that water cooler and coffee spaces for people to interact greatly facilitates the transfer of knowledge. In both studies the configuration of work space features ranks last in the impediments to knowledge transfer.

5.1.3.2 Question 12

In both studies respondents felt that the impediment that they experienced was the greatest in knowledge transfer could be overcome through more deliberate management.

The comparison of question 12 between the two studies showed that the responses were independent. Although both international and South African respondents believed that impediments to knowledge transfer could be overcome through more deliberate management, the differences between the two studies presented themselves in that the Don't Know and Other constructs. 14.43% of South African managers felt that they did not know whether more deliberate management would overcome the impediment, whereas 2% of international managers did not know.

22.68% of South African managers felt that impediments to knowledge transfer could not be overcome, as opposed to 4% of the international managers.

5.1.3.3 Question 13

Spearmans rank correlation calculations (Table 46) indicated that there was a positive correlation between the two ranks, and therefore the null hypothesis was rejected.

Figure 42 and Figure 43 below graphically present the findings of the South African and International studies, respectively.

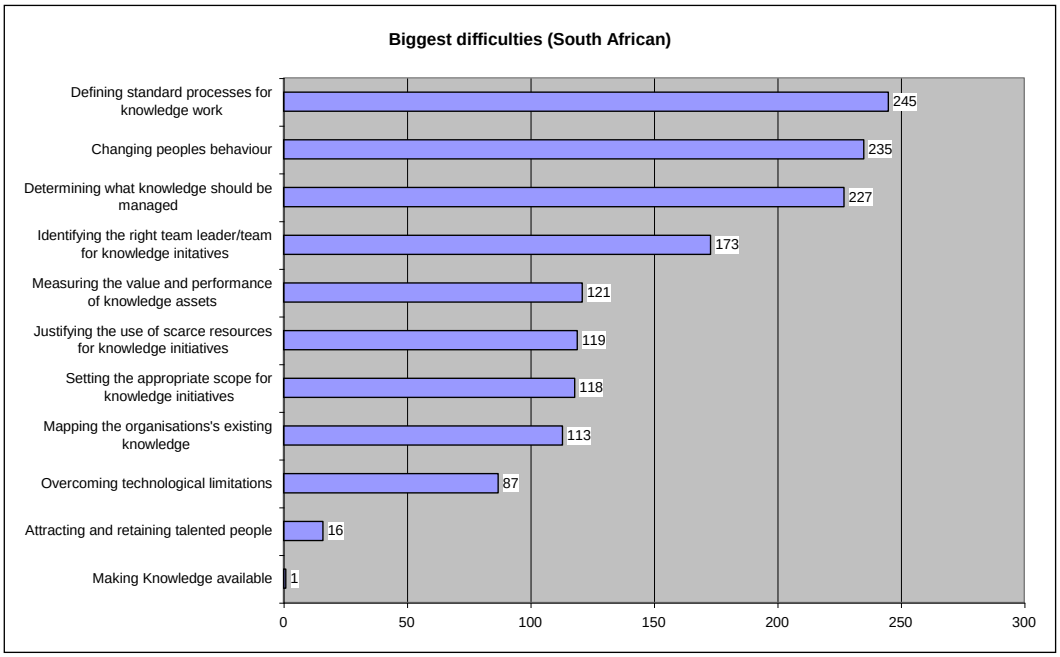


Figure 42: Biggest difficulties (South African)

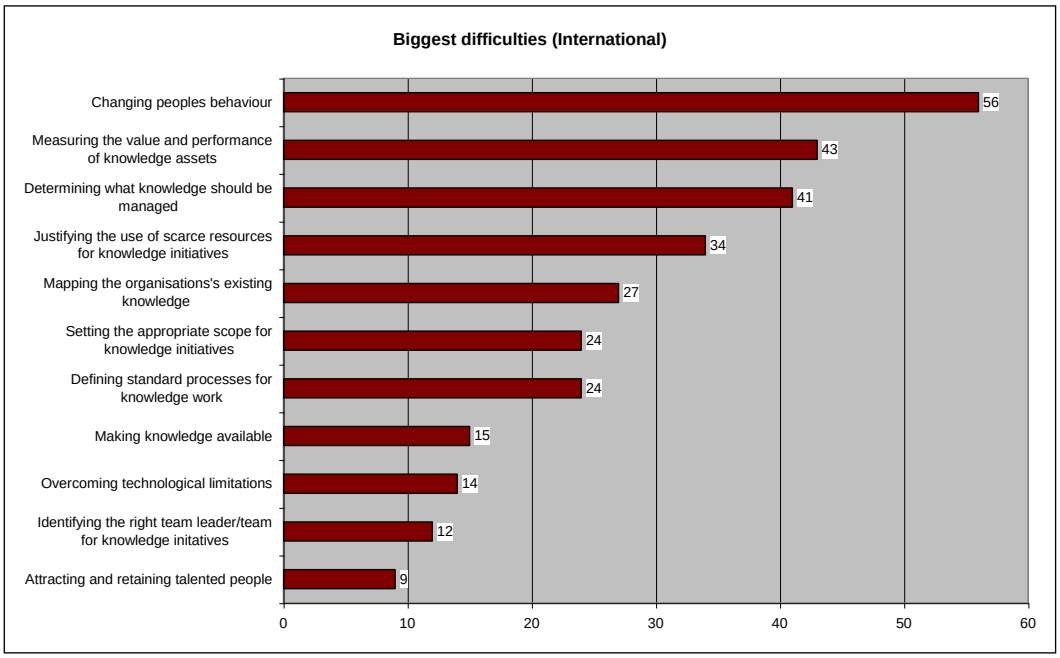


Figure 43: Biggest difficulties (International)

The greatest difficulty for South African respondents was reported as being the definition of standard knowledge processes for knowledge work. In the international survey, however, this achieved the ranking of sixth.

Respondents reported that changing people's behaviour ranked as the greatest difficulty in the international survey and second most difficult in the South African survey. In question 11 respondents indicated that organisational culture was the greatest impediment to knowledge transfer. Davenport, et al. (1998) report that one of the most important factors for a knowledge management project's success is the creation or presence of a knowledge friendly culture. It is their argument that people should have as appropriate orientation towards knowledge management, people should

not be inhibited in the sharing of knowledge, and the knowledge management project should fit in with the existing culture.

Ranking fifth in the South African study and second in the International study was the issue of measuring the value and performance of knowledge assets. Kaplan & Norton (1996) and Sveiby (1997) argue that due to the changing nature of competition in the information economy it has become necessary to augment traditional (industrial) performance measures. Kaplan & Norton (1996) and Sveiby (1997) have therefore developed the balanced scorecard and intangible asset monitor, respectively. The purpose of the performance measures was to provide a tangible measure on the performance of intangible assets.

Determining what knowledge should be managed was ranked third in the South African survey and third in the International survey. In a similar vein the mapping of the organisation's existing knowledge ranked eighth in the South African survey and sixth in the international survey. In addition, the setting of the appropriate scope for knowledge initiatives ranked seventh in the South African survey and in the international survey. Snowden (1999) and Cohen (1998) posit that most theoretical frameworks dedicated to the understanding of knowledge led the executive to confusing results in determining the value and position of knowledge. Specifically they refer to the translation of frameworks into actionable methodologies as being difficult to achieve. Through a process of a

combination of frameworks and setting of a knowledge context Snowden (1999) constructed a framework for knowledge management that incorporated knowledge identification and mapping.

Three constructs revolve around the involvement of people in knowledge management initiatives. The identification of the an appropriate team leader ranked fourth in the South African survey and tenth in the international survey. Justification of the use of scarce resources ranked sixth in the South African survey and fourth in the international survey. The attraction and retention of talented people ranked tenth in the South African survey and eleventh in the international survey. Martinez (1998) argues that people related issues are the most important to business. Executives, however, seemed to regard the greater employee culture as more important than the attraction, involvement and retention of the individual.

5.1.3.4 Question 14

Spearmans rank correlation calculations indicate a strong positive correlation of 0.90. In addition the null hypothesis was rejected indicating that there was a correlation between South African and International results.

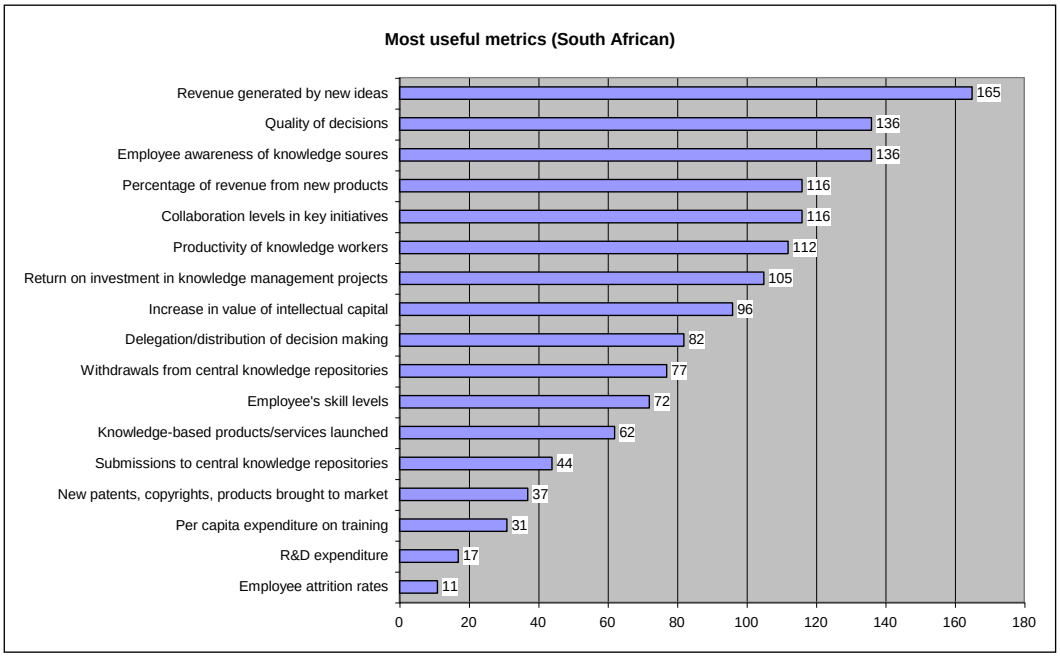


Figure 44: Most useful metrics (South African)

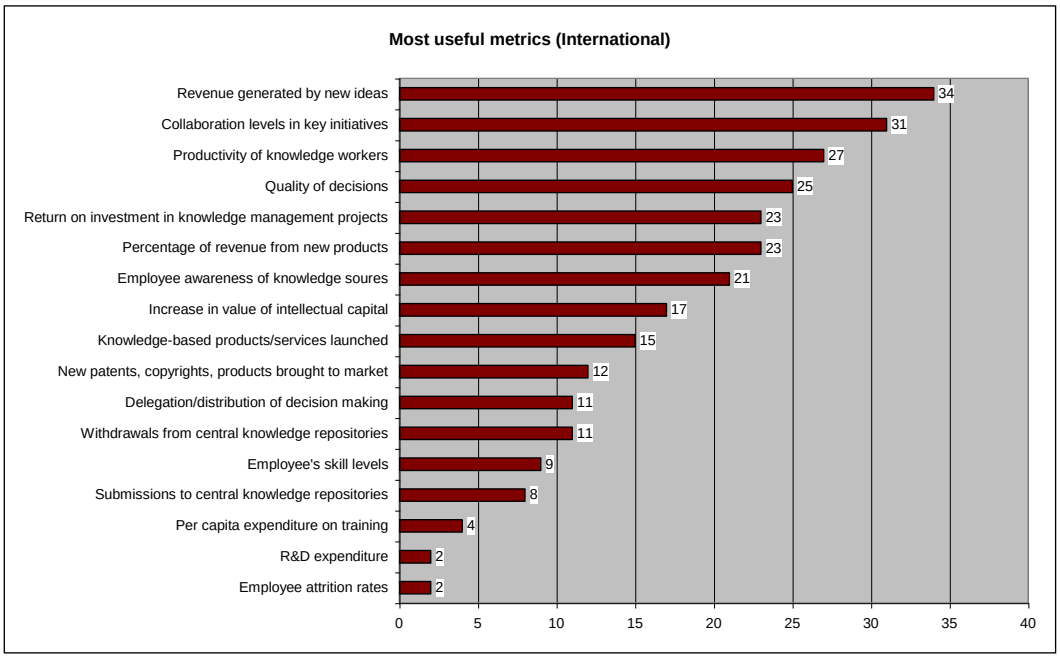


Figure 45: Most useful metrics (International)

Ranking highly in both studies are metrics based on revenue, as indicated in Table 61 below:

Metric	South African Ranking	International Ranking
Revenue generated by new ideas	1	1
Percentage of revenue from new products	5	5 (tie)
Return on Investment in knowledge management projects	7	5 (tie)
Increase in value of intellectual assets	8	8

Table 61: Revenue based metrics

Kaplan & Norton (1996) argue that financially oriented metrics do fulfil an important task in performance assessment. They should, however, be seen in context with other perspectives of performance, namely:

- The customer perspective
- The innovation and learning perspective
- The internal business perspective

The revenue-based metrics were ranked evenly in the top half of the metrics listed.

Table 62 lists the metrics revolving around the use of knowledge in the organisation. Highly rated amongst these metrics were those which involve the generation and transfer of knowledge. Employee awareness of knowledge sources and the degree of collaboration in key initiatives were examples of such measures. The results that flowed from knowledge management rated lower in the rankings e.g. knowledge-based products, new patents, copyrights, etc. Importantly though it was of the most importance to executives to build awareness and collaboration.

Metric	South African Ranking	International Ranking
Employee awareness of knowledge sources	2	7
Collaboration levels in key initiatives	4	2
Withdrawals from central knowledge	10	10

Metric	South African Ranking	International Ranking
repositories		
Employee's skill levels	11	12
Knowledge-based products/services launched	12	8
Submissions to central knowledge repositories	13	13
New patents, copyrights, products brought to market	14	9

Table 62: Knowledge use metrics

The quality of decisions ranked third in the South African survey and fourth in the international survey, indicating its importance. Ruggles (1998) argues that effective knowledge management leads to the appropriate distribution of knowledge thereby assisting in empowerment through delegation of decision making.

Metric	South African Ranking	International Ranking
Quality of decisions	3	4
Delegation/distribution of decision-making	9	10

Table 63: Decision based metrics

5.1.3.5 Question 15

The greatest risk for South African executives (and the fourth greatest for international executives) in the management of knowledge was the resultant insecurity of intellectual assets. Leonard-Barton (1995), however, points out that technological competencies are built through the complex interaction of knowledge workers. The departure of personnel would certainly lead to the insecurity of the intellectual asset but would not necessarily lead to a loss of strategic advantage.

For international respondents the greatest risk in managing knowledge was the creation of a self serving bureaucracy. The formalisation of knowledge management would undoubtedly lead to increased costs. These costs could present themselves in incentives (Ruggles, 1998, Davenport, et al. (1998)) and the creation of new knowledge roles (Earl & Scott, 1999).

South African respondents ranked the possibility of knowledge overload as second most important. While international respondents identified the perpetuation of obsolete knowledge as second most important. Ranking third for South African respondents was the issue of lack of metrics. Similarly, third for international respondents and sixth for South Africans was the risk of not being able to measure financial measures of success.

5.1.4 What is the nature of current knowledge management projects?

This section will consider questions 16 to 20 in terms of research objectives 1 and 2.

Respondents were required to complete question 16, 17, 18 and 19 only if they had initiated or completed a knowledge management project. 53 (54.64%) of the 97 South African respondents and 248 (57.54%) of the 431 international respondents completed these questions.

5.1.4.1 Question 16

Unfortunately no percentage response for each of the knowledge management projects was available for the international study. Therefore it was not possible to undertake any statistical comparison between results.

The most common knowledge project for both the international and South African respondents was the introduction of a knowledge repository. The knowledge repository most commonly takes the form a computerised database of specific company knowledge and experience.

The second most common project was the sharing of best practices to other parts of the organisation. Third most common was the sharing of

lessons learnt with other parts of the organisation. In the international study lessons learnt and best practices were reported in combination and rated second.

Knowledge audit/mapping/assessment were reported in combination for the international survey. For the South African survey 15.09% of the sample had implemented a knowledge mapping exercise, 7.55% had implemented knowledge audits and 1.89% had implemented knowledge assessment.

5.1.4.2 Question 17

Leaders of South African knowledge management projects were at senior level and general management level (47.17%), and information technology (15.09%). This was contradictory to the international study where 12% where from information technology and 6% senior management.

5.1.4.3 Question 18

Respondents were asked what was the most difficult aspect of managing their respective knowledge management projects. The results are presented in Figure 46 below. Calculations indicated a positive correlation of 0.54 but the null hypothesis was accepted.

It must be borne in mind, when viewing Figure 46 below, is the fact that the international results were adjusted by some factor that is unknown to the author.

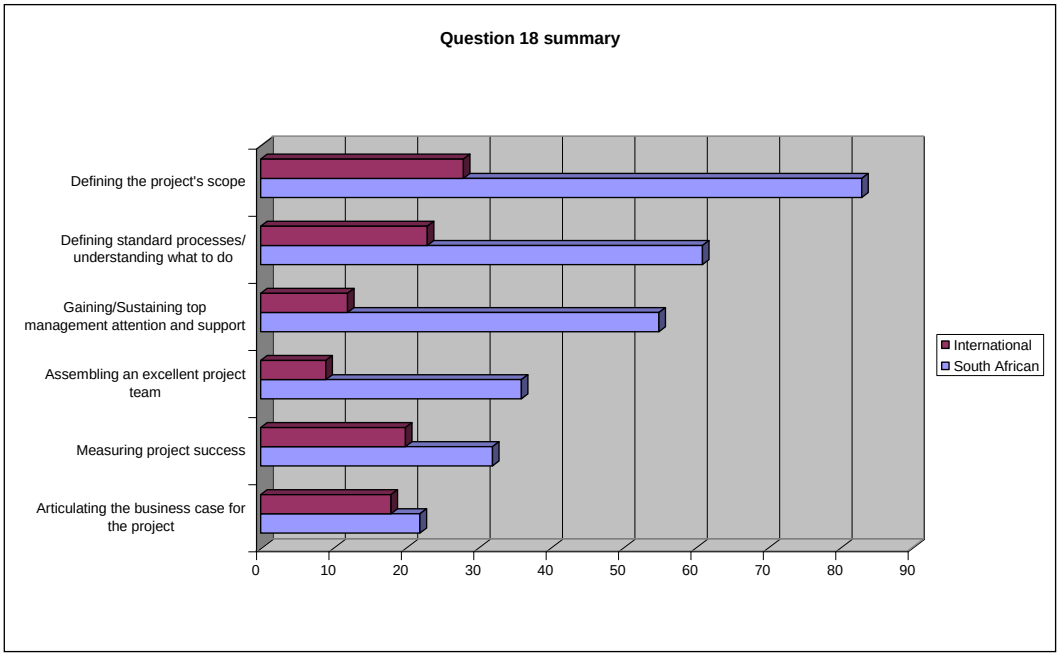


Figure 46: Question 18 summary

The definition of the project's scope proved to be the most difficult aspect of the project for both the international and South African respondents. Ranked second in both studies was the definition of standard processes to be undertaken in the project.

Lack of top management support ranked third in the South African study and fifth in the international study. Assembling an excellent project team ranked fourth locally, while ranking sixth in the international study. Measuring project success ranked fifth in the international study and third in the local study. Articulation of the business case for the project ranked sixth for the South African study and fourth in the international study.

5.1.4.4 Question 19

When questioned as to how management would assess the success or failure of the knowledge management effort, 30.19% of South African respondents did not know, 28.30% would be using non-financial measures, 22.64% would be gauging usage and 18.87% would be using financial measures. Unfortunately no percentage breakdown for the results was available for the international results. However, international respondent would tend be using non-financial measures, followed by usage and then financial measures.

According to the above results, there is recognition that financial measures are not the most important in gauging the viability of knowledge management projects. In addition, it was recognised that non-financial measure (such as innovation, cycle time, customer satisfaction, etc.) were important. Interestingly, for the South African respondents a large portion did not know how success would be gauged.

5.1.4.5 Question 20

Respondents were asked to indicate whether the following eight knowledge management projects were currently in progress, planned or should be entered into. All respondents were required to answer this question.

Analyses of these results will be dealt with through individual attention to each of the knowledge management project types, followed by a brief summary.

5.1.4.5.1 Question 20a

The Chi-square test of independence was undertaken on the data. The result of the test was to reject the null hypothesis with a probability of errorr of 0.052. International and South African respondents therefore responded similarly with regard to the establishment of new knowledge roles.

Earl & Scott (1999) argue that the new knowledge roles should be focused on the management of knowledge as a resource, in particular:

- The design and installation of techniques and processes to create, protect, and use known knowledge.
- The design and creation of environments to discover and release knowledge that is not known.

- The articulation of the purpose and nature of managing knowledge as a resource and its embodiment it in other initiatives and programme.

The greatest contributor to the chi-square result and therefore the greatest cause of difference between the surveys arose in the ‘should do’ category. In this respect the international acceptance of the concept of introducing new knowledge roles was greater. However a difference arose within the ‘planned’ constructs too. The South African survey respondents planned to introduce knowledge management roles to a greater extent than their international counterparts. This indicated that the South African respondents were ahead, of international respondents, in their planning.

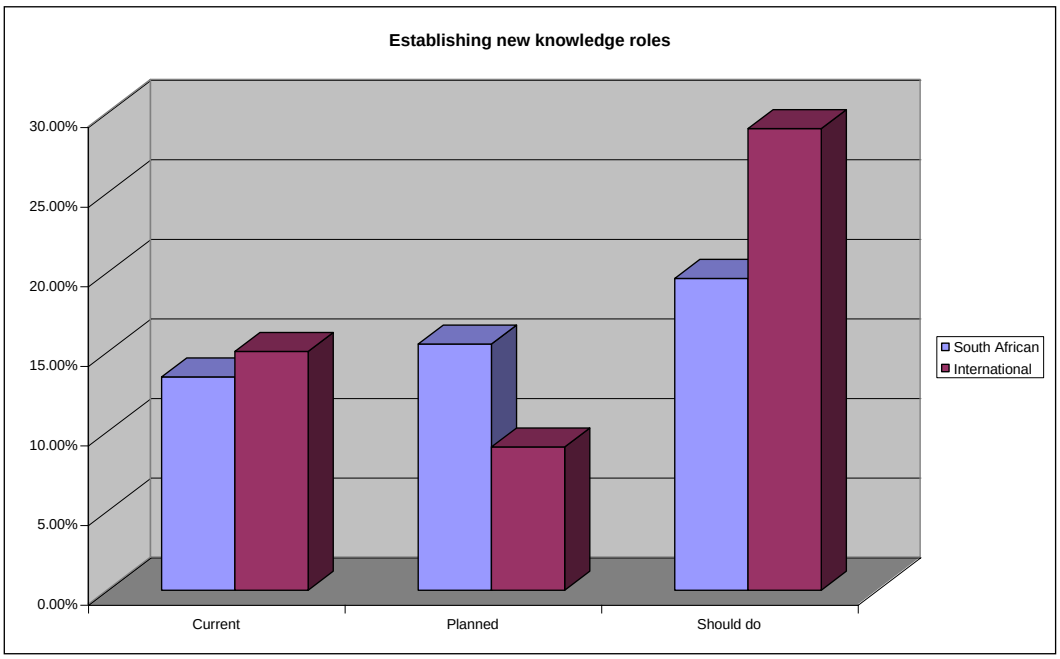


Figure 47: Establishing new knowledge roles

5.1.4.5.2 Question 20b

The Chi-square test of independence was undertaken on the data. The result of the test was to accept the null hypothesis with a probability of errorr in rejecting the null hypothesis of 0.309. International and South African respondents therefore differ in the implementation of the establishment of new knowledge roles.

Nonaka (1991) indicates that the creation of networks of knowledge workers was most effective for the transfer of tacit knowledge. This was due to the difficulty in codifying and storing tacit knowledge.

In the creation of networks of knowledge workers the international respondents entered into the activity to a greater extent than their South African counterparts. South African respondents planned to enter into networks of knowledge workers to a greater extent than international respondents did.

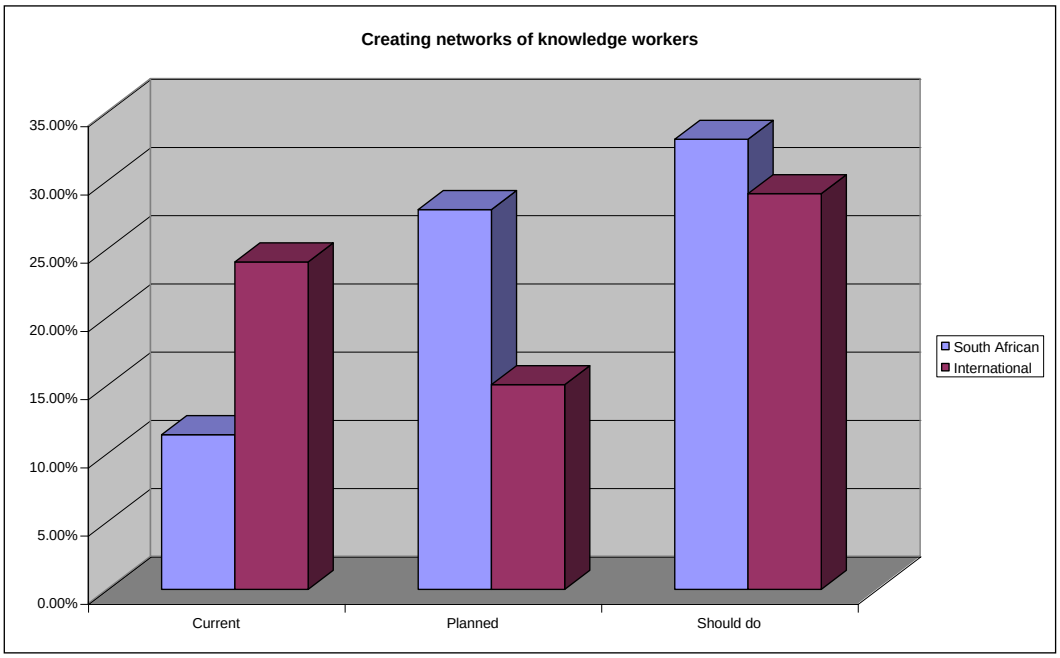


Figure 48: Creating networks of knowledge workers

5.1.4.5.3 Question 20c

The Chi-square test of independence was undertaken on the data. The result of the test was to accept the null hypothesis with a probability of error of 0.113. International and South African respondents therefore differed in the implementation of projects to map internal sources of expertise.

Snowden (1999) points out that the knowledge map is an aid to facilitate collaboration between knowledge owners. He defines a map as a set of data organised into a coherent and useable form, in other words, as information.

In all respects of mapping of internal expertise the international respondents were ahead of South African respondents.

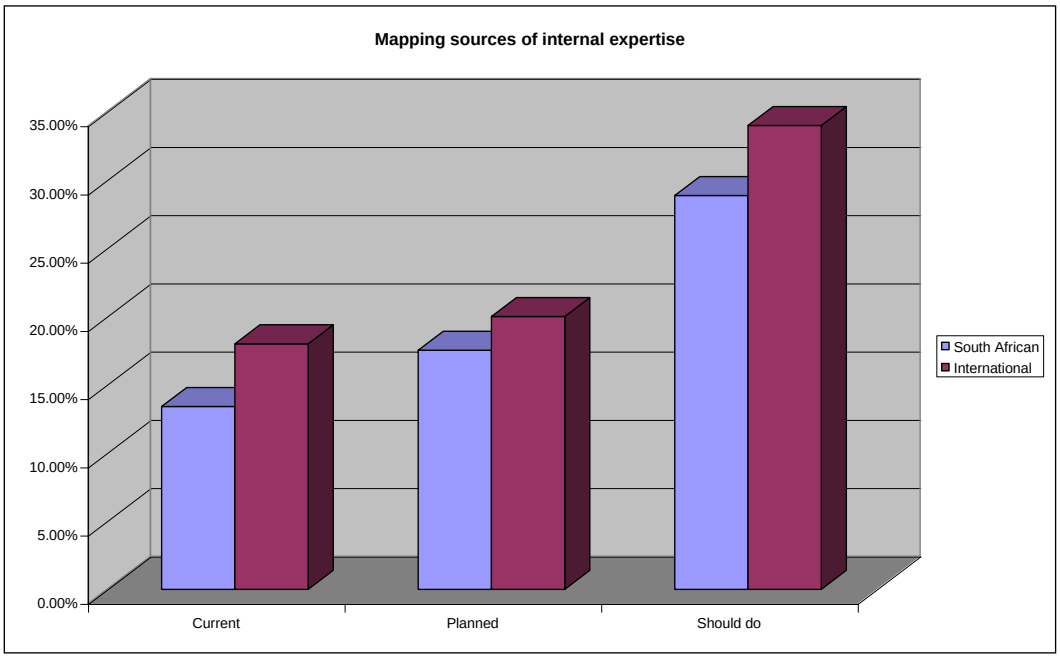


Figure 49: Mapping sources of internal expertise

5.1.4.5.4 Question 20d

The Chi-square test of independence was undertaken on the data. The result of the test was to reject the null hypothesis with a probability of error of 0.012. International and South African respondents therefore were similar in the implementation of data warehousing projects.

The implementation of a data warehouse was the second most common current knowledge management project for South African respondents and the third most common current knowledge management project for international respondents. Borghoff & Pareschi (1998) indicate that knowledge repositories collect, store and retrieve knowledge when required by the user. This process, it is argued, is similar to learning through communication.

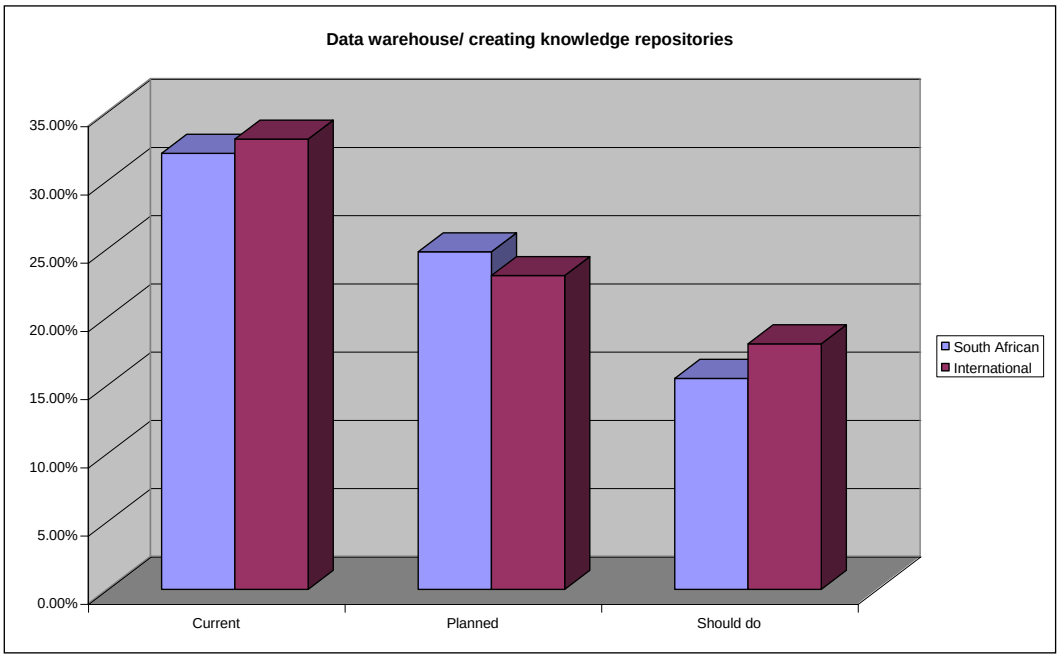


Figure 50: Data warehouse/ creating knowledge repositories

5.1.4.5.5 Question 20e

The Chi-square test of independence was undertaken on the data. The result of the test was to reject the null hypothesis with a probability of error of 0.009. International and South African respondents were therefore similar in the implementation of decision support tools.

The implementation of decision support systems is an advanced element of the knowledge management portfolio of applications (Herbert, 1998). In this respect the international respondents had current decision support system projects in hand to a greater extent. South African respondents had future planned decision support systems.

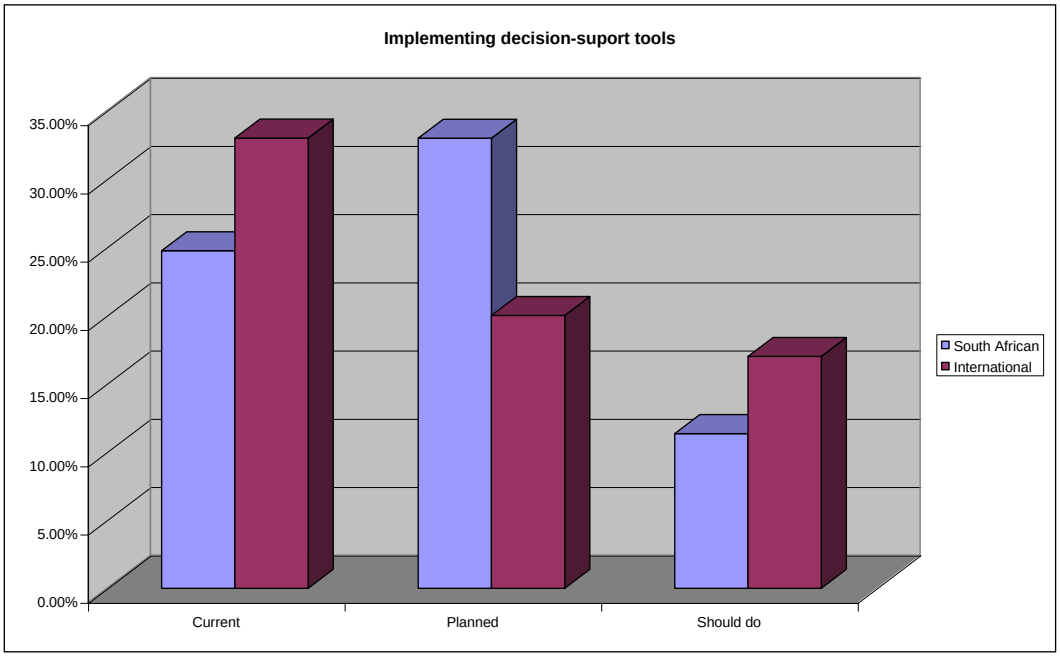


Figure 51: Implementing decision-support tools

5.1.4.5.6 Question 20f

The Chi-square test of independence was undertaken on the data. The result of the test was to reject the null hypothesis with a probability of error of 0.085. International and South African respondents therefore are similar in the implementation of GroupWare.

The implementation of GroupWare was the second most popular international knowledge management technology tool and the most popular South African knowledge management technology tool. The implementation of the tools was similar in all categories of implementation.

GroupWare is an electronic means for eliciting, sharing and organising quantities of information. Sveiby (1997) argues that GroupWare is an effective tool to use in the conversion of tacit knowledge to explicit knowledge.

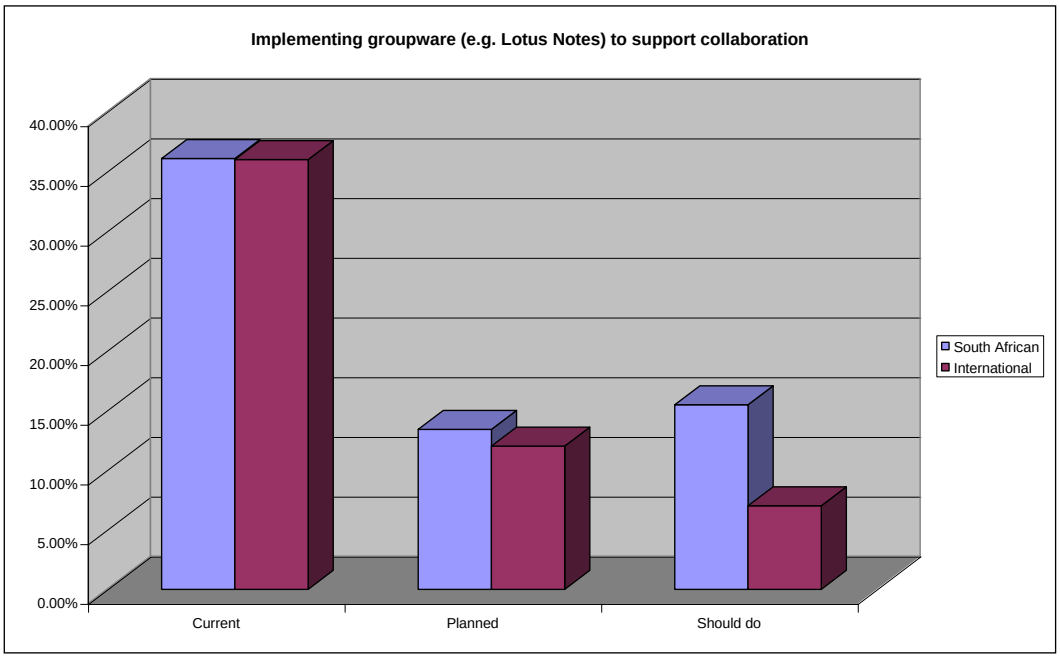


Figure 52: Implementing groupware (e.g. Lotus Notes) to support collaboration

5.1.4.5.7 Question 20g

The Chi-square test of independence was undertaken on the data. The result of the test was to reject the null hypothesis with a probability of error of 0.031. International and South African respondents therefore were similar in the implementation of an intranet.

The implementation of intranet was the most popular project for international respondents and the third most popular for South African respondents. South African respondents were behind international respondents in the 'current' project category, but ranked equally in the 'planned' and 'should do' categories.

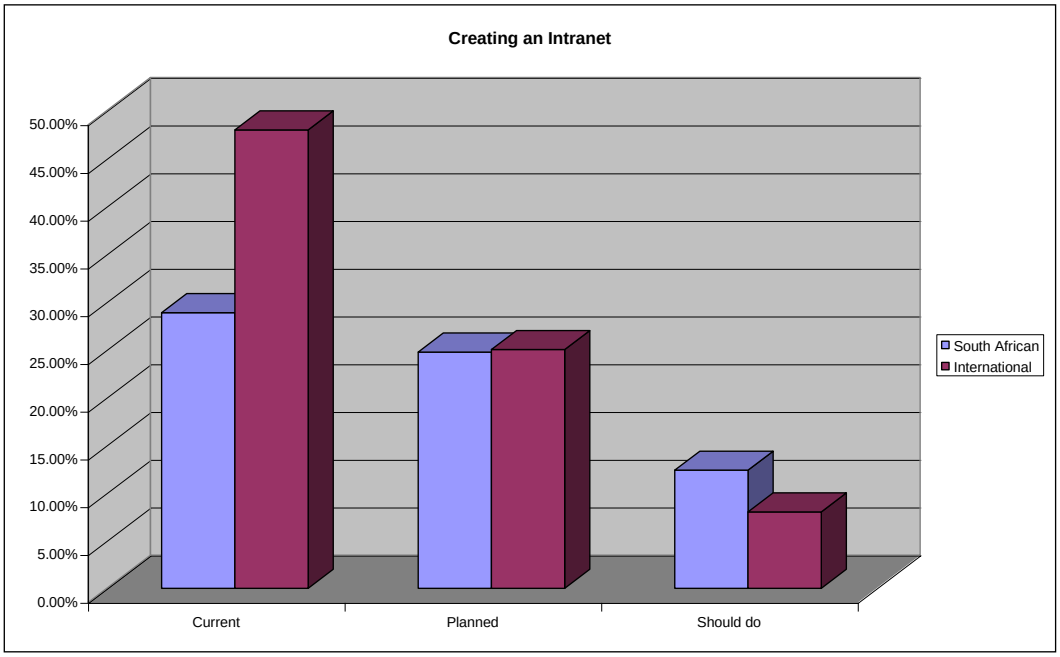


Figure 53: Creating an intranet

5.1.4.5.8 Question 20h

The Chi-square test of independence was undertaken on the data. The result of the test was to accept the null hypothesis with a probability of error of 0.112. International and South African respondents therefore differed in the launching of knowledge based products or services.

Little difference was noticeable between the surveys for the ‘planned’ and ‘current’ categories. However, the difference between the surveys presented itself where international respondents believed to a greater extent that they should launch a new knowledge based service or product.

The launch of knowledge based products or services would be a beneficial outcome of knowledge management initiatives.

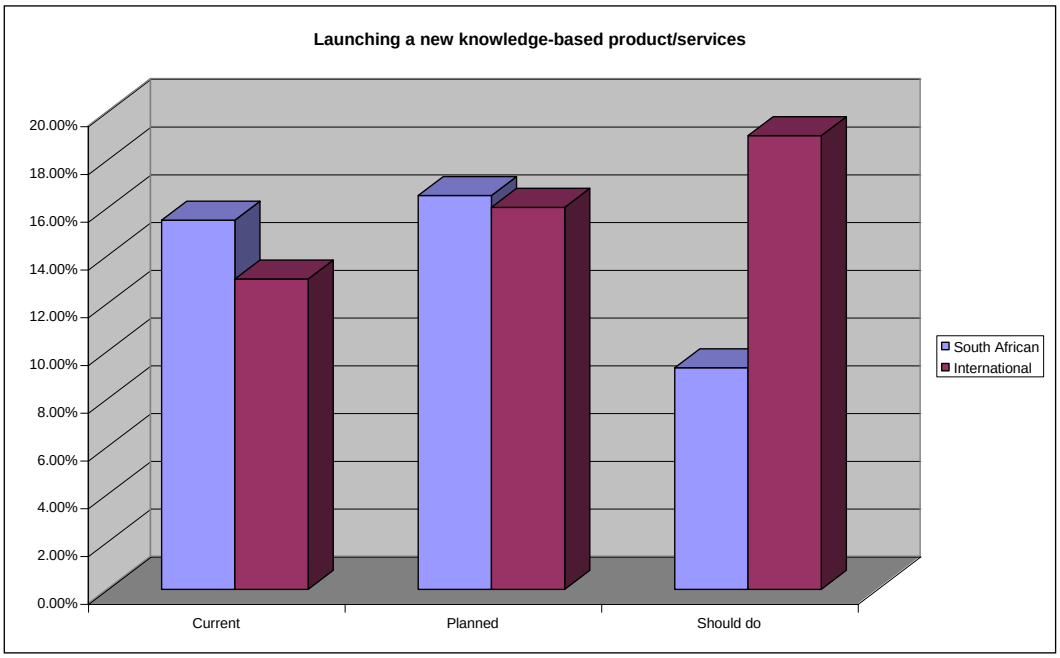


Figure 54: Launching a new knowledge-based product/ service

5.1.4.5.9 Question 20 summary

Comparative analyses showed that five of the eight types of knowledge management projects were similar within a 10% level of significance. The three project types that differed included:

- Establishing networks of knowledge workers,
- Mapping internal sources of expertise, and
- Launch of new knowledge based services/ products.

Knowledge projects that the most respondents felt they ‘should do’ were the mapping of internal sources of expertise, and the launching of new knowledge based services/ products.

The types of knowledge management projects that proved to be similar were:

- Establishing new knowledge roles,
- Data warehousing,
- Implementing decision support tools,
- Implementing groupware to support collaboration, and
- Creating an Intranet.

The knowledge projects that had been implemented to the greatest degree were the creation of an intranet and data warehouses.

Due to the frequency of response to all types of projects in both studies it is argued that knowledge management projects are currently being implemented and certainly senior executives are aware of this.

5.2 Summary

Chapter 5 has interpreted the results of the research objectives presented in Chapter 3. Chapter 6 will discuss the conclusions to be drawn from the research as well as the highlights of the research, areas for further research and recommendations for South African managers.

6 Conclusion

Chapter 6 will draw conclusions from the research, as well as highlight important findings and suggest areas for further research, and make recommendations for South Africa managers.

6.1 Highlights of the research

The literature survey and the results revealed several interesting factors; as summarised below:

- Managers, in both surveys, believed that their organisations were knowledge intensive and that through deliberate management they would be able to leverage knowledge more effectively.
- Executives indicated that innovation was the greatest benefit expected from knowledge management efforts.
- Respondents from both surveys indicated that they were poor at:
  - Representing new knowledge in documents
  - Transferring knowledge to different parts of the organisation
  - Facilitating knowledge growth through cultures and incentive
  - Measuring the value of knowledge assets
- 65.75 % of South African respondents believed that they had the correct level of focus on management efforts, as compared to 38% of international respondents.

- The use of Intranet, GroupWare and Data Warehouses were seen as the technology tools with the greatest potential.
- In both surveys culture was seen as not being conducive to knowledge management, primarily due to knowledge hoarding.
- The greatest challenge to respondents would be aligning the corporate culture with a shared understanding of strategy or business model. In addition, changing people's behaviour was indicated as the greatest difficulty. 62.87% of South African managers and 67% of international managers believed that more deliberate management could overcome challenges and difficulties.
- In both surveys the most popular metric was identified as being the assessment of revenues generated by new ideas.
- The most popular project was the implementation of knowledge repositories, but the biggest difficulty in the implementation of knowledge management projects was the definition of the project scope.

6.2 How the objectives were met

The aim of the study was to investigate the state of knowledge management in South Africa, and its comparison with that of the United States and Europe. This was achieved through the assessment of four research questions which, in turn, were divided into sub-questions. This section discusses how the objectives were met through the study.

6.2.1 Research question 1.1

This involved assessment of executives' perspectives on the notion of knowledge management. Responses to sub-questions indicated that knowledge management was believed, by respondents, to be important. It was also indicated that increased knowledge management could leverage knowledge to a greater extent, showed which types of knowledge were considered important, and suggested what the benefits of knowledge management are. It was also evident that South African and International respondents had similar views on the management of knowledge.

6.2.1.1 Sub question 1.1.1

89.69% of South African and 86% of international respondents agreed that their organisations were knowledge intensive. There proved to be no significant difference between the South African and International studies.

6.2.1.2 Sub question 1.1.2

Respondents in both studies tended to skew to the Agree Strongly and Agree end of the five-point measurement scale when asked whether more deliberate management would leverage knowledge to a greater extent. The International study indicated a greater degree of skewing to the Agree Strongly construct and could be interpreted as a greater degree of confidence as to the effect of management over the leveraging of knowledge.

6.2.1.3 Sub question 1.1.3

Respondents were asked to rank the importance, on a five-point scale, of nine types of knowledge. There was a significant difference between the two studies for three of the nine constructs. The results, in all cases, tended to skew to the very important end of the scale, thereby indicating that all types of knowledge were of importance to executives.

6.2.1.4 Sub question 1.1.4

The benefits of knowledge management were assessed in two parts. Firstly, respondents were asked to indicate which, from a list of eight knowledge management benefits would be of gain to the respondents'

organisations. In this respect all eight of the benefits were deemed to be of value, with responsiveness to customers and innovation appearing to be of greatest value. The difference between South African and International results in this respect was significant, but could be explained due to the nature of the question.

6.2.1.5 Sub question 1.1.5

Secondly, respondents were asked to indicate which of the eight knowledge management benefits were of greatest value. In this respect the comparison resulted in a relatively strong correlation (Spearmans rank correlation = 0.8) between studies, again with innovation and increased responsiveness to customers scoring the highest.

6.2.2 Research question 2

What are the levers available to executives in the management of knowledge and do these levers differ between South African and International managers.

6.2.2.1 Sub question 1.2.1

Of the eight knowledge management processes for which respondents were asked to rate their organisations' performance on a five point scale from Very Poor to Excellent, only one was found to be significantly different. On the whole, however, respondents believed they were above average performers for knowledge processes that had historically been a part of normal business, namely:

- Generating new knowledge,
- Accessing valuable knowledge from external sources,
- Embedding knowledge in processes, products and/or services, and
- Using accessible knowledge in decision making,

Where, however, processes involved aspects that are not part of normal business respondents felt they were below average, these were:

- Representing new knowledge in documents, databases, software, etc.,
- Transferring existing knowledge to other parts of the organisation,
- Facilitating knowledge growth through culture and incentives, and

- Measuring the value of knowledge assets and/or impact of knowledge management.

6.2.2.2 Sub question 1.2.2

Respondents were asked to indicate on a percentage scale where managerial efforts should be made in terms of People, Process and Technology. Firstly, respondents were queried as to where managerial efforts currently lay. There proved to be no significant difference between South African and international respondents in this respect. The current focus of managerial efforts was 50% People, 25% Process and 25% Technology.

In addition to the above, respondents were asked whether this focus was currently being applied. There proved to be a significant difference in this respect, in that 66% of South African respondents felt that this was the focus being applied whereas 39% of the International respondents felt that this was not the case.

Those respondents who felt that the required focus was not being applied were asked to indicate what, in fact, was the current focus. There proved to be no significant difference between South African and International respondents.

6.2.2.3 Sub question 1.2.3

The technology tools that were believed to be of greatest potential were Intranet, decision support tools and data warehouses respectively. With regard to these technologies, there proved to be no significant difference between South African and international respondents.

6.2.2.4 Sub question 1.2.4

With regard to the impact of culture on knowledge management it was not possible to undertake statistical tests of independence due to the lack of data from the international study. For South African respondents, 58% believed that their culture was not conducive to the management of knowledge for the primary reason of knowledge hoarding (58%). Of those who felt that their organisation was conducive to knowledge management, 69% reported their employees as being ‘knowledge thirsty’.

6.2.2.5 Sub question 1.2.5

The formalisation of knowledge management roles was not seen as a priority for either South African or international respondents. Of those who indicated a belief that knowledge management should be formalised,

reasons given were the facilitation of knowledge transfer (48%) and enabling knowledge management (44%).

6.2.3 Research question 1.3

What are the managerial challenges to overcome and do these challenges differ significantly from the international study?

6.2.3.1 Sub question 1.3.1

The biggest current impediments to knowledge were found not to be significantly different between South African and international studies. The greatest impediment was corporate culture in the international study, whereas “lack of shared understanding of strategy or business model” was the greatest impediment in the South African study.

6.2.3.2 Sub question 1.3.2

With reference to the impediments that respondents believed had the greatest effect on knowledge transfer, respondents were asked whether they believed that more deliberate management would overcome the impediment. Again, there proved to be no significant difference between the South African and international studies, with 62.89% of the South

African respondents and 67% of the international respondents agreeing that more deliberate management would overcome the greatest impediment. Interestingly, however, 22.68% of South African respondents were of the opinion that impediments to knowledge transfer could not be overcome, as compared to only 4% of international respondents.

6.2.3.3 Sub question 1.3.3

Respondents were asked to rank the difficulties they believed were the largest with regard to the management of knowledge. No significant difference was indicated between South African and international surveys. For both sets of respondents the largest difficulty proved to be ‘changing peoples behaviour’. The determination of the value of knowledge management efforts rated highly in both studies, as did assessment of which knowledge should be managed.

6.2.3.4 Sub question 1.3.4

When respondents were asked to rank measures that could be used to track the performance of knowledge management efforts over time, there proved to be no significant difference between South African and international studies.

Those metrics that ranked highest included revenue based metrics. It is necessary for respondents to build awareness of knowledge management efforts and to focus on collaboration.

6.2.3.5 Sub question 1.3.5

The insecurity attached to intellectual assets proved to be a risk of greatest concern to both South African and international respondents. Also of concern to respondents was the creation of a self serving bureaucracy through the formalisation of knowledge management roles.

6.2.4 Research question 1.4

This question sought to assess and compare the types of knowledge management projects that are currently or had recently been undertaken by respondents.

6.2.4.1 Sub question 1.4.1

This question sought to identify the types of knowledge management projects undertaken by respondents. In this respect both the South African and international respondents had undertaken a knowledge repository project. For South African and international respondents the

second most common knowledge project was the ‘rolling out’ of best practices to other parts of the organisation.

The knowledge repository was most commonly a computerised database of specific company knowledge and experience. Davenport & Prusak (1998) indicate that the introduction of a knowledge repository was indicative of the early stages of knowledge management in an organisation, and that it was relatively easy to comprehend and implement.

6.2.4.2 Sub question 1.4.2

This question sought to identify who was heading up knowledge management initiatives in organisations. Both studies indicated that the leadership of knowledge management projects had been senior management, specifically those in information technology.

6.2.4.3 Sub question 1.4.3

This question sought to identify the most difficult aspects of knowledge management projects. The definition of the project scope was rated as the most difficult part by both the South African and International respondents. Closely linked to this, and rated second for both studies,

was the definition of the standard processes or understanding what to do in the project.

6.2.4.4 Sub question 1.4.4

This question sought to identify how management would assess the success of knowledge management projects. Of South African respondents, 30.19% did not know how success would be measured. 28.30% of South African respondents would be using non-financial measure to gauge success, while 18.87% would be using financial measures.

6.2.4.5 Sub question 1.4.5

This question sought to identify whether eight types of knowledge management projects were either current, planned or should be undertaken. It was identified that five projects were similarly approached in both the South African and international studies with the mapping of internal sources of expertise and launching of new knowledge based services/ products as something that should be done.

6.3 Recommendations for managers

The following are three recommendations to managers who are embarking on a knowledge management initiative. It is suggested that:

- They ensure that participants in the knowledge management initiative have a positive orientation to knowledge management. The participants therefore need to be bright, intellectually curious, willing and free to explore;
- They ensure that the project is clearly defined in terms of purpose, using language that is free of confusion and ambiguity. The management of an intangible must be clearly defined in order to avoid confusion;
- Since knowledge management initiatives commonly involve changing the way people work, this change requires the appropriate motivation to be applied by senior management. It is suggested that performance incentives be used.

6.4 Areas for further research

Since the subject of knowledge management is broad in scope and a relatively new area of research, many potential research projects exist, of which three of which are listed below:

- Implementation issues in knowledge management projects,
- The use of non-financial measures of performance, and

- Assessment of critical success factors of knowledge management technologies.

6.5 Final conclusions

The need for, challenges in and levers of, knowledge management is well understood by South African and international respondents. Respondents understand that knowledge management is a forum in which strategic advantage can be created in the current business environment. The greatest challenge is seen as the alignment of knowledge management needs with the organisational culture.

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8 APPENDIX A: Consistency Matrix

Research Objective	*Research Question*	*Sub-Question*	*Instrument Question Number*	*Level of Data*	*Type of Question*
1. Assess executives' perspectives on the notion of knowledge management in South Africa?	1.1 Is the management of knowledge important?	1.1.1 Are organisations knowledge intensive?	1	Nominal.	Nominal (yes/no) Scale.
		1.1.2 Can knowledge be managed?	2	Ordinal.	5 Point Ordinal Scale.
		1.1.3 What types of knowledge contribute to competitiveness?	3	Ordinal.	5 Point Ordinal Scale.
		1.1.4 What are the benefits of knowledge management?	4, 5	Nominal.	Nominal Scale.
		1.1. 5 What is the most important benefit of knowledge management?	5	Ordinal.	Ordinal Ranking.

Research Objective	*Research Question*	*Sub-Question*	*Instrument Question Number*	*Level of Data*	*Type of Question*
	1.2 What levers can be used in the management of knowledge?	1.2.1 How do executives currently rate their performance in knowledge management?	6	Ordinal.	5 Point Ordinal Scale.
		1.2.2 What percentage of managerial effort should be focused on people, process and technology.	7	Nominal.	Nominal (percentile) Scale.
		1.2.3 What technology tools offer potential in the management of knowledge?	8	Ordinal.	3 Point Ordinal Scale.
		1.2.4 Are current organisational cultures conducive to the management of knowledge?	9	Nominal.	Open Ended.
		1.2.5 Should knowledge management roles be formalised?	10	Ordinal.	5 Point Ordinal Scale.

Research Objective	*Research Question*	*Sub-Question*	*Instrument Question Number*	*Level of Data*	*Type of Question*
	1.3 What are the managerial challenges to overcome?	1.3.1 What are the main impediments to knowledge transfer?	11	Ordinal.	Linear weighted scale..
		1.3.2 Would the deliberate management of knowledge overcome the impediments?	12	Nominal.	Open Ended.
		1.3.3 What are the difficulties in managing knowledge?	13	Ordinal.	Linear weighted scale.
		1.3.4 What metrics are the most useful in tracking the performance of knowledge management?	14	Ordinal.	Linear weighted scale.
		1.3.5 What are the risks inherent in the management of knowledge?	15	Nominal.	Open Ended.

Research Objective	*Research Question*	*Sub-Question*	*Instrument Question Number*	*Level of Data*	*Type of Question*
	1.4 What types of knowledge management initiatives are executives undertaking?	1.4.1 What is the nature of current knowledge management projects?	16	Nominal.	Open Ended.
		1.4.2 Who is leading knowledge management projects?	17	Nominal.	Limited Open Ended.
		1.4.3 What are the difficult aspects of these projects?	18	Ordinal.	Linear weighted scale.
		1.4.4. How is performance being measured?	19	Nominal.	Open Ended.
		1.4.5 What projects are current, planned or envisaged?	20	Ordinal.	Ordinal Ranking.

Research Objective	*Research Question*	*Data Level*	*Test of Correlation or Independence*
2. Determine whether there are significant differences between the state of knowledge management in South Africa and America and Europe	2.1 What are the significant differences between the South African and International (Ernst & Young) surveys, in the above categories?	Nominal	Descriptive Statistics, Two-sample T-tests and Chi-square tests of independence
		Ordinal	Descriptive Statistics, Mann Whitney U and Kolmorgorov-Smirnov Two-sample test

9 APPENDIX B: Research Questionnaire

This survey focuses on what may be your most critical organisational asset– the knowledge of your people. Our objective is to determine whether organisations like yours are attempting to manage this asset more deliberately and, if so, what forms such management is taking.

All responses will be held in the strictest confidence and the results will be reported only in the aggregate. In appreciation of your participation in this important survey, we will send you a complimentary copy of the executive summary.

Knowledge needs and issues vary dramatically in different types of organisations, depending on their goals, composition and capabilities. Before embarking on this survey, please indicate whether you are responding on behalf of your entire firm, your division or your business unit.

I am responding on behalf of:

a. ☐ The entire firm

b. ☐ One division (please specify): _____

c. ☐ One business unit (please specify):_____

Part I
THE CASE FOR MANAGING KNOWLEDGE

1. Are you in what you consider to be a "knowledge-intensive" business?

   a. ☐ Yes b. ☐ No

2. Please indicate your level of agreement with the following statement: "It would be possible, through more deliberate management, to leverage the knowledge existing in my organisation to a higher degree."

   a. ☐ Disagree strongly
   b. ☐ Disagree
   c. ☐ Neutral
   d. ☐ Agree
   e. ☐ Agree strongly

3. What types of knowledge are critical to your competitiveness?

	Not at all Important	*Not Very Important*	*Somewhat Important*	*Very Important*	*Extremely Important*
a. Knowledge about emerging technologies	1				
b. Knowledge about competitors	1				
c. Knowledge about customers	1				
d. Knowledge about best practices/effective processes	1				
e. Knowledge about supply chain partners	1				
f. Knowledge about emerging market trends	1				
g. Knowledge about regulation/legislation	1				
h. Knowledge about our own competencies and capabilities	1				
i. Knowledge about our own products and services	1				
j. Other (please specify): _____	1				
k. Other (please specify): _____	1				

4. What benefits do you believe your organisation could gain from more active management of its knowledge? (Please check all that apply.)

   a. ☐ Innovation: more consistent success in designing new products/services and processes
   b. ☐ Efficiency: increased productivity of knowledge workers
   c. ☐ Flexibility: ability to change and adapt to change more rapidly
   d. ☐ Empowerment: ability to support decision-making at lower levels in the organisation
   e. ☐ Reduction in duplication of effort
   f. ☐ Improved decision-making
   g. ☐ Increased responsiveness to customers
   h. ☐ Quality improvement: not repeating mistakes
   i. ☐ Other (please specify): _____
   j. ☐ Other (please specify): _____

5. Of the benefits listed in question 4 above, which would be *most* important to your organisation's success?

   _____

PART II
THE LEVERS OF KNOWLEDGE MANAGEMENT

6. Listed below are eight major knowledge processes. Please note for each your impression of your organisation's current performance.

	Very Poor	*Poor*	*Average*	*Good*	*Excellent*
a. Generating new knowledge	1				
b. Accessing valuable knowledge from external sources	1				
c. Representing knowledge in documents, databases, software, etc.	1				
d. Embedding knowledge in processes, products and/or services	1				
e. Transferring existing knowledge to other parts of the organisation	1				
f. Using accessible knowledge in decision-making	1				
g. Facilitating knowledge growth through culture and incentives	1				
h. Measuring the value of knowledge assets and/or impact of knowledge management	1	2	3	4	5

7a. In your opinion, does your organisation's ability to compete based on knowledge depend more upon people, process or technology issues? (Please assign percentage weights.)

a. People _____%
b. Process _____%
c. Technology _____%
100%

b. In your view, is this the relative emphasis being placed by your organisation *currently?*

a. ☐ Yes b. ☐ No

c. If no, what is the relative emphasis your organisation currently places on people, process and technology issues? (Please assign percentage weights.)

a. People _____%
b. Process _____%
c. Technology _____%
100%

8. What technology tools do you believe offer the greatest potential for enhancing your organisation's knowledge base?

	Some Potential	*Moderate Potential*	*Great Potential*
a. Groupware			
b. Data warehouses			
c. Decision support tools			
d. Internet access			
e. Intranet			
f. Directories of resident experts			
g. Other (please specify):_____			
h. Other (please specify):_____			

9. Please comment on the culture of your organisation and its impact on knowledge.

10. Do you think it is or would be valuable to have a formal role of "Chief Knowledge Officer" (or equivalent) in your organisation?

a. ☐ Not at all valuable
b. ☐ Not very valuable
c. ☐ Somewhat valuable
d. ☐ Very valuable
e. ☐ Extremely valuable

If you answered c, d or e above, on what tasks should a chief knowledge officer focus?

PART III
CHALLENGES TO OVERCOME

11. What are the biggest current impediments to knowledge transfer in your organisation? (Please rank order the top five, with 1 being the biggest impediment, 2 being next biggest impediment, etc.)

a. _ . Culture
b. _ . Incentive system
c. _____ Organisational structure
d. _____ Staff turnover
e. _____ Lack of shared understanding of strategy or business model
f. _____ Non-standardised processes
g. _____ Information/communications technology constraints
h. _____ Configuration/physical features of work spaces
i. _ . Top management's failure to signal its importance
j. _ . Lack of ownership of the problem
k. _ . Other (please specify):_____
l. _ . Other (please specify):_____

12. Reflecting on what you consider to be the largest obstacle (ranked 1 in question 11 above), please comment on the degree to which it could be overcome by more deliberate management.

_____

_____

_____

_____

_____

13. What do you think would be (or are) the biggest difficulties in *managing* knowledge in your organisation? (Please rank order the top five, with 1 being the most difficult, 2 being next most difficult, etc.)

a. _ . Determining what knowledge should be managed
b. _ . Measuring the value and performance of knowledge assets
c. _ . Defining standard processes for knowledge work
d. _ . Overcoming technological limitations
e. _ . Changing people's behaviour
f. _____ Mapping the organisation's existing knowledge
g. _____ Setting the appropriate scope for knowledge initiatives
h. _____ Justifying the use of scarce resources for knowledge initiatives
i. _ . Identifying the right leader/team for knowledge initiatives
j. _ . Other (please specify):_____
k. _ . Other (please specify):_____

14. If you were to track the knowledge performance of your organisation over time, what do you believe would be most useful to measure? (Please rank order the top five, with 1 being the most useful, 2 being next most useful, etc.)

a. _____ Submissions to central knowledge repositories
b. _____ Withdrawals from central knowledge repositories
c. _____ Collaboration levels in key initiatives
d. _____ Employee attrition rates
e. _____ Per capita expenditure on training
f. _____ New patents, copyrights, products brought to market
g. _____ R&D expenditures
h. _____ Percentage of revenue from new products
i. _____ Employee awareness of knowledge sources
j. _____ Productivity of knowledge workers
k. _____ Return on investment in knowledge management projects
l. _____ Increase in value of intellectual capital
m.. _____ Revenue generated by new ideas
n. _____ Knowledge-based products/services launched
o. _____ Delegation/distribution of decision-making
p. _____ Quality of decisions
q. _____ Employee's skill levels
r. _____ Other (please specify): _____
s. _____ Other (please specify): _____

15. What do you see as the major risks to managing knowledge in an organisation?

_____

_____

_____

PART IV
GAINING THE KNOWLEDGE ADVANTAGE

16. Please describe briefly a knowledge management project your firm/division/business unit has initiated or completed. (If you do not have a knowledge management project completed or underway, please skip to question 20.)

_____

_____

_____

17. Who led that effort? (Please indicate the title or area of responsibility of that person. A name is not required.)

_____

_____

18. What in your opinion were the most difficult aspects of managing that effort?
(Please rank order the top three, with 1 being the most difficult, 2 being next most difficult, etc.)

a. _____ Articulating the business case for the project
b. _____ Defining the project's scope
c. _____ Gaining/sustaining top management attention and support
d. _____ Assembling an excellent project team
e. _____ Defining standard processes/understanding what to do
f. _____ Measuring project success
g. _____ Other (please specify):_____
h. _____ Other (please specify):_____
i. _____ Other (please specify):_____

19. How did or will management assess the success or failure of the effort?

_____

_____

_____

20. What types of knowledge management efforts are underway, are planned, or would make sense for your organisation?

		Current	*Planned*	*Should Do*
a. _____	Establishing new knowledge roles	1	2	3
b. _____	Creating networks of knowledge workers	1	2	3
c. _____	Mapping sources of internal expertise	1	2	3
d. _____	Data warehousing/creating knowledge repositories	1	2	3
e. _____	Implementing decision-support tools	1	2	3
f. _____	Implementing groupware (e.g. Lotus Notes) to support collaboration	1	2	3
g. _____	Creating an intranet	1	2	3
h. _____	Launching a new knowledge-based product/service	1	2	3
i. _____	Other (please specify):_____	1	2	3
j. _____	Other (please specify):_____	1	2	3
k. _____	Other (please specify):_____	1	2	3

Please use the space below to provide any additional details or general observations that may help us in understanding the importance of knowledge and its management in your organisation.

_____

_____

_____

_____

_____

_____

PART V

Describe yourself...

Be assured that your responses to this survey are strictly confidential and will be reported only in the aggregate. The following information, however, will help us to detect trends and, if you choose, to send you a summary of the results in appreciation of your participation.

What is your title? _____

To whom do you report? ☐ CEO ☐ CIO ☐ CFO

☐ Other (please specify): _____

Please indicate the size of your firm/division/business unit (as reflected in your survey responses) in revenues:

a. ☐ < R100 million
b. ☐ R100 ~ R249 million
c. ☐ R250 ~ R500 million
d. ☐ R500 ~ R749 million
e. ☐ R750 ~ R999 million
f. ☐ > R1 billion

How many employees are in your firm/division/business unit? _____

What percentage of those employees would you say are "knowledge workers"? _____%

Please list the primary industry in which you compete: (Please select one).

a. ☐ Aerospace
b. ☐ Banking
c. ☐ Chemicals
d. ☐ Computers/Software/Electronics
e. ☐ Consumer Goods
f. ☐ Health Care
g. ☐ Insurance
h. ☐ Manufacturing
i. ☐ Media/Entertainment
j. ☐ Mining
k. ☐ Paper /Forest Products
l. ☐ Pharmaceuticals
m. ☐ Retail/Wholesale
n. ☐ Telecommunications
o. ☐ Transportation Services
p. ☐ Utilities
q. ☐ Other (please specify): _____

What do you consider to be your chief points of differentiation from competitors?

_____

_____

_____

_____

_____

Affix business card here or complete lines as noted.

Name:

Title:

Organisation:

Address:

Please return your completed questionnaire in the envelope provided or, if you prefer, fax your responses using the attached cover sheet to National Marketing, at Ernst & Young, fax (011) 498-1464

Thank you for your time.

This study examines the frameworks, methods and techniques that are currently used to support this emerging management discipline.
Findings of this survey will be reported only in aggregate and incorporated into an Ernst & Young report on Knowledge Management to be published in early 1999.

☐ Please send me the executive summary of this Ernst & Young Survey.