

**KNOWLEDGE MANAGEMENT: ISSUES, PROCESSES AND
OUTCOMES**

BY

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ABSTRACT

With the increase in more service-oriented industries in the current economy, companies are having to reassess their assets in order to overcome competition. The lifestyles of people have become more fast-paced and along with the effects of globalisation, companies need to be able to adapt quickly to the ever-changing nature of consumer demands. Traditional material assets are no longer the only things that could be considered of value within the organisation. The skills, expertise and knowledge of the employees within the company could also be considered an asset that should be utilised efficiently to generate more income for the company. Furthermore, the advances in technology have created a society where information is utilised and modified at a rapid pace. Therefore, organisations need to be aware of the knowledge that is within the company and utilise it efficiently to create services and products that would be attractive to the buying market.

In the interest of knowledge and its value within organisations, this research studies the capability of the organisation to manage the knowledge of their employees within the context of Knowledge Management (KM) processes. The research aims to discover how organisations identify the necessary knowledge required within the company and encourage their staff to become more knowledgeable. Moreover, this study includes questioning the extent to which companies have implemented KM strategies within the organisation that would

assist them in the management of employee knowledge. Furthermore, the thesis aims to study how knowledge is retained and disseminated within the organisation. Lastly, the Human Resource support systems that would assist in the management of knowledge within the company are also studied.

The research takes place within four different companies from four separate industries, namely the pharmaceutical, architecture, telecommunications and the oil and gas industries. The study is conducted using the qualitative multiple case-study method where key members within the chosen organisations are interviewed. It is discovered that although all the companies involved in the research are aware of the importance of their employees' knowledge and that they would like to manage it more efficiently, the organisations have not implemented any formal KM strategy. However, the companies have a variety of other policies and procedures that, when combined, could help the company to manage the knowledge base within the organisation. In addition, the findings of the study raise the issue of utilising support systems such as training and rewards as a means for encouraging employees to remain within the company as well as to contribute to the collective knowledge of the organisation.

In conclusion, this research discovers possible points of interest regarding the issues relating to the KM process that should be taken into consideration when planning a KM strategy within an organisation.

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LIST OF ABBREVIATIONS

ABPI – Association of the British Pharmaceutical Industry

CV – Curriculum Vitae

DIY – Do-It-Yourself

DTI – Department of Trade and Industry

E-mails – Electronic Mailing

ERP – Enterprise Resource Planning

EU – European Union

GSL – General Sales List

HRM – Human Resource Management

IT – Information Technology

KBMS – Knowledge Based Management Systems

KM – Knowledge Management

KMS – Knowledge Management Systems

NHS – National Health Service

OECD – Enterprise for Economic Co-operation and Development

OfCom – Office of Communications

OfTel – Office of Telecommunications

ONS – Office for National Statistics

OTC – Over The Counter

P – Pharmacy-only

QA – Quality & Assurance

R&D – Research and Development

RIBA – Royal Institute of British Architects

SMS – Short Messaging Service

SSIS – Semi-Structured Interview Schedule

TOE – Tonnes Oil Equivalent

TUC – Trade Union Council

UK – United Kingdom

UKCS – United Kingdom Continental Shelf

CHAPTER 1: INTRODUCTION

1.1. Introduction

For thousands of years, manual skills have been the primary source of productivity in human society. Most manual skills are learned on the job through apprenticeships and while artisans practised their craft, there are only a handful of elite people that acquire knowledge through formal education. However, the industrial revolution in the eighteenth century laid the foundation of the transformation of the economy from agriculture to industry and with it, not only did living standards rise, but also the location of life changed from rural communities to metropolitan cities. This also changed the nature of the manual skills required to do the work and mechanisation of tasks led to the rise of the manufacturing sector. Whittington (1993) mentions that, *“the challenge for the early capitalists was how to break the grip of skilled craft-workers over traditional production. Organised into highly secretive guilds, literally called ‘mysteries’, these craft workers were able to control the pace, organisation and quality of their work, immune from the intervention of outsider capitalists. Their control was based on both their exclusive knowledge of the necessary processes and their ownership of the tools of production”* (p.84). Early in the twentieth century, employers began to realise and actively discuss the need to retain worker-embodied knowledge. Although such knowledge is not directly controllable by the organisation, it is effectively stabilised through development of the long-term employment relationship (Jacques, 2000).

The scientific revolution of the past century has resulted in the systematisation of change itself from isolated and independent inventors such as Thomas Edison to huge research laboratories (Stiglitz, 1999).

In this day and age, globalisation has been playing a large part in the accelerated pace of technological innovation that has made information a key ingredient in the success of organisations. It has been said that business strategies are changing from time to time. What is once the latest trend in strategic management is now an obsolete factor of the past. Many scholars argue that we are now living in a post-industrial, information or knowledge economy, therefore among the most important assets that organisations must have to survive in the recent changes are information and knowledge. As mentioned by Barley (1996, p. 17), *“future prosperity is likely to hinge on the use of scientific and technical knowledge, the management of information and the provision of services. The future will depend more on brains than brawn”*. This is further supported by Drucker, (1993) who suggests that *“the traditional ‘factors of production’ – land, labour and capital – have not disappeared, but they have become secondary. They can be obtained, and obtained easily, provided there is knowledge. And knowledge in this new sense means knowledge as a utility, knowledge as the means to obtain social and economic results...knowledge is now being applied to knowledge”* (p. 42). Firms are harnessing knowledge as their primary source of growth, offering services that utilises knowledge as their main commodity. With the onset of new life-styles among the general public where convenience is the main-stay of working life, firms

that can offer services in demand are gaining a strong foothold in the economic ladder. Thus, gradually, economies are shifting from the manufacturing sector to the service-oriented sector. Firms are being valued more for their customer services, future products as well as the intellectual assets of the employees rather than just their physical assets. According to Jacques (2000), the effect of knowledge on capital is replacing the effect of capital on production as the focal point of analysis. Furthermore, with the onset of globalisation, work is also becoming less limited by distance and international boundaries. For example, certain call-centres of UK companies could be based as far away as India due to cheaper labour for the same knowledge.

However, has the knowledge society really arrived in the past couple of decades? The ways in which we work, play, learn and live are changing and global access to knowledge and information is a big part of these changes. The speed at which an organisation acquires knowledge and put it to good effect is now a key aspect of competitive advantage (ICL, 2000). Due to the economic changes that are occurring recently, companies have to strive hard in order to survive in this highly competitive situation. Organisations need to manage knowledge more effectively in order to meet their customer requirements more efficiently. This is true both in emerging markets and developed economies alike. Successful companies in the twenty-first century will have to identify, define and implement knowledge management solutions in business and as quickly as possible. It has been stated that competitive performance is linked to a firm's ability to adapt to major changes in

the environment and thus implicating its level of learning. Furthermore, organisations have to adapt faster and faster or else they will be naturally weeded out in the economic evolutionary process (Harrison and Leitch, 2000). Senge (1990) believes that in the future there will only be two kinds of companies; failures which die suddenly or slowly and learning organisations which have the ability to learn and react more quickly to a fluid market than their competitors. Innovation is now a crucial aspect of company strategies. However, industrialisation required new 'disciplinary' technologies for capitalising knowledge. It dramatically and painfully altered relationships between owners and workers as it 'manufactured' the employee and the manager (Jacques, 1996). But how seriously are these statements taken into consideration when organisations need to change their management systems?

The traditional management theory since the time Frederick Taylor undertook his famous studies of factory workers in the nineteenth century has been that there is a best and right way to do anything in order to achieve a standard result. Therefore, management's traditional goal is to maximise efficiency and minimise uncertainty. However, in the new information age, the concept of one single best way to manage people can be a disadvantage to the individuals working in the company as well as the organisation as a whole. Creativity as well as adaptability is crucial for the survival of the organisation and therefore, management styles need to change in order to recognise the growing need to manage knowledge workers differently from normal traditional scientific management practices. This would help to maximise

the potential of the knowledge workers of the organisation in order to increase their productivity and output of skills and intellectual capability.

Fast economies generate wealth faster than slow ones. Implicit in fast economies is the ready availability of knowledge and information as well as the free flow of ideas. Therefore, organisations are pressured into creating or acquiring new knowledge more than ever before. The managers of today are hard-pressed to adopt new management strategies that will provide the necessary processes to enable and support their knowledge workers. In doing so, the managers will be able to embrace uncertainty and complexity within the workplace and optimise the value of knowledge within the organisation that will make the company flexible with the changing environments and thus remain competitive in the market. It is often said, half jokingly, that the best ideas in the organisations come from conversations around the photocopier or the coffee machine. That is where people can socialise casually and exchange information and experiences and where they learn what is going on in the rest of the company (Condon, 1999). The concept of networking could therefore, be used beyond trying to gain contacts but actually utilised as a means for sharing information. This study researches on whether the companies manage the knowledge that can be retrieved from the employees since the employees of the organisations are the ones creating the new knowledge and generating the new ideas as well as what programmes or system they implement in order to achieve this goal.

In order for the organisations to function as a team, there is therefore, a vital need to promote the creation and sharing of knowledge. Are the organisations aware of what type or kind of knowledge is required by the company? Different companies need different types of knowledge. And it is important that the employers are aware of the kind of knowledge their employees are capable of producing. Therefore, efficient KM is needed to differentiate and utilise the most of the knowledge available to the organisation. Furthermore, KM is also about people whose assets are the knowledge that they have in their heads. Many organisations claim that their workers are the most important asset within their organisation but how true is this statement? It is conceded that more and more firms are recognising the importance of their people but are they utilising their abilities to the optimum level? This research looks at whether the companies are able to identify their supply of knowledge among the employees and develop a viable management strategy to deal with the inherent knowledge. At the same time, is the business strategy of the organisation closely aligned with the knowledge available in the organisation?

In order to accommodate the growing number of knowledge work, more knowledgeable employees (whom Drucker has coined the phrase 'knowledge workers') will be on the increase. Furthermore, the change in the organisational work available these days will mean a change in the structure as well as the location of the employees themselves. In organisational terms, the shift towards a knowledge-based economy is said to be typified by flatter structures, debureaucratisation and 'virtual' or networked forms of organisation which moves

away from the top-down hierarchical structures. These technological and organisational changes are closely intertwined, with new organisational forms both reflecting and advancing the use of new information technologies such as 'groupware', networks of semi-autonomous teams and intranet applications (Stiglitz, 1990; Newell et. al., 2001; Scarbrough and Swan, 2001). As networks are of a loose kind, they are difficult to manage in the strict sense of this word. Moreover, the old vertical division of labour will be replaced by horizontal co-ordination. This is driven by the nature of knowledge work itself, which is essentially concerned with problem solving, problem identifying and strategic brokering between two processes. Co-ordination can be based on collaboration between technical and professional groups who retain authority over their own work. Indeed as quoted in Warhurst and Thompson (1998), knowledge workers, working for their own interest rather than that of the company are *"less inclined to think of themselves as loyal soldiers and more inclined to think of themselves as sought-after faculty members"* (Hamel and Prahalad, 1996, p. 238). Furthermore, with the diffusion of information and resources, and control of knowledge workers by the managers require a form of management that is *"more collegial than supervisory, shar[ing] information, delegat[ing] responsibility and encourag[ing] upward and horizontal communication"* (Despres and Hiltrop, 1995, p.19). Such horizontal co-ordination is said to be replicated at lower levels through the increased use of teamworking to involve workers in problem solving and continuous improvement. Frenkel et. al. (1995, p. 786) notes that *"the trend away from routine work towards more creative, information and people-focused*

activity...leads management to cede more control over the work process to employees and requires management to ensure reciprocated trust”.

People who are flexible, can adapt quickly to changing environments and can take the initiative to utilise knowledge are therefore becoming more in demand by organisations. The companies are realising that knowledge workers do not just manipulate knowledge; they acquire, modify and create knowledge that could be beneficial to the organisation. Furthermore, the companies are recognising the need to manage their knowledge workers' ability, knowledge and skills in order to remain competitive. This need to manage their employees gives rise to a new management strategy or a KM strategy within organisations. Effective implementation of KM processes could help to maximise the intellectual asset of the company, as the knowledge within the employees has become its most valuable asset.

There are many questions that arise from the concept of knowledge work and knowledge workers. What are knowledge workers? What sort of work do they do that differentiates them from other workers? What do organisations need to do in order to manage knowledge workers properly and utilise their skills? Therefore, the rationale for the study of this particular area in KM is to discover whether or not a real knowledge society exists as mentioned in the literature available and if so, whether the full potential of the employees are being utilised by the organisations.

1.2. Research Objectives

The focus of this research is to discover the process and issues relating to the implementation of a KM strategy within an organisation. This research will be designed to achieve the following objectives:

- 1. To study how knowledge in an organisation is identified, whether and how the company encourages their employees to become more knowledgeable in their workplace.**
- 2. To identify KM processes within the organisation and to what level or extent the processes are being implemented throughout the organisation and the issues surrounding the implementation.**
- 3. To identify how knowledge within the organisation is retained and shared.**
- 4. To identify the nature and effectiveness of support systems organisations use to manage the knowledge of the employees within the company, for example, in terms of training or pay schemes.**

There are a variety of sectors where the employees could be referred to as 'knowledge workers', meaning employees who possess specialised knowledge of the work they are currently doing (Drucker, 1980). However, since there is a wide range of sectors, the knowledge needed for these sectors are also just as varied. There are sectors that require a more creative blend of knowledge where more design and creativity is called for by the professionals working in the company, for example; advertising firms, car designers and architects. On the other hand, there

are others that require a more scientific type of knowledge such as hospitals and pharmaceutical companies that utilises more scientific research, which has a need for specified knowledge in scientific fields as well as professionals from a scientific background. Furthermore, there are also companies that are more technologically based where information technology, engineering or technology in general play a large role in the services or products the organisation in question produces. This research intends to look at a comparison between the creative, technological and scientific types of knowledge management within four separate sectors of industry i.e. architecture, telecommunications, pharmaceutical and oil and gas. These industries are chosen because they each utilise different types of knowledge in different business contexts. The architecture industry would utilise more creative knowledge as compared to the oil and gas industry that would focus more on technological knowledge. Moreover, the pharmaceutical industry would require more proficiency in scientific knowledge compared to the telecommunication industry that could utilise a combination of both creative and technological knowledge. Therefore, a mixture of industries is chosen to discover any variations in the way organisations manage the knowledge of their employees depending on the type of knowledge required.

1.3. Overview of Chapters

In the following chapter, the Literature Review chapter, this research will present the many views and definitions proposed by various scholars regarding the issues surrounding the topic of knowledge, the knowledge economy, knowledge work and knowledge workers. These debates will be presented based on a framework by Jacques (2000) that provides a guideline that would help present the discussions in a more systematic manner due to the vastness of the literature available on the subject of knowledge and the many elements that are involved. In Chapter Three, the Knowledge Management chapter, the various aspects related to KM, namely the definition of KM and an overview of the KM process would be presented. In addition, the issues relating to the concept of knowledge sharing within the organisation would be discussed. Furthermore, the link between KM and Information Technology (IT) as well as types of Knowledge Management Systems (KMS) available will also be described. It is hoped that this chapter would explain further the understanding of the subject matter of KM as well as the issues surrounding the implementation of the KM strategy.

In the following chapter, the Research Methodology undertaken by this research will be described. The way the topic is chosen as well as the key themes of the literature review that leads to the research questions of the thesis will also be presented. This chapter will further explain the different research methods available i.e. the quantitative and the qualitative methods available as well as the chosen

methods used for the research. Furthermore, the benefits and limitations of the quantitative research method versus the qualitative research method are also discussed. In addition, the benefits of conducting interviews and multiple-case studies as well as a description of the subjects that are chosen for the research are also described. Lastly, the Research Methodology chapter will also describe the various steps taken in conducting the data collection and the data analysis of the study. The Background to the Industry chapter will attempt to describe the transition of the UK economy from the industrial era to the knowledge-based society. Furthermore, a description of the companies that took part in the research would be presented while touching upon the development of the industry of the four companies that showed the current competitive situation of the market. This chapter will show how the industry has developed in recent years that required the need for efficient KM within their organisations. It is hoped that this explanation will further support the rationale of this research.

In the Results chapter, the analyses of the data collected during the research will be presented. As the research is conducted through interviews and looking at four different industries, the subjects will be presented as case studies. This chapter will touch upon four main categories, namely the Identification of Knowledge, the KM process, the Retention and Dissemination of knowledge and finally the Human Resource (HR) support systems within the organisation. The focus of this chapter is to discover whether the companies implemented any KM policies and procedures that assisted in the management, encouragement and motivation of employees to

acquire, retain, utilise and share knowledge within the organisation. The next chapter, the Discussion chapter, will present an analysis regarding the similarities and differences found between the four organisations that took part in this research. The discussion will be based on findings in the Results chapter that will be compared with information presented in the Literature Review chapter, the Knowledge Management chapter and the Background to the Industry chapters. This chapter will present its discussions following the same topic headings as the Results chapter in order to present a more coherent analysis of the results discovered during this research.

Finally, the Conclusions and Recommendations chapter will present the key findings as well as the contributions to research of this thesis based on the research objectives and the research questions of this study. Furthermore, a reflection on the limitations of this research as well as recommendations on future research in the area of KM will also be stated. Therefore, through these chapters, the research process undertaken on the subject of knowledge and KM, the results found regarding the issues surrounding the implementation of KM within organisations as well as the discussions on the results will be presented.

CHAPTER 2: LITERATURE REVIEW

2.1. Introduction

After conducting a literature review, there seemed to be many definitions and classifications of knowledge and the elements related to it by various authors. Due to the vast number of articles available on the topic of knowledge, the different objects relating to the concept of knowledge i.e. knowledge work and knowledge workers, are often confused. This confusion could lead to a difficulty in presenting the various arguments regarding the issues surrounding knowledge in a systematic manner. Therefore, it is decided that the review of the literature be presented with the help of a framework proposed in an article by Jacques (2000). The use of Jacques' framework would help to interrogate further conflicting and similar traits found in the literature review concerning knowledge. According to Jacques (2000) four main objects of investigation are produced:

- *The knowledge worker*: Individuals who presumably differ in their relationships to employing organisations from the traditional characters of management inquiry: the generic employee and the manager.
- *Knowledge work*: As an intersubjective phenomenon this is not simply the work that knowledge workers do. Knowledge work may be an element of work done by those not defined as knowledge workers and vice versa.

- *The knowledge organisation*: Organisations whose competitive advantage is lodged more critically in forms of knowledge than in forms of capital and labour.
- *The knowledge econom(y/ies)*: Socio-political entities whose most critical economic factor is related to knowledge rather than to land, labour or (working) capital.

However, Jacques believes that there is a fifth element of enquiry that needs to be the prerequisite for the four above:

- *Knowledge as a 'root metaphor' for understanding work*: Understanding of emergent phenomena in post-industrial systems of production requires that we treat knowledge as a metaphor for understanding work, rather than as a mere element of the work relationship.

Each of the objects of investigation presented by Jacques would help to classify the different elements relating to knowledge. Assisted by Jacques' classification, this chapter would be able to cover the literature review available on the topic of knowledge in a more orderly manner. Furthermore, Jacques' article presents a viable framework to describe the literature review that reformulates some areas that still need to be identified. Therefore, this chapter will first of all present the concept of the knowledge as a root metaphor followed by the rise of the knowledge

economy. The discussion related to knowledge work as well as knowledge workers will also be presented.

On the concept of the knowledge organisation, although Jacques' article focuses mostly on the aspect of value within an organisation, Jacques also discusses the aspect of managerial processes that deals with the monitoring and management of knowledge workers within the organisation. Jacques mentions the subject of knowledge as an entity that could be "*accumulated, stored, leveraged, applied and contested within the structures of managerial organising and labour relations*" (2000, p. 208). Although Jacques (2000) does not state the term 'knowledge management' explicitly, he believes that creating value within an organisation could be achieved through changing and manipulating knowledge. Jacques' article does not dwell further into the issue of KM and therefore a research focusing on the concept of KM and its elements is needed. In this situation, Jacques' framework would be beneficial as a link to discuss the gaps within the topic of KM and the issues surrounding it. Due to the large nature of articles outlining the discussions relating to KM, the review of literature on that subject will be presented in the following chapter.

2.2. Knowledge as a Root Metaphor

What is knowledge? According to the Oxford Dictionary (1997), knowledge is defined as “(i) awareness, familiarity; (ii) person’s range of information, understanding (of subject); (iii) information; (iv) sum of what is known” (pg. 419). It is the second definition that this research is mainly focused on that is the person’s range of information or understanding of a particular subject, especially within the context of an organisation. According to Brown and Woodland (1999), knowledge is both a means and an end. As a means, it is information that can be used to secure something as tangible as raw material or as abstract as job satisfaction. However, as an end, it is valued as understanding or used for contemplation or reflection. Brown and Woodland state that knowing could be seen as the possession of knowledge, learning as the process of acquiring knowledge and teaching as the process of disseminating knowledge (1999). Furthermore, they write that knowledge is a prerequisite for the development of managerial capacities such as judgement, intuition and acumen. They propose that this is the kind of knowledge that is needed in order to undertake self-assessment, effective learning and development requires openness, a sharing of views about individual and group performance, as well as flexibility. It has been said that the reality of work dictates that we rarely learn in isolation. Self-development, even of the most practical of skill-based competencies, indicates a degree of co-operation and supportiveness among colleagues (Brown and Woodland, 1999).

Blackler (1993) suggests that there are a number of definitions of knowledge varying from socially constructed, often tacit, material and resilient to acquired through participation within communities of practice. These definitions of knowledge emphasise the intricacy of tacit skills and the importance of '*doing*' as well as of '*deciding*', the significance of culturally provided divisions for individual thought, the social processes through which concepts and actions are discussed, and the creative ways in which people use even the most abstract plans and representations (Blackler, 1993). In addition, Bertels and Savage (1999) and Truch (2001) mention that knowledge consists of people's skills, competencies, ideas, and intuitions along with the full utilisation of information and data. Knowledge is therefore presumed to be the key to understanding society as well as the technological developments taking place within it (Augier and Vendelo, 1999). Kreiner (1992, p. 62) adds complexity by stating that "*knowledge is a transient type of resource, as its relevance and credibility are time and context dependent. We cannot regard knowledge as something that we once and for all have collected and constructed. Knowledge must constantly be reproduced through execution*". Therefore the knowledge possessed by a firm is a dynamic entity that alters over time as new knowledge is added and knowledge not in use fades (Kreiner, 1992).

However, Sbarcea (2001) explains knowledge as a free-moving entity that has an active social life that is always changing and in a constant state of flux whereby knowledge flows between and across organisational boundaries. Furthermore, "*knowledge requires space in which dialogue can take place; where shared*

meaning and metaphorical frameworks can be constructed; and above all it needs the support and encouragement of human relationships and contextual richness. (Sbarcea, 2001). Therefore, according to Sbarcea (2001), knowledge flows and transfers through personal relationships over time. In its simplest version, knowledge can be drawn as a line, a continuum from individual-based to corporate-wide knowledge. On the other hand, Brailsford (2001) tries to explain knowledge not as an entity but by using the metaphor of light that can manifest itself both as a wave and a particle. Brailsford states that like light, knowledge can be considered in two perspectives; as an “*objective*” and “*process*” perspectives. Both these perspectives are equally important in a way that the perspectives can lead you in different directions while attempting to make use of and improve knowledge sharing. Brailsford presents that even though the ‘*object*’ perspective prescribes knowledge as a tangible thing that can be captured and stored, it is the “*process*” perspective that shapes the idea on knowledge sharing, networking and learning (2001). An interesting statement by Augier and Vendelo (1999) is that knowledge is a non-consumable resource; it is possible to use knowledge without using it up. Thus, the more knowledge is used, the more there is of it (Augier and Vendelo, 1999). Therefore, the articles suggest that organisations can acquire, create, store and maintain, and export knowledge as a product.

A certain aspect that we have to consider in relation to knowledge is the link between knowledge and information. There has always been an underlying confusion between knowledge and information especially through the change in the

economy from industrial to technical to the new knowledge economy. According to a survey by the Delphi Group, “58% of the useful knowledge of an enterprise is recorded information (documents and databases) and 42% resides in the employees’ brains” (Hickens, 2000, p.100). But what is the difference between knowledge and information? As stated earlier, knowledge is a mix of experiences, values and insight which provides a framework for evaluating and incorporating new experiences. In comparison, Sindell (2001) defines information as a flow of messages from which individual knowledge is created based upon the beliefs and values of the employee. Mullin (2001) further adds that information comes in various forms such as memos, laboratory notes and electronic mailing systems (e-mails) whereby ideas contained in these seemingly unimportant documents can sometimes provide vital information to future projects and researches. Galup et. al. (2002) also mention that information is organised data that is presented in context and this data becomes information when its creator adds meaning or value. Which means that knowledge is information in context along with an understanding of how to use this information. However, information should not be mistaken for knowledge as knowledge is not stored within the organisation. It is information that is stored within the company files and manuals. Knowledge on the other hand uses the information available and creates new experiences or ideas and the process of this knowledge is what is attracting the researchers to try and codify it. This means that, “*knowledge walks out the door when the employee does*” (Sbarcea, 2001). Therefore, plainly speaking, information are memos or data that is stored within the

organisation but knowledge of the employees help to understand what to do with the information stored.

Another terminology that can be associated with knowledge is learning. Jones and Hendry (1994) make a distinction between '*organisational learning*' and the '*learning organisation*'. The former emphasising "*HRM, training, knowledge and skills acquisition*" (Jones and Hendry, 1994, p. 154) while the latter links to the expansion and development of organisational capability; the tacit, experiential learning that often goes on unnoticed in organisations (McHugh et al., 1998). Today, the importance of learning may indicate a comparable watershed. Unlike knowledge, which is now easily capitalised, learning is the property of the worker of the workgroup until it is applied. Once applied, it becomes knowledge and can be capitalised. But if every situation is unique, it is the learning and not the knowledge that is the primary source of value. Jacques (2000) states that as the shelf life of an item of knowledge approaches zero, knowledge ceases to be power; the ability to change knowledge, to learn, becomes the source of power.

Furthermore, expertise is also often associated with knowledge. Starbuck (1992) presents the idea of knowledge as a stock of expertise rather than a flow of information. However, Scarbrough (1996) states that it is the expertise of the employees and not necessarily the knowledge of the employees that are more valuable to the organisation. Expertise is needed to control the management of knowledge in an organisation due to the challenging competition between

organisations. Therefore, according to Scarbrough (1996), the knowledge of an employee is not enough but the expertise of the employee is necessary to make the company more competitive. Moreover, expertise is not a thing to be possessed but a form of work that creates value through knowledge and which, therefore, commands a price in the marketplace. On the other hand, Fincham et. al. (1994) mention that the management of expertise is vital in the effectiveness of an organisation. However, they also state that firms cannot simply acquire new types of expertise; they must identify and combine the knowledge appropriate for diagnosing and solving the problems that confront them. Furthermore, by identifying the necessary expertise in advance gives the organisation an option to hire employees with the desired knowledge and abilities (Buhler, 2001). Therefore, the process of identifying the knowledge is an important part of the management of knowledge within an organisation. On the other hand, Senge in his book 'The Fifth Discipline' (1990) focuses mainly on '*systems thinking*' which he states is a conceptual framework, a body of knowledge and tools that make us understand what is happening within an organisation. Senge says that everything is connected to one another in some sort of a link and that in order to see what is wrong with something, one has to look at the whole picture. Besides '*systems thinking*', Senge mentions four other disciplines that help make a more effective organisation which are '*personal mastery*', '*mental models*', '*building shared visions*' and '*team learning*' (1990). However, Senge seems to present a pleasant picture of an organisation where, with little effort from everyone's part, the organisation can be a

tremendous success where in fact, it can be very difficult to have one organisation that can follow all the five disciplines Senge states.

The debates about knowledge as a root metaphor for understanding knowledge work lead to the discovery that despite the confusion between knowledge and information, many articles discuss about the definition and classification of knowledge in the context of the work being done as well as the organisation. In order to understand the concept of knowledge at work, the situation of the rise of the knowledge economy that brought about the need for knowledge work is presented. This leads to the next section of the literature review that presents the discussions related to the nature of the knowledge economy.

2.3. The Knowledge Economy

Through history, we can see that knowledge has played various roles within organisations. Castells (1989) suggests that knowledge is used to organise the mobilisation of greater quantities of labour and means of production during the pre-industrial modes of development. Furthermore, in the industrial mode of development, knowledge is used to provide new sources of energy and to reorganise production accordingly. However, in the informational mode of development, it has been suggested that knowledge mobilises the generation of new knowledge as the key source of productivity through its impact on other elements of

the production process and on their relationships. Today, this is especially true in high-tech industries, such as biotechnology and information technology, where individuals and organisations continue to discover new technological potentials and develop new ideas for application of the technology, which enters and destroys existing landscapes by processes of “*creative destruction*” (Schumpeter, 1975). This is agreed by Stiglitz (1999) who says that knowledge and information is being produced today like cars and steel are being produced a hundred years ago. Stiglitz continues further to mention that those, like Bill Gates, who know how to produce knowledge and information better than others reap the rewards, just as those who knew how to produce cars and steel a hundred years ago became magnates of that era (1999). Moreover, Mckinlay (2002) states that drawing on employees’ practical experience, regarding the workforce as an asset to be developed and realised remains a central concern of corporate management. Therefore, besides the development of new technology and new business strategies, these articles suggest that knowledge is becoming increasingly important within an organisation.

Due to the changes in the economy in the present moment, the concept of ‘commodity’ has also changed. Stiglitz (1999) mentions that knowledge and information vary from other commodities in a number of ways, which result in markets for knowledge and information differing markedly from markets for other commodities. For example, each piece of information is different from every other piece of information; “*intrinsically, information cannot satisfy the essential property of homogeneity that characterises competitive markets*” (Stiglitz, 1999).

Augier and Vendelo (1999) state that knowledge represents something existing; something already given whether it may be complex, tacit and even unexplored. Furthermore, Sbarcea (2001) also mentions that the workplace has become the site for the production of knowledge with a commercial value as it is the knowledge gained by experience that is becoming increasingly prized in the organisation. It is perhaps an indication of these facts that it is often said that technological evolution has brought us to the age of a “*knowledge society*”, “*knowledge economy*” or “*post-industrial society*”.

This realisation that knowledge and information is important to the economic growth of an organisation either at national or company level is becoming more prominent within the board of management of organisations as well (Du Toit, 2003). The need to diffuse innovations across much wider constituencies than individual workgroups has resulted in the emergence of the learning organisation and KM as important issues for management (McKinlay, 2002). Organisational knowledge may need to be sufficiently well integrated to allow the organisation to react quickly to changes in the market-place. However, more importantly, it could be profitable if organisational knowledge could help to create new marketing opportunities through creative thinking and, at a more mundane level, operate its internal value chain as efficiently and effectively as is possible in order to remain competitive. This is due to the fact that knowledge is undoubtedly an important asset in the industry, although it is difficult to value in monetary terms (Brown and Woodland, 1999). Brailsford (2001) does comment that the value of knowledge is

in direct proportion to how well the management can move it around the organisation. *“Thus, knowledge can create value within our organisations to the extent we can move it around, just like electricity”* (Brailsford, 2001). Clarke (2001) supports this argument by Brailsford by mentioning that the more knowledge is used, the more valuable it becomes, thus creating a self-reinforcing cycle. Moreover, Roos and van Krogh uphold the argument of knowledge as an ‘intellectual capital’ when they state that *“Today, physical capital is of less relative importance for creating and sustaining competitive advantage than intellectual capital. For many companies, the market value of intellectual capital is now too large to be categorised as good will. The emerging recognition of knowledge and intellectual capital has laid the groundwork for new, knowledge-based concepts, theories and practices of management”* (1996, p. 333).

Within the context of where an organisation can acquire the much-needed knowledge, Starbuck (1992) suggests that besides being held within the individual, knowledge could be found in the financial instruments of the organisation, the routines and cultures as well as the professional cultures of the employees. This knowledge within the organisation stems from the knowledge transferred by the employees within the company itself. *“People convert their knowledge to physical forms when they write books or computer programs, design buildings or machines...people also translate their knowledge into firms’ routines, job descriptions, plans, strategies and cultures”* (pp. 718-19). On the demand side, organisational culture will artificially limit demand for knowledge if it deprecates

any requests of knowledge as an admission of ignorance. But a greater limitation on the demand for knowledge is the “*not invented here*” syndrome. Each individual or group will tend to diminish the importance of any knowledge they might obtain from elsewhere, and to greatly embellish the power of the knowledge they already have (Stiglitz, 1999). This problem also arises when knowledge is “branded” by an organisation. The organisation’s prestige and image is tied up with that branded knowledge. Any admission that there might be superior knowledge elsewhere from which the organisation could benefit would be seen as “criticising” the organisation, “tarnishing” its brand reputation, and “diminishing” its franchise value at the very least, by helping its rivals (Stiglitz, 1999). However, Hope and Hope (1997) state that knowledge could also come from external sources such as suppliers, partners and customers. Feedback from these external sources coupled with the ‘best practices’ within the company could add to the internal knowledge of the organisation. Furthermore, Hope and Hope add that the feedback received needs to be documented as it is received and not altered to reflect personal views or biases in order for the organisation to learn from their sources (1997).

However, knowledge would not be of much value if it is not shared and passed around the organisation. Knowledge can reside wholly within an individual, or can be shared within a group, or the organisation as a whole (Roos and van Krogh, 1992). This is a complex and dynamic relationship, with the balance of shared knowledge depending on the benefits of sharing as perceived by both the organisation and the individual. “*Greater shared knowledge tends to create new*

knowledge, through the reflective process, in the light of personal experience” (Kolb, 1984, p.26). An organisation that is constantly developing new knowledge and focusing its pooled efforts towards the achievement of the shared organisational goals and values would be a more formidable competitor than an organisation where the employees are focusing on their own personal career development (Brown and Woodland, 1999). Rubin (1998) argues that knowledge is the main driver of economic growth in the future. Therefore, organisations are pressured into creating or acquiring new knowledge more than ever before. Stiglitz (1999) states that in the knowledge economy, the dangers of a monopolisation are perhaps even greater compared to the industrial economies. The concept of monopolisation within the knowledge economy is confirmed by Augier and Vendelo (1999) who propose that knowledge is typically an immeasurable resource such as technological knowledge and market knowledge. Furthermore, *“the knowledge possessed by a firm does not constitute a homogeneous mass. Instead, within a firm, one can find islands of specialised knowledge possessed by organisational sub-units”* (Augier and Vendelo, 1999, p. 253). Therefore, a combination of knowledge from other sub-units may help knowledge within an organisation to stay viable and valuable to the firm and perhaps even more importantly, help to prevent sub-units from getting caught in competence traps.

The articles that are available on the matter of knowledge economy refer frequently rather to the concept of value within an organisation. In an article by Bowman and Ambrosini (2000), they address three related issues concerning value

and valuable resources; 'what is value?', 'how is it created?' and 'who captures it?'. Naisbitt (1982) writes "*in an information economy, then, value is increased, not by labour, but by knowledge*" (p.17). This is agreed by Breu et. al. (2000), Truch (2001) and Du Toit (2003) who state that in the digital technological age, it would be the intangible assets such as data and the intellectual capital of the company that would bring the most value to the organisation. However, Bowman and Ambrosini (2000) look at the term 'value within a company' from a sale and purchase perspective as in how much is something valuable to the customer. Furthermore, they argue that the source of new value comes from the labour within the organisation, namely the employees. And finally, Bowman and Ambrosini state that the value captured is determined by the relationship between the customer and the service or product provider (2000). Jacques (2000) also questions the theory of 'what creates value' or 'who has a right to what part of the value created'. "*Failure to see how value is produced leads to ineffective decisions*" (Jacques, 2000, p. 202).

Within an organisation, it has to be determined what part of the organisation creates value to the overall profit of the company and who owns the rights to this value. Does the employee own the knowledge that is in their head? Or does the organisation claim rights to it? In a knowledge economy it becomes difficult to state who owns the knowledge of the organisation as the employees are the ones who create the knowledge. It has been said that employees create value by utilising their skills, expanding on their knowledge and by creating new ideas. However the knowledge and skills from employees can only be utilised by the organisation if

employees are willing to make this contribution. Therefore, the challenges of the management would involve among others encouraging and motivating the employees to turn their tacit knowledge into explicit knowledge (Zhou and Fink, 2003). Breu et. al. (2000) mention that there are two main reasons why organisations are concerned with value creation through knowledge. The first is that business decision-makers are increasingly realising the value they can drive out of exploiting intangible assets and the second reason is that current economies are shifting from “*make and sell*” to the emerging “*sense and respond*” paradigm. One could of course argue that any product created by the employee could be patented by the organisation but once the employee leaves the organisation, the knowledge within the employee will undoubtedly go with him. This may lead to a brain-drain in the organisation. However, for forms of knowledge or information that are not protected by patents, there are real problems in market transactions. The dilemma arises of how the employee could sell the knowledge, and if they do sell the knowledge, would they lose their so-called ‘property’ during the transaction? Furthermore, in reality, the market for knowledge depend largely on reputation, repeated interactions and on trust (Stiglitz, 1999). In its more popular forms, discussions of ‘knowledge work’, ‘knowledge-intensive firms’, and ‘learning organisations’ has to do with little more than individual or small group learning within organisations. This could lead to questions regarding what value involves.

Questions that can be asked are what then are the processes through which knowledge is turned into value? What are the ‘relationships of knowledge’ through

which one receives a larger or smaller share of the value produced? *“A knowledge market exists where knowledge sellers work out whether it is worth sharing their knowledge with a knowledge buyer”* (Hall, 2001). However, Jacques (2000) mentions that it is the learning within the organisation that is of most value to an organisation. The continuous learning of the employees as well as the management is what creates the organisation to become a learning organisation. And this attribute of the company will make it have a better advantage over other competitors. This does bring up an interesting debate of who owns the knowledge that is created by the employee as well as who has the right to the value created in the goal of channelling organisational wealth to investors (Jacques, 2000). Since the employees of the organisations are the ones creating the new knowledge and generating the new ideas, it is therefore vital that the companies manage the knowledge that can be retrieved from them within the shortest time possible. This is not only due to the competition between companies but also due to the high turnover rate in certain industries. Therefore it can be derived from the articles that not only is the pressure on the companies, but also on the employees themselves to produce or introduce new knowledge into the company that can be useful in creating a new product. The articles present the idea that the perception of knowledge depends on the work being done rather than what knowledge is from a theoretical or philosophical point of view. Regarding the importance of knowledge within an organisation in order to create value, it is important to present the various debates regarding the issue of knowledge at work itself for understanding work in general.

2.4. Knowledge Work

With the advancements in technology and new organisational forms in the 1990s, the labour market is affected in all levels. After conducting the literature review on knowledge work, it is found that although there are a vast number of articles that state how knowledge work has advanced within organisations, there are a limited number of detailed studies carried out on how knowledge work is being managed by organisations. Most of the articles available write about current labour trends and emphasise the importance of knowledge work in the post-industrial society. However, these views are often based on rhetoric rather than empirical evidence. The articles do not focus on existing problems that are being faced by organisations in managing the knowledge work, rather more on prescriptive elements about managing knowledge work. According to Jacques (2000), academic writing to date about knowledge work has mainly treated knowledge work, the knowledge worker, the knowledge organisation and the knowledge economy as new categories to understand within the existing interpretative frameworks of organisation studies. Furthermore, the emphasis in much of the existing literature is heavily biased towards technological solutions and lacks any deeper analysis on the concept of knowledge itself. Moreover, important issues such as the influence of organisational context, the limitations of IT or the significance of tacit or situated knowledge are frequently glossed over (Scarborough and Swan, 2001). There is a need to differentiate between knowledge work from other kinds of work because there is an assumption that knowledge work contains unique and profound qualities.

“The most dramatic difference lies in the assertion that knowledge work is primarily intellectual” (Alvesson et. al., 2001).

The need to distinguish the difference between knowledge work and other types of knowledge lead to a classification of knowledge. Nonaka and Takeuchi (1995) classify that knowledge is found in two forms i.e. tacit knowledge and explicit knowledge. According to them, explicit knowledge is something formal and systematic and that can be expressed in words and numbers. It can be documented, archived and codified, often with the help of IT (Newell et al., 2001). Furthermore, it can be easily communicated and shared in the form of hard data, scientific formulas, codified procedures or universal principles. It can also reside in manuals, policies and procedures as well as in individuals and group skills. However, tacit knowledge is somewhat more complicated. Nonaka and Takeuchi (1995) define tacit knowledge as something not easily visible and expressible. It is highly personal and hard to formalise, making it difficult to communicate or to share with others. It is embodied in people’s thinking and experiences which also includes subjective insights, intuitions and hunches that therefore make it something that is deeply rooted in an individual's actions as well as value that s/he embraces. Thompson et. al. (2000) support the idea that there are many classifications of knowledge by stating that *“there is knowledge that is abstract and pertaining to concepts, theories and formula. In contrast there is organisationally specific knowledge relating to that which is non-generalisable tacit, technical or formal, but which can be systematised in procedures, policies, routines and roles. Then there is*

societal or social knowledge derived from broader shared understandings, values and beliefs; or tacit knowledge that comes from practice and experience and that can be shared among work colleagues” (p. 126).

Furthermore, within an organisation, the process of knowledge can be defined by four different conversions of knowledge using the combination of tacit and explicit knowledge. That includes the conversion of tacit knowledge to explicit knowledge, from explicit to tacit knowledge, from tacit to tacit knowledge and from explicit to explicit knowledge. This process of conversion could explain the development of knowledge within an organisation and how management can obtain knowledge from their employees. It could also give some idea as to how knowledge can be retained in the organisation using either booklets or computer programmes. However, the concept of ‘tacit knowledge’ is lacking in systematic research because the field and its concepts are still ill-defined and the networks of conducting such research are still underdeveloped (Harrison and Leitch, 2000). This is consistent with Levitt and March’s more general conclusion that “*experimental knowledge, whether in tacit form or in formal rules, is recorded in organisational memory*” (1996, p.527). Kotylar and Saks (2001) also agree when they say that until recently, it has been extremely difficult to tap into the organisational knowledge that is held in the minds of the employees thus making it hard to capture it and share it among the staff. Although, saying that, the memory may be orderly but it still exhibits inconsistencies and ambiguities. Levitt and March (1996) state that some of the contradictions are a result of complications in maintaining consistency in inferences

drawn from a changing experience which are then likely to be organised into deviant memories that are maintained by subcultures, subgroups and subunits.

Polanyi (1966) speaks of tacit knowledge as an integrating force that binds and shapes all knowledge. Fleck (1992) further identifies tacit knowledge as an important and discrete area of managing knowledge. It is experienced through 'implicit learning' (Chao, 1996) or through the process of experiential learning (Kolb, 1984). However, Kim et. al. (2003) go one step further by suggesting a third classification of knowledge called "*Implicit Knowledge*". Kim et. al. define implicit knowledge as knowledge that can be externalised when needed but has not been externalised yet (2003). They justify their reasoning by mentioning that Nonaka (1994) treats explicit knowledge as knowledge that is not expressed externally, while Polanyi (1966) originally defines tacit knowledge as knowledge that cannot be expressed externally. Kim et. al. therefore come to a conclusion that there is a gap between Nonaka's and Polanyi's definitions which suggests that there exists a type of knowledge that exists internally but could be converted into explicit knowledge through organisational efforts or individual motivation.

Table 2.1 Kim's Expanded Classification

Perspective	Types	Definition
Revised epistemology	Tacit knowledge	Knowledge that cannot be expressed externally
	Implicit knowledge	Knowledge that can be expressed externally when needed, but currently exists internally
	Explicit Knowledge	Knowledge that is already expressed externally

(Kim et. al., 2003, p297)

Along with the many definitions of explicit knowledge, tacit knowledge or even implicit knowledge within the last few decades, there has been an increasing interest in the tacit dimension of knowledge. This is due to the fact that tacit knowledge could be the hardest to manage as it cannot be formally communicated and is often embedded in the routines and standard operating procedures of the organisation (Augier and Vendelo, 1999). *“Tacit knowledge is held in a non-verbal form, and therefore, the holder cannot provide a useful verbal explanation to another individual”* (Augier and Vendelo, 1999, p. 254). Tacit knowledge and its contribution to organisational memory are, by their very nature, important and intractable, not readily amenable to formal measurement and analysis in conventional methodological terms (Harrison and Leitch, 2000). Furthermore, according to Starbuck (1992), the challenge inherent with tacit knowledge is figuring out how to recognise, generate, share and manage it. This could be due to the fact that tacit knowledge of the workforce is no longer understood as necessarily hidden and oppositional but as a resource to be willingly shared by all and treated

as a common resource (Miller and Rose, 1990). While IT in the many forms available today such as e-mails and instant messaging can help facilitate the dissemination of tacit knowledge, the major hurdle for most organisations is identifying tacit knowledge in the first place.

The tacitness of knowledge could be assessed by measuring its level of codification, which is describing the level of codification as the degree to which the knowledge is expressed in writing at the time of its transfer. Knowledge that is characterised by a low degree of codification can be referred to as tacit knowledge (Hope and Hope, 1997). According to Augier and Vendelo (1999), such knowledge is typically believed to be hard to articulate and can solely be acquired through experience making it more difficult to transfer than explicit knowledge. Augier and Vendelo (1999) further mention that the difficulties with and the length of the transfer increases as the tacitness of the knowledge to be transferred increases. Indeed, it is precisely the difficulties in transferring a company's tacit knowledge base embedded in its staff that can be a basis for the company's competitive advantage (Stiglitz, 1999). Therefore, there is an appreciation that within KM, tacit knowledge has not just to be employed, utilised or harnessed but captured as well (McKinlay, 2000). However, Harrison and Leitch (2000) argue that the concepts of 'tacit knowledge' and 'organisational knowledge' are lacking in systematic research, because the field and its concepts are still inadequately defined and the networks for conducting such research are still underdeveloped.

The real dilemma that exists is how do we capture, share and transfer tacit knowledge? Sbarcea (2001) states that the emphasis on technological solutions to capture explicit knowledge by using word-processing documents and graphs are very effective but it has failed to recognise the capturing faculties of the tacit domain which is highly personalised. Furthermore, organisations depend too much on computer-generated data as 'knowledge' while they grapple to capture tacit or personal knowledge (Sbarcea, 2001). Although certain tacit elements can be externalised and codified to create explicit knowledge, it is the components such as insights and intuitions and the "gut feeling" that cannot be externalised, making them difficult to share (Spender, 1996; Leonard and Sensiper, 1998). However, Crowther et. al. (2001) suggest that if knowledge could be captured at its source through transaction recording and distributed throughout the organisation without any change in the nature of the knowledge, the organisation could remain a distinct entity that could be continually reconstructed through the compilation of the appropriate data reports. Crowther et. al. add that in this way, knowledge related to the organisation could be constructed and distributed without altering its legitimacy and therefore, it could be controlled by the managers of the organisation.

One thing that has to be remembered is that knowledge work is complex. This complexity may be related to the amount of depth of knowledge involved or to the level of interdependence between work components that would make it difficult to predict how change in one area will affect other areas. This uncertainty may also arise because work is occurring in new areas where working methods are not

sufficiently defined. Especially in the knowledge economy, it has been said that information is the commodity that really matters. By reviewing the classification of knowledge in relation to tacit and explicit knowledge as presented by the articles reviewed, it could be determined whether or not a particular work is classified as knowledge work or another type of work. In summary, if a certain type of work uses a higher level of tacit knowledge and less of referring to or manipulating explicit knowledge, this work can be labelled as 'knowledge work'. The articles reviewed dictate that for a work to be classified as 'knowledge work', the employee should be utilising more of the knowledge within the individual rather than following a routine sequence of activities. This is supported by Thompson et. al. (2000) who state that "*Knowledge work requires employment relationships and task structures that allow for creative application, manipulation or extension of that knowledge*" (p. 126). Therefore, running an organisation today requires the employees to expect the unexpected and increasingly it is these employees who utilise their knowledge to control the marketplace (Du Toit, 2003). These unique employees who are said to be becoming more in demand are commonly referred to as 'knowledge workers'.

2.5. Knowledge Workers

Knowledge workers are not a new phenomenon. This type of worker has existed for many years but they are typically known as employees of a specialised field of expertise rather than knowledge workers. More than twenty years ago, Kumar (1978) discusses about theoretical knowledge being a 'strategic resource' of the post-industrial society and its custodians which include scientists, mathematicians, economists and computer engineers. Basically, there are two forms of expert workers. The first category is the traditional experts such as doctors and lawyers while the second category is known as the scientific and technological workers. Doctors, lawyers along with scientific and technological experts are always considered respected employees within their organisation for their knowledge and expertise. However, Hull (2000) states that the growth of organisational professions such as managers and administrators are forcing challenges to the traditional professions. These new professions are heralding and enhancing the emergence of new forms of expertise and new expert divisions of labour. It is also commonly assumed that people who work more with ideas than with things are considered 'knowledge workers'. This new realisation towards the professionals who may be classified as knowledge workers are changing the management styles within the organisations.

There is also confusion regarding knowledge workers and professionals. People tend to be more familiar with the traditional notion of professionals i.e. doctors and

lawyers but currently, there is a rise in other professions that are undergoing higher education but which people would not normally associate as being a 'professional'. This new breed of professionals include architects, advertising workers, and computer experts whom are increasing in number along with the economic change that are encouraging a new information age. In the 1950-1980 time span, the percentage of technical and professional workers has approximately doubled and about sixteen percent of the workforce is engaged in professional or technical work. It also looks like this shift away from production and low-level clerical occupations will continue (DuBrin, 1981) while Alvesson (1993) believes that the old criteria for distinguishing professionals from non-professionals has been weakened. McRae (1996) further states that these 'new professionals' who represent the classic characteristic analysts or knowledge workers has expanded tremendously as an occupational group in the United Kingdom and indicates the highest projected growth rates towards the end of the century in the United States. Moreover, after they have completed their formal education, these professionals and other knowledge workers acquire their qualifications at the workplace and depend even less on formal education (Alvesson, 1993).

However, there remains considerable confusion within many companies about what knowledge workers actually are and how best to manage them. Different managers from different firms would likely have different opinions regarding what knowledge workers are. In addition, academic discussions about knowledge work and knowledge workers tend to be about the need for them rather than what they are

and what they do. When Drucker first wrote on knowledge work trends, he describes knowledge workers as “*professional, managerial and technical people*”. Nevertheless, this definition is too broad and ambiguous. It fails to distinguish knowledge workers from more traditional categories of white-collar work, much of which may be routine or repetitive. Furthermore, someone classified as a manual or blue-collar worker may operate in a high-tech room, and may bring considerable knowledge and judgement to bear on operational decisions. Interestingly, from reading the literature available, it is discovered that a large number of the authors tend to focus on IT specialists rather than other professions when discussing about knowledge workers (Hope and Hope, 1997; Harrison and Leitch, 2000; Borck, 2001; Chudnow, 2001; Lesser and Prusak, 2001; Galup et. al., 2002; Jang et. al., 2002; Ellingsen and Monteiro, 2003; Hicks, 2003; Johnston, 2003; Kim et. al., 2003; Scarbrough, 2003; Zhou and Fink, 2003). It has to be realised that other professions are also knowledge workers and that the classification of knowledge workers should not be restricted to IT specialists only.

Along with the demand for knowledge workers, there comes a need to discover what they do. As Jacques states, it has long been management’s job to make capital out of the originality of what labour knows and does (1996). The rise of the information revolution, along with the continuing automation of low-skilled work has led to an important change in management styles within companies. Managers are searching for more ways to fully utilise their employees for the benefit of the organisation. As quoted by Thomas Alva Edison, “*it is an important part of [my]*

duties to find out what [the workers'] ideas and opinions are...and thus to make capital out of their originality and their suggestions" (Jacques, 2000, p. 200). Moreover, *"it could be said indeed that the knowledge of workers was a key concern at this juncture in the development of industrial capitalism, providing the 'constitutive problem' of capital-labour relations throughout the twentieth century"* (Jacques, 1996, p.143). This importance in new management styles for knowledge workers has risen due to two reasons. For one thing, knowledge workers are now recognised as a more significant proportion of the workforce while secondly, knowledge and knowledge workers are now considered a necessary resource and a basis for competitive distinction. Especially when the work that exists within the companies are becoming more uncertain and unpredictable, it has been proposed by the articles reviewed that knowledge workers are increasingly more valuable to the organisation for their ability to handle uncertainty.

Another aspect that needs to be considered is that the rise of knowledge workers is changing the balance of power within organisations and is adding new tensions and responsibilities between managers and workers. The balance of power between the knowledge worker and employer is fundamentally different from that of the traditional worker. The knowledge worker has knowledge that is not company specific and therefore has job options that are not available to other sections of the workforce. The result is that knowledge workers signify a new type of worker who frequently acts more loyal to the profession than to the company where that work is being carried out (Hope and Hope, 1997). Especially when neither money nor

traditional financial packages seem to be the driving force behind knowledge workers, there is a danger that traditional loyalty priorities will also change. Hope and Hope (1997) state that personal development and professional loyalty will be of a higher priority over loyalty to the employer.

The situation of shift in loyalty may lead to the 'mobility' phenomenon in the knowledge-intensive enterprises. According to Demarest (1995), this is in fact the effect of the knowledge workers, whose primary loyalty is not to the firm like the professional manager but to the knowledge worker's own development, his/her skills, the knowledge base and the means of production. Knowledge workers are also liable to move in groups between organisations. For example a manager is head-hunted into a firm, and brings "his/her people" with him/her; people whose skill sets and knowledge bases augment his/her own, or has a network of contacts in other organisations therefore make his/her means of production more valued (Demarest, 1995; Hull, 2000). Especially in the emerging knowledge-based economy, employees are bringing their intelligence as well as their physical self to work. The commitment of the employees in terms of creativity and intelligence are becoming the key resources of the organisations. Unlike the traditional production models of the past, organisations are striving to develop new methods and means to meet customer demands in an ever-competitive market (Du Toit, 2003).

This competitive need is supposedly making the knowledge workers more valuable to the organisations as time progresses. The idea of employees being

demanded for what they can bring to the organisation is supported by Demarest (1995) who states that the employees in the information-intensive firms are not craft producers valued for their labour. These employees are valued for their learning ability, flexibility, and responsiveness to customer demands as well as their intuitive grasp of complex tangles of competitive forces. *"They are knowledge workers. And in a knowledge-intensive firm, the company's core assets go home at 5pm"* (Demarest, 1995). Therefore, Warhurst and Thompson (1998) argue that the knowledgeable worker is therefore not a post-industrial phenomenon but rather an integral part of the development of industrial capitalism. With this in mind, Warhurst and Thompson (1998) believe that it might be useful to discard the overly comprehensive notion of knowledge workers in favour of a more realistic appreciation of the growth of *"knowledgeability in"* specific subjects.

At the present moment of economic expansion in the information-intensive firms, there is also an issue of redundancies that is affecting the organisation. Voluntary reductions in the workforce may cause a negative effect on preserving the knowledge within the organisation. Many organisations are encouraging individuals to leave the company voluntarily by instituting incentives to soften the blow of impending layoffs (Lesser and Prusak, 2001). Unfortunately, encouraging employees to leave the organisation voluntarily often results in the most marketable and knowledgeable individuals to leave. Lesser and Prusak (2001) also warn that early-retirement programmes that apply to the older individuals may cause the companies to end up losing those employees who have accumulated the most

knowledge. Thus rapidly depleting the corporate memory, as well as the knowledge base and supply of mentors within the company (Lesser and Prusak, 2001). This could result in companies being pressured into ensuring that they implement work arrangements and support systems that provides a motivating environment that fully harnesses the knowledge workers' skills and contributions as well as attract and retain knowledge workers. This means that the power shifts in the organisations may be leading to a need in new management styles for knowledge workers, which will be discussed further in the following section. Rather than looking at traditional methods of managing employees with basic salaries and side benefits, there seems to be a need in changing management techniques in order to retain and reward the knowledge workers within the organisation. Therefore, new management strategies such as knowledge-sharing via intranets or recontextualisation of knowledge from projects via filed reports are being considered as methods of keeping the knowledge of the employees within the organisation and utilising the knowledge the best they can.

In a bid to understand further about knowledge workers, a review of the available literature is conducted. Unfortunately, after reviewing the literature on knowledge workers, it is found that although there is a vast number of articles which state how important knowledge workers are to organisations, there is a lack of researches detailing studies on how knowledge within the knowledge worker is acquired, created, applied, stored, disseminated and retained in an organisation. In other words, there is a lack of research on the management styles of organisation in

relation to the knowledge workers in the light of the emerging importance of their skills and contributions to the company.

In summary, by referring to Jacques' (2000) framework, we can see that this chapter has provided with debates relating to the concept of knowledge ranging from the skills people have (Truch, 2001), to a method of utilising information (Brown and Woodland, 1999) to an entity that is free-flowing and constantly changing (Sbarcea, 2001) and the discussions linking knowledge with information (Galup et. al., 2002) as well as knowledge with expertise (Starbuck, 1992; Scarbrough, 1996). It is therefore important to note that knowledge is viewed in many different ways by various articles and that further research is needed regarding the complex nature of knowledge to fully understand what it entails and what is needed to manage it.

On the issue of the knowledge economy, according to Jacques' (2000) framework, the knowledge economy relates to knowledge as the capital rather than the traditional materials such as land. The section on the knowledge economy showed debates surrounding the issue of the knowledge economy being discussed largely on the concept of value within the organisation (Bowman and Ambrosini, 2000) as well as the ownership of the knowledge (Breu et. al.; 2000). Moreover, the ability to utilise this knowledge efficiently through acquisition as well as sharing the knowledge available is thought to increase the value of the knowledge as well as the organisation (Stiglitz, 1999).

The concept of knowledge work proposed by the literature available discusses on the definitions of tacit knowledge and explicit knowledge (Nonaka and Takeuchi, 1995; Hope and Hope, 1997) and the ability to change tacit knowledge to explicit knowledge and vice-versa (Crowther et. al., 2001). Furthermore, due to the abstract nature of tacit knowledge, there is difficulty in capturing and utilising tacit knowledge (Sbarcea, 2001). Based on Jacques' (2000) framework, knowledge work basically depends on the complexity of the work and not solely on the work that knowledge workers do. Therefore, knowledge work focuses on the interchangeability of knowledge in order for it to be utilised efficiently regardless of whom the employees are.

The section on knowledge workers refer to the framework by Jacques (2000) which discuss on the concept of knowledge workers having deviated from the traditional views of professions to the new group of professionals in the current knowledge economy (Alvesson, 1993; Hull, 2000). Furthermore, the loyalty of the employees towards the company no longer applies since knowledge workers can take their commodity, their knowledge, with them wherever they go (Hope and Hope, 1997). Therefore, the articles suggest that knowledge workers need to be better managed by the organisations in order to maintain the value and knowledge capital within their company.

This chapter has reviewed the literature available on the concept of knowledge, knowledge work and the knowledge worker. Although Jacques' article provides the framework for this chapter, the lack of discussion on the issues surrounding the implementation of KM has shown a gap in the literature that deals with the many issues relating to KM within an organisation. The following chapter will present an overview into literature available on the subject of knowledge management as well as the issues and problems relating to the management of knowledge within a company.

CHAPTER 3: KNOWLEDGE MANAGEMENT

3.1. Introduction

Every day, people with years of experience and knowledge walk out of their organisations, taking that knowledge and years of investment with them. Considering that most organisations would not let employees leave with the material assets of the organisation, it is surprising that companies are letting the employees leave with one of the most prized assets; their knowledge. According to Harrison and Leitch (2000) and Puddy et. al. (2001), national governments and international agencies are increasingly recognising that the emergence of knowledge-based economies has profound implications for the determinants of growth, the organisation's production and its effect on employment and skill requirements and may call for new orientations in industry-related policies. Alvesson (1993) also states that the idea of knowledge-intensive organisations are gaining a large interest in the past few years. A recent KPMG survey of 100 leading UK firms found that a staggering 43% of respondents are undertaking some kind of KM initiative (Scarbrough and Swan, 2001). This is possibly because companies are beginning to recognise the importance of knowledge within their organisation *“since all companies use and sell knowledge in some form or other, knowledge management is a crucial component of corporate strategies”* (Wikström and Normann, 1994, p. 71). According to Clarke and Rollo (2001), a firm's knowledge or intellectual capital includes three elements: human, customer and structural

capital that can be utilised to increase the knowledge capacity of the organisation further. Although a KM process will never replace the value of a twenty year veteran, it can help to mitigate the loss of critical knowledge, methods and best practices and intellectual capital if that person is to leave the organisation (Robb, 2003). Furthermore, since knowledge intensive firms are typically engaged in complex and difficult tasks that cannot be perfectly converted into standardised work procedures and regulations, they are forced to attract and retain qualified people, who can adapt their repertoires to meet the demands of the task (Alvesson et. al., 2001). Therefore, companies would have to have the determination to acquire, create, develop and share new knowledge among their own employees in order to improve the knowledge already available in the organisation (Labich and Graves, 1993; Maccoby, 1996; Stewart and Curry, 1997).

The need to manage the knowledge within the organisation stems from the recent changes in the economic sector. A global economic revolution from the industrial to the information age has forced organisations to re-evaluate their corporate strategies and customs. This economic change is not only creating more challenges within the organisations to try and utilise the knowledge of their employees more productively (Nhira, 2001), but organisations are also pressured into changing their corporate strategies to encourage this utilisation in order to remain competitive (Labich and Graves, 1993). Clarke (2001) states that the core capability of the company in fast moving, innovative environments is increasingly typified by the capacity to generate new knowledge, to integrate and transfer knowledge and to import

knowledge. Du Toit (2003) further adds that the injection of new international competitors with different cost structures and different manufacturing and production processes, are changing the fundamental characteristics of products and reduced manufacturing life cycles. Therefore, according to Harrison and Leitch (2000), in order to survive and grow in an ever-changing world, organisations would have to adapt faster and faster or else they could be naturally weeded out in the economic evolutionary process. At the same time, the business strategy of the organisation has to be closely aligned with the knowledge available in the organisation. Hamel and Prahalad (1996) mention that the decline of manufacturing and the rise of the service sector is associated with a technological dynamism epitomised by announcements of the end of the machine age and the emergence of an information age within which work is no longer about the production of tangible goods, as mentioned earlier by Drucker, but is concerned with the centrality of knowledge and manipulation of symbols. Furthermore, success for organisations rests on *“knowing how to locate and juxtapose critical pieces of information, how to organise understanding into forms that others will understand”* (Quah, 1997, p. 4). This indicates that knowledge is believed to be the new source of competitive advantage for businesses in the future as power belongs to the people with knowledge and information (Yeoh, 1998).

However, it would be beneficial if this power of knowledge and information is well managed in order to remain competitive. Competitive advantage in today's global, rapidly changing market requires organisations to build and continually

replenish capabilities, at both the individual and organisational level, to work effectively with uncertainty. A review of the largest companies in the United States reveal that there is an average organisational life expectancy of forty years and that those who exceed this 'natural' life-span do so by re-inventing themselves and changing their principal activities (Grugulis, 1999). Creating the right conditions to build this capability and foster effective KM proves to be a continuing challenge for the organisations to come up with a tangible system. This may be possible when the organisation works together with their employees to achieve their goals. In order for the organisation to function as a team, there is therefore, a vital need to promote the effective creation and sharing of knowledge. It could be possible to promote this creation and sharing of knowledge through KM, whereby all organisational activities are viewed as knowledge generating and therefore, transforms the organisation into a learning organisation that shares and transforms their knowledge (Parikh, 2001). Furthermore, having recognised its growth in popularity, some critics argue that KM is being reconstructed by the HR community as the creation of intellectual capital through the development of employees and the management of organisational culture (Scarborough and Swan, 2001). Demarest (1995) mentions that understanding how the knowledge that provides differentiation in the marketplace is (a) constructed, (b) embodied, (c) disseminated and (d) modified-through-use is increasingly ranked by CEOs as among their top strategic priorities. Consultants are actively marketing KM as an attempt to harness and exploit the "*intellectual capital*" of the organisation. A notion that sits comfortably with the crowning of knowledge as the primary source of productivity, innovation and

wealth creation in globalised, post-industrial economies (Drucker, 1993). More importantly, KM strategies are beginning to address customer access to suppliers' knowledge bases for joint product development collaboration and market research (Mullin, 2001). In particular, knowledge-sharing across departments, functions or geographical locations is discussed as a core organisational competence for many (if not all) organisations, not just knowledge-intensive firms (Newell et al., 2001). By most accounts, the accumulation of capital could explain only a fraction of the increases in per capita income in the countries in East Asia. Their miraculous growth is largely attributed to closing the knowledge gap, the gap between the more developed and less developed countries in knowledge about how to transform inputs into outputs (Stiglitz, 1999).

There are however problems with the idea of KM, not least of which is that the concept of knowledge intensiveness is too vague to be helpful. Crowther et. al. (2001) raise the issue of trying to define what is meant by knowledge intensive i.e. how do we distinguish between knowledge-intensive and un-intensive? It is possible to use the term "*knowledge intensive firm*" and the term, while vague, is meaningful. It is not, however, possible to give a precise definition of what it is meant beyond the fact that it involves companies that utilise a variety of knowledge. This inability to give a more precise definition is possibly due to the complexity surrounding the many definitions of knowledge itself. Furthermore, as considered above, the current interest in knowledge growth presupposes it to be verified, institutional, scientific knowledge, whereas Crowther et. al. (2001) argue that there

is actually greater ambiguity in what is meant by knowledge. However, labels such as “*knowledge management*” are popular in both business and business schools but such labelling is driven by both academics and consultants in their respective drives to legitimate a field of study or practice as “*scientific*” (Crowther et. al., 2001).

Another problem that might be faced by the organisations is the awareness of the knowledge necessary within the company. In order to manage the knowledge available in the organisation, the firms have to be aware of what type or kind of knowledge is required by the company. Different companies need different types of knowledge. And it is important that the employers are aware of the kind of knowledge their employees are capable of producing. Especially when an organisation is a complex but systematic world where people of diverse professional relationships and goals, differing capabilities, understandings and worldviews exist and work together (Sbarcea, 2001). Other problems that might be related to KM could include participation from the staff of the organisations themselves if they are not eager to contribute to the success of the knowledge management. Moreover, something as abstract and difficult to quantify as knowledge would also be difficult to manage. Therefore, finding, organising and managing knowledge so that it could be meaningfully used to improve the efficiency or enrich the corporate environment has become problematic of which, according to Borck (2001), the resolution is a top priority. Especially in today’s environment where managing the internal knowledge of an institution is rapidly

becoming as important as managing the institution's cash flow and asset-liability mix (Lamb, 2001).

3.2. Definition of Knowledge Management

To utilise knowledge efficiently, it is important to understand what KM is. McKinlay (2000) states that there is much more to KM than simply storing information and that managing knowledge also relies upon the ordering, normalising and reflection of information. At the most basic level, managing knowledge is how an organisation acquires, creates, applies, stores and disseminates knowledge. KM is also about people whose assets are the knowledge that they have in their heads. It is argued that companies need to be better able to identify their supply of knowledge among the employees and develop a viable management strategy to deal with the inherent knowledge by helping the employees to innovate and adapt in the face of change (Microsoft UK, 2000). According to Hope and Hope (1997), 50-90% of a firm's value is created through its management of human capital. Moreover, KM is based on identifying the organisational positions and chronological moments at which individual and organisational learning is greatest in scope, depth and intensity (McKinlay, 2000). However, KM is not easy to define and many definitions supplied in the literature are very vague. There is no simple 'single view' or 'single definition' within which all the aspects of KM can be examined and therefore, knowledge is beginning to be understood as

an integration of multiple perspectives (Wainwright, 2001). The ambiguity of the concept, however, is itself a clue to the fashion-setting possibilities of this discussion. *“Ambiguity makes Knowledge Management amenable to multiple interpretations and remouldings which potentially extend its relevance across different communities of practice”* (Scarborough and Swan, 2001, p. 3). Offsey (1997) attempts to define KM as *“the broad processes of locating, transferring and more efficiently using information and expertise within an enterprise”* (p. 113) while Santosus and Surmacz (2001) state that KM is the process through which organisations generate value from their intellectual and knowledge based assets i.e. the knowledge worker. Truch (2001) describes the organisational processes that relate to KM in slightly more detail as processes that *“govern the creation, dissemination, and utilisation of knowledge”*. However, Truch (2001) mentions that as long as we accept the premise that KM is concerned with the entire process of discovery and creation, dissemination, and the utilisation of knowledge, then we are strongly driven to accept that KM is much more than a ‘technology thing’. This is in contradiction to the definition by Lamb (2001) who discusses the concept of KM as including three main components that are IT, HR elements and knowledge within the organisation. The components linking to KM will be discussed in further detail later in the chapter.

KM as a means to capture and transfer knowledge is another definition put forth by many authors. Loshin (2001) defines KM as the art or science of collecting organisational data and turning it into usable, accessible information and valuable

knowledge by recognising and understanding relationships and patterns. Du Toit (2003) who adds that KM is the capturing, filing and categorisation of the information supports this definition by Loshin (2001). Wickramasinghe and Mills (2002) also state that KM not only involves the production of information but also the capture of data at the source, the transmission and analysis of this data as well as the communication of information based on or derived from the data to those who can act on it. They also add that both effective and efficient processes as well as the functions of supporting and fostering innovation are key concerns of KM (Wickramasinghe and Mills, 2002). This definition is slightly similar to the definition presented by Ellingsen and Monteiro (2003) who state that vast bodies of knowledge representation cannot be maintained in full and it is only selective representations of knowledge that can be moulded into working knowledge within an organisation through specific organisational processes. However, Bertels and Savage (1999) mention that KM is an audit of “*intellectual assets*” that highlights unique sources, critical functions and potential bottlenecks that hinder knowledge flows to the point of use. KM also protects intellectual assets from decay, seeks opportunities to enhance decisions, services and products through adding intelligence, increasing value and providing flexibility (Bertels and Savage, 1999).

It is also widely argued that KM is more than just a new fad. *“To a growing number of companies, KM is more than just a buzzword or a sales pitch, it is an approach to adding or creating value by more actively leveraging the know-how, experience, and judgement resident within and, in many cases, outside of an*

organisation” (Ruggles, 1998). The organisation’s risk of knowledge loss is directly proportional to the amount of knowledge held at the individual level. The importance of KM does not only reside in minimising the risk of loss. Scarbrough and Swan (2001) state that there are major benefits associated with the development of new knowledge. However, the development of such knowledge requires that learning should take place in a climate of trust and openness. Condon (1999) mentions that there is a misconception that KM is about taking the knowledge from the employee and managing it. What KM really meant according to Condon (1999) is encouraging staff to provide information regarding their own skills and expertise to contribute to a knowledge base.

It is not about creating a central database that is a complete replica of all that is known by employees or that is embedded in the systems they use. On the contrary, KM is about embracing a diversity of knowledge sources, from databases, websites, employees, and partners, and cultivating that knowledge where it resides, while capturing its context and giving it greater meaning through its relation to other information in the company. KM is not about turning knowledge workers into interchangeable components by plugging them into some corporate base. Its essence involves fuelling what knowledge workers do best and that is “*thinking work*” (Ruggles, 1998). In fact, Microsoft believes that KM is about partnering technology with a corporate culture and business processes, and using it as the vehicle to manage the business information and the expertise of employees (Microsoft UK, 2000). “*With KM, systems are put in place to collect the answers*

and make them more accessible” (Loshin, 2001). However, it must be remembered that KM is not to be considered as just another system that the organisations use to have a competitive advantage over their competitors. KM is a long-term programme that involves changing the organisation’s culture right to the heart of organisational management (Hope and Hope, 1997). Besides changing the organisational culture to encourage knowledge retention, there is also the aspect of acquiring, applying and disseminating the knowledge available within the organisation to other employees or clients of the company that needs to be considered.

With all the definitions of KM, it is sometimes easier said than done about managing knowledge. Knowledge about an organisation or industry is an intellectual asset that, although paid for in part by the employer, is difficult to control and manage. This is because knowledge is fragmented into documents, policies, procedures, and other storage mediums. Managing knowledge also presents a challenge for management to retain knowledge in a form that is easily retrievable. This is not an easy task, since the enterprise must first identify the location of all needed knowledge, and second, determine the easiest way to retrieve it (Galup et. al., 2002). Since KM is required to translate data and information in a meaningful way, KM initiatives are unlikely to be successful unless they are integrated with business strategy, and related to the development of the core capabilities of the organisation (Clarke, 2001). Therefore, the organisations would most likely face problems in managing the knowledge in terms of knowledge retrieval and retention.

The recent approach to managing knowledge has fallen into two broad schools of thought. According to Hope and Hope, (1997) we have the “*information school*”, which believes that knowledge is comprised of objects that can be identified within information systems; on the other hand we have the “*behavioural school*” which sees KM as a dynamic process within which skills and know-how are constantly changing. By looking at the table below, we can understand the difference between the two schools further:

Table 3.1 Difference between Information and Behavioural Schools of Thought

Information School	Behavioural School
<ol style="list-style-type: none"> 1. Roots in computing, artificial intelligence, and systems management. 2. Looks at knowledge based systems as answer to KM. 	<ol style="list-style-type: none"> 1. Roots in sociology, anthropology, psychology and organisational behaviour. 2. Looks at understanding human behaviour and the mental processes of the employees as the answer to KM.

Adapted from Hope and Hope (1997).

The lines between these two schools of thought are somewhat blurred, but they are broadly representative of how KM is being approached (Hope and Hope, 1997). By referring to this table we can roughly classify Hope and Hope (1997), Ruggles (1998), Condon (1999), Truch (2001) and Jacques (2002) as being from the behavioural school whereas Lamb (2001), Loshin (2001), Wickramasinghe and Mills (2002), and Du Toit (2003) are from the information school of thought. Hope and Hope (1997) and Jacques (2002) believe that KM involves the management of knowledge within the long-term structural programme and framework of managerial and labour relations. Furthermore, Ruggles (1998) and Condon (1999)

state that KM is concerned with creating value through the utilisation of knowledge internally or externally from the organisation by encouraging staff to contribute to the knowledge base. Therefore, the behavioural school of thought takes a managerial and human relations focus on KM where they believe that KM is the entire process of acquiring, creating, utilising and disseminating knowledge which is more than just the usage of technology (Truch, 2001).

On the other hand, the informational school of thought leans towards KM being more mechanistic that focuses on knowledge based systems. This trait can be seen in Wickramasinghe and Mills' (2002) article when they mention KM to be the capturing and utilisation of data while Du Toit (2001) discusses about KM being the capturing and filing of information. Moreover, Lamb (2001) states that IT plays a large role as one of the main components necessary in efficient KM while Loshin (2001) believes that KM is the method of utilising data through being aware of and understanding the relationships within the organisation. It can be noticed that these articles discuss more on the capturing and utilisation of 'data' or 'information' as being KM and not so much on managing the employees' knowledge. Therefore, although this research does not wish to focus on the theoretical differences of the schools of thought, it would be of interest to discover which method of KM is taken by the organisations.

There is more to KM than meets the eye in terms of what is involved. The term KM does not convey the dynamic and fluid nature of knowledge. The word

“*management*” reflects an organisation’s need to control all of its resources. The term signifies restrictiveness by conveying the idea that an employee needs to have his or her knowledge managed. KM does not convey that organisations need to do more than just manage knowledge, rather they need to create environments that are conducive to knowledge exchange (Sindell, 2001). It is also easier to understand KM by looking at how it is linked to other elements within its field.

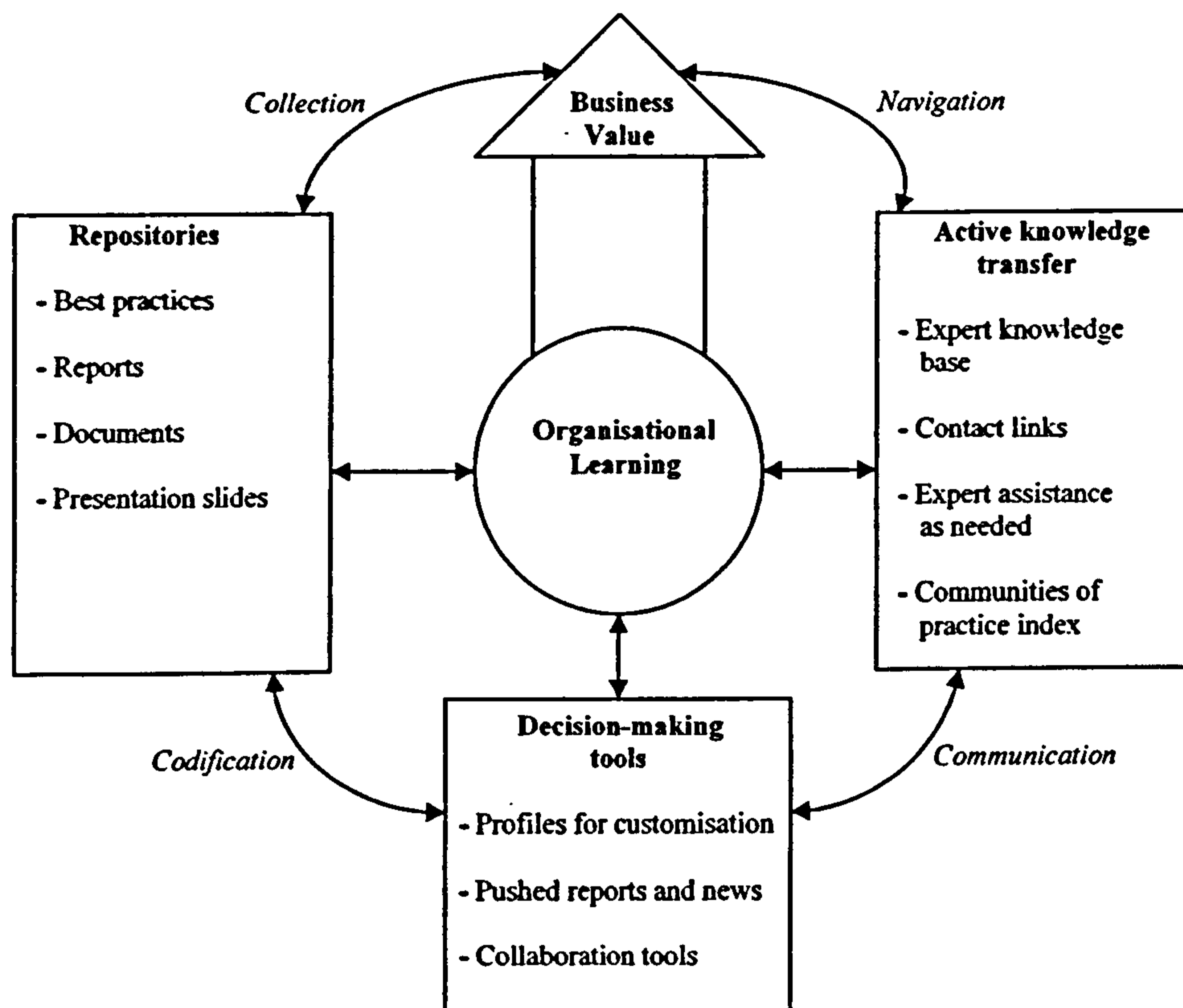


Fig. 3.1 The Knowledge Management Process (McInerney and LeFevre, 2000, p. 5).

By referring to the model shown in Fig. 3.1, it can be determined that the different elements of KM are linked to one another and they are of an interacting nature throughout the organisation. There may be different side issues that are

linked to each element, at which case would lead to a different outcome. The active knowledge transfer of the organisation could be achieved through networking with clients and competitors, socialising among the employees as well as through attending seminars or conferences. At the same time, a variety of decision-making tools such as manuals, reports and customer information as well as how the employees communicate with their clients, suppliers or colleagues could help the employee gain more knowledge during the networking process. The knowledge gained during these interactions is then stored either within the employee themselves as experiences or within the organisation through manuals, reports, teaching or training other employees and filed documents. Throughout this process, there is knowledge being created through organisational learning and eventually, the knowledge gained could help increase the business value of the company through better experiences as well as compiled best practices. Furthermore, the process cycle, if done often enough could help the organisation achieve an environment that encourages knowledge gain within the company.

However, there is a danger that what is acceptable in theory and affective in a diagram may not be possible in reality. It can be seen that managing knowledge throughout the process of organisational learning and storing of knowledge is a complex process. Therefore, organisations are finding new ways for their employees to gain knowledge as well as to share and retain that knowledge within the company. The diagram suggests that with more efficiently captured knowledge, the better prepared the organisation would be in facing the competitive market. This

suggestion is supported by Jang et. al. (2002) who state that the value of knowledge is capitalised when the knowledge is distributed, shared and internalised by the members who are in charge of the task. It is important that in order for KM to be effective, top management should be committed to implementing it in the organization (Wooldridge, 1997; Dove, 1998; Yeoh, 1998). The heart of managing knowledge is to understand why and what knowledge is important to the organization and then create the necessary processes to put it into action. Microsoft as a company believes that this is because KM helps prepare people for an environment of constantly shifting demographics, industries, economies, and customer needs by ensuring that people have the expertise and information they require in order to properly assess business problems and opportunities (Microsoft UK, 2000).

After all the discussions about KM, what actually are the benefits involved in managing knowledge? Some benefits of KM correlate directly to bottom-line savings, while others are more difficult to quantify. In today's information society, companies reveal the most opportunities and ultimately, utilise the most value from intellectual rather than physical assets. To derive the most value from a company's intellectual assets, KM practitioners maintain that knowledge must be shared and serve as the foundation for collaboration. According to Santosus and Surmacz (2001), an effective KM programme should help a company do one or more of the following:

- Foster innovation by encouraging the free flow of ideas.
- Improve customer service by streamlining response time.
- Boost revenues by getting products and services to market faster.
- Enhance employee retention rates by recognising the value of employees' knowledge and rewarding them for it.
- Streamline operations and reduce costs by eliminating redundant or unnecessary processes.

Santosus and Surmacz further add that a creative approach to KM could result in improved efficiency, higher productivity and increased revenues in practically any business function (2001). While KM offers cost savings, real value could be found in more forward-looking and adaptive organisations. KM practitioners argue that with efficient KM, companies will see benefits in faster product development, improved decision-making, more skilled employees, and enhanced services that better meet customer needs.

Unfortunately, after conducting a literature review on KM, it is found that KM literature is replete with the call for a unified KM strategy or methodology in order to leverage corporate knowledge assets (Sbarcea, 2001). An interesting fact to note is that steps and guidelines on how the organisations should manage knowledge and knowledge workers are suggested by the researchers. Among the steps mentioned include taking into account many factors i.e. innovation, responsiveness and competency as well as identifying the key management driver and determining what the core mission is (Cook and Cook, 1995; Cusimano, 1995; Maccoby, 1996;

Price, 1997; Miller, 1998). Step-by-step implementation process, prescriptive articles which talks of the need for KM or that helps us to design and refine the KM infrastructure and strategy within an organisation are popular examples of articles available within the literature search. However, there is a lack of empirical research conducted on the issues affecting the implementation of the KM strategy or the problems relating to the management of knowledge within an organisation. One of the issues related to KM that are being brought up by a few authors is the notion of knowledge sharing.

3.3. Knowledge Sharing

Managing the creativity of the employees is not enough as a means of KM. Knowledge sharing is also an important aspect of KM. "*Knowledge is power*" so, in some cases, knowledge that should be freely available in an organisation might be hoarded to create an artificial scarcity or monopoly. When knowledge becomes specialised, markets increase in diversity, and make knowledge even further dispersed. Knowledge, to be of value, has to be interpreted within some framework. Augier and Vendelo (1999) argue that by stressing the importance of shared knowledge, they emphasise the priority of knowledge networks since such knowledge networks can be seen as representing the cognitive frames and categories by which organisations structure new knowledge and thus, manage it. Roy and Roy (2002) suggest that tacit knowledge needs to be discovered, extracted,

and captured, and it has to be creatively disseminated so that this shared knowledge can be efficiently used to extend the KM base.

In the not so distant past, knowledge and skill transfer are being largely limited to classroom training, where the instructors would be the experts in their subjects. For example, sales training would be delivered by a seasoned salesperson by way of a lecture. This approach has many limitations in terms of knowledge transfer and skill transfer as there is no guarantee that all the information presented at the lecture would be transferred depending on the size of the group being trained (Kotylar and Saks, 2001). Organisations need to understand that knowledge could be shared and transferred in a variety of ways, and accordingly need to employ a wide range of systems and policies to facilitate this process.

A method that has been suggested by many people as a means for sharing tacit knowledge is through social interaction or networking (Foley, 2001; Puddy et. al., 2001). *“Social interaction in an exchange relationship facilitates learning by making it possible to exchange and combine not only codified knowledge, but also tacit knowledge”* (Mariotti and Delbridge, 2001). This method is supported by McKinlay (2002) who says that the prime source of tacit knowledge is the immediate team members of the employees and the key dissemination mechanism is face-to-face exchange. Through social networks, it has been proposed that employees could identify, share and work with corporate knowledge. Individuals could also exchange ideas and knowledge as well as identify experts, provide

referrals for those seeking answers and create networking among groups (Bertels and Savage, 1999; Lesser and Prusak, 2001; Newell et. al., 2003). This could lead to better communication within the organisation and therefore emphasis better knowledge sharing and dissemination. Furthermore, when uncertainty is high, organisations are advised to interact more, not less, with external parties in order to access both knowledge and resources available (Powell, 1998). Brailsford (2001) also supports the theory of knowledge sharing by suggesting that when success stories or innovations are shared across a community, a richer environment is created for knowledge acquisition.

While some companies may see these networks as promoting idle chit-chat, Gonsalves and Zaino (2001) report that Texaco recognised social networking as a source of knowledge that employees gather through on-the-job experiences and thus store in their heads. Gonsalves and Zaino feel that this information cannot be stored into an Excel spreadsheet or Word document (2001). Furthermore, knowledge transfer need not involve complex computer systems; often times, a simple conversation will suffice (Cappabianca, 2002). Oxtoby (1992) also states that “*the sharing and application of knowledge and experience by people who add value and eliminate waste at work*” (pg. 212) could be described as the corporate learning process. In addition, Hope and Hope believe that knowledge sharing is critical to success because intellectual assets, unlike physical assets, increase in value with use (1997). Another technique proposed as a tool for KM within the organisation is a bonus and shares plan (Lesser and Prusak, 2001). It involves paying bonuses to

departing employees willing to share their working knowledge with their replacements. The process provides an incentive to make outgoing tacit knowledge more visible and this has been used by the Harvard Community Health Plan, a health-maintenance organisation in Massachusetts (Lesser and Prusak, 2001). While on the subject of pay plans, Alvesson et. al. (2001) and Hall (2001) look at explicit rewards for employees for knowledge sharing through various means including financial rewards, more access to information, participating in more knowledge sharing ventures as well as career advancements and job security. There are also subtle rewards that included more recognition and personal satisfaction.

Knowledge sharing is also seen as a means to avoiding mistakes. Hoopes and Postrel (1999) believe that knowledge coupled with co-ordination will be beneficial to companies in reducing the amount of glitches. Glitches here are defined as *“costly mistakes that could have been avoided if some of the parties involved had understood things that were known by other participants”* (Hoopes and Postrel, 1999, pg. 838). Hoopes and Postrel (1999) and Duffy (2001) present a tripartite classification of a KM process whereby knowledge, co-ordination and co-operation is explained as knowledge from the employees that are shared to create common knowledge along with free-flowing communication from the different levels of the organisation. As well as the organisational integration, this classification could help to reduce the cost of mistakes made in the company and therefore, increasing the profit margin. However, it is easy to instruct organisations to encourage their staff to socialise or increase their networking in order to share knowledge but it is more

difficult to tell the organisations exactly how they should go about motivating the employees to share their knowledge.

An important thing to note is that knowledge sharing can also give rise to the danger of information leakage. A central characteristic of social networks is their tendency to span organisational boundaries: team boundaries, functional boundaries, and the organisational boundary itself (Crowther et. al., 2001). Consequently, a key managerial aspect concerning social networks involves the flow of information across the organisational boundary via knowledge exchange with customers and clients. Informal boundary-spanning activity not only provides for the sourcing and acquisition of information and know-how, but could also result in information leakage. Therefore, Crowther et. al. (2001) believe that KM is concerned with the control of this leakage.

At the same time, there is an atmosphere of doubt over knowledge sharing. Professionals are not noted for their humility. They might respond to peer group pressure, but an external request for knowledge sharing is often given short shrift (Hope and Hope, 1997). People cannot be forced to share knowledge (Warner, 2001) especially in fiercely competitive markets, where knowledge sharing ever becoming a common practice is something that can be doubted due to the risk of knowledge leaking (De Loo, 2002). A major obstacle to a knowledge-sharing culture is the belief that those with knowledge has power and regrettably this is often reinforced by the behaviour of senior management (Truch, 2001). Moreover,

there is often little respect across professional disciplines even when people are working within a team with a common objective. Hope and Hope (1997) state that researchers (the thinkers) look down on designers (the artists) who look down on engineers (the real-world practitioners) who disdain accountants (the number crunchers). The difficulty of giving due credit to any one person or team for their knowledge contribution is also a problem (Hope and Hope, 1997). Therefore, it is vital for the effective sharing of knowledge that the behaviour of management reinforces an appropriate culture through deeds and not just words (Truch, 2001).

Furthermore, in times of difficulty with the threat of downsizing hanging over the company, people might tend to hoard their knowledge to increase their indispensability when in actual fact, knowledge sharing might be more important in order to save the survival of the organisation. If knowledge hoarding is rewarded, then there will be a vicious circle of knowledge restriction instead of the virtuous circle of knowledge sharing (Stiglitz, 1999). This is seen most markedly in the myriad of knowledge transactions that occur within a firm. Stiglitz (1999) mentions that within an organisation, the "*payment*" for knowledge sharing is often recognition and prestige or the possibility of future reciprocity. But if managers or team leaders represent the ideas of the team members as their own or if sharing between certain team members is rather one-sided, then there is a problem of the "*supply*" of knowledge being diminished. There is a danger that workers will not assist in codifying the tacit knowledge about their job if they feel it will jeopardise their employment. The knowledge market must be built on trust that there will be

reciprocity, some *quid pro quo* in the transaction (Stiglitz, 1999). "*A culture that does not foster and reward sharing of knowledge cannot expect technology to solve its knowledge challenges*" (Yeoh, 1998. pg. 28). Interestingly, besides networking and socialising, quite a few of the literature available on the concept of knowledge sharing as well as KM as a whole impressed upon the usage of IT as a means for KM within an organisation.

3.4. Knowledge Management and IT

Despite the deluge in articles regarding knowledge sharing via social interactions and networking, there are other methods of KM proposed by various authors. One of the examples of how the skills of experienced or top performers can be passed on to others through the use of technology is e-mentoring (Kotylar and Saks, 2001). Like the more traditional forms of mentoring, junior employees can ask questions to their mentors, acquire career relevant knowledge and receive feedback through the use of e-mail. Kotylar and Saks (2001) believe that this approach is quite time-effective and, consequently, mentors are able to have a great number of mentoring relationships. The only drawback of this method that can be thought of is that the mentor might be overloaded with too many questions from their mentoring relationships that they would not have time for their own work. Another method currently being utilised by a US pharmaceutical company as a way of managing knowledge through IT is 'Warehouse' which is an attempt to integrate the social

and technical dimensions of KM (McKinlay, 2002). According to McKinlay (2002), the 'Warehouse' is a corporate-wide groupware package that facilitates coordination and collaboration across workgroups through shared access to technological capabilities. However, the current focus on electronic knowledge repositories wrongly reinforces a narrow view of KM. The use of IT should only be considered as a tool to assist KM and the organisations should not make synonymous associations between the IT-based electronic knowledge repositories with KM as a whole.

KM is first and foremost a managerial discipline that treats intellectual capital as a managed asset. Organisations must now understand that knowledge sharing is as much a social activity as a technical one and that computer networks that facilitate this kind of dialogue are likely to be, and seen to be, more effective (Hope and Hope, 1997). Furthermore, KM technology has become an increasingly important hub for all content on a network. The technology has matured to the point where most communication systems, data repositories and applications are controlled by it or flow information into it (Morejon and Gros, 2003). Microsoft believes that the primary "*tools*" applied in the practice of KM are organisational dynamics, process engineering and technology (Microsoft UK, 2000). These work in concert to streamline and enhance the capture and flow of an organisation's data, information, and knowledge and to deliver it to individuals and groups engaged in accomplishing specific tasks. People gain knowledge from their experiences and their peers' expertise (both explicit and tacit knowledge), as well as from the analysis of

business data such as sales and financial reports. One way to gain more knowledge from the experiences of the employees is through a system implemented by a pharmaceutical company in the US called 'Lessons Learned' (McKinlay, 2000). In this particular system, the tips generated by individuals and more usually, the workgroup debriefings at the end of a project are stored within a database. The 'Lessons Learned' database is more like an electronic suggestions box which is segmented by function, site, project and status (McKinlay, 2000). However, Microsoft fears that without properly managing these assets, a company cannot grow effectively. Information is lost, lessons are unlearned, work is prolonged, tasks are repeated, trends go unnoticed, and completed jobs are recreated (Microsoft UK, 2000).

KM, in principle, is nothing new. Scientists and marketing people are always doing this, but now they have the ability to move around masses of information with a system that does the sorting (Mullin, 2001). Waddington (2001) states that computer aided systems for KM are being designed to perform two essential functions. First, it allows knowledge workers and others who analyse and process information to shift their knowledge into public domain and secondly, enable everyone within the organisation to access that knowledge more quickly and easily than ever before. KM provides the processes and culture to ensure that companies maximise their return on all their intellectual capital i.e. the knowledge of a company's staff and customers as well as digital content. So arguably, no matter how big or small an organisation, as long as the company have some sort of

inter-linked digital content, for example document archives and published web pages, they need to be doing some sort of content management. And if the organisation wants to go on to implement a fully-fledged KM programme, then well-managed content is a crucial foundation (Waddington, 2001). One thing that must be remembered is that despite the benefits of having an IT based KM process, the question that need to be asked is the feasibility of the organisation realistically implementing the system within the company and how would the employees gain access and contribute to the system.

With technological advancements, KM is becoming more electronically based, such as knowledge repository databases, complete with user friendly interfaces that allow workers to easily access, contribute and discuss knowledge. Ciborra and Patriotta (1996) state "*new communication technologies...can play a strategic role since they provide companies with platforms that operate on a global scale by connecting users dispersed over the organisational networks*" (p. 121). The intranet could be helpful because it can potentially be an inventory for the company to store the knowledge of the employees. This is especially true for service-oriented organisations where the raw materials are the skills and knowledge of the employees and effective utilisation and harnessing of the knowledge is the product of the company (Condon, 1999). Furthermore, intranet technology is often depicted as part of the effective solution to problems of managing knowledge. According to Kotylar and Saks (2001), 'Proctor and Gamble' has introduced an intranet site designed to encourage greater employee collaboration and innovation, which can be

reached by 18,000 employees in research and design, engineering, purchasing and other departments. Another company that has also initiated an intranet as a means of a KM process is 'Boeing' (DiSabatino, 2001). A number of consulting firms have created formal learning networks as well in which employees with different areas of expertise exchange ideas and practices. The design and operation of these systems has spawned a new industry, with a constant stream of articles, books, conferences and organisations offering advice on the subject of KM.

At the same time, creating incentives for sharing knowledge and having focused business goals could help avoid many of the common pitfalls of KM. Developing a KM practice requires a well-balanced approach. The utopian vision fuelling KM has been the hope and promise that a company's intellectual or knowledge-based assets can be revealed, organised and made easily accessible through the use of technology (Sbarcea, 2001). Besides, information systems, tools and techniques are being used since the late 1970s to enhance information management (Parikh, 2001). Generally, tools fall into one or more of the following categories: intranets, internets, groupware, factual/procedural knowledge (e.g. manuals), best practices, discussion databases, corporate yellow pages/directories, subject matter expert directory, knowledge repositories, expertise access tools, e-learning applications, discussion and chat technologies, synchronous interaction tools, and search and data mining tools (Chudnow, 2001; Kotylar and Saks, 2001; Mullin, 2001; Santosus and Surmacz, 2001, McKinlay, 2002). However, most such technology-based conceptualisations are primarily based upon heuristics; embedded in procedure

manuals, mathematical models or programmed logic and therefore, the tools basically capture the “*preferred*” solutions to the “*given*” repertoire of organisation’s problems rather than the actual knowledge that is occurring (Malhotra, 1998). Moreover, Condon (1999) believes that knowledge is within people and not in computer systems. A lot of information can be stored within the computer system but using the knowledge and information properly and utilising the knowledge is still dependent on the employees (Condon, 1999). Since KM deals with cultural, strategic, process and technological issues, it is important that employees are provided with the proper incentives and tools to share knowledge since solutions are designed with specific business problems in mind (Microsoft UK, 2000).

KM has been enthusiastically embraced by communities of IT specialists and practitioners. Researchers are also not resistant to the new technology. In fact, Mullin (2001) believes they are enthusiastic about using a tool that cuts time in researching patents and other data. IT based KM takes information sets from various sources and shows what can be done with it. Without exception, researchers want to use these capabilities. They are not giving up any of their old ways of doing things as the IT system is really just a new tool that just gets you information faster (Mullin, 2001). Therefore, the focus among this community of researchers is on developing tools and systems for KM. Moreover, Clarke (2001) mentions that the organisations are utilising electronic network infrastructure of the internet, other digital systems and services, as well as the rapidly developing knowledge tools and

systems in the knowledge-driven economy to transform the organisational culture and the working lives of the employees. However, there is a chance that too much emphasis on IT could deviate the real focus of the system which is to manage the knowledge efficiently and not for the organisations to be dependent on a programme for storing knowledge only. The knowledge should be able to be stored, accessed as well as easily utilised by all users of the system and this is where the IT specialists have to be careful in prescribing the system into the organisation.

The concept of KM then, has helped IT specialists to legitimise and mobilise management support for organisational change programmes aimed at using IT to capture and codify knowledge (Scarbrough and Swan, 2001). The adoption of information technology is seen as closely intertwined with organisational issues (Fulk and DeSanctis, 1995). This acknowledges that the structures and routines within the organisation, such as pre-existing relationships and the distribution of resources may exert an important influence on the design, development and use of technology. It is found that a large proportion of the discussion about KM focuses on technical systems and the technical issues associated with their design and installation (Clarke, 2001; Mullin, 2001). However, little attention has been paid to the most fundamental aspects of implementing such systems i.e. the impact on users in general, and knowledge workers in particular.

In regards to KM and IT, there has been some confusion as to what is the difference between the IT systems and non-IT systems of KM. Some professionals

consider KM to be in the realm of IT. It is the responsibility of IT professionals to store, process, and disseminate knowledge (data), which is more the informational approach to KM. The non-IT perspective regard KM as a social process of sharing knowledge through such methods as conversation, storytelling, and mentoring (Sindell, 2001). Clarke and Rollo (2001) believe that there are no direct technological solutions, simply technological platforms that can help people to personalise, codify, transfer and distribute knowledge in the enterprise and this approach leans more towards the behavioural approach to KM. The technological end of KM has also created a blurred distinction between information and knowledge. According to Sbarcea (2001), a business information system stays at work, while its knowledge base (the employee) goes home. However, there are many underlying assumptions that are associated with KM and one of them is that employees will happily tap into the collective corporate knowledge base in their quest to find best practice, the solution to a problem, lessons learned and shared from transactions or engagements. A further assumption is that people will freely share and collaborate within the corporate environment (Sbarcea, 2001). However, with the problems regarding knowledge sharing already highlighted in the previous section, it could be interesting to see what the reality is regarding knowledge sharing within the organisation.

Various authors are suggesting a variety of systems of managing knowledge. Buhler (2001) discusses the use of a skill bank (also referred to as a skills inventory) to help organisations track the skill sets of their employees. As workers

acquire new skills (either on the job or off the job), the skills bank information is updated. This system is usually administered in the HR department and this bank provides valuable information about the skills possessed by the workforce organisation-wide. Moore (2001) suggests a similar system that is the browser-based portal as means of knowledge sharing and retaining knowledge. This system only extracts the documented information on the web but it could not extract the knowledge. An example of a company with this system is 'Proctor & Gamble' and there now exists a list of employees with fields of expertise that may be contacted by other employees for further information if necessary (Moore, 2001). Tillet (2001) reports that MWH Global, an international engineering organisation also uses a web-based KM portal as a method of KM.

Another method of managing knowledge that is reported in articles is using webpages to document knowledge. The international bank J.P. Morgan Chase is documenting and locating employees by their professional expertise through personal web pages and an internally developed platform (Yasin, 2001). In the mean time, Gonsalves and Zaino (2001) report that Texaco's KM arsenal includes PeopleNet, a custom-built application that lets employees build a personal profile and post it as a webpage on the company's intranet. An interesting aspect of the PeopleNet is that the content of the profile does not have to be purely work-related. Pictures and hobby lists coexist alongside users' summaries of their job expertise (Gonsalves and Zaino, 2001). However, although many of the companies are using webpages as a corporate yellow pages, employees generally overestimate or

underestimate their skills, undermining the system's effectiveness (Yasin, 2001). Furthermore, there is the danger of relying on the webpages and the intranet as a system where everyone will be able to gain access to it and be happy to use it. The webpages and the intranet might be useful to place important notices but if there is too much information on the webpages and the intranet, people could become overwhelmed with the amount of information, emails and notices.

Early adoptions of KM, which entailed sharing data via groupware systems and intranets, are helping facilitate knowledge sharing but unfortunately, it has not gone far enough. Sbarcea (2001) reports that the great promise of technology is its ability to scale large amounts of data. An unfortunate accompanying belief is that if a technological "*field of dreams*" is built, people will flock to share and contribute knowledge. The managerial dream is the mental image of a large, centralised repository stuffed full of corporate knowledge. However, the hegemony of computers has resulted in an acceptance of computer-generated data as "*real*" knowledge. In other words, while computer generated data can make knowledge visible via data storage, retrieval and accessibility, the data obtained is not criticised (Sbarcea, 2001). Furthermore, the core enterprise has become increasingly virtual, including an influx of intellectual capital from new channels such as e-business and enterprise automation which frequently leave users overwhelmed and awash in irrelevant data. The end result is an unmanageable data dump (Borck, 2001). Moreover, companies end up spending a fortune erecting such items as massive data warehouses that go largely unutilised or else they implement a complex KM

application that nobody really needs and few end up using (Robb, 2003). Despite the apparent repetitious nature of the “*gathering*” of data, the crucial task in knowledge work is to utilise them by enacting them. Ellingsen and Monteiro (2003) suggest that a crucial aspect of this process, which more often than not tend to be glossed over in accounts of knowledge work, is the preservation of earlier accounts while at the same time adding new layers, new versions. In keeping up with the vast, accumulated body of knowledge representations of a project, it is crucial to craft, mould or narrate a more manageable trajectory that also serves as an “*organisational memory*”. Fogarty (2001) supports the efficient utilisation of data when he states that collecting as much data is one thing but the data collected should mean something. It should be helpful to the employee searching for information quickly without having to go through useless information. Therefore, a need to manage information strategically is required.

Knowledge or information at least, can be as much a liability as an asset when it is handled as haphazardly as it is by most companies. Organisations collect every bit of data that seems attractive than hang on to the resulting information mass forever for fear of deleting something that might eventually be important. That is one reason why IT staffs at large corporations are increasingly teaming up with record management specialists, who are experts in when to keep information and when to purge it (Fogarty, 2001). This is so that the proverbial dumping ground of information within the IT based systems are effectively managed so that the

employees would be able to store knowledge as well as access it easily whenever necessary.

KM is a hot new topic that everyone wants to know about. Yet the bulk of the work on KM to date has been on the technical side; how to build KM databases and technical infrastructures, and how to get people to use them. Malhotra (1997) believes that this approach does not take into account the context within which these systems operate, and the wide range of other non-technical systems that need to be in place to make the most of a firm's knowledge or intellectual capital. Without these 'soft' systems, knowledge workers are no better off. Technology gurus, as well as hardware and software vendors, are offering "*out-of-box solutions*" that are expected to enable KM. Such off-the-shelf solutions are expected to offer means for storing best practices devised by human experts in information databases. These databases, in turn, may be later used for crunching out "*pre-determined*" solutions based on "*pre-defined*" parameters (Malhotra, 1997). The convergent and consensus building emphasis of such systems may be adequate for stable and predictable organisational environments. However, such systems, based primarily on rules and procedures embedded in technology, specify the "*minutiae of machinery*" while disregarding how people in organisations actually go about acquiring, sharing and creating new knowledge. By considering the meaning of knowledge as "*unproblematic, predefined and prepackaged*" they ignore the human dimension of organisational knowledge creation (Malhotra, 1997). Furthermore, "*the problem of integration of knowledge...is not a problem of*

simply combining, sharing or making data commonly available. It is a problem of perspective taking in which the unique thought worlds of different communities of knowing are made visible and accessible to others” (Boland and Tenkasi, 1995, p. 39). As the ‘softer’ forms of IT continue to expand, particularly in fields such as KM, the problems of ‘technology’ will arguable revolve, even more clearly than before, upon the social context of their application especially when KM has been criticised for emphasising technology at the expense of the people (Newell et al., 2001). Therefore, any system that is implemented within an organisation needs to take into consideration the various aspects of knowledge sharing as well as efficient retrieval of stored knowledge within the databases as well as other methods of storage utilised by the company.

3.5. Knowledge Management Systems

3.5.1. Introduction

The subject of KMS is slightly different from that of KM. KM looks at the overall process of managing the knowledge within an organisation. However, KMS focuses more on the system utilised to manage the knowledge. One of the often-quoted goals of KMS is to share the knowledge normally acquired and held by separate individuals or groups, throughout an organisation in a bid to remain more competitive. Employees monitor, examine and analyse data in order to make critical

business decisions and then share it among each other. This habit of sharing knowledge could lead to competitive intelligence that creates knowledge in terms of insight and understanding or tacit knowledge in the user's heads. The outcome of competitive intelligence are decisions that improve and optimise business decisions (Du Toit, 2003). As discussed earlier, it is clear that one significant distinguishing factor as far as knowledge intensive firms are concerned is that the knowledge resides within the individuals comprising the firms. This thereby creates a danger that the knowledge capital of the firms can evaporate as its employees leave. This leads to attempts to codify such knowledge to turn it into explicit knowledge that can be retained within the organisation. These concerns are arguably one of the principal reasons for the current knowledge debate and concern with KMS (Crowther et. al., 2001).

Since we are dealing with both tacit and explicit knowledge, different creation and transfer processes are needed. Sbarcea (2001) tries to identify a number of key questions that are required in order to create these processes. These questions include:

- Who is the intended recipient or recipients of knowledge?
- What type of knowledge do they need to do their work?
- How will different capabilities and understandings affect their view of the usefulness of the knowledge?
- What is the task the recipients will be performing and how will they know what knowledge they need in order to act?

- What common knowledge is likely to be the outcome of the task?
- How will the knowledge be legitimated? i.e. will the claim to 'knowledge' be tested by the work process itself or is this just one way of validating what is 'knowledge'?

Lang et. al. (2002) add that design intent, rationale and history are important basic types of knowledge that KMS are required to capture, organise and manipulate to help generate new design knowledge. This knowledge could help them to be more efficient in their task of designing or creating something new. Lang et. al. further state that KM issues in conceptual design are centred on information gathering, and the capture and use of design knowledge. The capture and representation of design intent, design rationale and design history is required for the purpose of (a) capture of design expertise as a corporate asset, (b) reuse of design expertise to accelerate future designs, and (c) facilitating backtracking during complex and ill-defined and ill-structured design problems (Lang et. al., 2002). This step of capturing information or knowledge as well as deepening control in the documentation process has become critical to corporate competitiveness (McKinlay, 2002). However, these questions and conceptual designs fail to take into account how the organisations would carry out finding the answers to the questions as well as conduct the implementation of the KMS.

3.5.2. Definition of KMS

KMS are a complex process. Identifying usable knowledge can be very difficult. Often it requires sifting through vast knowledge bases of reusable, single-use, and non-relevant knowledge. Parikh (2001) advises that the focus should not be on the discovery of truth, but on effective actions and improved performance through knowledge recycling especially when KMS is not a stand-alone process. Therefore, it is clear that the intention of using a KMS is to arrive at codified knowledge so that this knowledge could be applied by anyone with access to the manual. Crowther et. al. (2001) state that an expert is not needed in order to apply the knowledge from a manual.

Reviews of the literature have come up with wide ranges of definitions for KMS and they include linking KMS to a variety of aspects from increasing performance to managerial information systems. Badii and Sharif (2003) look at “*integrating*” knowledge into the daily processes of the organisation rather than “*managing*” knowledge as it would restrict the fluidity and might decrease its potential of changing data into information. The views of the authors are still insufficient in explaining the concept of KMS as they talk about integrating knowledge to the information management system that still restricts the movement of knowledge in terms of how the information is derived and changed into knowledge. On the other hand, Clarke (2001) and Kim et. al. (2003) discuss about a strategy that links/integrates knowledge directly into the business processes of the organisation

to increase performance. Moreover, Kim et. al. look at it as a strategy to implement a KMS rather than a strategy for knowledge in the organisation. Interestingly, Du Toit (2003) discusses about gaining knowledge through corporate or business intelligence about competitors. However, this still needs the intelligence and knowledge of the workers therefore, it requires a KM strategy to manage them.

There are tendencies for authors of articles to link KMS to managerial systems and among others, these include Jang et. al. (2002) and Newell et. al. (2003). Jang et. al. look at using knowledge to enhance competitiveness, not by building KMS, but by using a strategy that utilises knowledge directly through process innovation. Newell et. al. on the other hand link KMS with other managerial info systems i.e. Enterprise Resource Planning (ERP) to increase efficiency while still remaining flexible through enhanced information capture, best business design practice and effective utilisation of knowledge within organisations. Newell et. al. (2003) promote ERP systems as processes that will improve organisational efficiency through both enhanced information capture and organisational redesign around defined best practices.

Given the importance of knowledge, systems that are developed and implemented in organisations that aim to facilitate the sharing and integration of knowledge in a variety of industries are reviewed. Studies by McKinlay (2000, 2002) reveal insight into KMS being utilised within a pharmaceutical company. McKinlay writes about three main systems being utilised by the pharmaceutical

company that include 'Lessons Learned', Warehouse and an Electronic Café. As mentioned earlier, 'Lessons Learned' is a database of tips and information gained from debriefing after a project whereas Warehouse is a groupware package. The Electronic Café on the other hand, is a set of linked websites based on the stories of individuals linked to the drug development programmes of the respective pharmaceutical company (McKinlay, 2002). A combination in the usage of the 'Lessons Learned', the Warehouse and the Electronic Café is hoped to increase the knowledge repository of the employees within the organisation especially in the area of drug development. This is especially crucial to the field of pharmaceuticals since achieving faster 'molecule to market' stage both reaps huge financial gains through longer patent protection and could enlarge the pharmaceutical company's portfolio of commercially attractive drugs (McKinlay, 2000). However, it should be taken into consideration that all these three systems are very much technologically dependent and would still need the input of the employees in terms of their knowledge, expertise and information in order for the systems to be considered a success.

Researches by Glaser (2002) and Wickramasinghe and Mills (2002) also report on KMS in the health industry. Glaser focuses on KMS in hospitals based on drug administration that has patients' details and properties of drugs in order to cut risks of mistakes while Wickramasinghe and Mills look at the overall storing of medical records. The software-based systems will cross-reference the prescription with the patient's case notes of symptoms and diagnoses and check if the drugs prescribed

are suitable for the patient. It cuts risks of drug-administration mistakes and it could be a matter of life and death which is a way of avoiding tragic mistakes as mentioned by Hoopes and Postrel (1999). Cappabianca (2002) and Patton and Low (2002) also present a similar concept of KMS as a tool for sharing information in the military. Cappabianca looks at the process in the United States Air Force whereby efficient KM as well as knowledge sharing among departments can lead to better financial management within organisations while Patton and Low report at sharing data and information between government agencies to avoid terrorist attacks. Moreover, studies in the educational sector are conducted by Rao (2002) who looks at KMS in educational departments through intranets where students, staff and administration staff can access and share ideas as well as information. These authors present a description on the benefits of having an effective KM and an efficient KMS within each of the respective organisations. However, they fail to touch upon a more interesting aspect and that is the issues relating to the implementation of the KMS within the organisations.

Effective KMS implementation that forgoes moral hazards i.e. encouraging individual's willingness to share, and can help in creating an active learning environment is presented by De Loo (2002). De Loo believes that through action learning, employees and managers alike could sit down to share thought processes and ideas into solving problems, therefore creating organisational growth. Action learning could be used when an organisation is faced with real-life problems for which no clear-cut solutions exist. It can be described as a social process of

managers and workers getting together to review and interpret their experiences in order to understand the processes that have led them to solve a problem. The reflections made by workers and managers, which constitute a process by means of which a solution to a problem can be generated, may help them to solve similar or even very different types of problems they may encounter in the future (De Loo, 2002). Therefore, top management policies should be directed towards knowledge sharing, by setting up appropriate organisational structures, cultures, and motivation schemes.

Another interesting article presents the concept of a KM Reference model (Abou-Zeid, 2002). This model has three layers, the first layer involving what knowledge is available within the organisation i.e. the knowledge of the employees. The second layer involves the processes of knowledge acquisition, application, storage and dissemination while the third layer involves the resources available for the process to run smoothly i.e. IT or databases. However, this model can only be achieved if there is a proper knowledge culture implemented within the organisation. Interestingly, Abou-Zeid does not describe what a 'proper knowledge culture' should be. Other authors that present the concept of layering of knowledge are Ellingsen and Monteiro (2003) who talk about creating sort of a timeline to the data compiled to make a working knowledge. These articles reviewed above proposed quite interesting models on KMS but they fail to consider the realistic problems that might be faced by the organisations in implementing the models.

Some authors also associate KMS with IT. Clapperton (2002) studies KMS as a system that filters the e-mails looking for key words that are related to any ideas or interests of the person who owns the e-mail address and stores them separately from other mail. The system then becomes sort of like a reference-based system. Johnston (2003) on the other hand, mentions that HR personnel should be more IT literate to be able to handle more knowledge-based software for KMS. Plass and Salisbury (2002) research on a design model based on computer aided technology as a KMS. They postulate that their design model will be able to keep up with changes in the need and information in the system as well as how people can update their information after accessing the system to solve a problem. However, this will depend very much on how much people update their information as well as how easy the system is to run. Essentially, KMS uses some combination of the following technologies: the Internet, intranets, extranets, browsers, data warehouses, data filters, data mining, client server, multimedia, groupware and software agents to systematically facilitate and enable the capturing, storing and dissemination of knowledge across the organisation (Galup et. al., 2002; Roy and Roy, 2002; Wickramasinghe and Mills, 2002; Morejon and Gros, 2003). By having an efficient system, Fox (2002) states that we can save time and money having to ask the same questions over and over again to the same group of people when we can just access the answers from the system. However, the effectiveness of these IT systems implemented still requires the input from all parties to avoid repetition of asking the same questions and this participation depends largely on the motivation of the employees involved within the organisation.

Another portrayal of KMS proposed by numerous authors is KMS as a means for increasing intellectual capital individually or in an organisation. Zhou and Fink (2003) question which is more important; individual tacit knowledge, explicit knowledge or organisational knowledge as a whole? They also look at linking intellectual capital with KM to give an overall added value to the organisation. However Zhou and Fink only give a theoretical model through an intellectual capital web where different factors are integrated with each other and not an actual empirical study on the matter. Truch (2001) also discusses individual intellectual capital but proposes that employees should become more self-sufficient to share and learn new knowledge therefore making personal KM become more prevalent. However, Truch fails to indicate how the employees could achieve this level of self-sufficiency in order to increase personal KM.

On an organisational level, the KM skills are mainly being exploited by large organisations such as BP, Shell, BAE Systems and Ford. They recognise the benefits of sharing knowledge and creating repositories of it from inside and outside their organisations. Other organisations, such as the World Bank, attempt to develop systematic processes for recording the knowledge of employees on the verge of retirement. With a combination of video interviews and hyperlinks to important documents and reports, senior practitioners can impart their experience in a rich multimedia environment that can be shared with others. By capturing such insights, the organisation is able to preserve its memory and share it with succeeding generations of employees (Lesser and Prusak, 2001). Furthermore, there

is now a growing recognition of the value of establishing such practices within small and medium sized enterprises. Recent studies by the DTI and European research bodies recognise that small firms face problems in sharing know-how and retaining knowledge when experienced staff move on or retire. They also need to develop skills for turning tacit knowledge within company into an explicit, accessible form for new project and product development (Davis, 2001). Maholtra (1997) also lists a variety of organisations that has KM initiatives which includes Andersen's Knowledge Xchange, Booz Allen & Hamilton's Knowledge On-Line, CAP Gemini's Knowledge Galaxy, Ernst & Young's Centre for Business Knowledge and Monsanto's Knowledge Management Architecture but it is unsure as to how updated this is.

After all that has been said and done about KMS, there still lies the question about whether or not the employees will use the system. Most companies that are trying to manage the knowledge process are quickly realising that information input does not necessarily translate into knowledge output. Building knowledge-based systems, no matter how ingenious, does not mean that people will use them, or, if they do use them, that the benefits will justify the costs (Hope and Hope, 1997). Technology platforms may assist, but no technology will stimulate the flow of knowledge without attention to the cultural and organisational contexts in which people are encouraged to develop and share their knowledge (Clarke, 2001). Furthermore, there are many difficulties in building a useful knowledge-based system, including difficulty in capturing knowledge, lack of robustness and

flexibility. inability to provide deep explanations, difficulties in verification, little learning from experience and computational efficiency (Hicks, 2003).

Although it is easy to discuss managing knowledge and creating conducive environments for KM, there are many challenges involved in managing knowledge and there is no guarantee that the process or system will work without efficient implementation. But how does an organisation know that they have a viable working system? There really is no means to measure the effectiveness of KM but one of the suggested methods of measuring effectiveness of KM is the end of the pipeline, producing things that are ready to generate revenue. These can include new products, extensions of product lines, and new patents or better organisation and utilisation of existing patents (Mullin, 2001). However, the question remains on whether or not the employees can be persuaded to contribute to the KM of the organisation by willingly sharing their knowledge, efficiently storing, manipulating, and utilising the learned knowledge within the company. KM is a complex and problematic aspect of knowledge and the success of the KM within an organisation depend very much on a variety of issues. These issues ranging from what knowledge is needed within the company to how the company will efficiently retrieve knowledge already stored within the organisation need to be taken into account when considering any systems or processes that would help in the KM of the organisation.

CHAPTER 4: RESEARCH METHODOLOGY

4.1. Introduction

In this chapter, the research methodology undertaken during this research will be described. This chapter will identify how the topic for the research is chosen, what the research questions of this thesis are, and the debates surrounding the research methods available for conducting a study. Furthermore, the rationale for choosing a specific research method, the subjects chosen for the study, how the data collection is conducted and the data analysed is also presented.

4.2. Topic Search

From the initial literature review, it is found that there are a variety of discussions surrounding the issue of knowledge. Besides knowledge workers, the other main issues include the debates regarding the knowledge economy, knowledge work and knowledge management in the workplace. Through reading the literature available on the subject of knowledge, there are many articles that mention the importance of knowledge in the current economy (Stiglitz, 1999; Sbarcea, 2001; McKinlay, 2002) and that companies are beginning to realise the importance of knowledge and information to the economic growth of the organisation (Harrison and Leitch, 2000; Puddy et. al., 2001; Du Toit, 2003).

Furthermore, there is the proposition that knowledge has to be utilised efficiently in order for the company to remain successful in the current market (Wikström and Normann, 1994; Jacques, 2000). The concept of knowledge as a resource as well as the utilisation of employees from their knowledge rather than just their skill led to the next step in investigating the concept of KM.

During the literature review, the distinction between explicit and tacit knowledge emerged as a central concept (Nonaka and Takeuchi, 1995). This raised questions about whether the tacit knowledge of employees is recognised as important within an organisation and if they are being fully utilised. Further issues arose as to what methods the companies use to manage the knowledge of their employees as well as the knowledge existing within the organisation. This led to a detailed literature review search that uncovered a wide range of articles related to the benefits of managing knowledge, ranging from better competitive edge over the organisations' competitors (Stiglitz, 1999) to avoiding mistakes at the workplace (Hoopes and Postrel, 1999).

However, although many of the articles support the KM process within companies, there are also articles that raise some issues surrounding the implementation of KM procedures within organisations. These problems include difficulty in trying to identify necessary knowledge within the company (Galup et. al., 2002), how to acquire and retain tacit knowledge which is vague and difficult to quantify (Crowther et. al., 2001), the reluctance of the employees to share

knowledge (Truch, 2001) as well as the problem of trying to efficiently utilise stored knowledge (Borck, 2001). From reviewing these articles that discuss the benefits and problematic issues of KM, it was then decided that research into the issues surrounding the knowledge management policies and procedures of employees within an organisation is the best course of direction for the thesis in discovering new aspects and issues of knowledge and knowledge management.

4.3. Research Questions

As discussed in Chapter Two, the literature review on knowledge states the importance of knowledge as a resource within an organisation. Besides considering the traditional views of resource, organisations are becoming increasingly aware of their employees and their knowledge as an important aspect of their company, especially when organisations utilise and sell knowledge in some form or another. This awareness is making knowledge an important component of the company's management strategies (Wikström and Normann, 1994). However, the many definitions of knowledge are adding complexity in the challenges for organisations in managing knowledge.

From the previous chapters, we can see that knowledge is referred to as many things. It is defined abstractly as an intricacy of tacit skills (Blackler, 1993) or as a free-flowing entity that moves between and across organisational boundaries

(Sbarcea, 2001), to the more cognitive definition offered by Bertels and Savage (1999) and Truch (2001) that state that knowledge consists of the people's skills, competencies and ideas. As to the concept of knowledge as an entity, Kriener (1992) also mentions that knowledge is constantly reproduced while Augier and Vendelo (1999) propose that knowledge is a non-consumable resource. Furthermore, knowledge is always changing and the ability to change knowledge becomes a source of power for the organisations (Jacques, 2001). So it would seem that knowledge is becoming an intellectual resource for organisations besides the traditional capital associated with organisations. Therefore, in this current volatile economic market, it would be interesting to discover if organisations are aware of the importance of knowledge as a resource.

In addition to recognising knowledge as a resource, organisations must be able to identify and combine knowledge appropriate for diagnosing and solving problems that confront them (Fincham et. al., 1994). The identification of knowledge is especially important since different companies need different types of knowledge, and companies tend to be a systematic world where people of diverse backgrounds and capabilities, exist and work together (Sbarcea, 2001). Moreover, effective identification of what knowledge is needed within the organisation would allow the company to hire the right kind of employees with the desired knowledge and skills (Buhler, 2001). However, according to Galup et. al. (2002), this makes managing knowledge a challenge because organisations would first of all have to identify the location of all needed knowledge and then determine the easiest way to retrieve it.

Before the emergence of the knowledge economy, most management rarely considered employees beyond the scope of using their skills and expertise. With the rise of the knowledge economy, companies are feeling the pressure to offer quality services and products to their clients. Employees are also possibly pressured into contributing more in terms of their knowledge along with their expertise and skills in order for the organisation to remain competitive. Stiglitz (1999) mentions that those with the ability to produce knowledge and information more efficiently than others would have the competitive advantage over other organisations while Sbarcea (2001) states that knowledge gained by experience is becoming increasingly prized by organisations. Experienced employees are considered more valuable to the company as knowledge is deemed as power and efficient utilisation of knowledge includes encouraging employees to gain more knowledge. Therefore, it would be interesting to discover whether employees are being encouraged to become more knowledgeable as the ability to draw upon the skills and expertise of the employees is becoming an important factor to corporate management (McKinlay, 2002).

An interesting point that is stated in various articles is that the value of knowledge depends on how well management can utilise the knowledge within the organisation (Roos and van Krogh, 1992; Brailsford, 2001; Clarke, 2001) and that knowledge increases in value if shared within the organisation (Roos and van Krogh, 1992). Jang et. al. (2002), also add by saying that the value of knowledge is capitalised when the knowledge is distributed, shared, and internalised by the

members in charge of the task. Moreover, there is the benefit of sharing knowledge in order to avoid mistakes within the organisations as proposed by Hoopes and Postrel (1999). Furthermore, if the organisation is to become more efficient, the literature review reveals that companies should encourage employees to share knowledge among each other. In addition, methods of sharing knowledge which includes sharing knowledge through social interaction or networking (Bertels and Savage, 1999; Foley, 2001; Lesser and Prusak, 2001; Mariotti and Delbridge, 2001; Puddy et. al., 2001; McKinlay, 2002; Newell et. al., 2003) as well as through awarding bonuses, share plans and other awards for departing employees to share their knowledge before leaving the organisation (Alvesson et. al., 2001; Hall, 2001; Lesser and Prusak, 2001) is also mentioned in the literature review. However, the employees may be reluctant to share their knowledge due to the fear in loss of 'power' if they shared their knowledge in case they become dispensable (Hope and Hope, 1997; Truch, 2001; Warner, 2001) and this might lead to knowledge-hoarding (Stiglitz, 1999). This could be a crucial undertaking by organisations to achieve a fine balance between encouraging their employees to share knowledge as well as convince them that the employees are important to the survival of the organisation. As McKinlay (2000) indicates, the need to capture, utilise, employ and harness knowledge forms the basis of a knowledge management strategy, thus it would be interesting to discover how the organisations went about solving this problem of managing knowledge.

Another problem of sharing knowledge which could be faced by the company is the challenge of encouraging and motivating employees to share their knowledge by turning their tacit knowledge into explicit knowledge (Zhou and Fink, 2003). The focus on the conversion of tacit to explicit knowledge is following in the footsteps of Nonaka and Takeuchi (1995) who mention that knowledge management involves the conversion of tacit knowledge into explicit knowledge. Furthermore, Breu et. al. (2000) state that there is value in utilising intangible assets. Therein lies one of the challenges of tacit knowledge, in how to manage it (Stiglitz, 1999; Scarbrough, 2003), especially when there is a lack of systematic research in tacit knowledge due to ill-defined concepts of tacit knowledge (Harrison and Leitch, 2000). Furthermore, when there is tacit knowledge to consider, it will be difficult to codify the tacit knowledge of the employees and this leads to a difficulty in studying organisational knowledge (Kotylar and Saks, 2001). However, following the discussions of tacit knowledge, the question remains on whether the organisations actually utilise the tacit knowledge of their employees.

Through the reading of the literature available in the area of knowledge management in Chapter Three, the concept of retention of knowledge became more interesting. Since knowledge is within the employees, there is the question of retaining the knowledge within the organisation if and when the employee is to leave the company. One of the factors noted during the literature review that is linked to why retaining knowledge is so important is that the changes in organisational profession are leading to challenges in managing experts such as

managers, administrators, engineers (Hull, 2000). Professionals nowadays also go for higher education similar to the traditional experts, and will acquire their qualification at the workplace but will depend less on formal education (Alvesson, 1993). Furthermore, people are now rarely working in one company from the time they begin their working career until their retirement day. With the knowledge gained at the workplace, these professionals are more liable to change jobs which offers them more challenges, responsibilities or even better rewards. Therefore, employees might leave the organisation as there is no loyalty to the company. Some companies also have to deal with downsizing through redundancy policies and early-retirements which means a loss of employees with the most experience. All of which could lead to a loss in the overall knowledge base of the organisation (Lesser and Prusack, 2001).

One problem that is raised during the discussions in the literature review regarding knowledge retention is the issue of data-dumping. Organisations are becoming overwhelmed with intellectual capital which leaves the company with irrelevant data and this could lead to 'data dumping' (Borck, 2001). This means that companies have the added pressure of trying to manage all knowledge stored to prevent it from becoming a dumping ground of information (Fogarty, 2001). The literature review reveals that in order for a company to remain competitive in the active market, there should be efficient utilisation of the knowledge within the employees as well as the company (Sbarcea, 2001). Therefore, not only do organisations have to know how to store information but their process of KM has to

know how to retrieve and utilise stored information as well (Newell et. al., 2001). However, it would seem that currently, there are difficulties in building a robust knowledge-based system capable of capturing and utilising knowledge (Hicks, 2003) due to the complexities of managing knowledge as well as being a long-term programme (Hope and Hope, 1997).

At the current moment, KM is becoming more electronically based due to technological advancements (Ciborra and Patriotta, 1996; Condon, 1999; Kotylar and Saks, 2001) but it should be remembered that IT should not be synonymously linked with KM as a whole and that IT should only be there to assist KM. As it is, there are two broad schools of approaches to managing knowledge; the first being the informational school where knowledge comprises of objects that can be identified within information systems such as data warehousing, skill-banks, browser-based portals, and web-based personal profiles (Buhler, 2001; Gonsalves and Zaino, 2001; Moore, 2001; Tillet, 2001). But can these systems be effectively used to manage knowledge or are they an organisation's answer to a KM strategy? The second approach is the behavioural school where KM is considered to be the dynamics process within which skills and knowledge are constantly changing such as knowledge creation and adaptation (Hope and Hope, 1997) so what policies do the organisations have to encourage knowledge creation and utilisation? Therefore, it would be interesting to discover if the organisations follow an informational or behavioural school approach in managing knowledge by seeing which aspect they focus more on. Do the organisations focus more on implementing informational

systems to assist in their KM process or do they focus more on the behavioural aspect of employees creating, applying, storing and sharing knowledge?

Based on the background reading undertaken to discover more about knowledge and the management of knowledge, some gaps within the literature were found that needed following up. Especially when most of the articles discuss about the need for efficient knowledge management and yet mention so little about the actual KM process within the organisation. These articles propose the benefits of maintaining an intellectual capital (Truch, 2001; Fox, 2002; Zhou and Fink, 2003) but they still fail to discuss issues in maintaining or implementing an intellectual capital. Furthermore, the problematic issues related to KM i.e. the importance of tacit knowledge, the necessary knowledge needed within the organisation, the existence of knowledge sharing, the policies surrounding knowledge retention and the possible problems of data-dumping are usually raised but never really researched upon by the articles available.

By looking back at the research objectives, the intention of this thesis is to study the issues surrounding the identification, acquisition, utilisation, retention and dissemination of knowledge within the organisation as well as any supportive systems within the company that will assist in the implementation of a KM strategy. These intentions, along with the gaps in the literature review regarding possible problems with the KM process within an organisation which includes the utilisation

of knowledge or the effective retrieval of stored knowledge lead to a list of research questions that this study wishes to explore further during the research:

- What methods do the organisations use to identify necessary knowledge and encourage their employees to gain more knowledge?
- What are the policies and procedures that form the KM strategies implemented within the organisations and if so, do they follow an informational or behavioural approach?
- What are the ways in which organisations conduct and encourage knowledge sharing, knowledge retention and utilisation of stored knowledge within their companies?
- What are the benefits and shortcomings relating to the KM processes that are being faced by the organisations?
- How do the HR systems assist in the KM process and what is the relative weight of the systems in supporting the implementation of the KM strategy within the organisations?

Therefore, this research aims to discover how organisations recognise knowledge within their company, how they encourage the gaining and sharing of knowledge among their staff and finally how the companies retain the knowledge within their organisation. Moreover, the research would also like to uncover any problems that might be faced by the organisations while managing the knowledge of their employees and any other factors that might be involved with implementing a KM strategy within the companies.

4.4. Research Methods

There is a bit of difficulty in deciding which research method should be used to carry out the research. Burns (2000) states that, "*the choice of which research method is used should be based on an informed understanding of the suitability of that method for that particular research*" (pg. 391). This research wishes to study the concept of knowledge as a resource within an organisation. Furthermore, the study should also show if and how employees are encouraged to gain, share and store knowledge within their organisation. Moreover, the various policies that might be implemented within the organisation that encouraged the effective utilisation of knowledge of the employees would also be researched.

Since the research is to discover how organisations manage the knowledge of their employees overall, a system that would allow the discovery of these answers is needed. Therefore, the two main methods of research, which are the quantitative and the qualitative research methods as a means for uncovering the necessary data, is considered. The features of the research, as well as the suitability of the method for the research along with the benefits and limitations of each research method warrants deliberation before making a decision.

4.4.1. Quantitative Method

First of all, the quantitative method of research is looked at. According to Creswell (2003), quantitative research involves complex experiments with many variables and treatments. Furthermore, quantitative research collects data on predetermined instruments that yield statistical data. Nachmias and Nachmias (1996) also add that researchers using the quantitative methods deal directly with operationalisation, the manipulation of empirical variables, prediction and testing. Therefore, *“quantitative research places great emphasis on methodology, on procedure, and on statistical measures of validity”* (Nachmias and Nachmias, 1996, pp. 554). There are a variety of methods that come under the umbrella of quantitative research and this includes among others, surveys and experiments (Silverman, 2002; Creswell, 2003). Table 4.1, adapted by Silverman (2002), shows the methods of quantitative research.

Table 4.1 Methods of Quantitative Research

Method	Features	Advantages
Social Survey	Random samples Measured variables	Representative Tests hypotheses
Experiment	Experimental stimulus 'Control group' not exposed to stimulus	Precise measurement
Official statistics	Analysis of previously collected data	Large datasets
'Structured' observation	Observations recorded on predetermined 'schedule'	Reliability of observations
Content analysis	Predetermined categories used to count content of mass media products	Reliability of measures

(Silverman, 2002, pg. 3)

Despite the simplicity and systematic approach in many of the methods in quantitative research, there are some limitations in using these methods. Silverman (2002) lists a variety of limitations and these include among others:

- Quantitative research can involve little or no contact with people of the 'field'.
- Statistical correlations may be based upon 'variables' that are arbitrarily defined.
- The pursuit of 'measurable' phenomena can mean that unperceived values creep into research.
- A purely statistical logic can make the development of hypotheses a trivial matter and fail to help in generating hypotheses from data.

Overall, although quantitative research may be systematic and offers an orderly approach towards data collection, it fails to consider the 'softer' aspect of society which deals with human behaviour that cannot be discovered through controlling variables and stimuli.

4.4.2. Qualitative Method

A contrast to the quantitative research methods is the qualitative research methods. The methods used by qualitative researchers exemplify a common belief that they can provide a 'deeper' understanding of social phenomena that might not be obtained from purely quantitative data (Silverman, 2002). Miles and Huberman

(1994) also state that qualitative data are a *“source of well-grounded, rich descriptions and explanations of processes in identifiable local contexts”* (pg. 1). It is also suggested that the chronological flow of events of everyday life of individuals, groups, societies and organisations where more fruitful explanations could be derived can be preserved by using qualitative data (Miles and Huberman, 1994). Since one of the objectives of this research is to get a deeper understanding into the issues surrounding the organisational management process relating to knowledge, the qualitative approach seemed to be the best option. Furthermore, the in-depth understanding of society as it happens as well as the flow of events within the company could help the study come up with a more conceptual frameworks of reality as Burns (2000) mentions *“since human judgement is so profoundly a part of every human act, the supposed objectivity of science is, in fact, a delusion”* (pg. 10).

Qualitative researchers would therefore study life as it happens without trying to change or control the situation as in quantitative methods and this is most suitable for this research as it would mean a better understanding of the framework of the KM process within the company. Burns (2000) proposes that while scientific beliefs may have traditionally continued unquestioned for many years, the human element has become increasingly recognised as a critical and determining factor in the definition of truth and knowledge. Burns further adds that with the qualitative method, researchers tend not to have hypotheses but rather accept and study the natural scheme of things (2000). Furthermore, Miles and Huberman (1994) write

that qualitative researchers should study the explicit and implicit rules of the situation that is being researched. This is agreed by Nachmias and Nachmias (1996) who add that researchers using qualitative methods attempt to understand behaviour and institutions by getting to know the people involved as well as their values, rituals, symbols, beliefs and emotions. As quoted by Creswell, *“qualitative research is an inquiry process of understanding based on distinct methodological traditions of inquiry that explore a social or human problem. The researcher builds a complex, holistic picture, analyzes words, reports detailed views of informants, and conducts the study in a natural setting”* (1998, pg. 15). Creswell’s quote is supported by Burns (2000) who indicates that qualitative research places stress on the validity of multiple meaning structures and holistic analysis as compared to the statistical compartmentalisation of quantitative research. As there is no hypothesis in this research regarding the issues surrounding knowledge management within an organisation, the qualitative approach suited the study in terms of finding out actual occurrences within the company.

As it might be necessary to gain more insight into the natural setting of the participant, the qualitative researcher often goes to the site of the participant to conduct the research and collect data without disturbing the site any more than necessary. Whilst carrying out the research, researchers also try to build a rapport and credibility with the individuals. In this way, the researcher using the qualitative method is able to develop a level of detail about the individual or place as well as to be highly involved in the actual experiences of the participants (Creswell, 2003).

One of the objectives of this study is to discover the HR support systems that assist in the management of employee knowledge and therefore, the qualitative research would help to discover the social and human element within the companies chosen for the research.

One of the benefits of the qualitative research method is that it could offer a more flexible approach to collecting data. Researchers could collect open-ended, emerging data about what people say and do with the primary intent of developing themes from the data to understand events from the viewpoints of the participants (Burns, 2000; Creswell, 2003). Furthermore, qualitative research helps researchers to discover new integration, as well as generate or revise conceptual frameworks (Miles and Huberman, 1994). Therefore, *“the strength of qualitative studies lies in a descriptive or exploratory research that stresses the importance of context and the subject’s frame of reference”* (Burns, 2000, pg. 391). This would be extremely helpful in this research as the study of knowledge, which is a topic that is difficult to conceptualise would at least be able to be studied in a descriptive manner.

Although there is a lot to be advocated about the benefits of the qualitative method, there are also some shortcomings of the research method that need to be considered. These issues include the amount of time spent on data collection, the time spent on data analysis, a possibility of researcher bias due to the close relationship with the participants, a possibility of data overload, as well as the issue of validity and reliability of the method (Miles and Huberman, 1994; Burns, 2000;

Silverman, 2000). Since the qualitative research method requires the researcher to spend a larger amount of time with the participant as compared to the quantitative method, more time is needed for data collection; months, even years can be needed in order to collect the necessary data. Burns (2000) states that, "*there is a critical need for the researcher to spend a considerable amount of time in the research setting in order to examine, holistically and aggregately, the interactions, reactions and activities of subjects*" (pg. 13). Considering that this study intends to discover the natural knowledge management process within an organisation, time and energy would need to be spent within the organisation in order to discover the true overall picture of the company attitudes towards employees and their knowledge.

The issue of data analysis is also another criticism of the qualitative method. First of all, there is the amount of time that might be needed in analysing and coding data that is mostly subjective rather than objective (Miles and Huberman, 1994). This analysis of qualitative data could include transcribing recorded interviews and observations which although captures the spoken responses of the respondents, the reliability of the interpretation of transcripts may be gravely weakened by a failure to record apparently trivial, but often crucial, pauses and overlaps (Silverman, 2000).

Another aspect that has to be considered when deciding whether to use the qualitative research method is the possible bias, from the viewpoints of both researcher and participants (Miles and Huberman, 1994). Due to the intimacy of the

researcher-participant relationships during the research, there is a possibility that the researcher's presence itself will have profound reactive effects on the subjects during the study (Burns, 2000). Furthermore, there is the promise of anonymity from the researcher, which could make the evaluator's task difficult in terms of the preparation and presentation of the results (Burns, 2000).

Finally, an important criticism about the qualitative method is the reliability and the validity of the research. Basically, for a research to be considered reliable, it is a matter of consistency whereby other researchers should be able to obtain the same results if they are to repeat the same research. Furthermore, validity is a matter of 'truth' where according to Silverman (2000), there can be doubts about the validity of an explanation due to a variety of reasons including extended immersion in the field which could lead to selective results being portrayed. Due to the subjective nature of qualitative data and its origin in single contexts, it is difficult to apply conventional standards of reliability and validity as in the scientific, experimental statistics that is commonly used in quantitative research (Burns, 2000; Silverman, 2001). It would be difficult to replicate interviews, contexts, situations and interactions to any extent as well as to control what can or cannot be revealed in the results for the results to be considered truthful (Burns, 2000). However, if another researcher is to repeat the same research with the same questionnaire and with the same set of subjects, although the results would not be verbatim, the general outcome of the results would indicate the same situation faced by the subjects. The research would also still be considered systematic by utilising the same questions

and repeating the same experiment. Therefore, it is difficult when using the qualitative research methods to measure the reliability and validity of the research results as compared to the systematic approach of the quantitative methods but nevertheless, they would still produce the same results, thus making the research reliable and valid.

However, since this research aims to study the day-to-day process of management within the organisation rather than in a controlled environment, a systematic, laboratory approach of the quantitative method just would not be suitable for this particular research. Overall, the qualitative research method would give an opportunity to study realistically how the knowledge within an organisation would be identified as well as how employees are motivated to increase their knowledge. Moreover, the issues surround the implementation of a KM strategy within an organisation would be better understood by using the free-flowing realistic study of the qualitative research method. Furthermore, as one of the objectives of this research is to discover how knowledge is retained and disseminated within the organisation, the qualitative method would allow the collection of emerging data first hand. Finally, the qualitative research method would be useful to get a realistic view of the functions within the organisation involving the HR support systems as well as overall KM processes without any controlling elements forcing it into a restrictive environment. Therefore, the qualitative method is chosen for its feasibility and compatibility in conducting this research on KM strategies within organisations in a natural setting.

4.4.3. Quantitative vs. Qualitative

With all the characteristics mentioned by the various authors, there is a strong contrast between the quantitative and qualitative methods of research. Table 4.2. by Halfpenny (1979) demonstrates the different features of the Quantitative and Qualitative methods.

Table 4.2: Claimed features of Qualitative and Quantitative methods

Quantitative	Qualitative
Hard	Soft
Fixed	Flexible
Objective	Subjective
Value-Free	Political
Survey	Case Study
Hypothesis Testing	Speculative
Abstract	Grounded

Halfpenny (1979) cited by Silverman (2001, pg. 26)

From the table above, it can be inferred that qualitative research methods take a more subjective and softer approach to research compared to the quantitative method that is more rigid and controlled. Furthermore, since the qualitative researcher is concerned with intentions in the interpretation of the results, quantitative analysis is not sensitive enough (Mostyn, 1985). This perspective is agreed by Burns (2000) who says that *“qualitative methods attempt to capture and understand individual definitions, descriptions and meanings of events. Quantitative methods, on the other hand, count and measure occurrences”* (pg. 388).

After considering the differences between the two research methods, the research questions of the thesis is referred to decide upon which method would be most suitable as Yin (2003) mentions that the research methods that is chosen depends on the research questions. As this research wanted to conduct an in-depth study on the KM strategy within the organisation, the qualitative research method seemed to be the most appropriate choice of methods. This way, the KM process within the company could be studied without the need to control any variables.

4.4.4. Interviews

One of the main methods under the umbrella of a qualitative research approach is the interview method. According to various authors, an interview involves two or more people meeting face-to-face (or the telephone may be used) in order for one party to learn something from another party i.e. to elicit opinions or views, or to meet to exchange information (Brenner et. al., 1985; Glesne and Peshkin, 1992; Burns, 2000). An interview is conducted on a more formal basis where the interviewer will ask about that which they cannot see or can no longer see, for example, when they would like to search for an explanation for why something happened (Glesne and Peshkin, 1985). The ability to explore alternative explanations for that which cannot be observed directly is one of the strengths of interviewing in a qualitative inquiry. This is useful in studying in detail an

informant's perception regarding a specific person, event or process (Glesne and Peshkin, 1985, Burns, 2000).

There are a variety of other benefits of using the interview method and this includes, as modified from Brenner et. al. (1985), Nachmias and Nachmias (1996) and Burns (2000):

- It has greater flexibility in the questioning process - it allows both parties to explore the meaning of the questions and answers involved. Furthermore, any misunderstandings on the part of the interviewer or the interviewee can be checked immediately in a way that is just not possible when questionnaires are being completed, or tests are being performed.
- It gives the researcher a greater control over the interview situation - the interviewer can press for additional information or probe further when a response seems incomplete. The interviewer is also able to control the sequence of the items as the respondent cannot look ahead and anticipate trends in the enquiries.
- It has a high response rate as compared to postal questionnaire - people are more willing to talk and react verbally than to write responses to questions. Furthermore, a face-to-face interaction assists in the establishment of rapport and a higher level of motivation among respondents. An interview would also give rapid and immediate response from the subject.
- The interview survey allows the interviewer to collect supplementary information about the respondent - a useful method when extensive data is

required on a small number of complex topics. The interviewer also has the opportunity to observe the subject's non-verbal communication and the total situation in which they are responding.

- Helps to gain information from some minority groups - this approach is useful in obtaining responses from people who would find a written response impossible, such as very young children, the elderly, the illiterate and some disabled groups.

However, along with the benefits of the interview method comes the limitations that need to be noted and considered so that it can be minimised when conducting the research. These limitations include:

- Higher cost - in the sense of travelling to the organisations, time spent interviewing the respondents and if the questions are open-ended, the cost of recording and processing the information. Therefore, only a limited number of subjects can be interviewed.
- Interviewer bias - the appearance, the tone of voice, question wording and so forth of the interviewer may affect the respondent. The interviewer could become familiar with the respondent and therefore, could affect the analysis of the data.
- Lack of anonymity - the respondent may feel threatened or intimidated by the interviewer especially if some of the questions are of a sensitive nature. The respondents might feel that they are being 'put-on-the-spot'.

- Reliability and validity – this is due to the assumption that qualitative research is not reliable or valid. One of the reasons that most researchers are unwilling to embrace the interview as a research procedure has been the doubts cast on it in the early part of the twentieth century because of biases and unreliability. Coupled with the fact that many researchers argue that for a research to be considered reliable or valid means that the research should be able to be repeated in exactly the same manner and setting and obtain the same results. Since it is difficult to repeat the interviews again with the same subjects in exactly the same settings, it is assumed by some to be unreliable or valid.
- Difficulty in finding skilled and trained interviewers with appropriate interpersonal skills – this could lead to questions not being asked properly and unnecessary data being collected.
- Difficulty in analysing data - flexibility afforded by unstructured interviews may generate difficulties when attempts are made to categorise and evaluate responses.

(Modified from Brenner et al., 1985; Nachmias and Nachmias, 1996; and Burns, 2000).

Despite the awareness of the limitations of the interview, it is decided that by conducting interviews with the subjects, a deeper insight into the KM process within the organisation could be gained. Furthermore, as interviews allow on-the-spot directness to information and a general speed of response not available in other methods (Brenner et. al., 1985), this research method would help in gaining the data

necessary for getting an overall understanding of the nature of the organisation in relation to KM. Moreover, the subject of validity and reliability could be overcome by the notion that if the experiment is to be repeated using the same questions, thus making it reliable, the overall results would indicate the same as the previous experiment, making it valid.

4.4.5. Multiple-Case Study Method

It is decided that the case study method would be used that would encompass interviews with the participants as the primary source of data collection, and printed material about the organisations and their industries as the secondary source of data. The reason for choosing the case study method is partly influenced by a quote by Burns (2000) who states that “*case study is used to gain in-depth understanding replete with meaning for the subject, focusing on process rather than outcome, on discovery rather than confirmation*” (pg. 460). Furthermore, the case study method allows investigators to retain the holistic and meaningful characteristics of real life events that include the organisational processes (Yin, 2003). Case studies are generally being used when the researcher has little or no control over events and when the focus is on what is happening within the organisation or life cycle (Ragin, 1989; Burns, 2000; Yin, 2003). Moreover, the unique strength of the case study methods allows it to deal with a full variety of evidence including documentation, artefacts, interviews and observations as a means of gathering information, beyond

what might be available in a conventional historical study (Yin, 2003). Therefore, since this research is to study the natural occurrence regarding the implementation of the KM strategy as well as the issues surrounding it, the case study method would be able to give an in-depth view of the strategy within the organisation through interviewing the participants. In addition, referring to documents regarding the many strategies within the organisation would give an overall picture to the situation within the company.

In order to discover possible differences or similarities in KM strategies between companies from different industries, a multiple-case study method (also known as a comparative case study method) is utilised. Multiple-case studies are usually implemented when researchers want to understand, compare or interpret specific cases because of their intrinsic value (Ragin, 1989) or to illustrate how a phenomenon occurs in the circumstances of several exemplars (Stake, 2002). Ragin adds that the common goal of multiple-case studies are to produce answers concerning the causes of theoretically defined categories of empirical phenomena common to a set of cases (1989). Furthermore, multiple-case studies of multiple research entities are usually chosen for the purpose of cross-unit comparison (Berg, 2004). Therefore, multiple cases are often considered more compelling than single case designs and an overall study utilising multiple cases are regarded as being more robust (Herriott and Firestone, 1983).

Comparative case-oriented methods provide a strong basis not only for identifying causes but also for differentiating among important types and subtypes of social phenomena (Ragin, 1989). Every case chosen for the comparison should serve a specific purpose within the overall scope of the research (Yin, 2003). These cases are chosen because it is believed that understanding these cases would lead to a better understanding about a larger collection of cases (Stake, 2002). A suggestion that Yin (2003) makes is to consider multiple-cases as one would consider multiple experiments and that is to follow the logic of 'replication'. Therefore, in multiple-case or comparative case studies, the investigator would conduct an experiment and then replicate the same experiment in other subjects and obtain individual results from each case. The results are then cross-compared with each other rather than pooled together which would transform it into a survey rather than a multiple-case study (Yin, 2003).

According to Ragin, there are three steps in analysing a multiple-case study method; the first being the investigator searches for underlying similarities or differences among the cases. Secondly, the similarities or differences identified are shown to be causally relevant to the phenomenon of interest within each setting. And lastly, on the basis of the similarities or differences identified, the investigator formulates an explanation (1989). In short, the results are compared to discover any possible similarities or differences between the cases to give a theoretical outcome as to whether the phenomenon being investigated exists within several different contexts (Stake, 2002).

However, there are some concerns regarding using the comparative case study method. The multiple-case studies must involve the collection of very extensive data to produce understanding of the entity being studied. Since case studies are used to provide an in-depth study of the organisation or individual life cycle, a lot of time and effort is needed to collect the data from the separate cases that would reveal the various factors and perspectives of the subjects under study (Yin, 2003). Furthermore, there is some concern about human subjectivity when selecting evidence to support or refute a particular explanation for the evidence found between the many cases involved (Burns, 2000).

The limitations of using the comparative case study method has been considered but it is felt that overall, the multiple-case study method would provide a deeper study into the organisational development of KM. In the multiple-case study method, each case is examined as a total situation resulting from a combination of conditions, and then the cases are compared with each other as wholes (Ragin, 1989). This makes it possible to compare causal complexes between cases without making any assumptions as to the outset of the investigation, thus making the flexibility of the outcome enriching the dialogue between ideas and evidence (Ragin, 1989). Especially since the research being conducted wished to look at the methods used for KM as well as the issues related to KM, a research method that would allow the study to take a closer inside look into the processes within the organisation is needed. Therefore, the qualitative method using the comparative case study method via the interviews within different organisations seemed the

most feasible in getting extensive, in-depth data to build an overall picture of the management of knowledge within organisations.

4.5. Subjects

While considering industries that may be used as subjects for the research, it was deemed important to look at industries that use different levels of explicit and tacit knowledge between them and to compare them with each other. This is a comparison in terms of organisational strategy between sectors that required their employees to utilise more tacit knowledge and sectors that required more explicit knowledge. Furthermore, it would also be interesting to see if there are any similarities or differences regarding the management styles of the organisations regarding KM between companies that utilised more tacit knowledge compared to companies that utilised more explicit knowledge. It is believed that companies that utilised more tacit knowledge rather than explicit knowledge could be considered to be using more 'creative' knowledge within the company whereas companies that utilised more explicit knowledge than tacit knowledge could be classified as using 'scientific' knowledge. This is because science still refers to explicit knowledge and theories that can be codified whereas creativity stems from the tacit knowledge of the individual.

Therefore, four industries is decided upon, namely the architecture industry (creative knowledge), the pharmaceutical industry (scientific knowledge), the oil and gas industry (scientific knowledge) and the telecommunications industry (a combination of creative and scientific knowledge). The architecture industry could be deemed to be utilising more tacit knowledge since their field of expertise would require more creative inputs into their project designs. At the same time, the pharmaceutical as well as the oil and gas industries could be considered as utilising more explicit knowledge as they would be dealing with more scientific and technological knowledge at the workplace. On the other hand, the telecommunications industry could be said to be utilising both tacit and explicit knowledge through their manipulation of technological skills as well as creating new innovative technology for their products and services. A study that looked at how companies from the four industries manage their KM strategies as well as management styles within their different knowledge areas became the focus of this research.

After referring to the Top Ten companies of each industry from the industry association websites, the leading companies from the respective industries are contacted by phone and the concept of KM is discussed with the Office Managers and sometimes the Managing Directors. Various questions relating to the management system of employees, the concept of knowledge workers within the organisation and also the implementation of policies that supported the management of knowledge within their companies are asked during these conversations. If the

company contacted do not have a policy regarding KM, they are questioned further to discover if they have plans to implement any policies or procedures that would assist in the KM of the company. This telephone survey set the foundation for the types of questions that would later be included in the list of questions that would be used in the research. At the end of the telephone survey, the companies chosen for the research are indirectly whittled down to just a few companies. This is first of all, due to the fact that many of the companies are not interested to take part in the research and secondly, many of them are not interested in KM or policies regarding KM strategies. Since this research is to study the issues surrounding the implementation of KM strategies within the organisation, the latter group of companies are not used for this particular research as it would not be feasible to study companies that do not have any KM strategies or policies implemented in the first place.

Initially, the research managed to receive favourable responses from five companies; two architecture companies, one telecommunications company, one pharmaceutical company as well as one oil and gas company. However, halfway through the research, one of the architecture companies withdrew from the research due to unavailability of key members of staff to be interviewed. All the companies that took part in the research are either in the midst of implementing or designing policies to assist in the management of knowledge within their organisations. In the end the four companies, one from each industry, is chosen to get a broad overview of management styles regarding knowledge. Although there are inevitable limits to

the generalisability of such a sample, it is still possible to produce useful and interesting comparisons of similarities and differences between the different companies from the different industries. The subjects interviewed from each company are in managerial roles at different hierarchical levels. These included the Managing Directors, HR Managers, Project Managers, and Line Managers of each organisation. It has to be noted that although the HR managers interviewed in each company may not be given the job title of "HR Manager", their job position nevertheless undertakes the responsibilities that of a HR Manager. The role of the HR Manager in each organisation will be indicated during the following description of the interviewees.

At the pharmaceutical company (Bio Co.), the Vice-President, the Finance Director, the Quality Assurance Manager and the Research and Development Manager of the company's division that is based in Livingston, Scotland, are interviewed. The Finance Director of Bio Co. also undertakes a large number of roles in the HR perspective and therefore, he is interviewed in this capacity. For the architecture company (Build Co.), the Senior Partner, Finance and Office Manager, Research Co-ordinator and a Researcher are interviewed for the data collection at their office in Glasgow. The Finance and Office Manager of Build Co. is responsible for all HR activities within the organisation and she is interviewed in the capacity of a HR Manager. At the telecommunications company (Tel Co.) however, the interviewees are the Managing Director, the HR Manager and the Customer Services Manager who are based at a large branch in London while the

interview with a Chief Engineer is conducted in Glasgow, Scotland, where the participant is based. And finally, at the oil and gas company (Oil Co.), the Managing Director, the Organisational Development Officer, the Business Development Manager and a Structural Engineer are interviewed at their division in Aberdeen, Scotland. The Organisational Development Officer of Oil Co. is in charge of all matters relating to HR functions and therefore, he is interviewed for his role as the HR Manager. Their responses to the questionnaire are later used as the main part of the data of this research. The table below provides a list of the participants of this study and indicates the similar levels of position they hold in their respective companies.

Table 4.3. Research Participants

Position	Bio Co.	Build Co.	Tel Co.	Oil Co.
Managing Director	Vice President	Senior Partner	Managing Director	Managing Director
HR Manager	Finance Director	Finance and Office Manager	HR Manager	Organisational Development Officer
Project Manager	Quality Assurance Manager	Research Co-ordinator	Customer Services Manager	Business Development Manager
Line Manager	Research and Design Manager	Researcher	Chief Engineer	Structural Engineer

Each participant is interviewed once, totalling to sixteen interviews altogether, with each interview lasting between one to two hours. Some of the participants are interviewed again over the phone to gain further clarification of some of the points that are raised during the initial interview. Furthermore, when necessary, the participants also continue to provide documents and manuals detailing their policies

and procedures months following the interviews. By interviewing a representative from each of the managerial levels within the organisation, the goal of this study is to generate data that would allow for observation of similarities as well as potentially different perceptions across the various levels of management, as well as across the companies and industries themselves. Moreover, by researching on the different managerial levels within the organisation, the validity of this study could be maintained as the information obtained from each level of management could be verified and elaborated by other levels of participants in the company. It is recognised that the absence of data from lower level employees limits the extent to which a full picture of knowledge production and utilisation can be generated. Given the emphasis on qualitative methods, this double direction would be difficult in practical terms. Due to the ultimate focus on the management of knowledge, it is judged that the most practical and effective course of action is to interview those directly involved in the KM process at various levels.

4.6. Data Collection

For the data collection process, a Semi-Structured Interview Schedule (SSIS) is planned by referring to the research questions that are listed as well as from information derived from conversations with individuals from each company in the telephone survey. In a semi-structured interview, an interview guide may be developed for some parts of the study in which a direction is given to the interview,

without fixed wording or fixed ordering of questions, so that the content focuses on the crucial issues of the study (Burns, 2000). This allows the interview to be more flexible and permits a more valid response from the informant about their perception of reality as the informant uses language natural to them rather than trying to understand and fit into the concepts of the study. Furthermore, the informant has equal status to the researcher in the dialogue rather than being a guinea pig (Burns, 2000). Therefore, with this method, data on the respondents' overall perspective regarding the management of knowledge within the organisation would be collected.

The list of open-ended questions drawn for this research (refer to Appendix I) is classified into four main topic areas which are; Identification of Knowledge, Knowledge Management, Retention and Dissemination of Knowledge, and finally, the Human Resource Support Systems within the organisations. These questions are based on the objectives of this research stated in Chapter One as well as to answer the research questions stated earlier in this chapter in order to cover a variety of aspects regarding KM. The questions are divided into these four categories as the identification of knowledge, the utilisation or management of knowledge, the process of knowledge retention and the dissemination or sharing of knowledge tend to be the main aspects of the overall management of knowledge within an organisation.

In the Identification of Knowledge section of the questionnaire, the questions focus on whether knowledge is recognised as a resource within the organisation and on how knowledge is identified by the management. Furthermore, questions on motivating the employees in gaining more knowledge or creating products and services are also asked. The Knowledge Management section of the questionnaire asks the interviewees regarding KM processes that are implemented within the organisation as well as problems that might be faced by the management staff in trying to implement these processes. The next section of the questionnaire, the Retention and Dissemination of Knowledge, focuses on how knowledge is stored within the companies and how information or new knowledge is shared with the rest of the staff or clients. Finally, the Human Resource Support Systems section of the questionnaire asks about the training programmes as well as the reward and salary schemes offered to the staff of the organisation in order to either retain their services or to motivate them to participate in the KM processes of the company. Through these questions, an overall picture of the efforts undertaken by the organisations in their KM processes is studied.

First of all, the Managing Director of a Bioengineering company is interviewed using the questions already prepared as a pilot study. From the interview, some changes to the questions are made to relate more with the research questions of this research as well as the relevance to the management styles within companies. Appointments are then made to interview four individuals from four different levels of management within the four organisations chosen for this research. The staff that

are interviewed from each company are as described in section 4.5. The interviews are recorded on tape and the data transcribed into script for easier analysis. Furthermore, the data are then analysed using similar or different themes between each company relating to the management of knowledge within the organisations.

4.7. Analysis of Data

For the analysis process, first of all, each transcript of the interviews is read through and the quotes and information given by the interviewees that are related to the four main topic headings used in the questionnaire are highlighted. These quotes, information as well as any additional data that might be of interest are grouped together and noted down under each classification for easier comparison. The data are then analysed by comparing them within the levels of the same company to gain an overall picture of the KM process within the company. This comparison is done to see if there is cohesiveness within the organisation in terms of perception towards the management process as well as to discover any possible problems that might be faced by the management staff in managing the knowledge of their employees.

Next, the responses between the same levels of position from each company are compared in order to discover any similarities or differences in management styles or processes between the organisations in terms of KM. Finally, the overall

differences and similarities are analysed to give a more in-depth picture regarding what is involved and what possible problems may be faced by the organisation while managing the knowledge of their employees.

Additional information regarding the companies, which include background information on the companies as well as the industry involved, are also obtained before, during or after the interviews. The additional information is used to support the existence of KM policies and procedures within the organisation although many of the links between the changes and development of the industry and the management of knowledge within the organisation would be based on rational assumptions.

4.8. Summary

In conclusion, this chapter indicates how the topic of this research is chosen, whereby a brief recapitulation of the literature on knowledge workers led to a discovery of gaps in the literature regarding issues related to knowledge and the KM process. In addition, a list of research questions is also presented that provides an outline into the study of the KM process within companies to uncover how organisations are managing the knowledge of their employees efficiently and effectively.

A discussion over the benefit of the quantitative versus the qualitative research method is presented stating that the qualitative method of utilising interviews to conduct multiple-case studies is the most suitable method for this research. This is due to the fact that a qualitative approach would provide a deeper understanding as well as a more accurate discovery of the KM process or strategy within the organisation compared to the quantitative approach that might be too rigid or restrictive.

Furthermore, it is revealed that four companies participated in this research namely a pharmaceutical company, an architectural company, a telecommunications company as well as an oil and gas company. Data for the research is collected by interviewing representatives from four levels of management ranging from the Managing Director or Vice-President down to the line managers. The data is then analysed using a comparative analysis in order to gain an overall picture of the KM process within and between their respective organisations. The results of the analysed data will be presented in Chapter Six but first of all, a brief description of the industries along with the organisations will be discussed in the following chapter.

CHAPTER 5: BACKGROUND TO THE INDUSTRIES

5.1. Introduction

In this chapter, the background to the four industries that this research has been based on will be discussed. Furthermore, the development of each industry leading to the rise in need for knowledge workers within the industry will also be presented. At the beginning of the discussion of each industry, a brief description will be given of each company from the respective industry that has been chosen as a subject for the research. This is to provide a backdrop into how the competition within the industry gives rise to the management of knowledge. However, before the industries involved in the research are described, it would be prudent to look at the changes that has or are taking place in the United Kingdom (UK) industry in general over the past few decades. This section would give more focus to the changes in the economy that shifted from the industrial society to the knowledge society. These changes could explain how and why the different industries involved are evolved or trying to evolve in order to remain competitive in the current economic market.

5.2. Transition to a Knowledge-Based Economy

In the early part of the twentieth century, changes are taking place in society. Agriculture is slowly making its way towards a more manufacturing society. With the onset of the World Wars, UK is forced into an industrial age in order to utilise their machinery for the use of the army. Once the post-war era begun, industrialisation seemed to be the way forward in rebuilding the country. Employees are involved in manufacturing products, mining, construction and transportation. Energy is put into rebuilding society and trying to remain competitive with other nations in order to stabilise the economy. In 1978, there are 6,911,000 employees involved in the manufacturing sector and 1,372,000 employees working in construction (ONS, 2003a).

Every pro has its con and with the onset of industrialisation comes the rise of technology as well. Computer based information technology are changing the industries much the same way as the technologies associated with the agricultural and industrial transformations of previous centuries. However, although computer technology has taken decades to develop, its true potential only became apparent during the 1980s (Pettigrew and Whipp, 1991). Computers and computer-aided technology are taking over the jobs of people. Fewer and fewer employees are needed to do the same jobs that a computer could do, especially in the manufacturing sector. By 2003, the number of employees in the manufacturing sector reduced by about half to 3,436,000 employees only while the number of

employees in the construction industry reduced to 1,169,000 (ONS, 2003a). With the emergence of a more technologically based society, the need for employees with the special skills, expertise and knowledge to work in companies that utilises technological facilities are becoming more prominent. The society as such slowly started to shift from the industrial age to a more knowledge-based society.

Another affect that is also taking place in society is the situation of globalisation. The world virtually become a smaller place with far destinations easily reached and countries improving on their technology. Companies are no longer restricted to one geographical site and are capable of catering to a wider variety of clients. Therefore, this gives rise to even fiercer competition between organisations, not only between companies in their own home country but also with companies in other regions. With the implementation of the European Union (EU), organisations from other European countries are less restricted to set up offices in the UK and compete for tenders and contracts. This has led to organisations finding new ways to remain competitive. The combination of globalisation and increased competition around the world has driven the need for more knowledge within the organisation (Smith, 1998). Information and manipulation of information or knowledge became the key in maintaining the competitive edge. Companies are thinking of new ways to offer clients products or services that other organisations could not or has not offered. Industries as such are starting to focus on the abstract capital of their companies, i.e. the knowledge capacity of the organisation in order to tilt the scale towards gaining a successful foothold in the marketplace. Moreover, according to

Pettigrew and Whipp (1991), the ability of an organisation to remain competitive in the market relies heavily on two factors. First is the capacity of the firm to identify and understand the competitive forces involved and secondly, the competence of the business to manage the resources necessary for the chosen competitive response through time. Therefore, manufacturing and industrialisation has changed from the materialistic aspect of capital to the knowledge-based economy.

The industrialisation and globalisation of society also brought about another change. Since the 1980s, the industrial society has slowly started to change towards a more service-oriented society. The post-industrialisation mode of society has been making way to cater to the needs of the population. This change is actually an affect caused by industrialisation itself. When industrialisation began, people started to migrate more to the cities and therefore society started to evolve from 'ruralisation' to a more 'urbanisation' way of living. The concept of urbanisation being linked with industrialisation is actually mentioned by Kumar (1978) who states that 'industrialisation' does not only mean 'modernisation' but also 'urbanisation' whereby the lifestyle of the general public also changed accordingly. Therefore, people are living more individualistic lives rather than in a communal society.

The need for services that catered for the individual rather than the general public led to a gap in the market that is eagerly filled up by enterprising entrepreneurs who began to offer services that are catered to the specific needs of the clients. The social setting found in urban housing estates are created to cater to this individuality

of personalities. The creation of malls, cafés, and hypermarkets are there to suit the needs of the population that would like a variety of services at their disposal. Furthermore, due to the latest innovations in technology, the general population has better access to places on the other side of the world via the internet and has also ventured further on their holidays.

The knock-on affect brought on by globalisation and the concept of the 'global village' is felt through the various industries involved. Construction organisations focus more on airports and shopping malls; telecommunication companies focus on upgrading the broadband and mobile phone communication; while banking has initiated online services for the benefit of the customers. The service industry has become a major player in the overall economy with financial and business services now accounting for about one in five jobs in the UK compared with one in ten in 1981 (ONS, 2002). The rise in the service industry has seen an increase in employment over the past twenty years whereby in 1978, there are 7,862,000 employees in the service sector but by 2003, the number rose dramatically by nearly ten million to 17,251,000 employees (ONS, 2003a). Therefore, the society turned into a service-oriented economy where information and knowledge is becoming the main focus of companies who are vying for trade, tender and contracts from clients in order to tap into this booming market in whatever means possible.

On the forefront of methods being considered is the rising need of efficient management of information and knowledge of the employees by the organisation.

KM seeks to improve and manage a company's ability to utilise information resources effectively through the employees for a company's benefit or advantage (Smith, 1998). The industries that this research conducted a study upon are trying to improve the effectiveness of their organisation in terms of managing the knowledge of their employees. The companies involved hoped that by utilising effective KM, they would be able to remain competitive among their rivals.

5.3. The Pharmaceutical Industry

5.3.1. Bio Co.

The first organisation that is researched on is Bio Co., which is based in Scotland. Bio Co. is part of a corporation whose headquarter is based in the United States of America. The Bio Corporation is a global provider of biological products to life science companies. The company's products and technologies are used in a wide variety of applications within the areas of neurobiology, oncology, developmental biology, cellular physiology, haematology, immunology, cardiology, infectious diseases and molecular biology. The international organisation currently has 750 employees here in the UK and in the United States and the branch in the UK, Bio Co., is currently engaged in the development and manufacturing of monoclonal antibody products that can be used in diagnostic products as well as in pharmaceutical uses. The following section will provide an overview over the

situation within the Pharmaceutical industry that has brought a rise to the knowledge-intensive industry and therefore, a need for Bio Co. to manage their knowledge efficiently.

5.3.2. The Pharmaceutical Industry

The pharmaceutical market is one of the most dynamic sectors of the UK and world economies. The world market for pharmaceuticals is valued at \$255.36 billion in 2001 with the largest single market being the US that accounted for 54.1% of global sales. UK is ranked sixth with 3.7% of the world market behind Japan, Germany, France and Italy (Fenn, 2002). It is also estimated that the UK market for pharmaceuticals grew by 6.2% in 2002 to a value of £9.31 billion (Fenn, 2002). Furthermore, according to National Statistics, *“exports accounted for 98.5% of UK pharmaceutical manufacturers’ sales in 2000 as well as five of the top 20 best-selling drugs in the world were developed in the UK”* (Fenn, 2002, pg. 18). However, with the increasing globalisation of the industry, there is a possibility that operations may be relocated abroad. But with the majority of sales by UK manufacturers being made overseas, the UK industry is currently buoyant and it will remain a significant contributor to the UK economy (Fenn, 2002).

The pharmaceutical industry is highly competitive and research-driven. Investments in innovative research and development (R&D) are one of the keys to

future growth and prosperity in this particular marketplace (Taggart, 1993). According to the Department of Trade and Industry (DTI), *“In 2000, 37.7% of all UK R&D expenditure is directed towards pharmaceuticals while the UK pharmaceutical industry invests more than 20% of its turnover in R&D each year”* (Fenn, 2002, pg. 7). Furthermore, the UK pharmaceutical industry employs approximately 60,000 people and around a third of these employees are involved in R&D activities (Fenn, 2002). However, the development of new drugs can take many years and cost millions of pounds. *“The Association of the British Pharmaceutical Industry (ABPI) has estimated that it takes between seven and 15 years and more than \$600 million to develop a new drug”* (Fenn, 2002, pg.45). Moreover, there is no guarantee of success in return of such enormous investment. During these early periods, ‘wastage’ is phenomenal with far fewer than 1% of all initial researches being manufactured into a product that is marketed (Caines, 1995). To maintain their position, pharmaceutical companies must continue to introduce new, effective, safe and innovative products in a reasonably short period of time. *“The viability of the pharmaceutical companies is judged more by the perceived promise of their product than by their existing sales”* (Fenn, 2002, pg. 6). Therefore, companies are forced to work even more efficiently in order to produce medicines of value with as little ‘wastage’ and with the least amount of cost as possible.

Although the risk in pharmaceutical development are high, the rewards are also high since “blockbuster” drugs can generate sales worth billions of pounds and

drugs that are protected by patents can be capitalised on their investments for a number of years (Fenn, 2002). Pharmaceutical companies take out patents at the earliest pre-clinical stage and these patents typically last a period of twenty years unless an extension has been granted. Pharmaceutical manufacturers are primarily concerned with protecting the process of the product and then only with the production since rivalry among existing competitors are mainly in the form of product innovation (Taggart, 1993). Therefore, the patent is granted for manufacturing processes as well as a product's chemical compound (Pradhan, 1983). This is so that while the patent is in force, the pharmaceutical company has exclusive rights to sell the drug and can build up its sales and brand loyalty. However, when the patent expires, any pharmaceutical company can produce these drugs generically. This can affect the sales of the original product as these non-branded products can offer lower prices since their manufacturers do not have to recoup the considerable cost of R&D (Fenn, 2002). The overall costs can be considerably high since as a patent is taken before applied research is carried out, several years are lost before a medicine comes to market. The longer the research time, the greater the cost (Caines, 1995). Therefore, companies are pressured into producing viable products as fast as possible in order to survive within the competitive marketplace.

These competitive factors, coupled with the highly regulated nature of the marketplace, create high barriers to entry. These barriers are continually rising, owing to the growing costs of R&D and the increasing demands in the marketplace.

This increase in barriers has led to an industry structure consisting of a large number of very small firms and a very small number of very large firms (Pradhan, 1983). These factors has also led to a number of collaborations, co-developments and partnerships between companies, e.g. GlaxoSmithKline, AstraZeneca, and Pfizer which are the three companies effectively dominating the UK pharmaceutical market in order to keep costs down (Caines 1995). Smaller pharmaceutical companies overcome huge market barriers by forging strategic partnerships and licensing agreements with larger organisations while others operate in specialist markets that are not likely to generate competition from larger companies (Fenn, 2002). Although there has been significant consolidation in the UK pharmaceutical industry through the mergers, expenditure on R&D continues to grow with companies developing comprehensive pipelines of promising new products (Fenn, 2002).

There are two main sectors in the pharmaceutical market within the UK which are prescription-only medicines and over-the-counter (OTC) pharmaceuticals (Pradhan, 1983). Prescription-only medicines, such as antibiotics, can only be obtained via a prescription from a doctor or certain healthcare professions and can only be dispensed by registered pharmacists whom are operating from government-licensed premises (Fenn, 2002). Since these pharmaceuticals are highly regulated, they cannot be promoted directly to the consumer or patient and most of the products in this sector are prescribed through the National Health Service (NHS)

making the UK government the largest customer of prescription drugs (Pradhan, 1983; Taggart, 1993).

Regarding OTC pharmaceuticals, there are two main product groups. The Pharmacy-only (P) products do not require prescription but they must be sold in a licensed pharmacy under the supervision of a registered pharmacist. Whereas the General Sales List (GSL) medicines are sold in a wide range of retail outlets with no need for a pharmacist although the pack sizes and formulations are restricted, for example cough and cold medicines (Pradhan, 1983; Caines, 1995; Fenn, 2002). It is forecasted that the total UK market for pharmaceuticals will grow by 6.7% to 7.7% per year between 2002 and 2006. The highest level of growth is expected to be seen in the prescription-only medicines, which constitutes the larger market compared to the OTC pharmaceuticals (Fenn, 2002). However, the prospect of the UK drug industry on the GSL products as well as the private sector are good despite of the NHS as the vast majority of the population practices and is in favour of self-medication (Pradhan, 1983; Fenn, 2002). Changing lifestyles will lead to a greater demand for OTC drugs instead of visits to the clinic for prescriptions (Taggart, 1993). Small firms will have to concentrate on the OTC market, as the barrier to entry is lower than in the prescription sector and thus will aggravate a more intense rivalry (Taggart, 1993). Therefore, the pharmaceutical companies are in constant competition to provide cheaper OTC medicines to the general public quickly to retain a large percentage of the market.

For the companies to remain competitive, the companies are trying to utilise whatever means possible to increase their R&D efficiency. Information technology is advancing daily and pharmaceutical companies are trying to utilise this skill in R&D to increase output (Taggart, 1993). Intranets are generally being used with the idea of sharing knowledge faster and encouraging collaboration between departments. Furthermore, in the drug discovery process, KM has been well established (Liebman, 2001). KM has a reputation for being a soft science, but in the past couple of years it has been forged into a useful tool for market-focused laboratory R&D. Research-intensive companies are beginning to invest in text mining software after years of installing databases and document management systems. The result is the creation of a system for screening research data (Mullin, 2001). R&D staff at pharmaceutical companies has to do more work faster and with less staff than they did only a few years ago. A decade of layoffs, budget cuts, and retirements has created a need for new tools and strategies for cataloguing and communicating information at the same time as new laboratory techniques to add more speed to the process of product development and commercialisation (Mullin, 2001).

However, others put emphasis on managing knowledge, not just collecting it. Despite the advancement of enabling technologies, the organisation and management of corporations today remain unchanged from those used in the memorable past (Liebman, 2001). It would be prudent for pharmaceutical manufacturers to avoid the risk of concentrating too much on IT systems.

Everybody is addressing KM, but too many are addressing it only with IT. There are all these databases but the companies still wonder why they cannot manage the knowledge of their researchers (Mullin, 2001). Therefore, there is a need to look at how these companies can manage the knowledge of their employees especially in R&D to remain one step ahead of their competitors.

5.4. The Architecture Industry

5.4.1. Build Co.

On behalf of the Architecture industry, the company that participated in the study is Build Co., an architecture firm that has branches across the UK and around the world with the headquarters based in London. Although the branches are part of one large organisation, each branch exists and operates on their own with their own contracts and tenders, only communicating with each other on similar projects. The branch that is chosen for the research is based in Glasgow and has around thirty employees ranging from architects to building technicians to researchers. Build Co. basically designs buildings primarily for companies and other industries and rarely for individual residences. Their work is more commercially based as in retail work and support buildings for airports. Build Co. also tries to offer building designs as a product by using the same design scheme or same materials so that clients can use the same design repeatedly. The company does not offer a full consultancy service

of project manager and contractor but they do recommend to their clients companies that they has worked with. They gain clients through referrals, repeat clients and by awarded tenders. A description of the current situation within the architecture industry is presented in the following section that will show the competitive nature within the industry that is pushing Build Co into implementing efficient KM procedures and policies in their company.

5.4.2. The Architecture Industry

The word architect is derived from the Greek word for ‘builder’ (*archi* meaning ‘chief’ and *tecton* meaning ‘builder’) and until recently, within the last 150 years, the role of the architect included surveying and building as well as military and civil engineering. The development of the architectural profession in Britain is marked by the foundation of the Institute of British Architects in 1834, later on becoming the Royal Institute of Architects (RIBA) as it is still known today (Conway and Roenisch, 1994). However, initially, the Professional Code of Conduct stipulated by RIBA placed the architect at a disadvantage against other professions in related fields. In the highly competitive world with declining workloads, especially in the public sector that began in the late 1970s, architects found themselves bidding for work against firms who are advertising themselves as “architectural consultants/surveyors”. These consultants are willing to offer consultancy services in engineering, planning, computers, and whatever services they feel the clients

would like (Golzen, 1984). The architecture companies are bound by the RIBA code of conduct to only offer architecture services. Therefore, architects are losing contracts to “architectural consultants” who are not bound by the same limitations. This led to a relaxation in the code of conduct that confirmed the move in practice of the architecture industry from profession to business (Golzen, 1984). This change allowed the architecture companies to work in tandem with engineering companies, information technology consultants, and even construction companies in order to be able to offer clients better contracts. Nowadays, architecture is no longer an isolated activity. It can be carried out within a network of other political, social and economic institutions such as local authority planning, housing and environmental health departments, financial institutions such as banks and insurance companies (Conway and Roenisch, 1994). Therefore, it is becoming more essential that architects not only are proficient in architecture design, but also has some basic knowledge in a variety of fields related to the architecture industry.

The new technology being discovered in the construction industry also made it possible for architects to design buildings that are cheaper to build and faster to assemble. Employing skilled and semi-skilled labour may be expensive, and construction using manual labour can be a slow process. There may be problems with quality control and in a climate such as Britain’s, work may be held up for days by bad weather (Conway and Roenisch, 1994). Prefabrication seemed the obvious answer. With the machine and computer age, architects could produce cheap, production line designs that are easy to manufacture and quick to assemble

on site (Glancey, 1989). Prefabrication is useful when a large number of well-designed buildings are needed in a short time (Risebero, 1982). Companies that wanted to set up multiple buildings of the same design and size in a variety of sites can use these prefabricated buildings as a way to minimise costs, time and effort. Therefore, architects has to be more knowledgeable in means to cut costs and time when designing buildings for the clients.

With the effect of the complex phenomena of globalisation, the increased mobility and telecommunications has also affected architecture and urban planning. Cities continued to expand and began to employ ever larger numbers of office employees and workers in the service sector to support them (Risebero, 1982). While the area designated as familiar territory is larger than ever before, people find the world less and less meaningful. This is because a large portion of the known world is familiar only from a fleeting visit and is not a place with which people feel some affinity, where they feel at home, where they actually meet other people rather than being simply thrown together by chance (Ibelings, 1998). *“Airports, hotels, supermarkets, shopping malls, motorway stops and so on are all places where people occasionally spend varying lengths of time, but the function of these spaces is quite different from, say, the village square which is the social centre of a community”* (Ibelings, 1998, pg. 65). With the knock-on affect of globalisation and urbanisation, airports are becoming more than just terminals and hangers since customers are spending more time in the terminal buildings waiting for the next flight or malls becoming just one-stop shopping centres. The implications of the

development of the airport and mall are more than just architecture alone. Airport terminals are catering towards the shopper as well as the traveller with shops, entertainment centres and even health spas and business centres for the travelling businessman.

Moreover, malls are becoming social centres where the whole family can enjoy a day out from the cinema, restaurant, and shops to day-care for the younger children in the family. Furthermore, due to the decline of the city centre as the hub of urban life, the urban areas are now being developed to be self-sufficient entities with their own malls, hospitals, schools and even local airports (Ibelings, 1998). This led the role of the architect to develop into the arena of designing mass buildings for consumers rather than just office buildings for the private client. The architect has to be aware of the social implications of designing mass consumer buildings that would cater to the needs of the general public. Therefore, the need for more knowledge within the industry is becoming more prominent.

The consumer boom has also seen a vast increase in expenditure on Do-It-Yourself (DIY), which has necessitated the construction of hundreds of simply decorated warehouses on the edge of every major town (Glancey, 1989). Large nationwide stores that sell these DIY tools, supplies and accessories to the general public own these warehouses since these stores are placed near large housing estates or communities. Furthermore, the location of particular types of buildings also needs to be considered. New shopping centres and supermarkets are

increasingly being located on the outskirts of town, with good parking facilities and often motorway links with other urban centres (Conway and Roenisch, 1994). This is to cater to the need of the customers without having them go into the city centre. Therefore, architects are required to come up with new methods of building these huge warehouses and shopping complexes all over the country cheaper and faster each time.

There are also a few factors that can affect the design of a building. For one thing, clients may have a design in mind that the architect will have to bring into reality. These designs may need expertise in a variety of fields from council planning to environmental planning. Furthermore, the resulting growth in trade and communications fuels an interest in other lands and cultures and this in turn could widen the knowledge of other styles (Conway and Roenisch, 1994). This may lead to the clients having a preference to a cultural influence into the design of the building. For example wanting the building to have good '*feng shui*' in order for the business to be prosperous. Also, the growing concern for the environment may also question the use of energy both in the production and in the maintenance and use of buildings. Economical use of natural light and heating could also help to cut down costs of lighting and heating during the winter months for the maintenance of the building (Risebero, 1982).

Recognition of these issues may encourage the architect to look at different strategies for design and building today (Conway and Roenisch, 1994). Moreover,

with the introduction of cost effective materials for building and construction purposes, new regulations governing environmental impact that a new building could cause as well as general health and safety, today's architects has to be well informed in a variety of areas in order to provide the best possible services to their clients. Therefore, architects or consultants in the field of architecture has now become more diverse in the projects that they offer to their clients. Hence, they has the need to become more knowledgeable to survive in this knowledge society where what you know will make the difference between a successful bid for a project or a failure in getting a tender for a contract.

Most architecture firms use their buildings as an advertisement. They will try to get photographs of their buildings published in magazines or brochures as a means of attracting client indirectly (Golzen, 1984). Architectural firms generally wait for a tender to be offered or are approached by the clients themselves. As mentioned by Golzen (1984), *"few firms has successfully used the method of approaching potential clients for work, although architects did say that they would always consider such an initiative, provided that it was well presented and thought out"* (pg. 7). Especially when there is recognition that the architect is no longer a professional whose dealings with clients are above market forces (Golzen, 1984, pg.9). There is competition to get clients to choose them and not other architects or even architecture/engineering companies. Therefore, architecture firms would put down skills, expertise, qualifications and even the areas of knowledge of their

employees in their brochures and press packages in order to incite interest in their buildings and organisation.

The architecture practices are generally built around one or two well-known architects and the clients seem to expect that it will be those individuals who look after them throughout the jobs (Golzen, 1984). The architecture firms try to involve junior architects in these projects by gently filtering the associate during the course of the project but the firms find this quite difficult and has to approach this quite delicately. The firms want their junior partners or associates to be able to gain recognition and experience but this is only possible through exposure during a project. The necessity of the firms to introduce their junior architects is to be able to gain new clients through referral from past clients or from recognition of a completed project. There is stiff competition between architecture firms and between architects themselves as although projects are being offered by clients from all over the world, the number of architects in the profession is also increasing. In 1999, there are 29,829 registered architects in the UK whereas by 2002, the total increased to 30,275 (ARB, 2003). Therefore, architecture firms has to has something extra that will attract the clients and by having knowledgeable employees, they might has an edge over their competitors.

Architecture companies has also come up with new ways to gain and retain clients. The architecture firms are trying to move away from the traditional route of just designing buildings and are focusing on being more service oriented as well

(Barker, 2003). Besides, designing a building for the client, the architecture firm is also willing to be the project manager throughout the construction of the building, overseeing the project from start to finish as well as offer a maintenance service for the upkeep of the building for a long period of time. This gives the client a one-stop option for the whole process of the project without having to look for individual contracting companies or project managers. This will require the architecture firm to retain architects and employees who has a wide range of knowledge, from health and safety issues to environmental issues to managerial skills. Therefore, with the change in the economy from industrial to more knowledge oriented society which caters to the services of the clients, employees in the architecture firm are hard pressed to become more knowledgeable in a variety of fields so that they may satisfy the client. Furthermore, the organisations themselves has to reconsider their KM plans in order to utilise the knowledge of their employees efficiently.

5.5. The Telecommunications Industry

5.5.1. Tel Co.

The company that is used in the research for the Telecommunication Industry is Tel Co., which is one of Europe's leading providers of telecommunications services. Its principal activities include local, national and international telecommunications services, internet products and services, and IT solutions. They also offer

competitive telephone rates, landline and mobile phones to the general public. As an international service provider, Tel Co. also serves customers across Europe, the Americas and Asia Pacific. There are just over 100,000 members of staff in Tel Co. around the world and in the UK and has many branches throughout the UK that deals with various sections of the organisation. The telecommunication industry at the moment is at a rather buoyant stage where competition is rife. The section below will provide an overview on the current situation to give an idea on why Tel Co. is trying to manage the knowledge of their employees in order to remain competitive among other telecommunication companies.

5.5.2. The Telecommunication Industry

The phenomena of globalisation and legality has affected the development of the telecommunications industry in the UK. Deregulation and improvements in telecommunications has created intense competition for long distance, high-speed access to the internet, internet services for business and the development of mobile services (Dodd, 2002). Prior to deregulation, telephone companies are owned by the government but now through deregulation, private companies are allowed to be set up in order to avoid monopolisation of one company and to offer the best deals to customers. The UK is the first European country to deregulate telecommunications when British Telecom (BT) began to privatise and by 2000, there are 200 telecommunications firms doing business in the UK. However, there are only a few

major network service providers in the UK, the largest being BT. Currently, the deregulation and monitoring of the telecommunications industry is being conducted by the Office of Telecommunications (OfTel), a regulatory agency set up by the government in order to curb rising prices in the contracts offered to customers. However, due to the recognition of the growing importance of the internet, entertainment and telecommunications, the regulation of telecommunications will be handled by a new agency, The Office of Communication (Ofcom), which will monitor radio, television, internet entertainment and advertising as well as telecommunications (Dodd, 2002). Therefore, it can be seen that telecommunication has become a major player in the new economy that no longer focuses on industrialisation but more on the service and knowledge-intensive society.

The advances in telecommunications techniques and IT made in the last two or three decades has made a dramatic and significant impact on the world scene. Satellite coverage of international sports matches, communication from all over the world via telex, fax and later on electronic mail has been just a few examples (Bray, 1995). Closer to home, advances in technology has also upgraded the use of the mobile phone. The biggest growth in telecommunications services in the 1990s has been in the mobile phone services market (Dodd, 2002). As of March 2003, there are over fifty million subscribers within the UK, with people owning one or two mobile phones (DTIb). The changing lifestyle of the population has increased the use of the cellular phone. People do not has to make plans in advance and can contact their friends at the spur of the moment and socialise. Here in the UK, there

are four large companies that offer mobile phone connections and these companies are competing to offer the best deals to their customers. In an attempt to increase market share and promote the use of mobile phones as a replacement to landline services, cellular service carriers has started offering contracts that allowed unlimited calls to landline and their own mobile phones for a fixed monthly fee within the UK (Dodd, 2002). Teenagers are also using their mobile phones to stay in touch with their friends through text messaging or Short Messaging Service (SMS). This has led to service providers to compete between themselves to offer the best deals to customers ranging from a number of free text messaging a month to cheaper text messaging costs for a fixed monthly fee.

The general public are also using the mobile phones for security reasons to call breakdown services, or emergency services in time of need. There has been many articles in the newspapers of how people are rescued from atop mountains by text messaging a friend or calling the rescue services with their mobile phones. This has also prompted service providers to try to offer better coverage within a wider geographic region. Furthermore, since people are travelling more often than before, mobile phones are a convenient method of staying in contact with loved ones or business clients while overseas. For this reason, many countries are offering roaming services that allow a mobile user from one country to use the cellular services of the network in the visiting country (Dodd, 2002). This increase in mobile usage shows that the main sources of income for the telecommunications organisations stem not only from the physical products such as the fixed phones and

mobile phones, but from the actual service that are offered along with the mobile phones. To provide an efficient service, not only does the company need the facilities that would assist in maintaining their services, but also knowledgeable staff that could maintain the existing services as well as come up with new offers that the customers would like to have. Therefore, managing the knowledge of the employees has become a focal point within the management teams of the telecommunication companies as the rise in the knowledge society has emphasised a need for more knowledgeable staff members.

Internet usage has also increased within the past ten years. Students, employees and the general public alike are using the internet for studies, work or just personal use. As of December 2003, internet access is available to 50% of UK households and 65% of UK businesses including education (DTIa). With the number of people logging onto the World Wide Web for a variety of reasons, internet providers have to make sure that they maintain a fast service even during peak times. Businesses would require the internet to send electronic mail or files to colleagues and clients within a short period of time while still being able to do their work. Students would like to be able to download information for their school projects and consumers in general want to be able to download songs, recipes or any information required without having to wait for a long period of time. This led to the introduction of Broadband by telecommunication providers that offer high-speed internet access. Broadband is the term used to describe a wide range of technologies that enable high-speed, always-on access to the internet and other electronic services (DTIc).

At the end of 2003, the UK has over 3.5 million high-speed broadband users, a figure that is increasing by over 40,000 a week (DTIa). People are requesting faster broadband services that would allow them to download items from the internet faster, more efficiently and with cheaper costs. This means that telecommunications services has to be able to offer efficient services while retaining a low price in order to get a large chunk out of the broadband telecommunications market. Therefore, employees in the telecommunications industry has to be innovative, creative and versatile in order to be able to offer products that will attract the customers. This requires the employees to become more knowledgeable in their field of expertise and more efficient KM by the organisation.

Besides telecommunications for individual usage, the booming service economy and the 'global village' has also seen a rise in telecommunication services to businesses. Due to the competitive market within the industrial economy, companies are expanding beyond their home countries and has set up branches around the world. These companies are also accepting clients from around the world regardless of geographic region in order to gain prestige and recognition. The telecommunication service providers has noticed this need within the market and are offering package deals to companies for unlimited internet services, broadband, unlimited local calls, discounted international calls and even discounts on video or audio conferencing (Bray, 1995). Therefore, the service providers must be able to come up with new services, new packages, new products and overall better quality services and efficiency in order to remain competitive within the service economy.

The companies has to fully utilise the knowledge of their employees efficiently in order to be able to provide such offers and services and this gives rise to an increase interest in KM within organisations.

Besides competition within the UK itself, the telecommunications companies face competition with other countries within the European community. The UK, France and Germany control, between themselves, 60% of the telecommunications market (Dodd, 2002). There are many carriers that offer long distance services and fibre networks for customers and businesses across Europe and there is competition for these as well as mobile phone services. However, the enforcement of EU regulations on telecommunications is managed by the national regulatory agency of the member country, in the case of the UK is Oftel. This has led to an uneven implementation of European Commission deregulation directives (Dodd, 2002). Therefore, competition for contracts can be affected by the deregulation of the telecommunications industry in another European country. At the current moment, the UK telecommunications market is valued at over £25.3 billion even when market growth has slowed significantly in recent years, reflecting slower UK economic growth and the continued downward pressure on prices in an intensely competitive market (Barker, 2002).

The telecommunications market continues to face a number of problems in the past years. While the market is benefiting from the increase in mobile and internet usage, the industry is in serious financial crisis. Major telecommunications groups

such as BT and its major competitors NTL and Telewest has accumulated huge debts and has to take drastic action from asset disposals to financial restructuring to remain afloat (Barker, 2002). The situation is not helped by the competitive market that has allowed end-user prices to fall to make the market more competitive. Although telecommunications as a whole has been increasing its share of the total UK Information and Communications Technology market, telecommunications services are taking a shrinking share of the market, reflecting falling carrier services prices (Barker, 2002). In 1998, 36.7% of the 46.5% of the telecommunications equipment market are telecommunications services and this reduced to 34.2% out of 47% in 2001 (Barker, 2001). The number of employees in the telecommunications industry is also affected. Major companies laid off staff in an effort to improve profitability and reduce their debt burden. By 2002, there are 224,000 employees engaged in the UK telecommunications industry compared with 234,100 in 2001 (Barker, 2002). Therefore, companies are forced to utilise as much information and knowledge available to them from their employees in order to remain competitive hence increasing the pressure on proper KM policies and procedures within the organisation.

5.6. The Oil and Gas Industry

5.6.1. Oil Co.

The final organisation that the research conducted a study on is Oil Co. that is a major subsidiary of a leading global provider of engineering and construction services, technology products and integrated solutions within the oil and gas industry that is based in Norway. The main company employs around 30,000 employees in more than thirty countries and spans a number of industries, including oil and gas production and petrochemicals such as refining and chemicals, pharmaceuticals and biotechnology, mining and metals, power generation, pulp and paper and shipbuilding. The subject for the research, Oil Co., is based in Aberdeen and is predominantly involved in maintaining and modifying existing facilities in a number of industries, primarily oil and gas offshore. They have about 1,000 employees onshore and offshore. The current situation in the Middle East has given a rise in oil prices, putting increasing pressure on oil producing countries and companies to come up with contingency plans in order to remain a major player in the Oil and Gas industry. The section below will show that the current hike in oil prices is nothing new and has happened before. What has changed, however is that now, organisations are not waiting for politics to resolve itself but are utilising the knowledge of their employees to their full potentials to still be part of the oil market.

5.6.2. The Oil and Gas Industry

Oil and gas are one of the most important natural resources to be discovered in the UK during the twentieth century. They provide energy and essential chemicals for transport, industry and homes (DTId). Petroleum has been produced in small quantities on the UK mainland for centuries and it is only in the mid-1960s that a significant discovery of offshore gas while a major onshore gas field is found in the early 1970s (DTId). Generally, the area where petroleum and gas are found in the UK seabed and subsoil beyond the territorial sea which the UK exercises sovereign right or exploration and natural resources is formally known as the UK Continental Shelf (UKCS) (Wiggin, 2001). The most common form of liquid petroleum is crude oil, which form the most important fossil fuel along with natural gases (Carlton, 2002). Currently, the main market sectors are oil and natural gas which includes natural gas liquids (NGLs) (Wiggin, 2001). Oil is important for the production of fuels especially for transport and through further processing, the production of petrochemicals such as other gasses, plastic and fertilisers (Spitz, 1988).

Petrochemicals are also becoming a valuable commodity in the industry. In Europe, the chemical companies are joined by oil companies and national governments who are seeking a piece of the pie in the new technology of utilising oil and gas by-products (Bower, 1986). Currently, natural gas is quickly becoming a commodity for power generation by electricity companies as well as heating for homes (Carlton, 2002). At the moment, primary fuel supply in the UK is supplied

by coal, petroleum, natural gas, nuclear and hydropower (Wiggin, 2001). However, the production of gas as a fuel supply has been steadily rising compared to the other fuel sources. In 2000, the use of coal dropped 13% from the previous year while petroleum, nuclear and hydropower dropped 8%, 1.7% and 3.7% respectively. During the same period of time, production of natural gas has risen by 9.3% to a total of 108.5 million Tonnes Oil Equivalent (TOE) (Wiggin, 2001). Therefore, there is a sudden “dash for gas” (Wiggin, 2001) among the oil and gas companies to become the main or at least a major supplier of gas in the UK. The intense competition to control the oil and gas market has emphasised the rise in awareness of trying to utilise whatever means necessary to remain competitive and organisations are realising that the knowledge of their employees can play a large part in maintaining the advantage over their competitors.

The annual average price received for UKCS oil by producers has fluctuated dramatically in recent years. Oil prices are moving between £77 and £97 TOE before dropping sharply to £50 per TOE in the first quarter of 1999 to some £154 per TOE in the last quarter of 2000. The prices levelled off to average at £126 per TOE for 2001 while in 2002, the price fell slightly to some £124 per TOE (Beckett, 2003b). In 2000, the production of petroleum is 138.2 million TOE and natural gas is 108.5 million TOE. It is estimated that between 2001 and 2005, UK oil production will increase by 3.8% in volume and fall by 12% in value. In the same period, it is predicted that net gas production will increase by 15.5% in volume terms with sales increasing by 15.6% in value (Wiggin, 2001). Overall, in the UK,

gas sales remained fairly steady at £8.2 billion but sales of oil fell again, from £14.6 billion to £14.3 billion (Beckett, 2003b). Furthermore, the total income of operators and licensees remained fairly steady in 2002 at just over £24 billion. Unit operating costs increased slightly again in 2002 after the recent low seen in 1999 as total production fell while operating costs rose to just under £4.6 billion. New fields often pay to use existing infrastructure, therefore, requiring lower capital costs but in return, they has to pay higher operating costs. There is a rise in operating costs around 1991 which reflects the heavy expenditure by oil and gas companies on safety improvements following the Cullen Inquiry into the Piper Alpha disaster, and the fall thereafter demonstrates the effectiveness of industry cost reduction efforts (Beckett, 2003b).

The development in the Iraq crises has raised the price of oil well into the \$46 per barrel level (as of mid August 2004) and this has brought upon a fresh panic among the economics of the world as this could affect the overall economy of the world market. Therefore, the industrialisation of the oil and gas industry takes a back seat to the economical and management of the oil and gas industry in order to resolve the situation. Oil and gas companies are now trying to find new ways to cut costs as well as produce more oil in order to lower the price of oil due to the pressures by the local governments. Hence organisations are turning to their employees to utilise all their skills and expertise in whatever capacity possible to create new ways of discovering more oil shelves, methods of drawing out more oil with lower costs as well as finding new ways to utilise crude oil. As such, KM has

now become more important within the area of oil and gas and has become a priority of many companies in this industry.

Besides the sales or value of oil and gas produced, the value of oil and gas reserves in the UKCS need also to be considered in order to get a better view of how competitive this industry is. Combined oil and gas reserves increased in value by 20% between 2001 and 2002 to £109 billion. The value of oil reserves has more than doubled from £24 billion in 1994 to £63 billion in 2002. During the same period the value of gas reserves increased from £17 billion to £46 billion. These rises are the result of higher commodity prices, particularly in the period 2001 to 2002 (ONS, 2003b). The value of the UK's recoverable oil and gas reserves depends mainly upon the estimated physical amounts remaining, the current rate of extraction and the assumed future price per unit of oil or gas, net of the cost of extraction. By setting UK oil and gas reserves in monetary terms allows these subsoil assets to be compared with other economic entities (ONS, 2003b). Furthermore, the profitability rate for Oil and gas extraction companies increased in the third quarter of 2003 to 29%. This is similar to the average for 2002 but higher than 24.2% recorded in the previous quarter that is the lowest since 1999 (ONS, 2004). Overall, the UK compares well with other countries regarding energy supply and became one of only six Organisation for Economic Co-operation and Development (OECD) countries that produced more energy than they consumed (Wiggin, 2001). However, for the first time in many years, recently, the UK has imported oil to provide for the increase in the demand for petroleum and gas and

this has caused tension in the overall economy of the UK. Therefore, oil and gas companies are trying to find more ways to produce more oil and gas for the UK market and as such, focus on the KM of their employees to overcome this commodity shortage.

The changes in the employment rates among the oil and gas sector are also affecting the situation within the industry. Figures from the Office for National Statistics (ONS) show employment in oil related jobs rising from 29,300 in 1978 to peak at just over 40,000 in 1991, before falling sharply to below 28,000 in 1994 and 1995. Oil related employment recovered to remain mainly within the range of 30,000 and 32,000 from 1996 onwards (Beckett, 2003a). Furthermore, it is estimated that 265,000 jobs are supported by the offshore oil and gas industry in 2001. This total included approximately 104,000 jobs in the oil and gas industry and its direct suppliers, 67,000 in the rest of the supply chain, and a further 94,000 jobs dependent on the spending of employment income by those in the 171,000 directly and indirectly supported jobs (Beckett, 2003a). Around 31% of these jobs are in Scotland, which means that around 6% of the Scottish workforces are dependent on the oil and gas industry (Beckett, 2003a). Furthermore, Aberdeen City and Aberdeenshire Councils estimate that oil-related employment in North East Scotland is 54,000 in 1991 after which it declined to 40,000 in 1999 with an estimated further decline to 34,000 by 2006 (Wiggin, 2001). Therefore, oil and gas companies are further pressured to utilise the skill and knowledge of the remaining employees in order to remain competitive in this industry.

There are two major groups in the UK oil and gas industry; multinational companies and smaller companies that operate in the UK. Most of the international companies have oil wells around the world while the smaller companies might be involved in special projects that deal directly or indirectly with the production of oil and gas (Carlton, 2002). Moreover, most of the participants in the UKCS are also involved in the post-production of oil and gas, namely petrochemicals, refineries and engineering. This sector of the oil and gas industry is known as the '*downstream oil sector*' (Wiggin, 2001). The UK Government's main objective for the UK downstream oil sector is to promote open and competitive markets. This policy is set within the overall policy framework of creating strong and competitive energy markets that will ensure the UK has secure, diverse and sustainable supplies of energy at competitive prices (DTI, 2001). The companies are aware of the possible profit to be made in the petrochemical industry especially when in the developed world, petrochemical companies manufactured goods worth \$390 billion in 1980 (Bower, 1986). The oil companies thus, progressed with greater vigour into petrochemicals in order to diversify their products and profits (Spitz, 1988). Thus, besides the production of oil and gas, companies are also now competing for a stronghold in the petrochemical and downstream oil market.

The oil and gas industry at the current stage is important to the UK economy, as it is an important source of feed stocks for the UK petrochemical industry as well as supports significant exports (Bower, 1986). It is also a valuable source of tax revenue to the UK economy while providing a high level of employment.

Furthermore, besides being a resource for fuel, the use of gas for power generation provides a method of reducing carbon emissions into the environment (Wiggin, 2001). However, besides discoveries made in the UKCS being generally smaller and more difficult to develop, the reserve for oil and gas is finite. If the cost of developing smaller reserves cannot be reduced, the UK oil and gas industry could become uncompetitive with other nations. At the current moment, the North Sea provides a political stable source of oil but most of the operators in the North Sea has access to oil and gas reserves elsewhere in the world. These other nations may offer a more economical production cost and therefore the UKCS is vulnerable to competition from other nations (Wiggin, 2001).

Oil rich countries are also setting up their own petrochemical plants and producing products for export with knowledge and expertise acquired from other nations (Spitz, 1988). This is due to the awareness that through petrochemicals, a variety of products can be made that has a high value in the marketplace (Bower, 1986). Moreover, environmental and political groups are pressuring oil and gas companies to decommission and dispose with minimum pollution of redundant offshore structures and this could lead to added costs (Wiggin, 2001). These threats could be overcome through an advancement of new technology and skills that could help in the development of new exploration and drilling techniques that could in turn contribute to the development of smaller oil fields (Carlton, 2002). Therefore, oil companies and the UK oil and gas industry as a whole are becoming more aware of the need to utilise the skills and expertise of their technical and offshore staff in

order to develop new technology and materials that could help them remain competitive.

It is hoped that by having an overview to the backgrounds of the industries, a basis for the research can be seen into the need for proper management of knowledge among the employees within the organisations, regardless of industry. Since each industry is competitive in its own right, it is quite important that organisations are able to utilise the skills and expertise of their employees in order to provide products or services that will be valuable to their customers with as low as cost as possible. Furthermore, in the knowledge-intensive aspect of the industries, as the industries are diverse, the knowledge available in them is also diverse. Therefore, companies are trying to implement policies and procedures for efficient KM in order to capitalise on the diversity of the knowledge available in the company.

The information from this chapter along with the debates and arguments postulated in Chapters Two and Three will be used to discuss the results of the research in Chapter Seven. The following chapter will present the data collected on the organisations that took part in the research and the data will be presented based on the research questions stated in Chapter Four. It is hoped that the information from this chapter, the data presented in Chapter Six as well as the discussions in Chapter Seven will give an overall picture of the KM situation faced by companies in the four industries chosen for this research.

CHAPTER 6: RESULTS

6.1. Introduction

In the previous chapter, this thesis has presented a background to the different companies as well as the industries that are involved in the study. To summarise, the four companies that took part in this research are, anonymously named, Bio Co., Build Co., Tel Co., and Oil Co. The different positions within the organisations that are interviewed for the research range from the Managing Director of the firm to the line manager or basic researcher. The information in Chapter Five regarding the background to the industries of the companies would help to give a much clearer impression regarding the results found through the interviews conducted during this research. However, the discussion of the results based on the industries' background information will be presented in the following chapter and in this chapter focus will be more on the presentation of the results of the data discovered from the study.

This chapter will be divided into four categories: the Identification of Knowledge; Knowledge Management; the Retention and Dissemination of Knowledge as well as the HR Support Systems. This classification into the respective four sections is done in order to present the data in a systematic manner, in line with the areas of issues discussed by the research objectives and the research questions in Chapters One and Four respectively. The presentation of the areas of

issues proposed by the research objectives and research questions provide a sequential order into how knowledge is managed within organisations from the acquisition of knowledge to the utilisation and finally dissemination of knowledge. Therefore, the data on how knowledge is identified, how employees are encouraged or motivated to gain more knowledge, the KM processes within an organisation as well as the overall support system within the company will be presented in the following sections.

In the Identification of Knowledge, the focus will be on whether companies are aware of the importance of knowledge, how they identify the knowledge necessary within the company as well as how they motivate their employees to be more knowledgeable. Furthermore, in light of the competition within the respective industries, this section will also look at findings regarding how organisations encourage their employees to create new products, services, ideas and knowledge that might be beneficial to the organisation quickly and as cheaply as possible. In the Knowledge Management section, the findings relating to the policies and procedures of KM that the organisations implemented and to what extent they are being utilised will be presented. The Retention and Dissemination of Knowledge section will provide an overview of how organisations store and disseminate their knowledge among employees as well as to the general public. Moreover, how the organisations encourage their employees to share information among each other will also be reviewed. Lastly, the Human Resource Support Systems section will focus on the training processes, the pay systems and rewards given to employees in

order to improve the overall knowledge of the company. These support systems might be beneficial in maintaining the loyalty of the staff over a long period of time and thus, retain their knowledge within the organisation.

6.2. Identification of Knowledge

In this section, findings relating to whether knowledge is recognised as a resource and how it is identified within the organisation by the participants of the research will be revealed. This is to help answer the question of the identification of knowledge stated at the beginning of this research. Furthermore, the question of whether the organisation conduct any job analysis or have job descriptions of the positions within the company is also answered as this could help employers learn more about possible gaps in their employees' knowledge. This section will also reveal findings on how the organisations encourage and motivate their employees to gain more knowledge or to create new knowledge. And lastly, ways in which employees encourage their employees to create new services, ideas or knowledge within the shortest time possible will also be touched upon.

6.2.1. Knowledge as a Resource

In relation to the question of whether knowledge is recognised as a resource, it is found that all the subjects interviewed for this research, regardless of the companies, recognise knowledge as a resource.

Managing Director (Tel Co.):

“The management used to be more aware of those traditional reporting methods on a balance sheet about current assets and fixed assets and things like that and that has changed definitely”.

Business Development Manager (Oil Co.):

“We do recognise that because we are a service company, we don't actually produce anything, all of our asset is in the minds of the people that we employ. So we don't really say that people are our best assets, that's a bit glib I suppose, but in fact they are. But their intelligence is our asset and that's something that we take the course, because they work for us in the organisation, but we don't fully utilise that knowledge by any means and that's been recognised now for maybe a year or so, that we need to do something more on the tools and knowledge management side to get more value and more value to the business”.

Furthermore, according to the Research and Development Manager of Bio Co., knowledge is recognised as a resource due to the growing nature of the industry:

“It's a growing and changing requirement, partly because the company is growing its Research and Development organisation and moving away from an organisation which basically only use Research and Development to support manufacturing. Now the company is growing to expand Research and Development to take in new ideas, in other words to try and grow the company with research products coming through the pipeline through to manufacturing. So knowledge is more and more recognised as a significant resource within the company or within the Research and Development Group”.

The competition within the industry also necessitates for the organisation to be aware of knowledge as a resource. As quoted by the Organisational Development Officer of Oil Co.:

“When we’re getting involved in an important project, there would be termed what there is to use and what the clients want you to adopt. Basically how we can do things better and more smartly. We must better it. That kind of creates a pressure for us to identify what expertise we need and which problems are affecting the project of productivity”.

Furthermore, the Customer Service Manager (Tel Co.) indicates that with employees as their asset, they can offer good service to their customers:

“Definitely now there is more awareness that systems etc are great but the assets are the people and their knowledge and skills. And that in fact you could have really awful systems and still deliver excellent customer experience which is where our main business is in Tel Co. and that therefore people are the most important asset that we have”.

However, the Finance and Office Manager of Build Co. believes that the Managing Director of the firm would not recognise knowledge as a resource. She concedes that the Managing Director would recognise the importance of knowledge within the organisation, but he would not accept it as a resource as he would feel that knowledge is part and parcel of the employees and therefore, should not be considered as a resource. These sentiments are shared by the Managing Director of Oil Co. who says that in reality individuals might consider knowledge as a resource but he does not think that as a management team, they would recognise knowledge as a resource. Despite the conflicting response regarding knowledge as a resource,

all are aware of its importance to the organisation. As quoted by the Senior Partner of Build Co.:

“Knowledge is helped by the people, or groups of people and the process in which it is applied, it’s the bit in the middle. Otherwise, you’ve got information and you’ve got work to do, projects to do, and how do you apply that strategically, it’s the application of knowledge management or knowledge led architecture”.

Due to the recognition on the importance of knowledge within the company, when asked how the knowledge is identified within the organisation, the majority of the subjects interviewed state that they know what is needed based on either their own experience on the job, through talking with people, through surveys conducted or by discussing with their clients. Among those that recognise what type of knowledge is needed through experience in the industry as well as experience in the job itself include the Finance and Office Manager as well as the Research Coordinator of Build Co., the Customer Service Manager and Chief Engineer of Tel Co., The Vice President, the Quality and Assurance Manager and Research and Development Manager of Bio Co., and finally the Managing Director and the Structural Engineer of Oil Co.

Finance and Office Manager (Build Co.):

“It’s basically through doing the job, I’ve been here five years. So I know exactly what I require and I know what the guys require in order to run the job properly. I know what information we need to gather in, and what sort of information, the financial information obviously, what skills are needed to run the job efficiently. How many people are needed in the team to run the job effectively and to work to deadlines”.

Quality and Assurance Manager (Bio Co.):

“I think just really from knowing the business, knowing regulations, knowing the environment in which we have to operate and again depending on what recruitment, recruiting at what level, depending on what level of knowledge you need to have”.

However, those who say that they know what knowledge is needed through talking with their employees, surveys conducted within the organisation and discussions with clients include the Senior Partner of Build Co., the Human Resource (HR) Manager of Tel Co., the Finance Director of Bio Co. and the Organisational Development Officer of Oil Co. The HR Manager of Tel Co. who mentions that they know what type of knowledge is needed within their organisation through external surveys and discussions with clients confirms this:

“We work quite closely with the people and we do a lot of external research about how our customers perceive us. With that, we then look at it and identify gaps in the knowledge of the employees and see ways to coach them better in gaining that knowledge. So we used that external information and we also do internal surveys of our people about how they feel, about what they need very regularly and match the two and fill the gaps”.

The Finance Director of Bio Co. adds that they use third-party training analysis to find out in depth if there are any gaps in the knowledge base and with that, they can prioritise the employees in terms of what knowledge is needed. Besides having years of work experience in the own area as well as third-party analysis to find out any gaps in the knowledge base of the organisation, management could also look into conducting efficient job analysis or having detailed job descriptions as a means of discovering gaps in the knowledge of their employees.

6.2.2. Job Analysis and Job Descriptions

Those at Bio Co. know what knowledge is needed in the organisation by creating job descriptions for all their positions and *“part of those job descriptions have a criteria which lists the specialist knowledge or experience for each area”* (Finance Director, Bio Co.). Moreover, due to the nature of the company which is a subsidiary of the main company in the United States, Bio Co. is trying to create a standardised job description and job function which will be *“universal over the group in the UK and the groups in the US”* (Research and Development Manager, Bio Co.). Furthermore, as part of their HR Policy, both Tel Co. and Oil Co. have job descriptions for all their positions. Tel Co. for example, keeps detailed job descriptions of all the positions that is reviewed regularly according to the changing market place so that their employees will be updated and *“clear of their duties, roles and responsibilities”* (Managing Director, Tel Co.). Tel Co. keeps these job descriptions as part of Investors In People (IIP) but these job descriptions tend to be generic because *“software engineers, irrespective of what they are working on, should have the same set of skills”* (Chief Engineer, Tel Co.). This situation is mirrored in Oil Co. where the Business Development Manager states that:

“For every position, yes we do, we have roles and responsibilities, and job descriptions as part of our work management system, so they are fairly detailed but they are fairly mechanistic. An engineer for a certain level, a certain grade would have to have a certain degree or certain years of experience and competence and so forth”.

Surprisingly, Build Co. only has job descriptions for the administration staff, under the supervision of the Finance and Office Manager, and not for other positions that include among others architects, engineers and technicians. The other positions within Build Co. use Curriculum Vitae (CV) or a report that provides an overview of the job as a guideline to what they are doing. The Organisational Development Officer of Oil Co. mentions that it would be beneficial for the organisation to use CVs as a means for identifying what knowledge may be needed in the company as they may uncover job specific skills and knowledge that the employees have. However, at the time of the interview, it is indicated by the Senior Partner as well as the Research Co-ordinator of Build Co. that they are currently trying to implement accurate job descriptions for all positions once they finalise a HR policy for it.

Despite the emphasis on job descriptions, only Oil Co. conducts job analysis for the positions within the organisation. Moreover, the Business Development Manager of Oil Co. indicates that the organisation would also conduct a job analysis when there has been a change in the industry that has resulted in changes in the roles and responsibilities of the position. The rest of the organisations mostly rely on what a member of staff is currently doing in order to write a job description without conducting a formal job analysis on the position itself. However, the Finance Director of Bio Co. mentions that a job analysis is only conducted if there is a new position being created.

6.2.3. Encouragement and Motivation

As the organisations indicate that they are aware of the importance of knowledge within the company, it would be interesting to answer the question of how the management would convey the need for gaining more knowledge to their employees. One of the many ways of encouraging or motivating the employees to gain knowledge mentioned by the participants of the research included talking to them.

HR Manager (Tel Co.):

“The senior team do things like walking the floor, talking to people. They hold lunch with the senior management team, like with the Directors they come onto all of our sites and have lunch with people, once or twice a year so that they can share with you ideas and knowledge with the top team. And the chance to meet people at a senior level usually boosts morale quite nicely because it’s good to see people so that they know who you are and what you are doing”.

Quality and Assurance Manager (Bio Co.):

“The main thing I try to do is we’ve got quite a wide range of skills departments within the organisation, I try to encourage my staff to spend a bit of time in other departments to try and learn about their jobs and the pressures that they are under and to transfer some of our knowledge to them as well”.

The Business Development Officer (Oil Co.) also mentions communicating with the employees the values and the reasons for the project and involving the employees throughout the project in order to encourage them to gain more knowledge. Another method is trying to focus more on their own career development as a means of gaining knowledge (Finance and Office Manager, Build

Co.; Organisational Development Officer, Oil Co.) or trying to create an atmosphere that would be conducive for gaining knowledge (Senior Partner, Build Co., Structural Engineer, Oil Co.).

Senior Partner (Build Co.):

“I think just by the general extra dimension it adds to their lives in working in a place that strives to seek knowledge and use it and work as cleverly as possible”.

Organisational Development Consultant (Oil Co.):

“It’s very much focused on an individual’s development, what skills, what knowledge, expertise do they need to develop. First of all to do the job they are doing at the moment, actually to achieve their potential and to think why the process is also about identifying future opportunities and along with that again is identifying knowledge that they need to take on board to enable them to achieve through to the next position”.

The other way of motivating the employees to want to gain more knowledge is just by doing the work itself. Many of the subjects interviewed state that the job they are doing is interesting and the work itself encourage them to try to learn new things (Quality and Assurance Manager, Bio Co.).

Customer Service Manager (Tel Co.)

“The thing I noticed is that the people I work with genuinely like their jobs. I find that easier to help them find motivation in their work. If you’re doing something that’s boring and mundane, then you’re not going to try hard at it. So I try to make their work interesting, more diverse so that they’d find new things to do. Basically, I think if they like their jobs, they’d be happy doing it”.

Furthermore, the job itself would be the basis of where they would obtain experience for further career development or be beneficial to the company due to the knowledge they gain from it.

Research Co-ordinator (Build Co.):

"I think students who come in would work long hours just to get the experience they need. To get that knowledge because I think the experience is that knowledge. With the experience, you can demand better wages, positions, hours or even better jobs and responsibilities".

Finance Director (Bio Co.):

"There are a number of senior managers in the company who started off, if not on the shop floor, but at a much lower level and have worked their way up into senior management positions. People who have worked in the shop floor have worked their way into junior management positions. So we have a visible history of progressing employees as they gain more knowledge, people can see, we can't promise anything but they can see that there is potential for advancement".

It is noticed that higher management generally just talk to the employees about the need to gain more knowledge whereas middle and line management holds discussions with their staff and discusses the need for the employees to gain knowledge as a method of career development. The Managing Director of Oil Co. also indicates that there is generally no need to motivate employees since the people actually want to learn:

"In my experience most people enjoy coming to work here and we know that because we do employee surveys and attitude surveys and the majority of people are generally interested in learning new things. I would say right from the lowest paid people to the highest paid people, as a principle people generally want to come and improve their knowledge about the job. It's not something that we feel we have to put out a carrot, they are fairly open to gaining more knowledge".

Therefore, it is through training, through communicating or discussions with peers or basically through experience that the employees are not only encouraged to gain more knowledge but it also allows them the medium in which to acquire knowledge.

Business Development Manager (Oil Co.):

“We tend to get as many people that are associated with the issue together in the workshops and in the seminars that we have. And in the learning process that we have, so that we can get as much knowledge as we can into that part of our value creating process”.

Interestingly, both the Senior Partner and the Research Co-ordinator of Build Co. state that a lot of knowledge acquisition takes place during discussions either at the corner café or at the local pub.

Senior Partner (Build Co.):

“Social cross fertilisation is important because we have people working in project teams in our office or other offices. The only time they would meet is if they went to the pub. The only time they’d talk about each other’s project was when they went down to the pub. So that was always the way within Architecture for people to cross-fertilise knowledge. Whether it’s the pub, or it’s lunch, or go for a coffee out there on the square, that’s important”.

Research Co-ordinator (Build Co.):

“In Glasgow, there’s a fleet of architects and for a big city, it’s a small group of people. So we all see the same people in the same pubs and get involved in all the same things and talk about our work and see what everyone is doing. So it’s like a big pub crawl. It’s really funny”.

Besides trying to encourage employees to gain knowledge, organisations are also asked how they encourage employees to create products or services quickly in light

of the competitive market of their respective industries. Although the organisations do not have a quota system that have to be met on a regular basis (Senior Partner, Build Co.; Managing Director, Tel Co.; Vice President, Bio Co.; Managing Director, Oil Co.), all the companies do conduct reviews to see what project is completed. In addition, how long the process takes and if there are ways to shorten the time taken to produce a product or service is also considered by the organisation and this pressure encourages the employees to create products and ideas quickly. Most say that they would review the process of the project either during the project or after the project is completed in order to see what went wrong and to learn from the mistakes so that it would not be repeated in other similar projects (Senior Partner, Build Co.; Research Co-ordinator, Build Co.; Managing Director, Tel Co.; Customer Service Manager, Tel Co.; Chief Engineer, Tel Co.; Quality and Assurance Manager, Bio Co.; Research and Development Manager, Bio Co.; Organisational Development Officer, Oil Co.; Business Development Officer, Oil Co.).

Chief Engineer (Tel Co.):

“The overall software life cycle which maybe ten years ago, you used to speak of the life cycle in the order of years, now we talk in the order of weeks. In order to get products onto the market quickly then we’re required to do the development in a matter of weeks. We tend to have ideas in response to a demand. The demand is, we need the software very, very quickly or software where for example, mobile phone prices change day by day, we need to be able to change the mobile phone prices that agents, the customer advisors on the telephone can see. We need to be able to change that within a matter of hours which means that you’ve got to do the software changes, you’ve actually got to allow the products to be changed in flight while the agent’s making calls. Also, we try and get as many people as possible when we’re in a rush to finish something off. So that builds a team of knowledgeable people that could get things done. So that tends to generate a lot of pressure for us

guys and we know the pressure's there and I guess that's what's pushing us to create things or come up with the software ideas faster".

Quality and Assurance Manager (Bio Co.):

"We tend to look more at the process rather than the product and if we don't like the way things are being done, they should be done in a certain way. I think we encourage them to be creative and to say, look, we don't like this, you can change it as long as you do it in a controlled way and we go through the right procedure for changing things. We would also try to bring other people in and try and approach the process again so that we would do in more as a team rather than just asking an individual to review it".

In Build Co., the Research Co-ordinator adds that after a project, the people involved with the project would discuss and try to discover if there are any methods of prefabricating some of the parts of the building in advance to cut costs and time. These prefabricated parts would be sections of the building such as the staircases that can be built off-site and then brought on when needed and attached when necessary. Thus saving overall time and cost of the project as the design of the staircase could be used again in other buildings. However, the Managing Director of Oil Co. comments that it is difficult to motivate employees in the organisation since the oil industry is heavily unionised:

"It is actually quite difficult to motivate people who are part of a UK wide agreement. You can't even pay them a bonus to finish a job faster because the trade union agreement won't allow you to do that".

From looking at the results presented on the issue of knowledge identification, a summary of the results based on the different companies involved in the research can be indicated in the table below.

Table 6.1: Identification of Knowledge

Bio Co.	Build Co.	Tel Co.	Oil Co.
<ul style="list-style-type: none"> ➤ Recognises knowledge as a resource. ➤ Identifies necessary knowledge and encourages employees to gain knowledge through talking to them. ➤ Encourages employees to spend time in other departments to gain knowledge. ➤ Have basic job descriptions for all positions. ➤ Reviews product process to shorten length of production time. 	<ul style="list-style-type: none"> ➤ Recognises knowledge as a resource. ➤ Identifies necessary knowledge and encourages employees to gain knowledge through talking to them. ➤ Encourages employees through career development discussions. ➤ No job analysis and job description only for admin staff. ➤ Reviews product process to shorten length of production time. 	<ul style="list-style-type: none"> ➤ Recognises knowledge as a resource. ➤ Identifies necessary knowledge and encourages employees to gain knowledge through talking to them. ➤ Encourages employees to publish and give presentations to gain knowledge. ➤ Discusses career development with employees. ➤ Have detailed job descriptions for all positions. ➤ Reviews product process to shorten length of production time. 	<ul style="list-style-type: none"> ➤ Recognises knowledge as a resource. ➤ Identifies necessary knowledge through customer needs. ➤ Have detailed job descriptions for all positions. ➤ Encourages employees by informing them about the value of the project. ➤ Encourages through career development discussions. ➤ Difficult to motivate employees due to unionisation.

Therefore, although there are some mixed reactions to the importance of knowledge as well as the methods used to classify knowledge within the organisations, all the participants interviewed do acknowledge the need to manage the knowledge of their employees efficiently. This is to ensure the survival of their organisation among the competitiveness of their respective industries.

6.3. Knowledge Management

This section will present the findings relating to the policies and procedures implemented within the organisation to help in the management of knowledge of the employees. Even if the KM process is not formally recognised, there are certain policies and practices that are implemented that would help management to encourage new ideas from their employees, how ideas are reviewed and implemented as well as how skills and knowledge databases are stored. These policies and practices could involve utilising data-warehouses as well as efficient intranet services to sending employees for training as well as conferences to gain knowledge. The KM process is basically about helping the overall management of knowledge of the employees within an organisation whether it'd be following the informational approach or the behavioural approach to KM or even a combination of both. These policies and procedures when implemented could help in the management of acquiring, utilising, creating, storing and disseminating knowledge within the company.

6.3.1. Management of Knowledge

The organisations might not regard their policies as assisting in KM but this section will review the policies to see if their company practices could be useful in managing the knowledge of the employees. Especially when, as stated in the

previous section, many of the staff recognised the importance of knowledge within the organisation and following that, the need for efficient knowledge management.

Senior Partner (Build Co.):

“Our knowledge within our practice, what we have done, what we are doing and we have to make our people aware so that they can tap into that and not reinvent the wheel. Knowledge management is all about streamlining. It’s quality and it’s about streamlining for us. Not just what we do but what other people are doing”.

Structural Engineer (Oil Co.):

“We’re always thinking about these three aspects all the time; safety, environment and cost and all the decisions that we do have to consider in each of those aspects. There is the safety of the environment in case they are spilling oil or gas and there is the commercial risk as well. Obviously, if something is done which isn’t safe, it might cost the client a lot of money to fix it. So my job is very much associated with knowledge. What knowledge do I have? Do I know what knowledge I have at my fingertips? Do I know where to go to look for the knowledge I need and how do I pass that knowledge on to others? It’s very much a knowledge business and different clients have a different view on the value of that knowledge”.

Moreover, there is also a need to be knowledgeably capable to give the customers a more efficient support service.

Managing Director (Tel Co.):

“Customers used to know what they wanted before and now that it’s so complex and everything that they are relying on somebody having quite detailed, almost a consultancy level of support and information to support them in their business strategy. So I think that was probably what drove the need of managing the knowledge of our employees mostly. That people started to realise that we had to have key people and we wanted to keep them because it was expensive as well to really train people up to some of the levels that we needed people to be technically and knowledgeable capable in”.

Furthermore, efficient knowledge management could help reduce the risk of people researching for the same knowledge over and over again as new knowledge created within the organisation will be shared around the company (Customer Service Manager, Tel Co.; Chief Engineer, Tel Co.; Research and Development Manager, Bio Co.).

Customer Service Manager (Tel Co.):

“Because we are a very large organisation, there is more opportunity for duplication, for people asking for the same information, people producing reports on a very similar basis, on similar things. What we were finding is that people were often requiring us to access the same information and producing reports from the same information, through knowledge sharing. This whole process of requests for the same knowledge over and over again could be cut down with the use of a system that would manage the knowledge effectively and help my staff be more efficient”.

Surprisingly, despite the agreements for the need for effective knowledge management within their organisation, initial review of the interviews conducted show that none of the companies have any processes that are being associated as being a KM process. There are no specific policies, strategies or guidelines that are implemented within the organisation that are considered by the management to be of help in the overall management of knowledge within the organisation, regardless of whether the knowledge is within the employees or if it is stored within the organisation. However, on closer inspection and questioning further, a couple of the companies do have a system that could become a basis for a KM strategy.

6.3.2. Knowledge Management Processes

This section will answer the question relating to the policies or procedures regarding KM within the organisations. It is found that although there are no strategic KM processes identified during the research, there are some policies and procedures undertaken by both Build Co. and Tel Co. in managing the knowledge of their employees. In Build Co., a three-step system called the “Three-Wave” for idea suggestion, review and implementation of ideas that might be beneficial to the organisation is implemented. In Build Co.’s Three-Wave system, other members of staff will get the opportunity to review the ideas of employees formally.

Senior Partner (Build Co.):

“It’s about wave theory. Now there are three different waves, hence the picture that we clicked on was a wave, the third wave is an idea that is out there that might benefit the business. It’s just a wild wacky idea that somebody comes up with, whoever it is in the business, then it’s looked at. If it’s decided to progress that and put investment into it or just explore it a little bit further, then that will be pulled in and become a second wave which is something we are researching and maybe funding to research for use in our business and then when it became first wave it’s implemented. It is part of our business, part of our culture so that anybody can pull that in”.

Therefore, the system takes on an ascending order where the third step involves employees of any position or hierarchical level to suggest ideas that may be beneficial to the organisation. The ideas may consist of designs for a new working system, a new policy, or even a design for a building or project. This leads to the next step where the ideas are reviewed by the peers as well as management and brought into discussion during meetings. Ideas that management feels are beneficial

to the organisation and are feasible for implementation are taken to the final step, or the First Wave, where it is implemented either throughout the organisation or in the area that is most suitable. However, ideas that are not taken to the final step are not discarded but rather kept in a file, as they may become suitable for implementation at a later date.

Interestingly, the Three-Wave System is similar to the review process the Research and Development Manager of Bio Co., has within his own division although this is a rare occurrence in Bio Co. which states that they do not have any formally recognised review systems:

Research and Development Manager (Bio Co.):

“We do review, certainly, ideas in research and development, either generated by employees or we also use consultancy groups to generate ideas for us. If they moved from being an idea to becoming something more than that, if it’s developed into a project or a possible product, they would go before a review board. We also allow feedback from the other employees regarding an idea. I think one of the things that we have within the company, not just within R&D, is the requirement for all employees to make a contribution into new ideas. Into how they progress and I think it’s essential to actually develop ideas and allow them to progress. If you don’t let everyone make a contribution, the possibility is you’ll miss out on some good ideas on how ways to actually move things along”.

However, from reviewing the results of the interviews, it is believed that Bio Co. does have a basic form of review board even if it is not recognised by other members of Bio Co.

Finance Director (Bio Co.):

"We don't have a formal review board. We have a management group who get together on a weekly basis and any ideas that are communicated back to that management group are taken in that form and we also have regular communication meetings with all of our colleagues which allows the Managing Director to receive ideas from employees which we, the management, go on and discuss".

Quality and Assurance Manager (Bio Co.):

"We don't have any special review boards, no, but we do have monthly management reviews. And I think if there are ideas that have come up, yes we would discuss them. But it's not as a formal agenda like somewhere people would, if someone did suggest something when he came I wouldn't raise it because it wasn't a formalised, it isn't formalised in any sort of way that people are not encouraged actively to raise ideas".

Therefore, it can be seen that even though there is no formal system to review or process ideas, there is an informal review process carried out throughout the various departments in Bio Co.

In the case of Tel Co. however, the New Idea Scheme is implemented in order to encourage the employees to suggest any new ideas that might be beneficial to the organisation regardless of what section or expertise the employee is in. The New Idea Scheme involves employees suggesting ideas or giving suggestions to a particular policy or programme in order to make the organisation more efficient. The ideas that are suggested are then presented in the general meetings, first among the department managers and then if the idea is feasible, it is presented to senior management. Encouragement is usually given by presenting the person with the best idea suggested or who contributed the most to the scheme with either a

recognition award e.g. a plaque, or a monetary reward of about £50. The monetary value is not much but it is an on-going motivation for the employees to contribute to the scheme as the rewards are offered every three months.

Managing Director (Tel Co.):

“We take the view that everybody owns this New Idea Scheme, everybody’s a part of it and has a role to play in it and it’s their programme. It’s the people’s programme, they get out of it what they put in, and what they want to get out of it”.

Customer Service Manager (Tel Co.):

“If anybody has got a new idea for anything, that goes into a pot and it’s all registered and logged and controlled and rewarded”.

Besides using the New Idea Scheme as a formal method of reviewing ideas, the Chief Engineer of Tel Co. states that informal review of ideas also takes place within his own department through departmental team meetings. Along with the New Idea Scheme, these are ways for employees to give feedback regarding any ideas or suggestions presented by their peers or management. As stated by the HR manager of Tel Co., giving the employees the opportunity to contribute to the overall knowledge input of the company gives the chance to create a working atmosphere that the employees are pleased with. Tel Co. believes that this would lead to lesser staff turnovers as well as stronger loyalty to the organisation (Customer Service Manager, Tel Co.).

The procedure of having the weekly meetings as indicated by Tel Co. is familiar to that of Build Co. and Bio Co. whom both say that there are weekly meetings held

in their organisations as well (Research Co-ordinator, Build Co.; Finance Director, Bio Co.; Quality and Assurance Manager, Bio Co.). During these meetings, management would talk strategy and review anything that might come up as well as consider possible suggestions into problems or new ideas that are introduced to the rest of the members in the meeting to discuss as part of the agenda. That way, both management and employees of the department would have an opportunity to present any new ideas or topics of interest to the rest of the staff. Furthermore, it is indicated that if Build Co. has any time, they might get some project leaders together and look over the project to draw any ideas that they might have and get as many ideas as they can on paper. And if there are any ideas that are feasible, they will see if they can push it forward to management (Research Co-ordinator, Build Co.).

Besides having the Three-Wave system, Build Co. has also implemented a system called the Coaching System whereby different types of coaches or experts will get together and discuss the project being completed. These coaches include the Technical Coach, who is in charge of the technical aspect of the project; the Concept Coach, who is in charge of the design aspect of the project and the Product Coach, who is in charge of the product. Build Co. uses the system as a way of acquiring knowledge from one another, sharing knowledge through the discussion and retaining knowledge by keeping the knowledge in their head as well as through the minutes of the meeting. Furthermore, after the meeting, each of the coaches

goes back to their own project teams and passes on the information gained during the discussion.

Senior Partner (Build Co.):

“There is a group of six to seven of us who meet regularly and we try to bring people into, like if one of our architects is working on a job, we’d bring them in here, pin the drawings on the wall and a technical coach will sit there and so will a concept coach, to look at the design aspects and so will a product coach. If it’s a retail development and a retail coach will sit there and that means they are getting the best shared knowledge within the group. Technically, concept wise and product wise and that knowledge is not sitting with one individual person. It’s sitting with everyone. The difference between what’s on here, which is information and what knowledge is, is knowledge is based on people. But the way we are doing it is not based on one individual within the organisation because they take that expertise away with them”.

Therefore, even though this coaching system is not formally recognised as a KM process within Build Co., this system, linked with other systems could also become a basis for an efficient way to manage the knowledge of the employees. Although not entirely similar to the coaching system of Build Co., the Business Development Manager of Oil Co. states that they do offer the opportunity for peer-to-peer feedback and peer-assistance as part of their process for engineering. However, he adds that there is no real method of recording what happens to the ideas.

Business Development Officer (Oil Co.):

“We have peer reviews and peer assists constantly as part of our process for engineering. So that is part of what we do. That will review what they’ve actually done to make sure that it’s been done rigorously and it will also bring in special ideas from outside from peers. So we encourage that feedback. Again the issue there would be where do these ideas stop? Where do they leave? They maybe appropriate just for that piece of work and may then die and not be recorded anywhere. I think that is one of the issues to consider. So it might be good for that project but then what happens thereafter when another similar project comes along?”

Both the Business Development Officer and the Managing Director of Oil Co. bring up the danger of the ideas being lost once the project is over and not recorded properly as this would mean that it could not be utilised when another similar project comes along.

The Vice President of Bio Co. comments that they are currently trying to organise something that would help them to retain the knowledge of their employees within the company, especially due to the highly competitive nature of their industry. The concept of the knowledge bank has been suggested by a few of the staff interviewed at Bio Co. as a means for an inventory to resolve the problem of knowledge retention. Moreover, the knowledge bank could be used as a method for finding people with the necessary knowledge for the company.

Finance Director (Bio Co.):

“We know some of the specialist skills that we have. We don’t always know whose got a particular piece of knowledge. That is one of the reasons we decided to create a knowledge bank and it’s a thing we do from time to time when there is a post coming up. And while every post is posted internally which employees can apply for, there maybe something that comes up that we might think somebody would be particularly good for. If we feel that they have a particular skill. But without the knowledge bank, we wouldn’t necessarily know that somebody had a particular skill”.

In Oil Co., there is a similar method of a knowledge bank but it is implemented on a more personal nature. The Organisational Development Officer of Oil Co. indicates that they have a system called the Personal Performance Programme or P3 where by the programme forms an informal knowledge base.

“The knowledge that my team present would be, again it could be dependent on job descriptions in their P3 which measures what probably the key accountabilities are, what the responsibilities are, identify what skills they have, what skills they need. We also have process maps. It’s an outline of what the key elements of the activities are, what else we need to do, what the interfaces are with other parts of the organisation and that is the key indicator of what they need to do to win job awards in terms of skills and ability to carry out, what skills they need to do that and I guess key points at what stage”.

Furthermore, the Structural Engineer of Oil Co. mentions that they have sets of information or rules that are compiled by the organisation for their staff and clients so that people will be able to work in confidence, for example health and safety issues offshore.

“We basically say, ok, here is a framework for the behaviour for your structure, within this envelope, you can make decisions safely and one of those decisions is maybe for the managers of the platform. They are constantly having to move equipment around the structure, for example containers. So we will give them an envelope of rules that says you can put so many containers in this sort of area and anything within that envelope, you can do safely. So a wider set of rules that will give them a different set of circumstances. So by setting out sets of rules, essentially everyone knows they can work safely, everybody has the confidence in what they are doing. But then, you come to a point where the rules don’t cover the next step you take. So you have to do some assessment and analysis and that’s when you get this sort of iterative loop”.

In addition, the Finance and Office Manager of Build Co. states that although they do not have a formal method of KM, they do keep an efficient filing system for every project undertaken by the organisation. This filing system involves having a base file for every project where every single memo, fax, email, minutes of meetings, drawings or correspondence regarding the project is placed together in one file which has been issued a project number. Therefore, everything linked with

the project will have the same number so that it would be easy to search for any necessary correspondence. Also, all drawings related to the project have a Knowledge Box where it has the company name, project number, drawing number and edition number on it. Once there is enough information in the file, the drawings, memos etc. are then copied and placed together with other files that are in the same area; for example, drawings of staircases are placed together in the same file. Therefore, if someone is to search for drawings of staircases, he/she would only need to look up that particular file and then review notes regarding that staircase from searching the project number. Moreover, according to the Finance and Office Manager of Build Co., having these files also helps them to be aware of possible mistakes in the future and helps to avoid them without losing money:

“We are also looking at if we should run into problems in one particular job, how did that problem come about? How do we stop it from happening in the next job? So we retain that kind of knowledge. There wasn't enough for it, we didn't count the right number of man-hours so the next kind of job, if another job came in that was similar we would know the pitfalls. We only went wrong the first time round because we've kept a record of it. And we've got a pre-proposal and a pre-schedule and we have costings on the job. So we know, right, that job was slightly under what we initially put in because of whatever number of people. So the next time a job like that, of the same type comes, we know we've got a higher chance to make us run to costs and that way we are not losing money. So we keep that kind of knowledge where we've fallen down or we made money on that so we can take another project”.

The Managing Director of Oil Co. admits that it would be good fortune if they could apply new knowledge learned in other projects. At the moment, if they are to bid for another project that is similar to another one they have done before, there is a risk that they might end up with another person as project manager rather than someone who has experience in a similar project. The Organisational Development

Manager of Oil Co. states that the reason for this is due to the fact that they have a problem of carrying forward any new information they learn from similar projects and changing it to suit other projects that might be relevant. Furthermore, the Structural Engineer (Oil Co.) believes that the library within the organisation could be better managed in order for the employees to access them and learn from previous projects:

“I think our central technical library is unmanageable, the hard copy library, because nobody knows what’s in there. The index documents we’ve got for the contents of that library, they are unwieldy. There aren’t any search engines which we could use. We aren’t entirely sure where the documents are, who’s looking after them, how they are kept up to date, all those sort of questions. So we need to make sure we understand how an electronic library would do it then and the ownership is kept with the right people”.

Although it is not exactly a knowledge bank, Tel Co. has an electronic CV system that records all the skills and qualification that each employee has. It is hoped that with the CV system, it would be easier for the employees to search for someone that might have the skills or knowledge they require. The HR Manager says that rather than looking for the necessary person through own personal contacts, with the CV, it is hoped that the person can be found through searching their expertise. However, the CV is only restricted to each division and Tel Co. is hoping to link the divisions or communities together so that everyone will be able to access the CV to search for the skills they require.

Managing Director (Tel Co.):

“At the moment, the electronic CV that we have is only within each community of each department. We’re trying to widen out in the future so that we can link the communities together and see whether we can link the knowledge and skills from one division with another”.

The Managing Director of Tel Co. does adds that the process for linking the communities together in terms of the CV is going slowly because different communities need different kinds of skills and knowledge. Furthermore, the Customer Service Manager of Tel Co. states that it is unnecessary to share skills with other departments if they do not need them as it would only overload the system with unnecessary information. In addition, Tel Co. also conducts in-house surveys that try and find out the opinions of the employees regarding any programmes that management might want to implement or are currently organising within the company.

HR Manager (Tel Co.):

“Yes, we do these electronic in-house surveys where we ask quite specific questions about the programmes and the things that they are doing in our division with verbatim allowed and things like that and they are all done anonymously. Or if they choose to, they can if they want, they can name someone on their question and also we have calls where people can ring in and ask questions to the top team or stuff like that or make their concerns or issues or positive comments or whatever”.

6.3.3. Intranet

Despite Build Co. implementing the Three-Wave System or formal filing system; Tel Co. having implemented the New Idea Scheme as well as the electronic CV and in-house surveys; Bio Co. organising a knowledge bank and Oil Co. having the P3, there is still a need to bring all these strategies together that will help to make the organisation more cohesive in managing the knowledge of their employees. Most of the companies interviewed have a method that they feel helps them in managing the knowledge of their employees more efficiently and that is via the intranet. Despite the lack of a formal KM process within the organisations, all the companies except Bio Co. are utilising intranets within their branches. Build Co. has implemented a vast intranet system within their organisation as a means of sharing and retaining knowledge. The Finance and Office Manager of Build Co. says that she would email other members of staff via the intranet in order to notify them of any news or new information. The Research Co-ordinator and the Researcher of Build Co. also both use the intranet to inform other members of staff regarding new research found that could be beneficial to the organisation:

Research Co-ordinator (Build Co.):

“It’s more a file search facility rather than a word search. Everything has to be in a search facility that we can type in a job number and retrieve it – every email or fax – where it comes from and from whom and it’ll basically help you search and find that. So it’s very structured. Basically, what an intranet does is it’s condensing people’s knowledge into one or two pages about the project. For example, we have like an internet and it’s like a homepage and we have a lot of technical things like products and if people are interested in it, they can upload that and then search for a link. So it depends on where you want to go so your knowledge becomes upgraded as and when you sit

down and read it. If you tried to search on the internet for something to find it yourself, you'd never find it. But it's there (in the intranet) the next time you want to look for it and you know you've come across it and it'll give you a contact name of who wrote it and you can pick up the phone and call them. They're all in the same organisation".

At the current moment, Build Co. is trying to make their employees check the intranet on a regular basis for any latest information that might be useful to them. They are trying to get their employees to work through the intranet so that every information will be directly saved in the intranet. Furthermore, any new information will be posted on the intranet and they will read these notices as soon as they log on to their computers in the mornings. This way, the employees will be aware of any new development that has taken place in any particular project as well as be able to input ideas that might be helpful to another project team. It is hoped that through this process, more knowledge will be captured and in a sense, the intranet be used as a KM strategy. The concept of using the intranet as a medium of communication is also prevalent in Oil Co. Unfortunately, the system is used at a basic level only and not so much as an opportunity to exchange ideas and discussions. Currently, Oil Co. has an intranet system throughout the organisation. However, according to the Business Development Manager, it is just used as an information dumping ground without any proper exchange of ideas. On the other hand, in the case of Tel Co., aside from the company-wide intranet, each department or community has its own intranet or website.

Customer Service Manager (Tel Co.):

"We have a main intranet with loads and loads of centrally gathered information but this (community based intranets) sort of takes it down one more layer for presentations and detailed information benefiting to our community that we couldn't put on a bigger website. Because if we did that for the whole of Tel Co., it would just be massive. It's like a sub-element really, it's focused on our community".

To Tel Co., there are advantages and disadvantages to using the intranet as a means for storing information and sharing ideas. According to the Managing Director, *"the community intranet is feasible at the moment because there is no added cost to the company for using this method. Since it is already in place due to the company wide intranet, adding on the community based intranet is not much cost over the benefits that could be reaped"*. However, the disadvantage of community based intranets is that other communities would not be able to have access into the information that are in the intranets. And this disadvantage is recognised by the Chief Engineer of Tel Co. who states that:

"Well, we've got the Tel Co. wide intranet which is company wide and we can submit general information on it. But specific information that are community based stays within the community intranet. No-one else outside of my community would have sight on the information that is inside my intranet and that's a shame because I might want to know what's happening in other communities which might be helpful to my team members and I'm sure there are others out there who feel the same way".

The Managing Director of Tel Co. does explain that Tel Co. is trying to combine the intranets together so that everyone can have access to other intranets from other communities. However, the senior management is considering if it is worth it to link the communities together when people might not be interested in other

communities' information. According to the Managing Director, this is because different communities need different information and although having links to other departments might seem beneficial theoretically, it just might be more of a hassle to the departments to be overloaded with information that they do not need.

Upon looking back, it is easy to see why the organisations would implement an intranet system within the company as a method of managing the information within their company. The use of the intranet as a basis for acquiring, sharing, utilising and storing knowledge is a noble gesture and it does have many benefits which Bio Co. should consider. However, there is a danger of employees uploading a whole lot of information into the intranet without having someone organising the information properly. This could be a weak link in the intranet system where there is a lot of knowledge and information on the intranet but there is no systematic way of utilising the knowledge or managing it so that the knowledge can be accessed easily.

Chief Engineer (Tel Co.):

"It's extremely easy for us to keep including stuff into the intranet. Whenever we have completed a project and want the others in our community to know about it, because we have many teams and each team has a project, then we just put it on the intranet. So if people are interested, they can have a read through about the project. Also, if there's any new information about a type of process that someone's read about, we put it there (the intranet) too. But we don't actually have a way for us to access that information, like a search engine because we need someone to go through each information and catalogue it. So it's like looking at a huge library that isn't catalogued and if we want something, we have to go through each book until we find the information we need. So we need someone to put all the projects and information together so that we can find what we need just by typing out the key word".

It is hoped that by at least having an intranet within the organisation, in time, with proper management of the information on the intranet, the companies would be able to implement a more formal method of KM to help in the efficient management of the employees' knowledge. However, in KM, besides acquiring knowledge and processing them, there should also be ways for the organisations to retain as well as share the knowledge learned. All the companies interviewed say they try to encourage employees to share ideas or create products at the fastest time possible but rarely do they try to manage the application of knowledge learned where they change tacit knowledge into explicit knowledge. This is to prevent employees from having to rediscover the same knowledge over again.

6.3.4. Problems in the KM Process

As can be seen from the discussion of the literature in Chapter Three, the theory and practice of KM is not unproblematic. This can be illustrated with reference to a number of the research questions. In relation to the research question regarding the issues concerning KM, it is found that the organisations experienced a number of issues in implementing their KM processes. One of the issues faced by Tel Co. regarding their KM process, in this case the New Idea Scheme, is that general employees of Tel Co. are not given such an open-house opportunity to review ideas suggested by their peers (Customer Service Manager, Tel Co.). This is because the New Idea Scheme is handled by the New Idea Team that is a particular group of

people that have skills or expertise that might be relevant to that area. Furthermore, the Managing Director of Tel Co. also admits to having some disadvantages of the programme indicating that it is difficult to maintain the momentum of the scheme when nobody has the time to contribute. Especially when the employees are working on a shorter time scale to produce work, interest in the New Idea Scheme is lost because they are too focused on their own projects. Therefore, according to the Managing Director, the momentum of the programme relies very much on the contribution of the employees.

Another problem being faced is by Build Co. that indicates that due to the tight time-scale while involved in a project, it is rather difficult to share and review ideas (Research Co-ordinator, Build Co.). This problem is similar to the one faced by Bio. Co., who states that their biggest challenge at the moment is knowing what knowledge they have within their employees as well as getting people to contribute to the KM process.

Research and Development (Bio Co.):

"I think one of the hardest things is getting people to contribute especially at very junior levels. To contribute knowledge. A lot of junior scientists and staff don't feel they have a contribution to make and that's quite a difficult thing to manage that and make staff realise that they have a contribution to make. And they can make a significant contribution in terms of their knowledge into a generation of new products and new product ideas and that they don't just have a role at the basic level".

When asked about how they would overcome this problem of trying to encourage their employees to contribute to a knowledge bank, both the Quality and

Assurance Manager and the Research and Development Manager mention that it is basically down to the type of people hired. The Quality and Assurance Manager says that there are some employees who would come into work and do their job at the basic level whereas there are others that take their own initiative to contribute more into their work. Therefore, the Research and Development Manager of Bio Co. feels it would be good to try and find employees, who would try and contribute in terms of their knowledge, look into projects and project bearings as a way of overcoming the problem of getting employees to contribute to the KM strategy. Furthermore, both the managers state that if there is a knowledge bank implemented in Bio Co., they would look at what the employees are doing in terms of projects, check the job descriptions of the posts as well as review the record of the employees' qualification and training background as a means for encouraging people to contribute.

Quality and Assurance Manager (Bio Co.):

"I like to see people developing their skills and realise that they've got a specific bank of knowledge and I would encourage them and then to share and make contributions to see that they then get the satisfaction, the job satisfaction and know that they've been able to do something to carry on that knowledge".

Surprisingly, these statements regarding the Three-Wave System, the weekly meetings, the P3, and the filing systems are in contradiction to the answers Build Co., Bio Co., and Oil Co., give when interviewed. They admit that they have neither a formal KM process nor any formal method to review ideas suggested by employees (Office Manager, Build Co.; Researcher, Build Co.; Vice President, Bio

Co.; Finance Director, Bio Co.; Quality and Assurance Manager, Bio Co.; Managing Director, Oil Co.; Business Development Manager, Oil Co.). Most of the staff interviewed from Oil Co. admit that they do not have a formal review board to process ideas suggested by their employees at a lower level. If there is a review board, it would be at a higher level now for new technologies that requires funding and that would be more for technology rather than knowledge.

Managing Director (Oil Co.):

“No, we don’t have a review of new ideas. That would tend to happen on the project but I think there is a weakness in the way we are organised at the moment that often those good ideas get lost in the project and they don’t get transferred to other projects in the company. I think it is necessary, it’s just something that we are not good at, it’s an area that we need to improve on”.

Furthermore, some of the interviewed staff of Build Co. do not consider the Three-Wave system as a formal KM process that might exist within the organisation. The Finance and Office Manger of Build Co. says that she does not know much about that process while the Research Co-ordinator views the Three-Wave System as an idea bank where they could store knowledge rather than a process where ideas could be reviewed and implemented.

The reason for not having a formal KM procedure within Oil Co. is explained by the Managing Director who mentions that at the current moment, a formal KM process could not be implemented since they have higher priorities to settle:

“We’ve had a number of challenges in Oil Co. over the last 18 months and our life has been more about survival than putting into place some of the best ideas. So some of the ‘nice to have’ ideas, they stopped quite quickly because

we tried to cut costs. Because you can't measure this (benefits of KM), it is very easy to stop initiatives to deal with knowledge management because you can't really measure the value so easily".

Both the Managing Director and the Business Development Manager of Oil Co. add that an efficient method of KM would be beneficial to the company once they have the opportunity to implement it. Moreover, both agree that it could be considered as an investment for the future once the benefits of having the system are determined. They further comment that in order to do that, they would need to determine what the main areas of benefit and efficiency will be through having knowledge management. In addition, in an industry such as Oil Co., it is important to manage knowledge properly for the safety of others.

Structural Engineer (Oil Co.):

"It might be in many different forms but knowledge is how quickly you can make a decision. If circumstances change, how quickly can you respond to that change safely? It's easy to make a decision but if it's based on bad knowledge, where people are just guessing, then it's a bad decision and it could have serious consequences. It could put people at large at risk. A company could go out of business because they made the wrong decision based on the wrong knowledge. One of the things we say is, a little bit of knowledge can be a very dangerous thing in the wrong hands and so within the regulations that govern the business that I do, one of the key words is competency, so you have to be competent to use the knowledge that is available to you".

However, the Managing Director of Oil Co., mentions that since he is responsible for the company, and if it is not profitable, they have to consider the cost first. And to him, it is difficult to measure a knowledge database or knowledge management in terms of money.

Overall, even though all the organisations state that they do not have a formal process of managing the knowledge of their employees, it is discovered through the interviews conducted that the policies and procedures already implemented within the companies could become a basis for an efficient method of KM. For Build Co., the use of the Three-Wave system, the Coaching System and the filing system is just the first few steps into setting up an efficient KM process. It is hoped that through time, they would be able to have a knowledge-led organisation that could be beneficial to their clients as well as to their own employees. In the mean time, as mentioned by the Senior Partner of Build Co., they are progressing one step at a time to make sure every step is in place and understood company wide before the next few steps are taken. This is the same for Tel Co. and Bio Co. that are trying to implement a formal KM process through a series of smaller policies and practices, which combined, would give them a better management of the knowledge of their employees. Furthermore, Bio Co. could lose a lot of potential knowledge from their employees if they do not try to implement a knowledge bank within their organisation. Although it is quite obvious to see that Oil Co. is doing the best they can to organise a strategy of managing the knowledge of their employees on an informal basis, they also recognise that they are still having problems with trying to apply any knowledge learned. Therefore, it is hoped that Oil Co. will one day be able to reintroduce knowledge and lessons learned from each project back into the organisation and make it easily accessible to the employees so that they would not continuously be reinventing the wheel.

From looking at the table below, a brief overview regarding matters relating to the issue of KM processes within the organisations of this research can be seen.

Table 6.2: Knowledge Management Strategies

Bio Co.	Build Co.	Tel Co.	Oil Co.
<ul style="list-style-type: none"> ➤ KM strategies necessary to avoid employees researching the same knowledge and to share with the rest of the company. ➤ Has a formal idea review programme in research and design. ➤ No intranet. ➤ Difficulty in knowing what knowledge is within their employees and getting them to contribute. 	<ul style="list-style-type: none"> ➤ KM strategies necessary to stop employees from 'reinventing the wheel'. ➤ Has 'Three-Wave System' as formal method of reviewing ideas. ➤ Has Coaching System for discussing ideas and strategies. ➤ Has vast intranet system. ➤ Difficulty in sharing and reviewing ideas due to time-scale in completing projects. 	<ul style="list-style-type: none"> ➤ KM strategies needed to provide demanded services to customers. ➤ Has New Idea Scheme as formal method of reviewing ideas. ➤ General employees not given opportunity to review ideas suggested by peers. ➤ Utilises electronic CV as means of contacting people. ➤ Each department has own intranet. ➤ Momentum lost if no one contributes. 	<ul style="list-style-type: none"> ➤ KM strategies necessary for safety reasons. ➤ Has Personal Performance Programme to monitor employees' career. ➤ Have sets of rules and regulations for safety to share with clients and competitors. ➤ Has intranet but is being used as data-dumping. ➤ No efficient utilisation of knowledge stored. ➤ Difficulty in having KM strategy due to other priorities.

In conclusion, although the organisations involved admit that they do not have any systematic KM process, this section has revealed that most of the organisations have some policies regarding reviewing ideas, implementing them and storing information. Although this could not be considered as an efficient, fully functioning KM strategy, the combined utilisation of the different policies could be beneficial in at least managing and maintaining the current knowledge base within the organisations in a basic manner. Therefore, it is interesting to move to an examination of the methods, if any, that they use to store the information they

obtain and share the knowledge among their employees as the next step in managing the knowledge of their employees.

6.4. Retention and Dissemination of Knowledge

In this section, data answering the question of how knowledge is retained and disseminated within the organisations interviewed will be presented. How organisations store the knowledge of their employees as well as how they would share the knowledge among other employees or clients are the key issues that would be looked at.

6.4.1. Inventories

Although all the companies interviewed state there are no formal methods of retaining knowledge within their organisation, they do implement various practices that help in the storing of knowledge. When asked whether their respective organisations have any knowledge inventory that lists the knowledge that their employees have, most of them state that they do not (Managing Director, Tel Co.; Quality and Assurance Manager, Bio Co.; Managing Director, Oil Co.).

Managing Director (Oil Co.):

“When it comes to the ‘smart ideas’ thing (knowledge inventory), no we don’t have a formal system for that and that’s why we are working on some form of knowledge database”.

With this in mind, Bio Co. is trying to rectify the situation of not having an inventory by trying to implement a type of knowledge database within their organisation.

Finance Director (Bio Co.):

“Currently, in terms of their knowledge, each employee has a personnel file. Within that personnel file is either an application form or a CV which has a list of all their pre-existing qualifications before they came here. Each employee also has a training record where we record all training routes which takes place, in-house or training courses, whatever. Every employee has an individual record. What we are doing at the moment is we are collating the information from the pre-existing qualifications and skills and our own training records to in effect create a knowledge database of employees. So we are working towards that at the moment”.

The reason why there are no formal knowledge inventories is explained by the Vice President of Bio Co. who mentions that not only is it difficult for people to list down exactly what they know but that people do not have the time to write the things down for recording. This reason is supported by both Managing Directors of Tel Co and Oil Co respectively as well as the Structural Engineer of Oil Co.

Managing Director (Tel Co.):

“We’ve had several goes at trying to do that (knowledge inventory) but it’s very, very difficult. Primarily the difficulty that I have experienced is people’s perception of their skills set is very difficult to quantify. Each individual could provide me with a different assortments of skills and knowledge. For example, if I say, right, I want people who have design experience, unless I have some way of quantifying that design experience, I basically come up

with a list. All it does is probably tell me that 90% of the people have design experience. It hasn't really been of any great use. It's a subject that we go back to constantly".

Although the companies do not have any knowledge inventories about what their employees know, all of them have a skills inventory that lists the skills and qualifications that their employees have. This inventory could be used as a basis for building a knowledge inventory within their organisation (Senior Partner, Build Co.; Finance and Office Manager, Build Co.; Research Co-ordinator, Build Co.; Managing Director, Tel Co.; HR Manager, Tel Co.; Organisational Development Manager, Oil Co.).

Senior Partner (Build Co.):

"When somebody joins the practice, they are asked to say what experience do you have in terms of software, building types that they've worked on, so on and so forth".

Organisational Development Officer (Oil Co.):

"I think that we need to get smarter, and this is a general problem I guess, is a CV if they need to go for some of the job specific skills and knowledge people have and how they can substantiate that by what achievements they made. And again looking at the skills, knowledge and achievements from these CVs would certainly help the company identify what knowledge is in the company".

This is similar to Bio Co. that states that they have a mini-CV in place of an inventory.

Research and Development (Bio Co.):

"I suppose you would call it sort of a database that lists the experience, basically like a mini-CV. Instead of a CV you might put together if you were

applying for a job which is rather more detailed and descriptive of what you have done in your background and so on. We have, I suppose, a group of mini-CVs which every person in the R&D group have which describes their experience, the technologies and areas that they have worked in. So we have, I suppose, a small database of the kind of experience that we have within the group here in Scotland and the groups in the US”.

The Structural Engineer of Oil Co. mentions that in his division, they do have an inventory that is given to clients to see what skills their employees have but the only problem is that the inventory is not as good as it should be:

“Yes, we have inventories for various types of knowledge in as much as we know which design reports we have from our various clients for the various structures which we have done. I think what we do better is identifying what is important to inventory and what is knowledge which might be in paper form which is generated as part of the process. So we will generate a lot of knowledge on the way to producing a report to say what we’ve done so we would give to a client which summarises that knowledge. We would have in our inventory the final report but some of the steps to get to that point we wouldn’t necessarily be documenting as well as we could. It would come down to the individual remembering where he left that file, rather than having it properly logged and catalogued and all this kind of thing. So in that sense we are not as clever as we could be”.

The problem of not documenting all the steps taken in the project could be rectified if Bio Co. is to follow in the footsteps of Build Co. that logs every single drawing, memo, fax and information regarding each project so that every step is recorded and filed.

It is encouraging to see that the companies do take notice of what skills their employees have but at the same time, the skills inventory is just an inventory. It just gives a list of qualification, skills and training done but it does not indicate what knowledge the employees actually know. One of the ways to rectify the situation

that is currently being used by some of the organisations interviewed is to use an idea bank. An idea bank is where the employees can submit ideas that might be helpful to the organisation. We have seen this in the case of Build Co. and Tel Co. with the Three-Wave system and the New Idea Scheme respectively. Whatever ideas that are suggested but not processed into an actual product of service are kept in case it becomes feasible later. Unfortunately, neither Bio Co. nor Oil Co. implements any idea banks within their organisation. Bio Co. does agree that it is something they needed to look into in terms of having an official system of recording or storing ideas in case they resurface later on (Finance Director, Research and Development Manager, Bio Co.). This situation is put succinctly by the Senior Partner of Oil Co. who says:

“No, I’m afraid we don’t have an idea bank. Our bank is empty”.

However, Oil Co. has implemented a system of suggestion boxes all over the organisation giving employees the opportunity to suggest ideas that might be useful for the company. Unfortunately, the ideas taken from the suggestion box are not recorded and kept in an idea bank, therefore, losing out on a potential knowledge database. Having a skills inventory or an idea bank is a step in the right direction of creating a knowledge database but it fails to account for the knowledge of the employees who do not contribute to the system.

6.4.2. Retention of Knowledge

Although the organisations do not have a knowledge database in place, they have implemented various means of retaining some knowledge of their employees within their organisation. When asked how the organisations store information that they gain from their employees, most of them (apart from Bio Co.), say they use the intranet (Senior Partner, Build Co.; Research Co-ordinator, Build Co.; Researcher, Build Co.; HR Manager, Tel Co.; Structural Engineer, Oil Co.).

Research Co-ordinator (Build Co.):

"We have set up our intranet where all the offices are forced to take the time to put something into the intranet and that way, it'll be stored in. Everything has to be in a search facility that we can type in a job number and retrieve it. Every email, fax, where did it come from and from whom and it'll basically help you search and find that. So it's very structured. As the intranet develops, we'll get more people in and we'll get more advantage but it's not really doing anything yet. So we're trying to develop ourselves and our work as we get more work from our clients. We're trying to put those in so that we can learn from that and keep what is fine and then maybe develop on other things so that the project is better next time".

Since most of the organisations rely on the intranet as a means of storing and sharing information, it would be prudent to make sure that the intranet is updated on a regular basis as well as maintaining good accessibility to the intranet. That way, the latest information will be accessible easily to the employees to ensure a smooth flow of knowledge sharing.

Structural Engineer (Oil Co.):

"There is an area on our intranet at the moment where you can log things that have gone well, things which have gone badly, lessons learned. It's not

as broadly used as it ought to be. Possibly because the access to it isn't as easy as it should be. I think we need to improve the accessibility of our intranet before this really becomes useful".

Besides using the intranet as a medium of storing knowledge, the organisations also use hard copy files and computer files to retain any information within their company (Finance and Office Manager, Build Co.; Research Co-ordinator, Build Co.; Researcher, Build Co.; Managing Director, Tel Co.; HR Manager, Tel Co.; Chief Engineer, Tel Co.; Managing Director, Tel Co., Organisational Development Officer, Oil Co.; Business Development Manager, Oil Co., Structural Engineer, Oil Co.).

HR Manager (Tel Co.):

"Yes, we do have paper files for our information as well as computer files. The computer files are backed-up and updated regularly while we make sure that we have a copy of all our hard files, paper files, you know. If people want to see these files, then they can get onto the server and the files are there. For the paper files, we have sort of a small library in the department where they can read or copy the necessary files. It's just like a basic filing system which people have access to".

Business Development Manager (Oil Co.):

"We do file our reports but again it's not very rigorous, we just archive it. We let project managers know that it's there to be looked at and it's up to them if they want to come and find it. But it's not a very good process, I have to say. So it's pretty crude. That's all we have.

In the case of Bio Co., however, a lot of their information are not only kept in files or in the computer but in laboratory log books as due to the nature of their industry, the log books become a central part of the storing of knowledge (Vice-President, Bio Co.).

Research and Development Manager (Bio Co.):

“Within the R&D group, most of the information is stored, in terms of scientific work, on paper in laboratory notebooks. Again we are fairly poor in that we do actually, and are required to generate lab notebooks, keep them up to date, have them signed off and approved. But actually what we do with that information, once it’s in the lab, we are fairly poor at in terms of either storage of information, archiving information, archiving of data. In other words, if we have a fire in the building, all our information would disappear. We do store some of it in fireproof cabinets and fireproof safes but I would say that 50 to 60 to 70% of our information, that we would require for the development of products that satisfy the sort of quality and regulatory requirements for launching a new product into the European market or the American market would disappear. And we would be incapable of recovering that data because we don’t archive and store it effectively and efficiently. That’s another one of the things we are looking at, how we do that better”.

Although the storing of information in files is a good idea, there is still the problem of trying to access that knowledge efficiently. Oil Co. and Bio Co. seem to be the only ones to voice this problem in relation to the filing system as they indicate that they need someone who knows where the necessary information is stored and is able to access it easily when needed.

Managing Director (Oil Co.):

“Now there’s a difference between data and information and I wouldn’t classify archiving records as a good way to get access to information, if you know what I mean”.

It is interesting to see that the organisations are still using the traditional methods of storing information rather than relying on the advanced technological aspect of using an intranet. Furthermore, the organisations also encourage their employees to transfer their knowledge into written manuals or procedures as another step in retaining information (Researcher, Build Co.; Customer Service Manager, Tel Co.;

Vice President, Bio Co.; Finance Director, Bio Co.; Research and Development Manager, Bio Co.; Business Development Manager, Oil Co.).

Customer Service Manager (Tel Co.):

“We try to encourage our employees to write up what they know. Regardless of what it is, whether it’s training they’ve been to or experience they have gained from working in the department. We’ll put it up on our website and it encourages the staff because they get the recognition on the website as well as being the author. We also have a newsletter that we try and get people to contribute to. It doesn’t matter if it’s a recipe for roast turkey or if it’s ways to handle customer enquiries on a bad day. It’s something that we can use as a way to get hidden knowledge from our people”.

Finance Director (Bio Co.):

“The only area that I can think of where it’s something that is actively encourages is where we write our procedures. Generally it’s the person who’s got the most experience in that area that writes the staff operating procedures for that area. And these procedures can be written and it gives us that person’s knowledge. So an aspect of their tacit knowledge will find its way into the operating procedure. These procedures are written by people who know what they are doing and they should be written in a way that somebody who doesn’t have that specialist knowledge can follow those procedures and carry out the function”.

It would seem that the organisations researched upon have various techniques to store information and knowledge within their organisation i.e. the knowledge of their employees as well as information already available to their company. However, a combination of these procedures together might give a better management of knowledge for a smoother flow of knowledge sharing.

6.4.3. Dissemination of Knowledge

The concept of sharing knowledge within the organisation is important for the longevity of an organisation. Employers and employees should be encouraged to share knowledge as a means for storing knowledge. Passing on ones' knowledge to another can make a huge difference in completing projects and offering better services. Especially when an employee is to leave the organisation for whatever reason, without the sharing or storing of knowledge, this could lead to a brain drain within the company. When asked how the organisations share knowledge within the company, it is indicated that the organisations either use the intranet or email. The Senior Partner of Build Co. mentions that the coaches would meet regularly and publish reports on the intranet so that anyone interested in a particular area can search for the specific expert and read reports regarding work done by these people. Furthermore, the Researcher of Build Co. states that she would prepare presentation packs of any research she has done and she would e-mail it to people as well as put it on the intranet. This is similar in the case of Oil Co. where people are forced to go through their intranet to access their e-mails. And therefore, they would have a brief look at the main headlines of what is happening in the organisation and if something is to interest them, they can click on the actual report to read further (Business Development Manager, Oil Co.).

In Tel Co., they try and persuade people to write reports or articles to put on the intranet. They hope that through this process, employees will be able to access the

articles and gain more information from them. Moreover, it would give a form of recognition to the author of the articles and would act as a means of encouraging others to contribute to the intranet. The Chief Engineer of Tel Co. is particularly enthusiastic of the benefits of using the intranet as a medium of storing knowledge.

Chief Engineer (Tel Co.):

“One of the most significant development I have seen in the accessibility of stored information on the organisation as a whole, has been the development of the intranet. The development of the intranet has made information that was historically either out of date or difficult to get hold of easily accessible. It took a long time, you would perhaps have to find someone who knew about something and apply for a copy of that document. That would be a time consuming process and you would get fed up waiting. The accessibility of the intranet is absolutely superb. It’s an excellent way of sharing knowledge”.

The organisations are wise to utilise the technological benefits of the intranet to share knowledge. However, a majority of the participants interviewed still rely on the traditional way of sharing knowledge via discussions with one another (Senior Partner, Build Co.; Research Co-ordinator, Build Co.; Managing Director, Tel Co.; Customer Service Manager, Tel Co., Finance Director Bio Co.; Research and Development Manager, Bio Co.).

Managing Director (Tel Co.):

“Really an awful lot of the knowledge is with the individuals and one of the most important things for us is the skill of that individual and the knowledge that the individual has for that particular part in the company in a particular area. So if we are to group people together and have a discussion after each project, we can get a lot of information and knowledge going back and forth among them”.

Research and Development Manager (Bio Co.):

“We have monthly review meetings which are the 15 development staff all sitting down together to review research work, development work and project work that’s been going on within the group. And those are the opportunities for people to disseminate information or new techniques or new technologies which may have benefit within the research and development group”.

The Vice President of Bio Co. does say that although it is a good idea to get the scientists from different projects to meet together to discuss their work as it would be a good way of sharing information, it is sometimes difficult to arrange a meeting as each project is working on a different time scale. In Oil Co., they try to gather people together after a project to get feedback on what happened during the project. The team would discuss and try and gain any new knowledge that they can glean from the process of the project. However, both the Organisational Development Officer and the Business Development Manager of Oil Co. believe that this process is not administered rigorously. They state that the lessons learned session is not recorded properly or published on the internet and therefore, a lot of the new information gained from the discussion does not get passed around to others in the organisation or with clients. This is especially important in an industry such as Oil and Gas where accidents can cause lives, as explained by the Structural Engineer of Oil Co.:

“Certainly after the Piper Alpha explosion there was a great need to share knowledge and a lot of research work was done and we get involved in some of that research work ourselves where we can put our experience into documentation which a much wider audience will see. But that’s with the approval of all our clients and we accept that we may lose a commercial edge because we have special skills which we have given to ourselves, which we are going to give to our competitors. But it’s for the greater benefit of the industry and that works two ways because our competitors will be doing the

same things and we will gather their knowledge as well in a form that again they are legally entitled to use”.

Therefore, sharing knowledge among employees is not only important for retaining the knowledge within the organisation but could also be a health and safety issue. Sharing information is also important if someone is to leave the organisation. As knowledge is within the head of the employees, if they are to leave, it might cause a brain drain. When asked if the organisation would ask the employees to train a successor before they left as a way to cope with the brain drain, many of them indicate steps that are taken in order to retain as much information as possible. Among the steps taken include training the successor, asking the person leaving to write down manuals or guides, giving presentations and seminars as well as having group discussions with other members of the team before leaving (Senior Partner, Build Co.; Researcher, Build Co.; Managing Director, Tel Co., Customer Service Manager, Tel Co.).

However, both the Organisational Development Officer and the Business Development Manager (Oil Co.) comment that it is more of a hand over period rather than a training procedure. The employee leaving would more or less pass down the roles and responsibilities rather than actually train someone. Furthermore, they feel that the possibility of training a successor depends on the level of the position as well as the reason the employee is leaving. If they are leaving of their own volition, the employees tend to be quite complacent about sharing their

knowledge before they leave but if it is through other means, then it is possible that they would not be willing to part with any information they have.

An important issue that is brought up when discussing training successors is whether there is time for the training. Most of the participants interviewed mention that they would try their best to have the employee who is leaving to train a successor but it is difficult due to the lack of time (Managing Director, Oil Co.; Chief Engineer, Tel Co.; Quality and Assurance Manager, Bio Co.).

Managing Director (Oil Co.):

"We probably do not have a successor training because of the nature of this business. People leave very fast. It's just a kind of industry thing and therefore, if that person has special knowledge the probability is they leave with that knowledge, it won't be imparted to anyone else. There's a risk of brain drain, yes, but in fact in this business, there is a very large number of self-employed people and they tend to move around the market like a bunch of gypsies. So it's very difficult to measure that sort of intellectual capital of your company because the capital is very mobile".

Another problem that is highlighted regarding training a successor is the situation of competitiveness among the industry. The Research and Development Manager of Bio Co. and the Finance and Office Manager of Build Co. both say that despite trying to arrange an overlap of times between the person leaving and the successor filling the post, there is the issue of competition within their respective industries. Both are cautious about having someone stay on longer than necessary if they are leaving since the person leaving might take away information that might be beneficial to the competitors.

Furthermore, there are some that say that it is difficult to train a successor due to the specialised knowledge that the employee holds. Both the Finance Director of Bio Co. and the Structural Engineer of Oil Co., state that there are some positions within the organisation that have extremely specialised knowledge. In this case, if that particular person is to leave the company their knowledge would be lost to the organisation and they would have to replace the person with someone with the exact specialised knowledge. Both the managers of Bio Co. and Oil Co. feel that these positions are not something that they could train someone to be knowledgeable in within a short period of time. Moreover, a few of the participants mention that although it is a good idea to share knowledge among each other, it is a lot easier said than done as many people are wary of sharing knowledge with others (Chief Engineer, Tel Co.; Organisational Development Officer, Oil Co.).

Organisational Development Officer (Oil Co.)

“For a lot of people, knowledge is about retaining and recording data. I think the key is unlocking that and trying and making that accessible. However, individuals have difficulty articulating the knowledge they do have, where they don’t recognise it as knowledge that’s of benefit to the organisation. And another problem is that the people who do recognise it are reluctant to let go of that and make it more widely available. They in fact perceive of it as their own. Their asset is particular empowerment. So I think that’s a difficult issue as I see it and that’s how you get people instinctively say to recognise that they’ve got knowledge and then are willing to share it with others”.

The issue of trying to get employees to recognise their own specialisation and knowledge as well as be willing to share their knowledge with others is a fine line that is walked by the organisations in encouraging their employees as well as maintaining the knowledge base within their company. Therefore, although all the

organisations try to encourage their employees to share their knowledge before leaving, it is difficult since many are hesitant to share and some positions held too specialised a knowledge to pass on as well as not having enough time to do so.

Besides retaining and sharing the knowledge among employees, the research is also interested in discovering how the organisation would apply any new knowledge that is created within the company and whether it is applied throughout or just in specific departments. In asking the question of how knowledge is being utilised within the company, it is discovered that some applied through training and others through seminars and presentations and all the organisations said that new knowledge is applied throughout the company as long as it is relevant.

All of the participants within Build Co. revealed that any new information that they find would be put onto the company database and intranet as well as through written reports. In Tel Co., they try to apply the 'best practice' policy organisation wide (Managing Director, Tel Co.). They try and apply new knowledge within the company through communication, either via e-mail or just through word of mouth. Furthermore, since the intranet within Tel Co. tend to be community specific, any new knowledge discovered within the department would be passed around to the other staff within the community. Furthermore, if the information is related to the rest of the employees in Tel Co., the information will be placed on the company intranet.

As for Bio Co., they usually offer training programmes as a mean of sharing new knowledge within the organisation. When someone has come back from a training programme, they would be asked to give a presentation, hold a seminar or train others within the department or the company. It is hoped that through this practice, the new knowledge that the employee has gained would be shared with the rest of the employees (Finance Director, Quality and Assurance Manager, Research and Development Manager, Bio Co.). In Oil Co., they try to spread new knowledge created or discovered through an informal knowledge sharing approach by getting employees into groups and letting them discuss things and ideas (Organisational Development Officer, Oil Co.). And then they try and monitor the situation so that any new ideas that are uncovered through the discussions are implemented efficiently. Furthermore, sometimes, there are different people from different departments gathered and each of them would then pass on the knowledge gained from the discussion to their own team members within their respective departments (Business Development Manager, Oil Co.).

Therefore, all the organisations do apply new knowledge or product that is created within the organisation mostly organisation wide and they share this knowledge so that their employees will be more knowledgeable about any new information that has come out. This led to the question as to what knowledge should be shared and to whom? The participants from all the organisations say that it is senior management that determines what knowledge should be released and other than personal information, mostly all new information is openly distributed to

the staff and clients (Senior Partner, Build Co.; Finance and Office Manger, Build Co.; Managing Director, Tel Co., Vice President, Bio Co.; Finance Director, Bio Co.; Managing Director, Oil Co., Organisational Development Officer, Oil Co.).

Furthermore, in both Build Co. and Tel Co., they would try and promote their ideas and knowledge to their clients through marketing (Research Co-ordinator, Build Co.; HR Manager, Tel Co.) so that the clients would be aware of what services are being offered by the company. Oil Co. goes one step further with the clients and customers by setting up an alliance with their supplier, customers and themselves so that any information that is gained will be passed on to the other members of this alliance. This is so that they could help to cut down on costs, time and effort on all parties involved (Managing Director, Organisational Development Officer, Business Development Manager, Oil Co.).

In Bio Co., although they would distribute product brochures to their customers, the management has a tighter restriction over which knowledge should be shared as Bio Co. would need to get approval from the head office in the United States. This is because Bio Co.'s parent company is listed on the stock exchange and any new information that gets released to the public could affect the share prices:

Research and Development Manager (Bio Co.):

Distribution of information to the public is centrally controlled mostly through the US corporate office in terms of what's released in terms of information of the company. It could be financial information, product information and so on is all controlled through the corporate office. Anything that we release to anyone, financial information can have a significant

impact on the share price and therefore, we don't release any information at all without the corporate approval".

The following table provides a summary of the results relating to the discussion of retention and dissemination of knowledge within the organisations of this study.

Table 6.3: Retention and Dissemination of Knowledge

Bio Co.	Build Co.	Tel Co.	Oil Co.
<ul style="list-style-type: none"> ➤ Uses basic CV of skills as inventory. ➤ All scientists maintain lab log-books daily. ➤ Employees asked to write down procedures of process. ➤ Have problems assessing stored information. ➤ Knowledge shared through discussion with other employees. ➤ No time for successor training. ➤ Replace positions with people with specialised skills only. 	<ul style="list-style-type: none"> ➤ Uses employees' CV as inventory. ➤ Utilises intranet to store knowledge. ➤ Utilises hard and soft copy filing. ➤ Asks employees to write manuals based on experience. ➤ Share information by publishing articles on the intranet. ➤ Prepares presentation packs for clients and other employees. ➤ Tries to train successors. 	<ul style="list-style-type: none"> ➤ Utilises employees' CV as skills inventory. ➤ Utilises intranet to store information. ➤ Has hard and soft copy filing. ➤ Asks employees to write manuals and newsletters based on experiences and published on the intranet. ➤ Knowledge shared through discussing with other employees. ➤ Employees asked to give presentations. ➤ Try to apply best practice techniques. 	<ul style="list-style-type: none"> ➤ Get employees together after project to share experience. ➤ Lessons learned not recorded properly or published on the intranet for future projects. ➤ Rules and responsibilities passed down to employees. ➤ Different employees from different departments meet up to share knowledge. ➤ Need someone who knows where the necessary information is to access stored knowledge.

From the results above, it can be seen that the organisations do implement various techniques and methods for storing and sharing information within the company. Also, examples for the importance of sharing information from people leaving the organisation to sharing knowledge in the industry to prevent tragic accidents from happening are being presented. A combination of all these practices could make the organisations more efficient in managing the knowledge of their

employees. However, the management of knowledge also needs efficient support to maintain the momentum of the KM process as well as to avoid any problems of brain-drain if the employees are to leave the organisation. Therefore, it would be interesting to discover the Human Resource aspect of the employees that assist the company in maintaining the overall knowledge base within the organisation.

6.5. Human Resource Support Systems

In this section, the results regarding the question of the Human Resource Support System aspect of the organisation, namely training programmes, salary schemes as well as reward programmes that might be implemented within the organisation to encourage employees to be more knowledgeable will be focused upon.

6.5.1. Training

From the results presented earlier regarding acquiring, storing and sharing knowledge, many of the participants mention that their employees gain and share knowledge through training. When the participants are asked what sort of training is given to their employees in order to increase their skills, many say that the training depends upon the jobs the employees are doing as well as on their personal reviews. There are quite a few of the participants that say that the job that the employees are

doing determines what sort of training they would undergo (Finance and Office Manager, Build Co.; Managing Director, Tel Co.; Chief Engineer, Tel Co.; Vice President, Bio Co.; Finance Director, Bio Co.; Research and Development Manager, Bio Co.; Managing Director, Oil Co., Structural Engineer, Oil Co.). Most of them say that they would offer any training that is related to the job of the employee as long as they feel it would benefit the employee in terms of career advancement as well as the organisation that would be gaining the skills of the employee. Furthermore, in Tel Co. and Oil Co., many of the positions are very technical and therefore, they need to gain proper technical training. Moreover, in the case of Oil Co., there is legislation that would determine some of the training necessary in terms of health and safety on offshore platforms (Managing Director, Oil Co.).

Besides basing the training on the type of jobs that the employees are doing, the organisations also arrange training based on the personal reviews of the employees. In Build Co., they have personal reviews for the employees as well as the RIBA review that would determine the training that is required by the employees. The RIBA would determine what training is needed to gain the qualifications for an architect and this would involve attending seminars, lectures and presentations. However, according to the Research Co-ordinator of Build Co., there is no systematic structure of training for architects as compared to engineers as there is no guideline or structured training programme. Therefore, many architects in

training could end up working for many years on a job and not get enough or adequate training (Research Co-ordinator, Build Co.).

In Tel Co., they would try to align the objectives of the organisation along with the personal development process of the employees and try and offer them training that would suit their career (HR Manager, Tel Co.). The Chief Engineer of Tel Co. does not believe in offering too much of a change in the training to the employees from their area of work in order to maintain the employees self-esteem. He feels that if the knowledge of the employee is building up rather than making 'jumps' then it would make people more confident with themselves and their work (Chief Engineer, Tel Co.). Through this, Tel Co. hopes to maintain a productive environment within the organisation for their employees to grow in.

Oil Co. has a similar practice as Tel Co., whereby they would review the employee's progress through a performance appraisal system and offer training suitable for the employee's particular area of expertise (Business Development Manager, Oil Co.). Furthermore, they have a training calendar which encompasses a series of the core management training events set up for the year. This training schedule is for each of the business leaders in their area which would then be passed down, through them, to their own members of staff (Organisational Development Officer, Oil Co.). Oil Co. hopes that through efficient performance appraisal systems and a training calendar, they would be able to offer better training

programmes for their employees in order to help them gain knowledge that would be beneficial to the employee themselves as well as to the company.

Therefore, a lot of the training offered in the organisation is generally formal with actual courses and seminars. However, a couple of participants feel that besides the formal training given, the actual job itself is training enough as it allows the employee to gain some valuable experience. Both the Research Co-ordinator of Build Co. and the Customer Service Manager of Tel Co. feel that the best training that an employee could have is through the work that they are doing. The Research Co-ordinator (Build Co.) states that many of the senior partners are in high demand due to the amount of experience that they have. Hence, many of the architects do not have a structured training programme as it is deemed that their job is their training. As for Tel Co., the Customer Service Manager mentions that they would provide a mentor to guide the employee through the job so that they could get hands-on training.

It is encouraging to note that the organisations interviewed offer a vast variety of training programmes in order to increase the knowledge of their employees. Therefore, this research is interested to uncover whether the organisation would be willing to pay for the course or give time off to the employee if the respective employee wanted to go on a course that might not be organised by the company. The results show that the organisations are willing to send their employees for the courses, sometimes with time off (Finance and Office Manager, Build Co.), but

would rarely pay for the course, except for Bio Co. that is willing to pay for the course as long as it is beneficial to the organisation (Finance Director, Bio Co.). Furthermore, the Managing Director of Tel Co. prefers that the employees receive the training away from their desks as then they would be able to concentrate on their training and not be disrupted with the job being carried out in the office. However, the Structural Engineer of Oil Co. indicates that it is not really an issue in his department as many of the engineers these days would not attend additional degree courses as it is not an incentive to them. The engineers would only attend short courses that do not take them out of their jobs.

Structural Engineer (Oil Co.):

"We don't prevent them from gaining further knowledge. We would like to keep them, because obviously, we invest time and effort in them. If they want to do a further degree at night school in their own time and there isn't as much sense for engineers doing a few years work with a company and then going back to college to get more education. There isn't as much as there used to be. Now there are so few engineers and the money is so good that if you went back to college, there would be fewer grants going around, they might struggle a little bit more than they used to do in the past. So there isn't the incentive let's say on an individual's side to go back and get those qualifications. The incentive isn't there".

Training within the four organisations are conducted formally, informally, in-house and externally to offer a wide range of expertise to their employees. This gives the opportunity to the employees to gain more knowledge that would be beneficial to them personally as well as to the organisation as a whole. This leads to the next part of the section that questions the type of salary scheme to employees. A good salary scheme would help to retain knowledgeable employees as well as encourage others to try and seek more knowledge.

6.5.2. Salary Schemes

This section of the chapter will look at what organisations take into consideration when designing a pay system for their employees. In light of the research question on HR support systems, all the positions interviewed state that the pay is generally aligned with job market prices as well as reviews from performance appraisals, length of time at the organisation and experience of the employees. In Build Co., they take into account the market prices as well as the general pay structure of RIBA for architects and technicians (Senior Partner, Finance and Office Manager, Build Co.).

Tel Co. refers to the performance appraisals aligned with the benchmark from the market rates as well as their job descriptions to plan their salary scheme (Managing Director, HR Manager, Tel Co.). This method is similar to Bio Co., which benchmarks the positions with outside private companies that have similar positions or are in the same business (Vice President, Finance Director, Bio Co.). Furthermore, Bio Co. also looks at the employee's initiative and contribution in their work to determine their appraisal status that in line will affect the salary that the employee receives (Quality and Assurance Manager, Research and Development Manager, Bio Co.). Whereas in Oil Co., the Managing Director mentions that they looked at the age, experience, qualification, level of responsibility, authority as well as the external market conditions to design the salary system within Oil Co. Moreover, they would also look at the employee's

contribution to determine additional bonuses to the salary (Organisational Development Officer, Oil Co.).

Therefore, the pay system within the organisations tend to be more traditionalistic and conservative as it seems to suit the companies best by benchmarking the rates of the job against that of the going market rate and align that with the overall performance reviews of the employees. In addition, the organisations also consider the employee's contributions to the company to further determine the rate of pay for the staff. A fair pay system will help to retain the employees and directly, their knowledge too. But a pay system is not the only thing that could help in retaining the employees as rewards, monetary or non-monetary, could also help the employees remain loyal to their organisation.

6.5.3. Rewards

There are many ways of offering reward to a person, monetary and non-monetary. A common monetary method of rewarding an employee is either through bonuses or benefit plans while the organisations tend to offer praise, recognition and empowerment to their employees as a way of giving non-monetary rewards. Furthermore, these bonuses are also offered as a sign of recognition to the employees' contribution to the company. Although the rewards or bonuses given by the organisation do not amount to much value in terms of money, the rewards offer

a sense of accomplishment in the employee as well as a sense of belonging among other staff. A feeling of confidence and appreciation will help to retain the employees within the company longer as well as encourage employees to share their knowledge with other members of staff. When questioned regarding methods of rewards for offering new ideas or creating new products, a majority of the respondents mention that they offer a combination of benefits as well as praise and recognition as a means of rewarding the employees.

Besides, offering bonuses and rewards to the employees, Build Co. would also offer more high profile projects, more responsibility within projects, more time off to work on something specific or simply more time off work as a way of rewarding their employees (Senior Partner, Research Co-ordinator, Build Co.). Tel Co. would offer more visible signs of appreciation in forms of plaques, small monetary rewards and notices of appreciation to their employees as reward for best contribution and performance within the organisation (Managing Director, HR Manager, Tel Co.).

As for Bio Co., the Research and Development Manager states that they offer performance related bonuses as well as encouragement on their career progressions in order for their employees to generate new ideas and products. Furthermore, the Finance Director of Bio Co. adds that they would offer a financial incentive if the employee are to create a new product out with the Research and Development department and on their own time and energy. Oil Co. has a system of nomination

that would allow employees themselves to nominate a colleague or a department that they feel offers the most contribution to the organisation in terms of ideas or efforts. These nominations are reviewed on a quarterly basis and awards are given to the best employee or department (Organisational Development Officer). Moreover, the Structural Engineer of Oil Co. adds that providing the right environment, the right tools and the right mix of people can be a sense of a reward to the employee and it would be conducive to people to create new ideas. The Structural Engineer mentions that for engineers, money is not everything and the sense of accomplishment at having worked with a good team is a reward in itself.

Sometimes, employees appreciate given more responsibilities as a reward as in the case of Build Co. However, there are some employees who do not wish to get more empowerment as their reward.

Business Development Manager (Oil Co.):

“We have performance related pay for senior levels but that’s not what we’re talking about here. It’s a difficult one actually because if you get to a certain level our roles and responsibilities carry authority as you go up the chain, if you like. Each person has a certain amount of responsibility but even then we’ve found that if you get to a certain level, we say, ok that’s fine, we want you to take on more responsibility. Some people are reluctant to do that. They want to stay within the confines of that responsibility area. I think you reach a break point with empowerment to be quite honest, I think people reach a level and then the big decision for them is do I need to go to the next level or am I comfortable where I am”.

Although the organisations offer rewards for contribution to knowledge, as in the case of Tel Co. that offers a small monetary value for best idea suggested by an employee or in Oil Co. that provides a reward on a quarterly basis for best

contribution by an employee, interestingly enough, the companies do not offer any rewards, monetary or non-monetary for any patents that might be produced within the company. A few of the participants interviewed say that there is no need to reward for patents produced if they are from R&D as it is their job to create new ideas.

Finance Director (Bio Co.):

“The R&D employees, if it’s a project they are working on as part of Research and Development, then that’s part of their job is to create those products. For our part of it with the business, it’s probably unlikely that rewarding someone for a patent would happen”.

Furthermore, both the Research and Development Manager (Bio Co.) and the Business Development Manager (Oil Co.) state that any new knowledge discovered within the organisation or any new products created or patented is the intellectual property of the organisation. The Business Development Manager of Oil Co. reasons that since the products are developed on company time, they should be company property. Moreover, the Research and Development Manager of Bio Co. feels that it is important for the organisation to retain the intellectual rights to the property as they can generate income from it. However, generally, the other participants say that patenting is not a usual practice within the organisation and therefore, there is no need for any rewards for patents. In addition, the Managing Director of Oil Co. mentions that it is difficult to reward people in the organisation as there are many rules that are governed by the industry’s union regarding rewards and bonuses as many of their employees are either union or part-timers.

Managing Director (Oil Co.):

“Well, you could find that if we happen to be on a petrochemical complex and lets say that there are 1000 people there and we have 200 of those people, all 1000 of those people might well be on an industry wide agreement. But if Oil Co. decides to give a bonus to our 200 people, the other 800 people might go on strike because they are not getting the bonus. So it’s very difficult to pay people using bonuses”.

Therefore, from the results presented, it can be seen that the basic HR policies relating to training, salary schemes and rewards can play an important role within the organisation. The policies can help in trying to encourage employees to acquire more knowledge, help the organisation to retain knowledgeable employees as well as to encourage them to share their knowledge with other employees. This coupled with procedures that manage the knowledge of the employees, allows efficient storing of knowledge within the organisation and encourages sharing of information among employees that could assist the company in becoming more effective, more efficient and hopefully, stronger in facing the competition in their respective industries.

In the table below, a summary of the results discovered during the research, gives an overall view of the situation faced within each organisation regarding the HR support systems that exist within the organisation.

Table 6.4: HR Support Systems

Bio Co.	Build Co.	Tel Co.	Oil Co.
<ul style="list-style-type: none"> ➤ Type of job done determines type of training necessary. ➤ Employees sent for paid training as long as beneficial to the company. ➤ Salary inline with market rate and benchmarked with similar positions. ➤ Performance appraisals, experience and tenure also considered for salary scheme. ➤ Performance related bonuses given. ➤ All products owned by the company. 	<ul style="list-style-type: none"> ➤ Type of job done determines type of training necessary. ➤ RIBA determines some necessary training for qualification. ➤ No real training programme for architects. ➤ Salary based on market rate, RIBA, performance appraisals, tenure and experience. ➤ Bonuses and higher profile jobs given as rewards. ➤ All products owned by the company. 	<ul style="list-style-type: none"> ➤ Job done determines necessary training. ➤ Offers career development style training. ➤ Salary inline with market rates, performance appraisals, length of time, experience and benchmarked with job descriptions. ➤ Plaques, recognition, small monetary reward and notices of appreciation given as rewards. ➤ All products owned by company. 	<ul style="list-style-type: none"> ➤ Job done determines necessary training. ➤ Some training necessary for health and safety. ➤ Training offered based on performance appraisal. ➤ Salary inline with market rates, performance appraisals, tenure, experience, level of responsibility and authority. ➤ Gives reward to employee or group who contributed the most. ➤ All products owned by the company.

In conclusion, it can be seen that despite not having any formal procedures for managing the knowledge of their employees, the companies have a variety of other systems that would help them to manage as well as utilise the knowledge within their company. Furthermore, the HR support systems play a role in giving support to the managerial team in encouraging as well as motivating the employees into contributing to the process, gaining more knowledge as well as to retain them within the company. In the following chapter, the results of this research will be discussed, taking into accordance the referral to the research objectives, research questions, the debates stated in the literature review chapters as well as in the Background to the Industries chapter. By taking into consideration all the different elements, an analysis of the overall picture of why and how the organisations manage the knowledge of their employees will be presented.

CHAPTER 7: DISCUSSION

7.1. Introduction

From the Results chapter, we can see that the organisations involved in the research do recognise knowledge as a resource and they try and encourage their employees as best they can to acquire more knowledge. Furthermore, although there are no formal KM strategies within the organisations, most of them have certain procedures implemented that can be used as the basis for a formal KM process at a later date. Moreover, the companies indicate utilising certain methods for retaining, disseminating as well as maintaining the knowledge base within the company.

The table below provides a summary of the issues discussed within the Results chapter and 'X' indicates that the companies either have or are aware of those issues. By reviewing the table, the similarities and differences of the companies in handling the KM strategies within their respective organisation can be clearly seen. Within this chapter, a discussion of the similarities and differences found within and between the organisations will be looked into. Furthermore, the analysis will take into account the findings from the literature review conducted to explain the current condition of the organisations. Finally, a comparative analysis on the opinions of the management team will be presented to show an overall view of the situation and perception regarding the KM processes within the organisation.

Table 7.1 Summary of Issues

Summary of Issues	Bio Co.	Build Co.	Tel Co.	Oil Co.
Recognises knowledge as a resource	X	X	X	X
Identifies necessary knowledge through:				
a) talking with employees	X	X	X	
b) talking with clients/customers			X	X
c) the work itself	X	X		X
Job analysis done only for new positions	X		X	X
Job descriptions for all posts	X		X	X
Encourages employees to gain knowledge through:				
a) talking to them	X	X	X	X
b) giving them interesting work to do	X	X	X	X
c) discussing career development		X	X	X
d) publications and presentations			X	
e) discussions with other employees	X	X		
f) the work or working environment itself		X		X
Reviews product process to shorten production time	X	X	X	
KM strategy necessary to stop employees researching the same information again	X	X	X	
KM strategy necessary for safety reasons				X
Has formal strategy implemented throughout the organisation to review ideas		X	X	
Has formal strategy implemented to review ideas in specific units only	X			
Has formal strategy to review career progression of employees				X
Has efficient method of filing information throughout the project process		X		
Has difficulty accessing stored information	X			X
Has an intranet system		X	X	X
Difficulty in getting employees to contribute to the KM strategies	X	X	X	
Utilises CV as skills inventory	X	X	X	X
Utilises intranet to retain knowledge		X	X	X
Maintains lab log-books to retain knowledge	X			
Maintains hard and soft copy of files	X	X	X	X
Senior management determines what information can be released	X	X	X	X
Publishes articles/reports on the intranet		X	X	
Employees share information via discussions		X	X	X
Tries to train successors		X	X	
Training determined by job done	X	X	X	X
On the job training given		X	X	X
Training given to obtain qualifications		X		X
Salary inline with market rates, performance appraisals, tenure, skills and experience	X	X	X	X
Non-monetary rewards given		X	X	X
Performance related bonuses given	X	X		X
All products owned by the company	X	X	X	X

7.2. Identification of Knowledge

With the onset of globalisation, organisations within the UK are facing increasing competition not only from other UK based companies but also from other multinational companies that have branches in the UK. This situation is highlighted by Smith (1998) in Chapter Five who states that with the creation of the EU, other European based companies are given much easier access to set up companies in the UK. Furthermore, according to Harrison and Leitch (2000) and Puddy et. al.. (2001), national governments and international agencies are recognising that the emergence of knowledge based economies is having a profound implication for growth.

Since the effects of globalisation, coupled with the advancements in technology has made information a key ingredient in the success of organisations, the first objective of the research is to study how knowledge is identified within an organisation as well as how employees are encouraged to become more knowledgeable. Moreover, with the arrival of the knowledge economy, organisations are forced to reconsider what they would traditionally consider as assets of their company and consider the option of utilising the knowledge of their employees as a resource. As different companies require different types of knowledge, it is important that the employers are aware of the knowledge their employees are capable of producing.

7.2.1. Utilising Knowledge as a Resource

One of the questions asked in this research is to see if knowledge is recognised as a resource and from looking at the results, it could be seen that all the organisations involved do recognise knowledge as a resource. Furthermore, the companies are also aware of the competitive nature of the industry that made the need for knowledge more important.

In answering the first research question relating to how knowledge is identified, the research shows that the organisations identify knowledge needed within the company through the experience of the management, talking to the employees, surveys and through job descriptions. The organisations believe that with efficient identification of knowledge, it could help companies be aware of the knowledge owned by their employees and they will be able to utilise it to create new products or services that might be in demand by the customers. This notion is supported by Brown and Woodland (1999) who say that knowledge is information that can be used to create something or to do something and it could also be used to understand a concept. Besides identifying what the employees know, an identification of knowledge for future projects could also help the company in planning what knowledge would be necessary for the future. Since almost all of the companies interviewed have job descriptions, except for Build Co., the organisation could see where they are lacking in knowledge and could take steps to overcome the gap in knowledge. We can see in Chapter Two, Buhler (2001) supports this move of

identifying the necessary expertise in advance as it would give the organisation an opportunity to hire employees with the desired knowledge and abilities for future projects.

In the Background to the Industries chapter, we can see that the pharmaceutical industry is buoyant at the moment (Fenn, 2002). The sales of prescription and OTC medicines are gradually increasing. However, there is increasing competition from other organisations within the EU as well as in the rest of the world for the development of medicines and other bio products. Therefore, Bio Co. is trying to identify what knowledge is needed as well as utilise it especially in the field of R&D in order to remain competitive especially when Taggart (1993) says that the pharmaceutical industry is highly competitive and very much research driven. The need to be able to identify the necessary knowledge needed or is available within the organisation and utilise it is particularly important for Build Co. where the industry has changed in recent years from one that offered professional architectural advice to one that is more of a generic business. It is reported by Golzen (1984) that architectural companies now offer a variety of services from consultancy to project management rather than just designing the building for the clients. Furthermore, there is competition from other building organisations that provide the same services without the necessary affiliation or creditation from the RIBA (Conway and Roenisch, 1994). Therefore, Build Co. is constantly pressured in providing services and products to their clients that would allow them to remain competitive within the construction market.

Tel Co. is also facing similar problems to Build Co. in that increased competition due to deregulation and improvements in the telecommunications industry has created intense competition for telecommunication services (Dodd, 2002). Due to deregulation, smaller telecommunication firms are being set up and this has increased competition for the share of the telecommunications market. Therefore, Tel Co. is trying to identify the knowledge that they need through detailed job descriptions and external surveys with clients in order to be able to create products and services that would be in demand by the customers. In the case of the oil and gas industry, the current hike in oil prices is affecting the world economy and therefore, the oil companies are being pressured into finding new ways to keep the cost levels down. Although the production of natural gas and the production of petrochemicals from crude oil are on the increase (Beckett, 2003a), the overall situation of the oil crises is affecting the cost-effectiveness of the oil companies. Therefore, to remain competitive within the oil and gas market, Oil Co. is utilising the job analysis and job description programmes within the organisation in order to identify what knowledge is available for the creation of new services and products for the customers.

Although there are a wide variety of technologies available to assist the organisation in the identification of knowledge, it is discovered that the respondents realise what knowledge is required within the company through their own personal experience. There is no difference in the replies by the managers of the companies who feel they know what knowledge is necessary for the competent implementation

of a job or project based on their own experience in having done the job or managed the project. Furthermore, the participants of the research feel by discussing the nature of the job position with the respective employee, they could discover gaps in the necessary knowledge as well as encourage their employees to gain further knowledge. The companies believe that their organisations could remain competitive among other companies within the industry through acquiring more knowledge.

Therefore we can see that rather than investing in sophisticated software in order to try and identify the knowledge necessary within the company, organisations are benefiting further through more networking and discussions with their employees. Moreover, some of the organisations (Tel Co. and Oil Co.) are asking the clients themselves through surveys to discover possible gaps in knowledge so that it could be rectified. The organisations of this research feel that by realising the knowledge that their companies already have as well as through gaining more knowledge could they cater to the needs of their clients more efficiently.

7.2.2. Encouragement and Motivation

An interesting question of this research that needs to be explored is regarding how employees become more knowledgeable. We can see in the Results chapter that although the organisations do try and motive their employees to gain more

knowledge, they do it in an informal manner by talking to their employees or while discussing the process of career development with their employees. Furthermore, it is noticed that middle management from the organisations seem to agree that doing meaningful work is motivating enough for gaining knowledge. Interestingly, although all the companies encourage their employees to acquire more knowledge, higher management would generally just talk to their employees whereas middle to lower management would actually discuss the matter with their employees on a more personal basis. This is probably due to the fact that line managers would know the employees on a more personal level and therefore, would be able to give advice on their career development as well as set them challenging jobs to do as a means for gaining more knowledge.

However, the companies cannot simply acquire new knowledge or expertise. They must identify and combine the knowledge appropriate for the project to allow the diagnosis and solving of problems that might confront them during a project (Fincham et. al., 1994). Therefore, all the organisations in this study conduct reviews on a regular basis to see how long the projects take as well as what knowledge they can extract from each project completed. Build Co. does try and identify any weaknesses within the organisation after each project through group discussions and they would try and see where they can reduce the time, costs and energy of the project process in order to benefit the client. The rest of the organisations involved in the research do organise group discussions and try and capture any new knowledge after each project. However, there is a danger that these

lessons learned are not being passed on to future projects, such as in Oil Co. Therefore, efficient management of knowledge is required by each of the organisations in order to remain competitive within the respective industries. In addition, any information gained would benefit the organisation as Du Toit (2003) states that participation from new international competitors with different cost structures and different manufacturing of production processes are drastically changing and reducing the manufacturing life-cycle.

7.3. Knowledge Management

In the current financial market, industrial age has given way to the service-oriented industry. Due to the change in the life-style of the general public through urbanisation and globalisation, there is an increase in companies trying to cater to the needs of the people in terms of offering services rather than products. The service industry has become more prominent in the overall economy and in recent years accounts for one in five jobs in the UK (ONS, 2002). Therefore, there is stiff competition among the organisations, regardless of industry in order to offer services and products to the customers that would give them a fair share of the market. Wikström and Normann (1994) emphasise this point when they say that knowledge management is a crucial component to corporate strategies as all companies use and sell knowledge in some form or another. Therefore, the

management of the organisations, especially their resources, whether they are materialistic or information is important during these competitive times.

With the changes in the economy to a more knowledge-based structure, the management styles of the organisation are also shifting. Organisations are pressured into adapting faster to the economic and technological changes or else other companies that can generate information faster than them will overrun them in the competitive market place. Companies are now trying to incorporate more efficient uses of knowledge within their organisations through KM strategies. Especially when the value of knowledge is in direct proportion to how well the management can move it around the organisation (Brailsford, 2001). Therefore, the second objective of this research is to try and identify whether any KM strategies exist within the organisation and to what level it is implemented throughout the company.

7.3.1. Management of Knowledge

The organisations involved in the research recognise the need for KM to be able to utilise the knowledge effectively within the company. Due to the highly competitive nature of the four respective industries where they are competing to offer services and products to their clients, all the companies interviewed voice their concerns for trying to stay afloat. Although the companies are from different

backgrounds and industries, all of them realise that KM is important for the efficient overall running of the organisation. This is inline with the quote from Thompson et. al.. (2000) who mention that knowledge work requires proficient employment relationships and task structures that allowed for creative application, manipulation or extension of that knowledge.

Furthermore, the companies hope that through KM, they would be able to reduce the risk of employees searching for the same information over again and be able to share information efficiently throughout the company. Wickramasinghe and Mills (2002) agree with this attitude as they state that KM is a process that includes the capture of data at the source, the transmission and analysis of the data as well as the communication of information to those who can act upon it. Moreover, as seen in the results chapter, all the companies interviewed realise that if they do not manage the knowledge of their employees efficiently by creating new products or services, they would lose out on a large share of the market. Harrison and Leitch (2000) support the importance of knowledge management when they say that organisations have to adapt quickly to the changes in the market place or else they will be weeded out in the economic evolutionary process.

7.3.2. Knowledge Management Processes

The process of urbanisation, globalisation and technological breakthrough has affected all four companies in the research. The technology available today in communications has given the general public the opportunity to remain in contact with their friends, families and colleagues in a variety of manner. The scientific advances are giving the every day man the option to self-heal himself by going to the local pharmacy rather than going to the doctors. Moreover, there are more vehicles and transportation available for the people and all this affects the production of gas and crude oil due to the demand in the product. These elements are playing a large role in the industries of the four companies that participated in the research, as they have to adapt to the constant need by the consumers for more services. Therefore, the companies are trying to find new ways in managing the knowledge of their employees to be able to offer the products and service the general public desire.

In relation to the research question on whether there are any policies regarding KM within the organisation, from looking at the results chapter, it can be seen that although there are no formally recognised KM strategies within any of the organisations, each of the organisations have individual methods of knowledge acquisition, idea review, creation of knowledge, retention of the employees' knowledge as well as the dissemination of knowledge to other members of staff and to their respective clients. Rather than having one formal process that covers all the

aspects of KM from acquiring to disseminating knowledge, the respondents have a series of smaller processes that cover each aspect of the KM strategy.

Both Build Co. and Tel Co. utilise their formal systems of idea review (the Three-Wave System and the New Idea Scheme respectively) as a means for acquiring and reviewing ideas suggested by their employees. Both these systems give employees the opportunity to submit their ideas and have them formally reviewed for further progression into a new product, service or just new knowledge. Unfortunately, Bio Co. and Oil Co. do not have any formal methods of reviewing new ideas from the staff other than Bio Co. implementing it in the R&D division of their company. Oil Co. do place suggestion boxes around their company for people to submit ideas but it is done in a casual manner and not very much encouraged. Furthermore, the ideas placed in the suggestion box are not stored in any database that could be kept for later use. With Build Co. and Tel Co., the systems implemented give them the opportunity for storing ideas even if it is not being progressed further into a service or knowledge.

Besides the formal idea review processes, there are other methods of KM that the organisations are utilising, ranging from Coaching systems (Build Co.) to the Personal Performance Programme (Oil Co.) and overall, these could help the management team to organise and utilise the knowledge of their employees more efficiently. These systems answer the research question relating to the extent in which KM exists within the organisation. It is found that the policies and

procedures regarding KM, although not formal, do exist in a variety of ways throughout the companies that handles specific elements of the KM process. This existence is especially important when the current situation of each industry is highly competitive.

The construction industry is becoming more diverse with companies offering clients a one-stop service for all the clients' needs from architectural drawings, to quantity surveying, right down to maintenance management once the project is completed (Ibelings, 1998). According to ARB (2003), the number of architects is increasing and therefore, there are more architectural firms. Since Build Co. does not offer a full service as in other architecture and construction firms, it may be possible that through effective knowledge utilisation and with further training of the employees, Build Co. might be able to offer more management services to the customers in order to remain competitive within the architectural industry. Furthermore, with the knock-on affect of globalisation, shopping complexes are becoming more than just one-stop shopping centres while airports are more than just airport terminals for flights. In addition, with more airlines offering cheaper flights overseas, people are also spending more time within the airport terminals while waiting for connecting flights and therefore, airports are offering a vast array of shopping and entertainment experience for the traveller (Ibelings, 1998). Since Build Co. is involved in the design of support buildings for airports as well as retail outlets, the organisation could gain more clients by being able to offer more creative use of the buildings. This is where the Three-Wave system, the coaching

system as well as the detailed filing of all documents related to each project by Build Co. comes into play. The systematic review of new ideas and group discussions throughout the project process helps Build Co. to come up with new ideas and products that could be in demand by the clients as well as find new ways to cut costs and time. Furthermore, Build Co. could then compile the ideas that their employees are generating and publish it as a report for their clients as a way of sharing their knowledge.

In the case of the telecommunication and the pharmaceutical industries, both are very much dependent on the changing technology and time frames. In the telecommunications industry, what used to be months or years before a new telecommunication products is released, is now a matter of weeks when an upgrade is available. Whereas in the pharmaceutical industry, it is estimated that it would take between seven and fifteen years as well as more than £300 million to develop a new drug (Fenn, 2002). Although the products in the telecommunications industry are constantly updated in a matter of weeks and those at the pharmaceutical company are facing a time-line of a few years, the intense competition to be the first to produce a new product is increasing the pressure on the companies to remain competitive. Furthermore, within both the telecommunication and the pharmaceutical market, the changing lifestyles are bringing an increase in certain demands. There is a massive growth in the use of mobile phones as well as the internet in the UK over the past decade (Dodd, 2002). Besides using the internet for personal use, companies are also using the internet to communicate with clients and

staff in different geographical locations. Therefore, the creation and the usage of Broadband are also increasing dramatically. Within the pharmaceutical industry, the prospects of the GSL products in the UK drug industry are good and increasing due to the practice of the vast majority of the population that is in favour of self-medication (Pradhan, 1983; Fenn, 2002). These changes are raising awareness within both Tel Co. and Bio Co. into managing the knowledge of their employees more efficiently.

As reported in the results chapter, Tel Co. is being forced to constantly evolve technically, specifically in the engineering department to remain stable within the market forces. This need for constant technical evolution is due to the deregulation of the telecommunications industry where there are more telecommunication companies now than there are 10 years ago (Fenn, 2002). This is a similar situation faced by Bio Co., which is focusing most of their attention on their R&D unit by having an effective idea review procedure within that unit. Both the New Idea Scheme at Tel Co. and the review procedure by Bio Co. are there to assist employees in contributing ideas as well as sharing their knowledge. However, the lack of opportunity to propose and review ideas within Bio Co. from other employees could be a loss for the organisation in terms of possible products that might be valuable in the market place especially when “blockbuster” drugs can generate sales worth billions of pounds (Fenn, 2002). In addition, there are no guarantees that there would be success of a drug at the end of the investment as only one percent of all research would end in a marketable drug (Caines, 1995).

Therefore, it would be wise for Bio Co. to extend their formal idea review board in the R&D unit to the rest of the company to encourage employees to contribute ideas.

Moreover, the issue of time and cost in either producing a new technological update or a new drug are affecting both Tel Co. and Bio Co. They are both being pressured by market forces to produce and create products that are marketable within a shorter period of time and with lower costs. Nowadays, telecommunication companies are offering a combination of packages that include mobile phone rates, landline rates as well as unlimited internet access and Broadband to their customers (Bray, 1995). Tel Co. is trying to overcome the competition through the use of the CV system where the skills and expertise of the employees are listed as well as the use of the New Idea Scheme. Through the CV system, Tel Co. hopes that any employee wanting to gain more information regarding a specific subject would be able to search for a particular expert by using the CV and from the initial connection, would be able to collaborate between departments on a variety of projects. As for Bio Co., the length of time it takes for the process from idea to actual marketable product, along with the product protection via the patent of twenty years (Taggart, 1993), has made Bio Co. issue a policy whereby all scientists must maintain a log book that is updated regularly. Through the upkeep of lab books, Bio Co. hope to discover possible products for future manufacturing while conducting research in other fields. However, it is found that Bio Co. could still improve on their KM process as there is only submission of ideas but no

competent systematic storage or utilisation of the knowledge within the organisation. The information that could be gained from the lab books and review of ideas are not catalogued or filed. Neither are they shared with other members of the organisation on a regular basis. Thus, the information does not get spread to other parts of the organisation and just stays in one place. Therefore, Tel Co. and Bio Co. are trying to manage the knowledge of their employees through a series of policies and processes in order to utilise as much knowledge as they can to stay one step ahead of the game.

The situation with Oil Co. is slightly different from that of the other companies. In recent times, Oil Co. is facing a number of challenges within the organisation where they have to focus more on the work involved rather than the KM process in order to survive the competition. Although the management of Oil Co. admits to the benefits of having such a KM process, they are facing difficulties in implementing any strategy for managing the knowledge of their employees due to their priority in keeping on top of the challenges they are facing. Furthermore, Oil Co. states that it is difficult to implement a programme when they do not have a value attached to it. The concept of value and what creates value are issues raised by Bowman and Ambrosini (2000) and Jacques (2000) and to Oil Co., the truth of the matter is that numbers and financial value play a big role in whether or not a system will be implemented. The only way Oil Co. could implement a KM system is to identify where the main areas of benefit and efficiency would be through having a KM process. However, this is a rather difficult process since knowledge is such an

abstract entity and therefore, difficult to quantify (Sbarcea, 2001). Therefore, Oil Co. has some difficulty in trying to convince their head office that having a KM strategy would be beneficial for them.

One of the areas of benefit that Oil Co. could look at is the area of gas production since there has been an increase in gas supply in recent times (Wiggin, 2001). Moreover, the situation in the Middle East has increased the price of oil, putting pressure on the world economy to stabilise itself. This makes it necessary for oil companies to utilise the skills, knowledge and information of their employees to maintain the equilibrium of the economy. Therefore, Oil Co. is losing out on an opportunity of trying to gain a fair share of the oil and gas industry by failing to utilise the knowledge of their employees efficiently.

Although Oil Co. does not have any formal review board, they do offer peer review and feedback for any ideas that might be suggested by the employees through department meetings and discussion with employees. In addition, Oil Co. also implement a Personal Performance Programme where the employee is reviewed on the job they are doing, the responsibilities involved with the job, the knowledge they have and knowledge they should obtain to further their career. Even if this is not considered as a KM process by Oil Co., it can be used as a basis for managing the knowledge of employees by identifying what knowledge is needed and then from there, move on to gain the necessary knowledge and utilise it. Since Oil Co. is also involved in the production of petrochemicals, gaps in the

knowledge for petrochemical and gas production could be focused on to gain more knowledge regarding the subject matter especially when petrochemicals are fast becoming a valuable commodity in Europe and the rest of the world (Bower, 1986).

Oil Co. also compile sets of information or rules for their staff and clients to work safely and with confidence on offshore platforms and other parts of the production plant. Oil Co. prepares these guidelines with the hope of reducing the possibility of mistakes and costs that could occur during an accident. This practice is supported by Beckett (2003b) who indicates that there is a rise in operating costs that reflect the heavy expenditure by oil and gas companies on safety issues following the Piper Alpha disaster. Duffy (2001) also expresses the same sentiments by indicating that through shared knowledge could mistakes be avoided. Furthermore, due to pressure from environmental and political groups, Oil Co. also has to consider the environmental health and safety issues surrounding oil and gas production as this could lead to added costs if failed to take under control (Wiggin, 2001). Therefore, Oil Co. is taking into consideration the various factors to try and implement certain practices that although could not be officially called KM processes, would at least help to manage the knowledge of their employees more effectively and efficiently.

So in answering the research question concerning the KM processes, it could be seen that although all the companies do not have a formal strategy, they do try to implement specific policies and procedures that could assist the management teams

in monitoring, managing and utilising the knowledge of their employees. In addition, the changes within the global market as well as within the industry itself are encouraging employees of the companies to take the opportunity to become more knowledgeable in a variety of skills and expertise to cater to the constant changing demands of the customers. Therefore, by utilising the various KM processes that are in place within their companies, management teams do try to acquire, utilise and encourage the efficient management of their employees' knowledge.

7.3.3. Intranet

It has been presented in the literature review chapter that many of the articles that discuss about KM present the view of using IT as means for KM. Lamb (2001) proposes that one of the main components of KM is IT whereas Galup et. al.. (2002), Roy and Roy (2002) and Morejon and Gos (2003) state that KM processes use a variety of IT that include internets, intranets and browsers. This pattern of utilising IT as part of the KM strategy can be seen in all of the organisations, except Bio Co., where they have and are utilising the intranet to varying degrees. Build Co. is trying to set up the e-mails of their employees via the intranet. Furthermore, Build Co. want their employees to work through the intranet where every memo, document or drawing designed by the employee would be automatically saved in the intranet.

Tel Co. has set up community based intranet systems that is separate to the company wide intranet. Although Tel Co. would like to link all the different community intranets together, there is a fear that each department would be overloaded with unnecessary information. Despite the fact that Tel Co. might be losing out on potential information from different departments, they indicate that if there is information that could be relevant to other members of the organisation, they would encourage the employee to contribute to the company wide intranet. In the case of Oil Co., they use their intranet predominantly for communications. Also, Oil Co. admits that they do not use the intranet as a medium for discussions and exchanging ideas. The intranet in Oil Co. is more a storage for information without the efficient retrieval of information. If utilised effectively, the intranet can be a strong basis for a KM process within the organisations as Fox (2002) states that time and money can be saved from having to ask the same questions over again when the answer can be searched for within the system. Despite advancements of enabling technologies, organisations must try to avoid the risk of concentrating too much on the IT aspect of KM and focus on the actual management of the knowledge from the employees and within the organisation (Liebman, 2001). This brings us back to the question of whether the organisations follow an informational or behavioural approach to KM. Both Build Co. and Tel Co. choose to utilise the intranet more proficiently in managing the knowledge within the organisation. To them, the intranet is the tool as well as the mean for capturing, utilising, storing as well as sharing information and knowledge. Therefore, it would seem that that the

management styles of Build Co. and Tel Co. lean more towards the informational approach to KM.

7.4. Retention and Dissemination of Knowledge

In this section, the discussions surrounding the methods of retention and dissemination of knowledge utilised by the organisations of this research would be presented. The need for retaining and sharing information available within the companies is important as according to Sbarcea (2001) knowledge will walk out the door when the employee does. The organisations interviewed are aware of this fact and are implementing some procedures for storing and sharing knowledge among its employees.

7.4.1. Inventories

Although none of the companies involved in the research have a knowledge inventory, there are other ways in which they list the skills and expertise available within the organisation. Oil Co. does indicate that they have a knowledge inventory but only in the engineering department in order to present to clients the knowledge that the engineering staff have. Despite the lack of a knowledge inventory, all of the organisations do admit to having a skills inventory of their employees. The skills

inventory is a list of skills and expertise of employees within the organisation, very much like a CV, where other employees could use to contact those with a particular field of expertise for further information if necessary. In the literature review chapter, Buhler (2001) and Moore (2001) both discuss the benefits of organisations utilising the skills inventory. The skills inventory would be updated regularly and therefore, the organisations could use this inventory as a basis to build a knowledge inventory within the company. Furthermore, besides the skills inventory, Bio Co. is currently trying to organise a knowledge inventory of some sort that would include the training record of their employees as well as a mini-CV containing the respective employee's skills and expertise. However, all of the companies claim that it is difficult to implement a knowledge inventory, as it is difficult to write down what the employees know. Especially when a lot of the knowledge involved is tacit knowledge, it is difficult to quantify. We can see that this is proven in the literature review chapter when Augier and Vendelo (1999) say that tacit knowledge is difficult to articulate, as it is difficult to transfer or to codify. Therefore, unless and until the organisations can find a way to codify tacit knowledge, the knowledge inventory would predominately remain as a list of expertise rather than a list of knowledge.

Another inventory that is mentioned by companies includes the project inventory where reports related to the projects would be filed. Build Co. and Oil Co. do have an inventory of the final report of each project but Oil Co. does not have a log of process to see how the project is carried out step-by-step as is done in Build Co. In

Build Co., the filing of every document, memo and drawings from every project gives the staff of Build Co. the opportunity to review the whole process if necessary. Oil Co. only keeps the final result and therefore, they are losing out on a lot of potential information. Ellingsen and Monteiro (2003) approve of the method of the final report inventory by Build Co. as they say that the preservation of the earlier accounts of each project, while at the same time adding new layers and new versions, is a crucial aspect of knowledge management that tend to be over-looked. It is hoped that through efficient utilisation and combination of inventories, the organisations would be able to retain and utilise the knowledge of their employees better.

7.4.2. Retention of Knowledge

The organisations interviewed for the research admit that they do not have a formal process for retaining knowledge within the organisation. However, there are other methods implemented within the company that help to retain the information within the company. All of the organisations agree that there is a need for them to store information within their organisation. One of the reasons voiced by them is the loss of knowledge when an employee is to leave the company. Through the retention of knowledge, the companies hope that they could retain at least some of the knowledge left behind by the employee. This is agreed by Lesser and Prusak (2001), who mention that when employees leave the company, especially through

retirement, it may cause the company to lose the employees that have accumulated the most amount of knowledge and experience and thus depleting the organisational knowledge base and supply of mentors. Furthermore, in Build Co., as the industry is involved with other institutions from local authority planning, environmental health departments to banks and insurance agencies (Conway and Roenisch, 1994), staff within Build Co. are encouraged to store any information relating to the regulations and legislation set by the authorities for each project.

There are many methods of storing information utilised within the organisations and one of those is the intranet. Many articles in the literature review voice the use of the intranet for storing information (Borck, 2001; Yasin, 2001; Robb, 2003) and we can see from the results obtained that all of the companies, except Bio Co., utilise their intranet for retaining information. Furthermore, hard files, computer files and manuals written by the employees are also used to retain the knowledge within the organisation. In the case of Bio Co., lab books kept by the scientists are utilised to store information. Moreover, Tel Co. and Build Co. also utilise their New Idea Scheme and the Three-Wave system respectively as a method of storing information. Any ideas suggested that are not implemented are saved in case they could be used in the near future.

However, although the processes implemented by the organisations are good for storing information, most of the respondents report that they are having some difficulties in utilising the information saved, as there is no capable method of

accessing it. This danger is highlighted in Chapter Two by Robb (2003) who states that organisations spend a fortune setting up complex systems for storing information and they go largely unutilised or very few would use it as they are turning into dumping grounds for data. Lack of access to the stored knowledge seems to be the problem faced by all of the organisations. That is the overwhelming amount of data available to them that are stored within the organisation but there is no efficient management of the information. This difficulty needs to be overcome by the organisations as Crowther et. al.. (2001) state that if knowledge can be captured and utilised without any changes in the nature of the knowledge, the organisation could retain a distinct entity that can be continually reconstructed through the compilation of the appropriate information.

7.4.3. Dissemination of Knowledge

The dissemination of knowledge among the employees within the organisation is an important factor in the management of knowledge. Being able to share the knowledge that is within the employee with other members of staff would greatly benefit the organisation. This is agreed by Newell et. al. (2001) who mention that knowledge sharing across departments is discussed as a core organisational competence for many if not all organisations, not just the knowledge intensive firms. Therefore, we can see from the Results chapter that the organisations

involved in the research encourage their employees to share their knowledge with one another.

One of the main methods used by the organisations to share knowledge is through networking and through group discussions. It can be seen in the literature review chapter that this method of knowledge sharing is highlighted by Foley (2001), Mariotti and Delbridge, (2001), and Puddy et. al.. (2001). The organisations involved in the study believe that through meeting other people and discussing various topics relating to work, there would be an exchange of ideas among the employees as well as an identification of expertise. By sharing knowledge and information within the organisation, different departments would be aware of the new knowledge that might be created in other parts of the organisation. Bertels and Savage (1999), Lesser and Prusak (2001) and Newell et. al.. (2003) believe that there could be an exchange of ideas as well as identify experts, provide referrals for those seeking answers and creating network among groups through social interaction. Therefore, the results co-relate with the articles quoted in Chapter Three.

However, Bio Co. states that they are having difficulties in getting their research staff and scientists together to discuss each other's work as they all work on different projects with different time scales. This could be one of Bio Co.'s weaknesses as there is a lot of tacit knowledge to be gained from the scientists especially when the industry is particularly competitive. Since the changing

lifestyles of the general public is giving rise to the practice of self-medication (Taggart, 1993), pharmaceutical companies must encourage the sharing of knowledge among its employees to create new products for the booming consumer market. Moreover, with the increase in use of telecommunications by businesses for the daily communications of the organisation (Bray, 1995), Tel Co. is encouraging their employees to share their knowledge by persuading them to write reports or articles to publish on their company wide intranet. Tel Co. hopes that through this method, other employees would be able to access the information and create new services or products for their clients. Furthermore, in the construction industry, the effect of globalisation is causing an awareness of many cultures and affecting them to blend with one another. One of the main features of culture that is impacting the building industry is the rise in *'feng shui'* beliefs among clients (Conway and Roenisch, 1994). Build Co. is aware of this interest in the culture of the Far East and they also add that they are being faced with clients who want environmentally friendly and energy efficient buildings. Therefore, Build Co. has to gain the necessary knowledge and share it among their employees to be able to cater to the demands of their clients.

In the case of Oil Co. where accidents can lead to loss of life and an extremely large amount of costs, sharing knowledge is vitally important among their employees as well as with their competitors. The need to share their knowledge is brought to light after the Piper Alpha disaster off the coast of North East Scotland where a considerable loss of life occurred when an off-shore platform exploded

(Beckett, 2003b). Oil Co. has implemented guidelines for sharing knowledge of their employees through manuals and reports that would be shared with each other and to their competitors and vice versa. Through this method, it is hoped that further accidents could be prevented. As stated by Hoopes and Postrel (1999) in Chapter Three that by sharing knowledge, the organisations can avoid making or repeating mistakes. Therefore, it is important for Oil Co., and the other organisations, to be able to extract and share the tacit knowledge of their employees to remain at the forefront of their industry. Roy and Roy (2002) propose that tacit knowledge need to be discovered, extracted, captured and disseminated, for shared knowledge to be effectively used to extend the knowledge base within an organisation.

Another reason organisations wish to implement a culture of knowledge sharing within the company is to retain some level of knowledge when an employee leaves the company. All the respondents say that they would encourage the person leaving to talk to other members of the team, give presentations or offer on-the-job training to the successor of the position before leaving. The organisations are also aware that through these methods of sharing knowledge, not all knowledge will be captured and most will be lost. However, a certain degree of best practices might be passed on to other members of staff. Robb (2003) states that although KM cannot replace the experience or the knowledge of the employee leaving, it can help to mitigate the loss of critical knowledge, methods of best practice and intellectual capital of the organisation.

In addition, most of the Managing Directors of each organisation say that it would be difficult to get people to train a successor since most of them would not have the time before they leave the organisation. Moreover, the higher management of the organisations interviewed also say that people are hesitant to share their knowledge as they are either not aware of the knowledge they possess or they are afraid that once they share their knowledge, their bargaining power within the organisation would lessen. This hesitancy among employees regarding the sharing of knowledge is highlighted in the knowledge management chapter by a number of authors who indicate that people would be wary of sharing knowledge, as they would consider knowledge as power (Hope and Hope, 1997; Warner, 2001; De Loo, 2002). The more knowledge they possess, the more power they have within the organisation (Truch, 2001). Therefore, the different organisations, regardless of their industry, are facing the frustrating position of encouraging their employees to share their knowledge with one another.

From this discussion, it can be seen that the research questions regarding how knowledge is being retained, disseminated and utilised within the organisation are answered based on the findings of the inventories implemented, the knowledge sharing approach through group discussions and seminars as well as the utilisation of knowledge through best practices passed down from one employee to another. Therefore, it can be seen that the organisations do follow the KM process as proposed by McInerney and LeFevre (2000) in Figure 3.1 in Chapter Three through the implementation of various policies and procedures.

The organisations try to identify and gain knowledge through networking, training as well as discussions with their employees while utilising the CV as a skills inventory for expert assistance, as suggested in the 'active knowledge transfer' stage in the diagram. Furthermore, the organisations maintain manuals and information regarding their clients and their products as well as communicate via the intranet to help with their decision-making plans regarding any projects. In addition, after a project is completed, the employees would have a discussion to determine the best practice process, keep files of all documents during the project and maintain reports of the project as a way of storing information within the organisation as suggested in the 'repository' stage of McInerney and LeFevre's diagram. The organisations believe that through this KM process, they would be able to increase the business value of the company with a more robust knowledge base within the company as well as within their employees. Finally, the organisations believe that by reviewing the ideas of their employees, motivating them to gain knowledge and encouraging them to share their knowledge with others, would lead to an atmosphere that encourages employees to continuously contribute to the knowledge base within the organisation. This bring us to the next section which would discuss the extent to which HR support systems could be helpful in the management of knowledge within the company.

7.5. Human Resource Support Systems

In Chapter Five, we can see that the service industry is becoming more prominent. Organisations are more service oriented rather than focusing on product manufacturing and therefore, there is intense competition among organisations to be able to cater to the demands of their clientele. Over the past twenty years, the number of employees in the service industry has risen by nearly ten million to over seventeen million employees (ONS, 2003a). Therefore, companies are pressured into vying for contracts and trade from the clients in order to tap into this booming market. The organisations that took part in the research indicate that they are interested in managing the knowledge of their employees since there is constant competition within their respective industries. Besides acquiring, sharing and retaining the knowledge of their employees, the organisations should also consider their support systems in order to retain the knowledge as well as the employees themselves within the organisation. This attitude is approved by Wickramasinghe and Mills (2002) who is quoted in Chapter Two as saying that effective and efficient processes and functions of supporting and fostering innovations are the key concerns of KM within an organisation. Therefore, in line with the research question relating to what HR support systems are used by companies to help in the management of knowledge, it is found that organisations utilise their training programmes and remuneration schemes as a means for encouraging, motivating and maintaining the loyalty of their employees to contribute to the knowledge base of the company.

7.5.1. Training

All the companies interviewed indicate that they would send their employees for training based on the job they are doing as well as the employee's own performance review. The nature of the person's job would determine the level of training required. In the case of Build Co., the new technology being discovered within the industry makes it possible for architects to design, build and assemble buildings faster than before. In Chapter Five, Glancey (1989) indicates that with the machine and computer age, architects could produce cheap, production line designs such as prefabrication that are easy to manufacture and quick to assemble on site. Therefore, although there is no structured training programme for architects within Build Co., it still offers a series of modules, as proposed by RIBA, for gaining necessary qualifications. Moreover, Conway and Roenisch (1994) state that architectural organisations should gain knowledge in a variety of fields to cater for the increasing demand of the clients and therefore, Build Co. is encouraging their employees to acquire as much knowledge as they can.

As the nature of Tel Co. and Oil Co. is more technical rather than creative, the engineers of both Tel Co. and Oil Co. prefer their staff to have more hands-on training. This is especially important for Tel Co. where in the telecommunications industry, the latest development could become obsolete within weeks (Bray, 1995), staff do not have time to leave their work for further training and would gain the experience necessary while on the job. Furthermore, Oil Co. indicates that their

employees would prefer to gain experience on the job and through on-the-job training than to leave their workplace for further studies. Carlton (2002) mentions that in the oil and gas industry, cost of production and decommission of redundant offshore platforms could be overcome through advancement of new skills and technology, new exploration techniques and drilling methods. Therefore, Oil Co. sees the need to train their employees to be highly versatile in the ever-changing nature of the industry.

In addition, the organisations believe that through training, they could also help the employee to progress through the career development process. The organisations would review the employee's performance appraisal to determine training that would be necessary for the employee's field of expertise. The companies hope that by offering training and good career progression, the employee would be encouraged to remain within the organisation. However, it is indicated in the literature review that this is doubtful as employees are more loyal to their own career advancements first before being loyal to the organisation (Demarest, 1995; Hope and Hope, 1997). Nevertheless, by offering training to the employees, not only will the employee gain more knowledge, but it would also create a positive environment for the employee to work in.

7.5.2. Remuneration Schemes

From the Results chapter, it could be revealed that the companies involved in the research align their pay system through benchmarking with market rates. Furthermore, they would also consider the seniority, the contribution and personal performance review of each employee when designing the salary scheme. The organisations do this to be able to offer competitive rates within the industry especially when market forces are highly competitive at the current moment (Smith, 1998).

The organisations that took part in the study also mention the concept of reward in an effort to encourage employees to share their knowledge as well as to retain their services within the company. Both Tel Co. and Oil Co. offer monetary rewards and awards respectively as a way to reward employees for their contribution. Furthermore, the organisations believe that praise and recognition, although of no monetary value, is important for the employee to feel positive of their work and of the organisation. Moreover, some organisations like Build Co. and Bio Co. offer either more high profile jobs to junior architects (Golzen, 1984), or give more time off for employees to complete a project as a way of rewarding their employees. Alvesson et. al.. (2001) and Hall (2001) indicate the concept of rewarding employees for knowledge sharing through a variety of ways including those conducted by the organisations such as financial rewards, career advancements and participate in more challenging work. Through these reward systems, the

organisations are hoping to encourage their employees to retain their knowledge via manuals and reports as well as to share their knowledge with other members of the company or with clients.

Although the organisations interviewed report that they do not offer any rewards for patents within the organisation, they do indicate that patents filed would be the property of the organisation. However, it is felt that despite the nature of the organisation, there should be encouragement among the staff to create products that could be patented. Especially in the case of the pharmaceutical industry where organisations can gain large revenues while the patent is in effect, which could last over twenty years (Fenn, 2002), Bio Co. would be prudent to try and encourage their employees to create products that could be patented.

From looking at the discussion of the results chapter, we can see that the companies involved with the study have some procedures that they hope would help them to manage the knowledge of their employees efficiently. According to Abou-Zeid (2002), the KM process includes three steps that are the identification of knowledge that is available within the organisation, the processes of knowledge acquisition, application, storage and dissemination, and lastly the available resources to support the knowledge management process. From the discussion above, we can see that the companies in this research do satisfy the criteria as imposed by Abou-Zeid even if the procedures implemented are not considered as formal methods. Furthermore, due to the effect of globalisation, industrialisation,

and urbanisation, the respective industries of the organisations that took part in the research are become highly competitive. Therefore, in answering the research question, the organisations are striving to implement effective KM strategies within their company through training as well as a balanced remuneration scheme in order to be able to retain, encourage and utilise the knowledge of their employees efficiently. It is hoped that through competent management and utilisation of knowledge, the companies would be able to remain in a strong position in the market place against the competitors.

However, in relation to the research question of the issues that organisations faced relating to KM, the companies do state that they are facing problems in implementing the policies and procedures. These problems have more to do with the time and effort of employee contribution (Build Co., Oil Co.), or the opportunity to contribute or participate in the programs (Tel Co., Bio Co., Oil Co.). This has some differences to what is said in Chapter Three. In the literature on the subject of KM, the articles discuss more on problems to contribute to the KM strategy due to reluctance of the employees to share their knowledge (Hope and Hope, 1997; Truch, 2001; De Loo, 2002). This research shows that it is not so much a problem with employees wanting to share their knowledge but more on the fact that they do not have the time or in some cases, the opportunity to take part in the KM policies. Therefore, to create more efficient KM processes, the management of the organisations should consider taking steps in ensuring that every employee interested in contributing to the KM strategy would have the time and the

opportunity to do so. It is, of course, easier said than done since some employees would be more focused on their jobs than to take time off to contribute to the KM process (Oil Co.). However, in the case of Tel Co., all the employees should be allowed to give feedback on their peers' ideas and not just by the New Idea Team so that the employees would feel more involved.

Furthermore, Oil Co. and Bio Co. admit that they are facing problems in carrying forward lessons learned to other projects. Information gained during peer feedback and review are not written down and filed while discussions after a completed project would be filed but there is no real system for accessing the information when needed. Moreover, the hard copy library of Oil Co. is not easily accessible as there is no efficient management in the filing system in both Bio Co. and Oil Co. and therefore, nobody knows what is stored. The inability of both companies to access and manage the knowledge already existing within the organisation could be a loss to the company in terms of revenue as other companies could come up with new techniques within the industry.

Although the organisations are aware of the importance of knowledge as a resource within the company, they are hesitant to implement formal systems of KM as they feel that it is difficult to encourage employees to contribute to the system. However, these organisations do not seem to recognise that each of the procedures that are implemented within the company, which range from intranets to systematic idea review processes, could be linked and utilised with other policies within the

organisation in order to create a more efficient system of KM. It should be emphasised to the respondents that they do not need a formal KM strategy to manage the knowledge of their employees but that a combination of all the other procedures already in place could go a long way in efficiently managing the knowledge within the organisation.

Moreover, not all of the systems implemented by the companies involved in the research are based on IT although there is some reference to the convenience of the facility with each process implemented. Many of the articles reviewed in the literature review chapter tend to base their KM processes on IT systems as well as management of IT specialists and this is not the case with what is discovered in the research. It is discovered through the research findings of this thesis that KM does not have to be based on technological software and that through simple networking, and recording of information as well as good KM practices within the organisation could help the company manage and utilise the knowledge, skills and expertise of their employees more efficiently. In addition, the companies from this research feel that any employee, regardless of position, has a right to contribute to the systems implemented within the organisation as means of enriching the company with more knowledge. From this discussion, it can be seen that although Bio Co. and Oil Co. do not utilise advanced technology in managing the information within their organisations, the management of both these companies utilise more of the soft-management style in managing the knowledge of their employees. They would sit down and discuss with their employees regarding what the employees would like in

terms of training to help in their career progression, as in Oil Co. with their P3, or with Bio Co. encouraging the employees to spend more time in other departments to exchange knowledge. This shows that both Bio Co. and Oil Co. revert more towards the behavioural approach to KM as compared with Build Co. and Tel Co. that utilises the informational approach to KM. Further similarities and differences between the management styles of the companies will be discussed in the following section.

7.6. Reflections on Differences in Perception by Managerial Level

In this section, the perceptions of the management team would be presented to indicate any differences or similarities in the opinions of the interviewees towards the KM process. This is to show how the participants of this research perceive KM strategy to be and how they react to it. It is noticed that participants who hold senior positions in the organisation tend to discuss on the benefits of having the policies and procedures. They are more eager to describe what the system does, how it works, who are involved and how it is going to help them in managing their employees (Senior Partner, Build Co.; Managing Director, Tel Co.). Middle to lower management of the organisations discuss more on the benefits of using the systems as well as how it affects their employees (Finance and Office Manager, Build Co.; Customer Service Manager, Tel Co.; Quality and Assurance Manager, Bio Co.; Business Development Manager, Oil Co.).

However, there is no differentiation in positions when they discuss the problems they face in implementing the policies and procedures or the difficulties their employees have in trying to participate in the KM processes of their organisations (Managing Director, Oil Co.; Chief Engineer, Tel Co.; Research Co-ordinator, Build Co.; Finance Director, Bio Co.). This indicates that while senior management presents the policies and procedures on a more managerial focus i.e. the benefits, what it entails; the middle to lower management who are actually involved in the actual process itself discusses it on a more personal level.

Moreover, the middle to lower management are also more aware of the day to day problems they face on an experience level rather than the general expected problems that the senior management are aware of. This shows that although senior management might be the authority behind implementing the policies and procedures, it is the middle and lower management that is actually hands-on in the whole process of the KM strategy.

From the Results chapter, it is found that there are also very little differences in response between the different levels of managers within each company. There might be differences in the focus of the response but they all pretty much agree with the general overview of the KM policies and procedures that are implemented in the company. This shows an understanding between the levels of management within the organisation as to what the final outcome of the KM process is meant to be.

The comparison between the different positions between the companies show that the Senior Partner of Build Co. is very enthusiastic of their Three-Wave system and discusses the process in terms of its benefits and how it is managing the knowledge of his employees. The Managing Director of Oil Co. and the Vice-President of Bio Co. however, are more cautious about the concept of the KM strategy. The Managing Director of Oil Co. says that since it is difficult to value in terms of monetary benefit, it is more difficult to implement it within the company due to other matters that are of a greater priority. It is similar to the opinions of the Vice-President of Bio Co who explains that even if they do want to have a KM process, the work their scientists are doing is their first priority, leaving everything else pretty much on a secondary level. In the case of Tel Co. however, the Managing Director there explains the implementation of the New Idea Scheme but he is also cautious as to how to implement the KM processes, as he does not wish to overwhelm his employees with too much unnecessary information. So it can be seen that even though senior management have different approaches to how they manage their KM strategy, all, except Build Co., are pretty cautious about the KM policies and procedures.

What is interesting to notice is that middle to lower management prefers to discuss KM processes they would like to have in their organisation, ranging from a knowledge database (Bio Co.) to more efficient assessing of stored information (Oil Co.). This could be due to the fact that middle to lower management works closely with their staff and therefore, are aware of the shortcomings of the policies and

procedures already existing within their companies. It would be prudent for higher management teams to consider the opinions being presented by their lower management and their employees if they wish to be able to utilise their knowledge more efficiently.

Therefore, it can be seen that the competitive nature of each of their respective industries along with the desire of the management team to manage their employees are seeing an implementation of a variety of policies and procedures that when conducted individually, will give the management team an opportunity to manage specific aspects of their employees' knowledge. It is now up to the companies to be able to combine their processes in a way that would make it more efficient to manage and utilise the knowledge of their employees on a more overall perspective.

CHAPTER 8: CONCLUSIONS AND RECOMMENDATIONS

This chapter outlines the contributions to research from this study. Furthermore, the limitations to the research conducted as well as additional recommendations on research opportunities for those who wished to study further in the field of KM are discussed.

8.1. Key Findings and Contributions

This section of the chapter will present contributions to research that are discovered during the process of this study. The utilisation of the multiple-case study method in conducting this research has allowed for a discovery of similarities and differences between the companies that participated in the research. Since the structure of the multiple-case study method allows for a comparative view between the four companies in this research while still maintaining research on the key issue that is the KM process, the distinct styles of management and policies along with the KM strategies of the companies could be studied. Reference to the objectives of the research that is listed in the Introduction chapter as well as the research questions proposed in the Research Methodology chapter of this thesis will be made in presenting the contributions of this research. The contributions will be presented based on the research objectives of this study.

The first objective of this research is to study how knowledge in an organisation is identified and how organisations encourage their employees to become more knowledgeable in the workplace. This ability to identify and change knowledge is important and has become a source of power for organisations (Buhler, 2001; Jacques, 2001; Galup et. al., 2002). It is found that the organisations in this research recognise knowledge as a resource and that it is not necessary for organisations to invest heavily in state-of-the-art technological software or systems to help in the identification of knowledge that is necessary, as well as to encourage employees to increase their knowledge. Simply by speaking to the employees or through experience doing the work itself is sufficient in finding out what knowledge is crucial to the workplace as done by Bio Co. and Build Co. Speaking to employees or work experience is similar to what is been mentioned by Gonsalves and Zaino (2001) and Cappabianca (2002) who stress the importance of social networking and on the job experience as means of gaining knowledge. In addition, having detailed job descriptions and conducting job analysis for all jobs within the company help determine knowledge that is required in the organisation. Furthermore, by discussing possible career progression with the employees as well as giving them the opportunity to take on more interesting work encourages the employees to try and gain more knowledge for their own benefit as well as the company. Moreover, it is found that the organisations would conduct a review after each project is completed or a weekly meeting to review the progress of a project in order to discover possible ways of reducing the time and cost it took to complete the project. Therefore, the contribution to the research showed that it is through basic social

interactions between employees and discussions between management and employees that the identification of knowledge is determined. Furthermore, it is through these interactions that employees are encouraged to increase their knowledge levels to benefit themselves as well as the organisation's knowledge base.

In the second objective regarding the identification of KM processes within the organisation and to what level or extent it has been implemented throughout the organisation, it is found that none of the organisations interviewed have a formal KM strategy. This is initially surprising as Augier and Vendelo (1999) and Roy and Roy (2002) say that managing knowledge is important as a means of increasing the efficiency of the knowledge-base of the organisation. However, there are other policies and procedures implemented by each company that help them to manage the knowledge of their employees up to a specific level. The procedures include processes for reviewing ideas submitted by the employees, either formally as in Build Co. and Tel Co., or informally in department meetings as in Oil Co. and Bio Co. Furthermore, the policies also involve having detailed CVs of all the employees' skills and expertise as evident in Tel Co.; a programme for monitoring the personal performance of the employees such as the P3 in Oil Co.; as well as a company wide intranet system such as the systems implemented in Build Co. and Tel Co. Although the practices implemented by the organisations are company policies in their own right and only help to manage one aspect of the employees' knowledge at a time, a combination of all the procedures could be used to provide

an overall management system that could be considered as a KM strategy within the organisation.

Furthermore, the extent to which the KM process is implemented varied from company to company and policy to policy. Some of the practices are implemented company wide such as the Three-Wave scheme in Build Co., whereas some are only open to certain sections of employees such as the New Idea Scheme in Tel Co. that is reviewed by a select group of employees and board members. The level to which participation is allowed depended on the specific process as well as the relevance to the employees. This elitism is due to the fact that companies do not want to overwhelm their employees with unnecessary information or to take on processes that have no benefit for them. Moreover, it is felt that, sometimes employees are focusing hard on completing their work that they do not have the time to contribute to the KM process. Therefore, the fact that although the companies tend not to have explicit KM strategies, they do have a series of policies and procedures implemented throughout the company or within limited participation to assist in the management of knowledge within the organisation. This discovery is the second contribution to this research and it is supported by Jang et. al. (2002) who state that the value of knowledge is capitalised when the knowledge is distributed, shared and internalised.

The third objective of this research is to discover how knowledge is retained and disseminated within the organisation. During the research, it is found that none of

the companies have any formal methods of retaining knowledge within the organisation. There are no knowledge inventories or databases and the reason for this lack of retention mechanism is that not only is there difficulty in having employees write down everything they know, sometimes employees do not have sufficient time to do so. However, the only kind of inventory that is being utilised by the companies is an inventory of skills and expertise of the employees. This acts as a mini-CV and allows employees to search for other employees who might be able to assist them in any problems they come across during a project, as mentioned by Buhler (2001) regarding maintaining a skills bank or inventory. In addition, paper and paperless filing systems are also used as a method of storing information within the organisation but this storage facility would only work efficiently if there is easy access to the information as well as knowing what is being stored in the filing system or organisational library. Employees could gain a vast amount of knowledge from the stored information if it is accessed and utilised efficiently. The organisations would then be considered as being able to utilise the knowledge that is stored within the organisation.

Regarding the method of disseminating knowledge within the organisation, it is found that most of the organisations still rely on the traditional method of networking and discussing with other employees as a means for sharing new knowledge or information. They try to get the employees together after each project to discuss their experiences during the project and to discuss what new knowledge or information is gained while completing the project. The organisations hope that

through these discussions, the employees would be able to share their experiences gained during the project as well as present ideas for future projects that might save time, money and effort for the company. This is similar to the motives in the pharmaceutical company researched by McKinlay (2002) where they maintain a set of linked websites based on stories of individuals during the drug development programme to share their experiences and knowledge. Furthermore, employees are also required to give the occasional presentation to the other employees, can be requested to write up a module or asked to train a successor if they are to leave the organisation as a way of sharing information. All these actions, which are mentioned and approved by many authors in the literature review chapters (Bertels and Savage, 1999; Foley, 2001; Lesser and Prusak, 2001; McKinlay, 2002; Newell et. al., 2003), are there to get the employees involved in meeting, networking and sharing knowledge with each other to increase the knowledge base within their organisations, as well as to avoid making or repeating any mistakes which could cost money, time and lives (Hoopes and Postrel, 1999).

In terms of both knowledge retention and dissemination, it is found that most of the organisations interviewed in the study use the intranet for storing and sharing information. The companies would upload the information or report on a project onto the intranet allowing other employees to access it whenever they wished. However, this practice could lead to an overload of information and no efficient way to access necessary data while discarding unwanted information. The intranet becomes more of a stock-pile of information rather than a medium for retaining and

disseminating information. A few of the respondents mention finding difficulty in knowing what knowledge is stored within the organisation as well as the difficulty in trying to retrieve the information. This problem is due to the fact that they are unaware of where the information is stored and what kind of information is available and this revelation should be taken into serious consideration by the companies to put in order the stored information within the organisation. It is found that careful and efficient management of the intranet is needed if the organisations are going to be utilising it as a facility for storing and sharing knowledge. Newell et. al. (2001) say that in KM organisations should not only know how to store information but also know how to retrieve stored information. Therefore, this research discovered that besides the intranet, the organisations utilise the practice of storing information either in paper form or on the computer. Moreover, the organisations also rely on the basic method of word-of-mouth and discussions to share their knowledge with other employees. However, it is also discovered that the organisations must be careful to efficiently manage the knowledge already stored as it would be a waste of time, money and energy if the employees are to rediscover the same information when it is already available within the company (Fox, 2002).

The final objective of the research is to identify the nature of support systems organisations use to manage the knowledge of their employees. It is found that the companies would utilise training schemes, a flexible reward system as well as a fair salary scheme that is benchmarked with the current market to help manage and maintain the knowledge base within the company. The employees view training as

a step in their career progression and therefore are encouraged to remain in the company if they knew that the company would give them time off as well as pay for some of the training as long as it is beneficial to the organisation in the long-run. Furthermore, a reward system that appreciates and shows recognition of the efforts of the employees either in monetary or non-monetary terms helps to motivate the employees to remain loyal and contribute to the KM process within the organisation. This type of reward system is supported by suggestions made by Alvesson et. al. (2001), Hall (2001) and Lesser and Prusak (2001) regarding giving bonuses, share plans and other rewards for departing employees to share their knowledge with other employees before leaving the company. Moreover, a fair salary scheme that is in line with competitive salary prices with other companies from the same industry or with positions that did the same job duties within other industries, effectively helps the management team in retaining the employees within the company as well as motivates them to participate in the KM strategy of the organisation. Therefore, the final contribution to the research show that although the HR support systems are in the background to the KM strategy and not directly involved in encouraging employees to contribute to the knowledge base within the company, they do play a large role in the overall management of knowledge within the company by retaining the employees' services as well as motivating them to get more involved in the KM policies and procedures that are implemented within the company. This is inline with the statement by Hope and Hope (1997) which says that KM is a long term programme that needs to be undertaken by all levels of the organisation and ingrained in the main organisational culture.

In conclusion, it can be seen that rather than having a formally recognised system of KM within the organisations, which everyone would automatically accept as a KM strategy, the companies are implementing a series of policies and procedures that manage the knowledge base of their employees. These policies and procedures manage specific areas of the KM process from how knowledge is acquired to the method of sharing knowledge between employees. So it would seem that if these policies and procedures are combined and utilised together, the organisations do not necessarily need a formal KM strategy as long as the procedures already implemented within the company are effective in managing the knowledge base efficiently. However, if there are any issues regarding the policies and procedures that do not allow for efficient KM within the company, it would be wise for the organisations to review the policies to improve it. Furthermore, the organisations could inform the employees that the procedure would be beneficial for the company as a way for managing a specific area of the KM process and this could help the employees become aware of the function of the policy and would be more likely to contribute to or implement it.

Whilst the findings discussed here reflect on a large number of issues, the following contributions of the thesis can be highlighted. First of all, the perspectives taken on the knowledge process and the use of qualitative case studies, encourages a shift in the research away from a focus on the formal system of KM towards the actual, informal processes of managing knowledge. In other words, greater benefit would be achieved from studying knowledge management than

Knowledge Management. This means that companies should pay more attention to the 'soft' skills of managing knowledge for encouraging, motivating and rewarding employees to contribute to the knowledge base rather than focusing on a perfect system that would acquire, store and disseminate the knowledge at will within the company. It can be seen that the organisations in this research are already taking a step in the right direction by interacting with their staff, taking the time to review the ideas of their employees during meetings as well as rewarding employees for best contributions in the workplace as in Tel Co. and Oil Co. It is the contributions of knowledge from the employees that would start the ball rolling as well as maintain the momentum of the KM process and therefore, it would be prudent for the organisations to focus more on this aspect of the KM strategy.

A second contribution is that whilst there are differences across industries in why and how knowledge is identified and utilised, the core of effective management of knowledge stems from the creative, efficient management of the employees themselves. For example, constant and open communication is needed between managers and employees for a viable knowledge management process. This is already being attempted by all the companies involved in the study by giving the employees meaningful work to do, talking to them and also discussing the employees' career progression as conducted by Build Co., Tel Co. and Oil Co. The higher management levels may indicate what policies and procedures would be implemented as well as have discussions with their employees on a general level. This is probably due to the fact that higher level managers have other matters that

take up their time and do not have as much time to spend with their employees. The higher level managers do try to have meetings and discussions with their staff but it can be seen that it is usually done through department meetings or presentations. As such, it is the one-to-one discussions with the employees by middle-line managers that have a stronger impact on the employees. The fact that the line-managers take the time to sit down and discuss possible career progressions, provide continuous feedback as well as discuss the ideas and opinions of the employees as done in Tel Co. and Bio Co., could be a way of encouraging the employees to either gain more knowledge, know what training to attend as well as what is expected of them within the workplace.

Moreover, the style of managing the employees, either following the informational approach or the behavioural approach, could play a part in the effectiveness of the managers in managing the knowledge within the company. According to the literature review, the informational approach focuses on KM being related to the process of gathering, categorising, filing, utilising and modifying data into useful usable information (Lamb, 2001; Loshin, 2001; Wickramasinghe and Mills, 2002; Du Toit, 2003). While on the other hand, the behavioural approach believes more in the human element of the process of encouraging staff, changing the organisational culture as well as helping staff to gain more knowledge and share them with the rest of the community of the company (Hope and Hope, 1997; Ruggles, 1998; Condon, 1999; Sbarcea, 2001; Sindell, 2001; Truch, 2001; Jacques, 2002). From the results and discussions of the thesis, it seems both Build Co. and

Tel Co. focus more on the informational approach by utilising the intranet substantially as a means of storing, filing and discussing ideas. Admittedly, Oil Co. also maintains an intranet but since they are not utilising it as efficiently as Build Co. or Tel Co., as they have problems with retrieving stored knowledge, the company cannot really be classified as following an informational approach. At the same time, even when Bio Co. and Oil Co. both focus more on the general aspects of management as a means of encouraging employees to gain and share more knowledge, i.e. talking to them, discussing career progressions as well as offering rewards to best contribution, Build Co. and Tel Co. also take the time to talk to their employees as well as find ways to encourage them to share and retain their knowledge within the organisation. Therefore, the best approach to managing the knowledge base within the company would be the utilisation of both the informational and behavioural approaches. The managers could manage the knowledge of the employees by implementing policies and procedures that assist the KM process, while at the same time, focusing on managing the employees themselves. This could be done by showing that the employees' knowledge is important to the organisation through discussions and by talking to them. Encouraging networking between departments while providing modern facilities such as the intranet could be a way of maintaining the loyalty of the employees to remain within the organisation, thus retaining the knowledge base of the employees.

Finally, at a more policy-oriented level, on the issue of knowledge retention, this research demonstrates that companies should strongly consider utilising more non-

monetary rewards and benefits to persuade employees to remain in the company. Respondents feel that training, recognition and career progression are important elements in making employees feel needed and welcomed in the organisation. The fact that employees are rewarded for their contribution at work could be an encouragement for them to contribute more towards the knowledge base within the organisation. Furthermore, when the employees are awarded recognition for their achievements, it would make the employees more inclined to try harder to achieve their goals. Moreover, by allowing employees to attend training programmes for their own career progression, albeit for the overall benefit of the company, the employees would appreciate the effort of the organisation and this could help in retaining the loyalty of the employees. Therefore, the HR support systems are important in the overall process of KM and although it need not be central to the KM strategy, the support systems need to be utilised alongside the other policies and procedures as a means of maintaining the KM strategy.

From these contributions, it can be seen that this research has discovered that companies do not necessarily need to implement formal, technologically based KM systems as long as they utilise certain policies and procedures within the organisation that encourages and motivates employees to contribute to the knowledge base. The literature available on KM tend to focus more on formal KM systems that utilises technological software, as well as puts pressure on formal KM being implemented in the organisations. This research shows that although formally recognised KM processes is commendable, it is not the be all and end all in the KM

strategy. The results of this study show that the KM process within the organisations could be achieved without these formal systems or technological software with the KM strategy being a combination of formally recognised policies along with other common organisational practices that utilises the knowledge capacity of the employees efficiently. Moreover, the KM process should also include the HR support systems that would assist in maintaining the knowledge base within the organisation. Therefore, it is an issue of interest that the organisations should utilise whatever means they can in order to manage the knowledge within the company as long as the policies and procedures are utilised together strategically and the employees are aware of the process. This is so that they may be able to contribute to the knowledge base more effectively.

Furthermore, this research also indicates that the organisations also seem to focus much on trying to retrieve the tacit knowledge of their employees and change it into explicit knowledge. The companies hope to be able to retain the tacit knowledge of their staff in files, manuals and information so that other employees can utilise it. However, as part of the KM strategy, it is very important for the companies to be able to retrieve stored knowledge within the organisation so that employees would not lose time and effort in recreating answers to solutions that already exist. It is noticed that with the utilisation of the intranet, the organisations such as Bio Co. and Oil Co. are fast becoming a 'data dump' without any efficient means of knowledge retrieval. In addition, the employees are unaware of what information is stored within their stored files and company libraries and this could lead to a loss in

important knowledge being utilised within the company. This is a situation that is commented upon by Borck (2001) and Robb (2003) who warn that an organisation that depended too much upon systems to store knowledge could find themselves with huge amounts of information without any means to efficiently retrieve the knowledge that has been stored. Therefore, it is an emerging issue that someone is needed to be in charge of sorting out the stored knowledge in an orderly fashion and to inform the rest of the staff of the existence of this stored information so that the knowledge from these files can be utilised efficiently. By looking at these contributions, it can be seen that this research has added new information to the existing body of knowledge regarding KM and the issues surrounding it.

8.2. Reflections and Recommendations

Upon reflecting on the thesis, there are a few limitations to this research. One of the main limitations is the fact that this research only interviewed managers. It would be better if the research could incorporate some questionnaires for employees to answer besides the managers. These questionnaires would help give a better picture of the KM process from the employees' perspective rather than from the managerial perspective alone. Granted, since this research wanted to study the managerial point of view regarding managing knowledge within the companies, this study only conducted interviews with key members of staff who are the managers to gain the necessary data, as they are the ones that manage the knowledge.

However, by including either all or a section of the general employees, the study could present employees with an opportunity to present their opinions and discussion regarding the KM strategy. Furthermore, conducting interviews with all the employees in a managerial position rather than just one from each level would give more insight into the managerial decisions that take place regarding the KM process. This would take more time and resources but would give a more in-depth picture into the actual versus the intended KM process and so the problems faced by both the managers and the employees in terms of implementing KM policies and procedures.

Another limitation that could occur in interviews is the possibility of researcher bias during the data collection. Although the interviews are conducted following a semi-structured questionnaire, there is the possibility of the researcher, without realising it, suggesting and prompting information to the participant when s/he has difficulty in answering a question. This could lead the participants to answer in a way that they feel the researcher would like to hear or focus on an aspect that is more favourable towards the study rather than stating the true picture. Furthermore, the limitation of the researcher bias could continue during the data analysis process due to the subjective interpretation of the data according to the researcher's perspective, which may make the data more supportive of the research. Moreover, the participants within the organisations might not want to be seen in a bad light and might offer positive responses regarding their role, position and procedures implemented within the company in order to give a good impression regarding their

work place. This is a possible problem of respondents who might not want the researcher to think lightly of their role or responsibility as well as consider their company to be inefficient (Nachmias and Nachmias, 1996). This could lead to skewed results in the data collection with a rosy outlook on the KM process and not give a true picture into the problems that organisations could be facing.

In addition, as this research is conducted using qualitative methods, reliability depended largely on the perception of the researcher during the analysis of the data. The subjectivity of the analysis of the method is controlled by making sure that the results are reported as they are discovered. The validity of the research would still remain constant because if the research is repeated with the same set of questions, at the same companies, with the same respondents, relatively the same answers would be obtained. Therefore, the results of this research has to take into account the assumptions that the data is valid and reliable based on the perceptions of the researcher and the contributions of the participants at the time of the data collection. Furthermore, since each of the organisations that took part are just one of many other companies in their respective industries, comparison could only be made between the companies from these different industries and not actually between the industries itself. This is the limitation of the multiple-case study method where the data collected cannot be pooled together to get a compiled data but rather the data is used independently for comparative study. As such, the companies chosen for the research should have their own distinct characteristics as well as common ground between the organisations so that the common topic could be studied while having

differences to research upon. It would be better if more companies from the same industry are included into the study so that in addition to a comparison between the companies from different industrial backgrounds, a comparison on the KM process between the industries could also be gained. However, since this is a comparison in the management of knowledge within companies of different backgrounds and industries, more than one company from each industry would create different sets of comparisons.

Lastly, another major limitation of the research conducted is time. It took some time to contact the different organisations and wait for their responses. Furthermore, trying to arrange the interviews for the data collection with the various participants, who are based all around the UK, and who sometimes cancels or postpones appointments also causes delays with the thesis process. Although this is expected in a research that is conducting interviews, the time frame should take into consideration any unexpected delays. Moreover, each interview has to be transcribed from the tapes into documents so that analysis could be made effectively and this took a large amount of time to transcribe each tape concisely in order not to miss out any important points. In addition, the amount of time spent analysing the qualitative interview, searching for similarities and differences as well as making comparisons between the companies further extended the on-going process of the research. These limitations should be taken into consideration when conducting further researches in similar areas of KM in order to avoid similar limitations.

Besides the limitations, a few recommendations into possible future research need to be considered. It is highly recommended that further research into the management of knowledge be carried out in order to study more efficient KM strategies within the organisation. Especially when a majority of the literature available regarding the subject matter focus more on the need for KM practices rather than issues and problems surrounding the implementation of the KM process. Moreover, it would be interesting to discover how organisations manage the knowledge already stored within the company as this proved to be a sore point among participants of the research.

It is also recommended that future studies could focus on just one industry and study the different managerial approaches and the problems involved with implementing a KM strategy within the organisations. This future study could involve using a different type of multiple-case study method whereby rather than having different companies from different industries, the research could study different companies but within the same industry. However, rather than pooling the results or data which would turn the study into a survey, the research could make a comparative study of the similarities and differences in management styles regarding KM within the same industry. This comparison could give a deeper understanding into how the industry can affect the managerial practices in regards to KM. Different companies within the same industry might implement different procedures, resulting in different management styles. Furthermore, by offering a combination of quantitative and qualitative methods of research such as close-ended

questionnaires to lower members of staff and conducting interviews with key positions within an organisation would not only provide a picture of the managerial aspects of the KM process within each individual organisation, but also provide data on how employees respond to the implementation of the KM strategy within the company. It is hoped that other interested parties in the area of knowledge and knowledge management would take these recommendations into consideration before conducting a research in the field of KM.

8.3. Conclusion

To conclude, this chapter presents an overview of the research objectives of this thesis and they prove to be met based on the results from the study along with the discussion of the key findings of this thesis which includes the methods in which organisations identify necessary knowledge within their company and the types of processes implemented within the organisation to manage the knowledge of their employees. Besides touching upon the knowledge process that exists within companies, this research also emphasises the need for effective knowledge retrieval either from the employees or from the stored knowledge within the organisation for efficient KM. The findings of this thesis also look at support systems implemented within the firms that participated in this study that motivate or encourage employees to acquire, create, share and retain knowledge as well as to retain knowledge workers within the company. In addition, the contributions of this thesis express a

need to focus on the informal aspect of managing knowledge as well as maintain efficient people management and HR policies in order to create an effective KM strategy within the organisation. Besides that, this research discuss some of the problems being faced by the employees as well as the initiation taken by management throughout the KM process in order to maintain the most efficient strategy possible.

This chapter also presents the limitations of the research that includes interviewing managers only rather than a combination of managers and staff, the possibility of researcher biasness during the interview and analysis of data, issues regarding reliability as well as time constraints. Finally, the recommendations for possible studies in the future within this field of KM that consists of combining both qualitative and quantitative research methods through interviews and questionnaires as well as focusing on researching one industry at a time are also offered to get a clearer picture regarding KM. It is hoped that through the presentation of this thesis, from the literature review on the issues surrounding knowledge and KM, the results obtained during the research as well as the discussion based on the results, a deeper understanding into the area of knowledge management within organisations are achieved.

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APPENDIX I

List of Questions Asked During the Research Interviews On Knowledge Management: Issues, Processes and Outcomes

Knowledge Management: Issues, Processes and Outcomes

A Ph.D. Research Study by Zabeda Abdul Hamid from the Human Resource Management Department, University of Strathclyde, Glasgow.

Organisation:

Interviewee:

Position:

Job description:

QUESTIONS:

Section 1: The Identification of Knowledge:

1. Is Knowledge recognised as a resource in your organisation?
2. How do you know what sort of information or knowledge is needed in your company?
3. Do you conduct any job analysis or have detailed job descriptions for every position in your company?
4. How do you motivate your employees to be more knowledgeable or acquire new knowledge?
5. How do you motivate your employees to motivate your employees to create new products or services?
6. Do you have a quota as to how many new products or ideas should be created or produced in a year?

7. What steps do you take in order to produce the most knowledge/ideas/services in the shortest time possible?

Section 2: Knowledge Management

8. Do you have a special review board that will review all new ideas presented by your employees?

9. Do you allow feedback from the employees' peers regarding any new ideas created?

10. What policies and procedures have you implemented within the organisation that you feel assists you in the management of knowledge?

11. What problems have you faced in implementing these policies and procedures?

Section 3: Retention and Dissemination of Knowledge

12. Do you have an inventory characterising the knowledge that your employees have?

13. How do you store knowledge within the company?

14. Do you have an idea bank where you can store new ideas that were thought of but were not made into any product or service?

15. If someone were to leave the company (for a variety of reasons), would s/he be asked to train his/her successor before s/he leaves the organisation in order to retain some part of their knowledge within the company?

16. How do you apply new knowledge created within your organisation?
17. How do you determine what information should be released and to whom?
18. How do you distribute information, products or services to the rest of the organisation or to the public?

Section 4: Human Resource Support Systems

19. What sort of training is given to your employees to increase their skills and knowledge?
20. Do you have any type of rewards (i.e. monetary or non-monetary) for the creation of each new product, idea or service?
21. What do you take into consideration when designing a pay system for your employees?
22. What sort of support do you provide throughout the whole process of developing a new product, service or idea?

Thank you for your time and co-operation.