An Exploratory Study of Knowledge Management and Management Control in Multi-nationals in Ireland

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Masters of Business Studies (MBS) by Research

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Abstract

The aim of this study is to investigate the nature of knowledge management within the multinational sector in Ireland. Further it explores the prevalence of knowledge management, the types of knowledge management activities, the barriers and enablers of KM and the links to performance management. Knowledge has been recognised as an important resource (Drucker, 1993; 1999; Stewart, 1997; Hamel, 2000; Leidner, 2001; Roberts, in Bhimani, 2003). Knowledge is regarded as an emerging concept; understanding and managing knowledge is difficult (Sveiby, 1997; Lynn, 1998; Burton-Jones, 1999; Hildreth et al., 2000; Tidd, 2000; Cormican and O'Sullivan, 2003; Bose, 2004). Management challenges have emerged from a changing economic climate. Globalisation, technology advancements and a move to a service-oriented environment have established what is known as a 'New Economy.' Performance management is undergoing change and management techniques are investigated to address these issues. Otley (1999) argues that performance management practices need to be evaluated not just from an economic perspective but from a managerial perspective. Otley and Ferreira (2005) present a management control framework that can be used as a tool to expose some of the emerging challenges.

This research has adopted a managerial perspective. A review of the literature was conducted. The research chose a triangulation approach to data collection where both a questionnaire and a case study using semi-structured interviews and a review of internal documentation were employed. The empirical investigation analysed performance management and knowledge management practices within the case organisation. Findings from the research indicated that external accreditation acted as an enabler of knowledge management as did supporting tools and processes including information technology mechanisms. A proposed framework for use as an evaluation tool to determine the maturity of knowledge management in an organisation is an output of this research. Findings identified the controlling influence of the parent organisation as a barrier to knowledge management within the case organisation.

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Abbreviations

The full term will be used once within the body of the text followed by the abbreviation in brackets; thereafter the abbreviation will be used.

BPR	-	Business Process Re-engineering
BSA	-	Business System Analyst
BSC	-	Balanced Scorecard
CIMA	-	Chartered Institute of Management Accountants
CMM	-	Capability Maturity Model
Email	-	Electronic mail
EVA	-	Economic Value Analysis
HR	-	Human Resource
IC	-	Intellectual Capital
ICT	-	Information Communication Technology
IDI	-	Information Delivery Initiative
ISO	-	International Standards Organisation
IT	-	Information Technology
KM	-	Knowledge Management
KMA/KMP	-	Knowledge Management Activity/ Knowledge Management Practice
KPI	-	Key Performance Indicator
KSF	-	Key Success Factor
MC	-	Management Control
MCS	-	Management Control System
MNC	-	Multi-National Companies
PMS	-	Performance Management System
PM	-	Performance Management
SCF	-	Structured Customer Feedback
SMART	-	Specific, Measurable, Achievable, Realistic, Time-bound.
SPL	-	Software Process Library
SQA	-	Software Quality Assurance

Online applications used at the case organisation

- Training Tracker - a web-based tool used to track individuals training evaluations and costs.

- Web time - a web-based tool used to record employees time spent on particular projects and tasks.

- Test Director and Bug zero - web-based tools used to monitor defects in software.

Chapter 1: Introduction

1.1 Introduction

'We have a hunger of the mind which asks for knowledge of all around us, and the more we gain, the more is our desire; the more we see, the more we are capable of seeing.'
Maria Mitchell

This chapter introduces the rationale for an investigation into the management and control of knowledge within Irish organisations. This builds the justification for research in this area. Initially this chapter outlines the research environment by introducing the domain and related domains of knowledge and performance management. This gives the reader an insight into the context of the research and explains some of the terminology associated with the topic. It highlights some of the management challenges in this area, the research problem and specific research objectives. This provides a purpose and framework for the research study. Then, the chapter outlines the themes within the literature and gives a brief overview of the adopted methodology.

To set the context it is helpful to give some examples of some knowledge management (KM) terms. Knowledge-based industries include; computer companies, high-technology firms, software companies and drug-research companies. Knowledge-based service companies include; law and consulting firms, pharmaceutical companies, finance and insurance companies, media and multi-media companies, and educational institutions. A knowledge economy is one that depends on knowledge intensive industry more than traditional manufacturing industries. Drucker (1999) uses an example of a neurosurgeon to describe a knowledge worker. The following paragraphs identify gaps in the literature and some economic considerations.

1.2 Overview of the research approach

The research rationale, challenges and objectives are outlined within this chapter. Chapters two and three provide a literature review of KM and management control (MC). This aims to give an understanding of the underlying dimensions within the research area with specific emphasis on KM aspects that are employed by an organisation. Chapter two introduces a knowledge economy, the emergence of KM and what it entails. It reviews (MC and performance literature in relation to knowledge. Chapter three highlights the main challenges to managing knowledge in the 'New Economy' and looks at the literature in relation to knowledge management activities (KMAs), enablers and barriers and links to intellectual capital (IC).

Chapter four outlines the adopted research methodology. A triangulation methodology was adopted for this research; this involved a review of the literature, a questionnaire, a case study and a review of internal documentation. The questionnaire returned a 26% response rate. The case study involved fifteen interviews with ten employees from varying hierarchical levels within the case organisation which was operating in the software industry. A presentation was made at the BAA Annual Conference, Manchester, UK in 2003 and at the Waterford Institute Research Review, 2004. Feedback at the early stages of the research was valuable in refining the research objectives and focusing the research study.

Chapter five and six present the findings from the empirical evidence, the questionnaire and the case study. Chapter seven discusses the findings within the context of the research objective and chapter eight outlines the conclusions and recommendations.

1.3 Research rationale

The need for research in KM and its control is evident through a combination of the perceived value of KM, management issues and challenges arising in relation to managing knowledge and the economic transformation to a 'knowledge economy.'

Drucker (1993) argues that the value of knowledge is paramount to all other economic resources:

> *'The basic economic resource-the means of production, to use the economist's term--is no longer capital, nor natural resources (the economist's 'land'), nor 'labour.' It is and will be knowledge.'*

Organisation knowledge and core competencies form the main foundation of competitive advantage and are fundamental to meeting business challenges in the 21st century (Drucker, 2002; Hamel, 2000). This is further accentuated by Alavi and Leidner (2001) who contend that knowledge should be treated as a vital and significant strategic organisational resource that can influence the competitive advantages of the organisation. Tidd (2000) and Sveiby (1997) argue that there is a gap within the literature, as in there are currently no commonly accepted operational level measurements that illustrate the value that can be derived from KM. Burton-Jones (1999) contends that KM is an emerging concept and that a common theme is that knowledge is probably the least understood and most undervalued of all economic resources. The term knowledge management has evolved and many definitions are available (Wiig, 1997; Quintas et al., 1997; Zack, 1999; Bounfour, 2003).

It has been stated by Beckman (1999) that Wiig introduced the concept of *knowledge management* in his keynote speech at the International Labour Organisation Conference in 1986 as:

> *'Creation, learning, sharing (transferring), and using or leveraging knowledge as a set of social and dynamic processes that needed to be managed'*

In his original definition Wiig describes the type of activities associated with KM from a process-oriented perspective; later the definition of KM was refined to a more organisational perspective (Wiig, 2000).

Quintas et al. (1997) define it as:

> *'the process of critically managing knowledge to meet existing needs, to identify and exploit existing and acquired knowledge assets and to develop new opportunities.'*

Quintas et al. (1997) have focussed on the value of KM with regard to providing business opportunities. Zack (1999) believed that to remain competitive, organisations must efficiently and effectively create, locate, capture, and share their organisation's knowledge and expertise. KM continues to be described as an emergent concept (Bose, 2004; Burton-Jones, 1999) and a commonly accepted definition has yet to develop.

The literature suggests that KM is recognised as an important resource, (Roberts, in Bhimani, 2003; Drucker, 1999; Stewart, 1997). The purpose, goal and expected outcomes of KMAs include improving performance, productivity and competitiveness, effective acquisition, sharing and usage of information within organisations, capturing best practices, reducing research costs and increasing innovation (Maglitta, 1995; Cole-Gomolski, 1997a; Ostro, 1997; Bassi, 1997; Mayo, 1998). A study by the American Productivity and Quality Centre shows that 89 per cent of the participants in the study stated that the core goal for KM is to capture and transfer knowledge and best practices (Allerton, 1998). This presents a focus on existing knowledge rather than new knowledge. Mayo (1998) reports on a survey which indicated that the main obstacles to KM implementation were lack of ownership of the problem, lack of required time, organisational structure, senior management commitment, rewards and recognition and an emphasis on individuals rather than on teamwork. KM could be described as a general improvement practice. However, there is evidence to suggest that there are unsuccessful KM projects and failures to KM implementations (Storey and Barnett, 2000; Feher, 2002).

How an organisation manages its performance has been investigated on many occasions (Simons, 1995; Langfield-Smith, 1997; Otley, 1999; Baxter and Chua, 2003; Chenall, 2003; Luft and Shields, 2003; Merchant et al., 2003) and studies have investigated a broad range of performance management components. Academia and industry have put forth many frameworks and mechanisms (Simons, 1995; Otley, 1999; Kaplan and Norton,

1996; Larsen et al., 1999). Otley (1999) argues that performance management practices need to be evaluated not just from an economic perspective but from a social, behavioural and managerial perspective, within an overall organisational context.

Managing an organisations' knowledge has not had as much focus as managing performance over the same period of time as industry has been focused on explicit knowledge primarily related to manufacturing processes and the service industry was not as prominent and thus to a degree it is still in its infancy as a management technique. Tangible manufacturing processes and techniques such as just in time (JIT) and activity based costing (ABC) were easily measured and integrated into performance models and frameworks. Whereas a move to a service-oriented environment poses challenges as knowledge is both explicit and implicit and services are less automated. Cormican and O'Sullivan (2003), De Gooijer (2000), Lynn (1998) and Sveiby (1997) identify that knowledge is difficult to measure and manage, and thus suggests that there is a gap in the literature to address this challenge. Contrary to this, Bhimani (2003) proposed that the key challenge is to sustain sufficient credence in the monitoring, measurement and assessment of organisational activities such as the knowledge generation and processing of knowledge. Further Bhimani (2003) claimed that this can be done by adopting commonly accepted mechanisms.

Collier et al. (2003) suggest that even though there is interest in the accounting literature in reporting intellectual capital (IC) there is little interest in an accounting perspective on the management of the knowledge that gives rise to the valuation of IC. In effect the links between knowledge and financial performance do not appear to be fully understood. Bontis (1998) argues that examining the processes underlying IC development may be of more importance than ever finding out what it is all worth. This links with KM as Larsen et al. (1999) argue that the IC underlying processes are knowledge processes and activities.

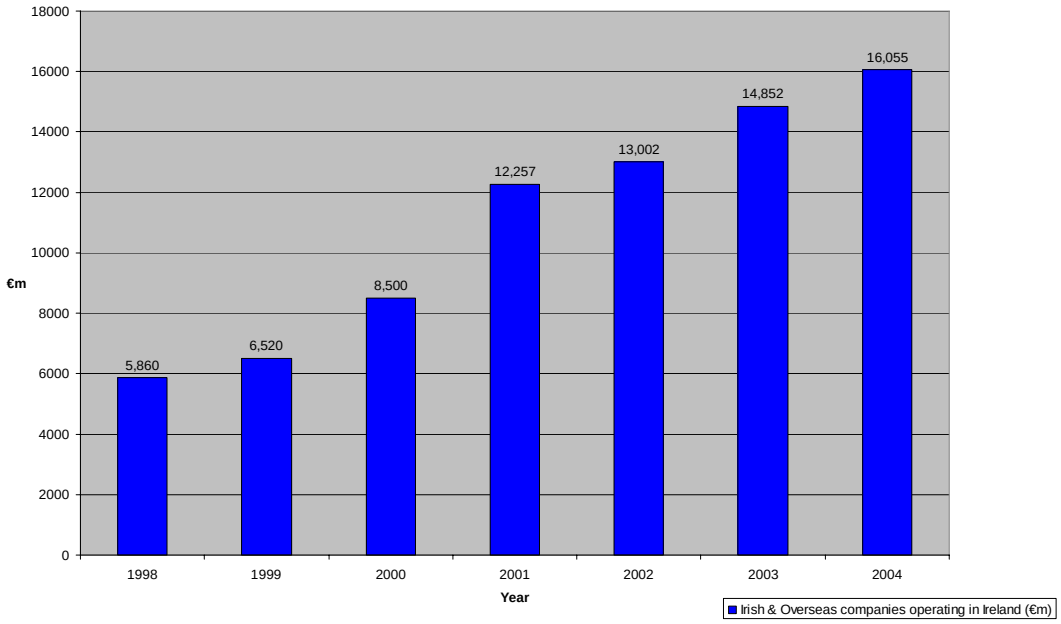
Due to an economic shift from manufacturing to service industry, referred to as a move from pre-modern to modern to post modern industry or fordism and post-fordism, the type of management issues arising has changed and implies a requirement for changes to management techniques. The focus on assets has changed from physical to intangible.

The current era has been coined a 'new' or 'knowledge' economy, developing an understanding of what is signified by 'a knowledge economy' holds possibilities to enhance our understanding of the context of this study. However, Holmberg et al. (2002) argue that there is still no consensus as to whether a New Economy exists, what it means and how it differs from the old economy. In contrast, O'Donnell et al. (2006) argue that ideas and the ability to continuously generate them are viewed as more important than the traditional triad of land, labour and financial capital.

In addition, one of the drivers of this study was the researcher's industry experience, working within the knowledge economy in a service-oriented environment. Following an investigation of the literature there was little empirical evidence of KM in Ireland (Brennan, and Connell, 2000; Collier et al., 2003; Lynn, 1998).

Ireland's software export volumes (Figure 1.1) illustrate the degree to which Ireland depends on its knowledge intensive industries. Software accounts for about 10% of all exports from the country, in absolute terms. Ireland is now the largest exporter of software in the world, ahead of the USA, with 60% of all software sold in Europe originating in Ireland (Enterprise Ireland, 2006).

Figure 1.1: Software exports from Ireland



Source: Enterprise Ireland (2006)

The Information Communication Technology (ICT) sector in Ireland employed 82,100 people in 2002. These statistics support the need for research in this area as Ireland becomes more dependant on knowledge intensive industries. It is pertinent that in April 2005, the European Commission adopted a proposal for a new EU programme for research and named it: 'EU Research – Building Knowledge Europe: The EU's New Research Framework Programme 2007-2013.' The proposal provides new impetus to increase Europe's growth and competitiveness, recognising that knowledge is Europe's greatest resource (European Commission, 2006a). This European focus on the knowledge economy can be attributed to the Lisbon European Council. The European Union set itself a strategic goal for the next decade: *to become the most competitive and dynamic knowledge-based economy in the world, capable of sustainable economic growth with more and better jobs and greater social cohesion* (European Commission, 2000). The strategy was designed to enable the Union to regain the conditions for full employment and to strengthen cohesion by 2010. Following this, Reding (2005) advocates a bottom-up approach that each member country needs to formulate their own Lisbon action-plans, with choices and commitments involving national stakeholders and debates in national parliaments. This provides a European context to this study and highlights the priority this topic holds at European policy-making levels.

1.4 Research challenges and context

Research of this nature poses many challenges for the researcher and there are a number of obstacles to be considered when negotiating a research path in this field. These include: the maturity of the research topic, perceived difficulties with managing knowledge, sensitivity of knowledge as a resource, links and disparity between KM and IC, limitations of social research, service-oriented environments and the indistinct boundaries of the study.

Empirical evidence is not mature in this area (Burton-Jones, 1999; Bose, 2004). For example, publications in this area such as in the Journal of Knowledge Management and Journal of Intellectual Capital were only established in 1997 and 2000 respectively. Knowledge is perceived as problematic to measure and manage (Sveiby, 1997; Lynn,

1998; De Gooijer, 2000; Cormican and O'Sullivan, 2003). Throughout the MC literature there seems to be no other specific resource that has gained this attention. Allee (1997) describes knowledge as a social phenomenon. However, there are no commonly accepted mechanisms (Sveiby, 1997; Tochterman et al., 2001). These challenges are investigated during the course of this research.

KM is a sensitive area; it may relate to an organisation's key success factors, competitive advantage and economic growth (Hamel, 2000; Alavi and Leidner, 2001; Drucker, 2002). Social research and service-oriented environments pose challenges as knowledge is both explicit and implicit and processes and actions are subject to human intervention. There are also organisational learning and sociological considerations. There are issues regarding ownership of knowledge, in some cases there is resistance from employees to share knowledge with their employers (Byrne, 2001). Each activity and how it is undertaken may be different and thus it does not lend itself to repeatable experimentation, an exploratory investigation should facilitate this type of study. KM processes and activities have been recognised as being fundamental to IC development (Larsen et al. 1999; Bontis, 1998; Collier et al., 2003). The challenge arises in the continuous differentiation and inter-connectivity between the two domains.

It is relevant to describe the boundaries of this research to crystallise the focus of the study, KM is pervasive across domains thus the boundaries may be permeable and not tightly delineated. This study uses a number of research lenses to investigate concepts from different perspectives: the managerial lens seeks to manage knowledge from multiple sources and overcome challenges that may arise, and the employee lens draws on the mechanisms, processes and tools employed to manage knowledge at an individual level. Each perspective draws different conclusions and is incomplete in isolation but is still valid to assist the process of focussing the different perspectives for analysis. This study does draw on some external influences but retains a focus on KM and MC internally to an organisation. Technical, social, IC and organisational learning aspects are considered but do not represent core elements of this study. A holistic approach has been adopted to facilitate the analysis and to ensure that the boundaries that are established do not stifle the research objectives.

1.5 Research objectives

Following an initial review of the literature the preliminary research problem and objectives of the study were formed. This was an iterative process throughout the duration of the research as objectives were further refined. Overall the research objective is to investigate the nature of KM in Ireland. The research problem is that knowledge is difficult to manage yet it is recognised as a critical resource and integral to competitive advantage. The objective can be further broken down into the following sub-objectives:

- To explore the prevalence of knowledge management activities
- To investigate the type of knowledge management activities undertaken in Irish multi-national companies (MNCs).
- To examine mechanisms employed to manage knowledge as a resource
- To explore the linkages between managing knowledge and managing performance

Chapter 2: Links between Knowledge Management and Management Control

2.1 Introduction

'A known mistake is better than an unknown truth.'

Arabic proverb

This literature review aims to provide a theoretical setting for the research investigation. It will provide a basis on which to examine the practices and dimensions of KM. This chapter describes the context in which KM has emerged, the knowledge-centric view of the firm and recent shifts in management control. The scope of this research does not lend itself to a review of all aspects of KM and thus it excludes KM aspects in relation to organisational learning, sociology, human resource (HR) management and technical aspects of KM systems. It is relevant to note at this stage that although the literature in this area has grown considerably in recent years, KM and related terms and concepts are still gaining clarity in their understanding.

Martensson (2000) notes *'the boundaries of KM are fuzzy and because of the nature of knowledge, the attainment of a formal definition is unlikely.'* Further, Hicks et al. (2006) clearly articulate that there is little consensus on the meaning of KM, knowledge and information.

2.2 Toward a knowledge economy

A 'New Economy' exists; it differs considerably from the industrial economy; the economy has undergone a fundamental change driven by globalisation, the revolution in information and communication technology (ICT) and a move to a service-oriented environment. Cohen et al. (2000) identify many terms with similar meaning that depicts the transformation of our economy: a 'post-industrial society', an 'information society', an 'innovation economy', a 'knowledge economy', a 'network economy', a 'digital economy', a 'weightless economy', and an 'e-conomy.' Holmberg et al. (2002), cited in Bhimani (2003), argues that there is still no consensus as to whether a New Economy exists or how it differs from the old economy. They all have their merits in emphasising the different aspects of the structural change but are also vulnerable to misinterpretation.

The knowledge economy could be interpreted as a reflection of the alignment between increased educational standards matched with increased complexity within work assignments.

The shift to a knowledge economy seems to intensify over time. Drucker (1996) outlines various developments in the manufacturing economy by identifying the shift from industries that are primarily labour-intensive to industries that are primarily knowledge intensive. An example is that of the manufacturing costs of prescription drugs, where labour represents no more than 10 or 15 percent, with knowledge (including research, development and clinical testing) representing almost 50 percent. This illustrates what managing knowledge might refer to, managing research and development or clinical testing where delegation and work assignments are less rigid and more fluid in line with an employees experience and intuition. This could include knowledge creation or dissemination where processes are abandoned for creativeness and flexibility. KM has been associated with many positive areas such as improved performance, productivity and competitiveness, sharing and usage of information within organisations, decision making, capture best practices (Maglitta, 1995; Cole-Gomolski, 1997b; Ostro, 1997; Bassi, 1997, Mayo, 1998). These inferences accentuate the justification for KMA. The following section shows how this tendency toward a knowledge economy is influencing perspectives taken within a firm to create a knowledge-centric view of the firm.

2.3 Knowledge-centric view of the firm

This section introduces the knowledge-centric view of a firm; it forms a basis for assumptions taken during the course of this research. Organisation theory has many different aspects that include agency theory of a firm, a resource-based view, a knowledge-centric view, transaction-cost theory and others. This study focuses on the knowledge-centric view. However, it is worth noting that some research considers knowledge integrated into a common pool of resources and thus do not make a distinction between knowledge and resource based views of the firm. For example, Nelson and Winter (1982) argue that resources, knowledge and capabilities are related as concepts.

Further, they link Polanyi (1962) and Simons (1982) treatments of knowledge and deduct that information technology allows the codification of tacit knowledge.

Pioneers of a knowledge-based view of the firm include Nonaka and Takeuchi (1995), Von Krogh et al. (1998), Roos et al., (1997), Grant (1997; 2000) and Roberts (1999). Wiig (1997a) was the first to coin the term *'knowledge management'* in 1986, since then it has been continuously evolving within research, academia and practice. The main themes of research in KM include: types of knowledge; KM as a process; KM activities in organisations; relationship between KM and organisational learning and the relationship between KM and IC. Unlike raw material, knowledge usually is not coded, audited, inventoried, and stacked in a warehouse for employees to use as needed. It is scattered, messy, and easy to lose (Galagan, 1997). Furthermore, Allee (1997) has defined knowledge in terms of 12 qualities: knowledge is messy; it is self-organising; it seeks community; it travels on language; it is slippery; it likes looseness; it experiments; it does not grow forever; it is a social phenomenon; it evolves organically; it is multi-modal; and it is multi-dimensional.

The knowledge-based theory of the firm postulates that knowledge is the only resource that provides sustainable competitive advantage, and, therefore, the firm's attention and decision-making should focus primarily on knowledge and the competitive capabilities derived from it (Roberts, 1999). Grant (1997; 2000) also puts forward a knowledge based view of the firm. However, the analysis is also critical of the emergence of this as a new theory where for example Grant (2000) argues that recent developments in KM have shed light on the fundamental issues of the business enterprise that have long been integral to strategy, organisation and human resource management.

Grant (1997) suggests some specific requirements when managing in a knowledge-based economy by adopting a knowledge-based view of the firm. Grant suggests that a first requirement is to identify the knowledge that is already available within the organisation by completing a 'knowledge audit.' Grant (1997) outlines a set of assumptions that: knowledge is the overwhelming productive resource; different types of knowledge vary in their transferability; individuals are primary agents of knowledge creation and in some cases also act as the principal repositories; knowledge is subject to economies of scale in

relation to its deployment; and once created it can be deployed at a relatively low marginal cost. Grant claims that individual's knowledge can be managed and shared by different mechanisms such as transfer, direction, sequencing (time-patterned sequences, each specialist has his own time slot) and routine (complex pattern of behaviour resulting from a simple trigger). In some cases it is more fruitful to combine specialised skills of individuals rather than try to integrate all knowledge across all domains. This seems like a rational approach as specialised areas are more complex than non-specialised areas and may not be relevant to other areas. Grant suggests that one person learning what is known by another may not be an efficient process.

In some cases knowledge society and learning society have been seen as synonymous (Hargreaves, 2003). Mechanisms of integration as identified within the knowledge based view presented by Grant, (i.e. transfer, direction, sequencing and routine) have some similarities to that of the processing characteristics that Coombs and Hull (1998) identified (i.e. generation, utilisation, transfer, and codification) and Stankeviciute's (2002) classification of KMAs (dissemination, creation and transfer). It is generally accepted that these are part of the key activities of KM. Grant (1997) proposes that the trend among practitioners and companies to identify the knowledge available within an organisation using mechanisms such as 'knowledge audits' can be directly linked to the way that accounting systems identify and value a firm's tangible assets. Therefore, this suggests that an organisation could leverage its existing accounting function to take responsibility for some KMAs.

2.4 KM and Government Policy

Government policy is promoting KM in an attempt to position Ireland as an innovative competitive country. It recently released an announcement for a 'Strategy for Science, Technology and Innovation 2006' programme where €3.8 billion will be channelled over the next seven years (Lillington, 2006). Improvements in the Irish economy are linked to Government policy in areas such as education, double-taxation agreements and incentives for foreign investment as well as a favourable international economic climate. Government policy is continuing to direct investment towards knowledge intensive areas.

Forfás (2001) is the national board responsible for providing policy advice to Government on enterprise, trade, science, technology and innovation in Ireland. It links with industry partners to assess future skill needs to identify any likely shortfall. Forfás identified a shortfall of at least 3,600 people over the period to 2010 unless steps are taken to increase domestic supply. The main areas where shortages are projected to emerge are in ICT, biotechnology and pharmaceutical related disciplines

An analysis of data from the Central Applications Office shows that the volume of applicants for technology-based courses such as engineering has fallen over the last six years. Table 2.1 illustrates this decline which may impact future demand and potentially have an influence on our knowledge creation ability and on retention of knowledge workers within the technology sector. Conversely the origin of Ireland's knowledge workers may change in that as our ability to produce graduates with these skills declines it may be possible to import qualified people to support our knowledge economy.

Table 2.1: Third level education trend

Year	Number of 1st choice applicants in Engineering/technology courses	Total num of applicants	%
2005	7,339	53,784	13.65
2004	7,428	54,263	13.69
2003	7,736	55,239	14.00
2002	7,228	50,996	14.17
2001	9,090	51,115	17.78
2000	8,981	51,381	17.48

Source: Central Applications Office (2006)

Recent newspaper articles cite a vibrant third-level research base as essential if Ireland is to achieve its goal of becoming a knowledge based economy (Ahlstrom, 2006). In response to these assessments, the Irish Government has made funding decisions that have encouraged third level colleges to increase the places available for information and communication technologies and science courses. The Technology Foresight Review report, a report completed by an independent task force established by the Irish Council

for Science Technology and Innovation (2000), identified that ICT and biotechnology were key to future competitive advantage. It was established that Ireland needed to considerably strengthen the knowledge and research base in these areas. The Government established Science Foundation Ireland, (SFI) which invests in science and technology research to generate new knowledge, to develop leading edge technologies, and establish competitive enterprises in the fields underpinning biotechnology and ICT. It is these industries, biotechnology and ICT that can be considered prominent in the knowledge economy in Ireland. SFI also supports co-operative efforts among education, Government and industry. The Government committed funding of €750m over the period 2001-2006 to attract world class research in these areas to Ireland, further manifesting their commitment to the development of knowledge-intensive industries. The Government has recently committed funding of €3.8 billion over the next seven years (Lillington, 2006). The Information Society Commission was established in May 1997 by the Taoiseach to oversee the implementation of a strategic framework for the development of the Information Society in Ireland. It has provided Internet access to all schools and promotes knowledge sharing and retrieval in Ireland through its website (http://www.isc.ie/) and press releases.

From the domestic evidence it is clear that Government policy is attempting to pro-actively address the challenges posed by the shift in economic activity to a knowledge-based platform, through the work of Forfas, ISC and SFI and eGovenment. It is not easy to evaluate the success of these initiatives but a steady incline in exports such as software as illustrated in the previous chapter (figure 1.1, page 7) is a positive indicator.

2.5 Links between strategy and KM

For many knowledge-intensive organisations, such as accounting, software development and pharmaceutical companies their competitive environment necessitates the consideration of factors distinct from traditional organisations. These might include; market instability, technical advancements, and shorter product and service lifecycles, whereas traditional manufacturing organisations were primarily focussed on tangible assets such as the cost of premises, mass produced items, production lines (Prahalad and

Hamel, 1990; Drucker, 1996; Grant, 1997; Burton-Jones, 1999). Further, Nonaka and Takeuchi (1995) and Lynn (1998) argue that KM is fundamental to an organisation's adaptation, survival and competitiveness in the face of increasingly rapid and discontinuous change. The link between these two areas, a move to service-oriented organisations and the necessity of KM is not well established as there is still a degree of uncertainty associated with KM adoption.

The competitive environment of traditional organisations and knowledge intensive organisations do differ considerably. Williamson (1999) and Eisenhardt and Brown (1998) have identified a number of implications for strategy analysis, processes and outcomes where the competitive environment consists of knowledge intensive organisations. These include the requirement for a proactive rather than reactive approach to competition. Strategy formulation and implementation is not always structured, for example, Kanter (2002) suggests that companies that want to outpace the competition throw out 'the script' and improvise their way to new strategies. Values, beliefs and vision become critical when people are the key value drivers, as they guide and align the behaviours of employees (Collins and Porras, 2000; Davidson, 2002). However, it may be worth considering that the literature manifests a characteristic in manufacturing companies as static and isolated from advancements commonly adopted in knowledge-intensive organisations. This could be argued as a misconception as manufacturing organisations seem to be influenced and embrace opportunity from the emerging attributes of a knowledge economy. Both manufacturing and knowledge-intensive organisations could engage in a KM strategy using the differing perspectives of their environments, although Levett and Guenov (2000) identified that few manufacturers had fully embraced KM.

2.6 The emergence of KM

DiMattia and Oder (1997) argue that the growth of KM has emerged from two fundamental shifts: downsizing and technological development. This is consistent with suggestions from Newell et al., (2003) who suggest that KM is a response to business process re-engineering. The term *'knowledge society'* was originally formed in the

economics and management area, and is an explicitly social scientific concept focused on the changing role of organisations, and in particular the relationship between employees and commercial organisations. The original formulation of the concept refers explicitly to the role of what has since come to be known as information and communications technologies (ICTs), as a catalyst in the transformation of societies towards a knowledge society. However, the technical use of the terminology within ICT, and in particular computing and Artificial Intelligence (AI), has a very different focus to that in management theory.

KM has attracted widespread interest from within both academic and business communities alike. The scope of KM ranges from database management which is technical to organisational learning which is philosophical; the scope of this research focuses of links between KM and management control systems (MCS). The research is linked to many areas; some are outside of the scope of this research such as technical aspects of KM systems, human resource management, and philosophical aspects including organisational learning. This research may refer briefly to these but its fundamentals lie primarily within the KM and MCS area.

Itami (1987) views individual capabilities as important outputs and inputs to a firm's activities. A firm's people-based information and skills accumulate over time, new and revised stocks develop, and this is put to work in new projects. The people-specific capabilities that are used to develop, apply, create and integrate new information to expand existing knowledge and skills are, according to Itami, a firm’s competitive advantage.

Roberts (2003) argues that the knowledge production process should be conceived of as a manufacturing process, in which knowledge is made, resources are used, and a positive return is generated. There are many perceived benefits to KM within an organisation (CIMA, 2001; Sveiby, 1997; Wiig, 1997). For example: as a source of value creation; new products; improved customer relations; visibility of intangible resources; assists the strategic management of the firm and augment human resource management areas such as the retention of resources which can results in a more stable workforce.

Valuing knowledge was pioneered by Swedish companies who initially provided IC information in their financial statements or in supplementary allied reports (Lynn, 1998). While there is little consensus as to what knowledge actually is, many do accept that knowledge is a primary competitive factor in business today; knowledge is a non-traditional, intangible asset, its accumulation, transformation, and valuation lie at the heart of IC management (IFAC, 1998). It is argued that organisations need to tap valuable firm-specific knowledge resources, integrate and disseminate such knowledge, and thereby develop a distinctive competence (Hamel and Prahalad, 1994; Davenport and Prusak, 1998). Evidence to support effective mechanisms to achieve this is not widely available.

2.6.1 Intangible assets

Itami (1987) and Barney (1991) focus on information-based resources but in a broader context. Itami proposes that difficult-to-accumulate information-based resources are a firm's invisible assets and form the basis of its competitive position: brand image, customer confidence, distribution control systems, corporate culture, and management skill, are examples of invisible assets. Itami argues that the value of a firm's informational assets grows because of information flows within firms and, also, information flows to and from a firm's environment. Table 2.2 below presents Itami's invisible assets with reference to a firm's internal and external environments.

Table 2.2: Invisible assets

Information flow	Type of invisible asset
Internal flows	Corporate culture
	Managerial skills
	International management
External-internal flows	Accumulated customer information
	Technical know-how and skills
	Distribution channels
	Customer networks
Internal-external flows	Brand names
	Reputation
	Advertising know-how
	Marketing know-how

Source: Itami (1989)

Itami (1987) argues that there are four key reasons why invisible assets offer the only route to competitive advantage: (1) Most of these assets cannot be readily obtained in the marketplace; (2) accumulation of invisible assets takes time; (3) invisible assets allow simultaneous and multiple use; and (4) the value and quantity of invisible assets increase over time as they are used. Unlike most commentators on the resource-based view, Itami (1987) argues that people, knowledge workers, customers and clients, are the key assets. Nahapiet and Ghoshal (1998) argue that organisational advantage stems from the capabilities organisations have for creating and sharing knowledge. Competitive advantage could be construed as an ability to reposition, reinvent, restructure and realign and organisation. These could be linked to KMA and initiatives.

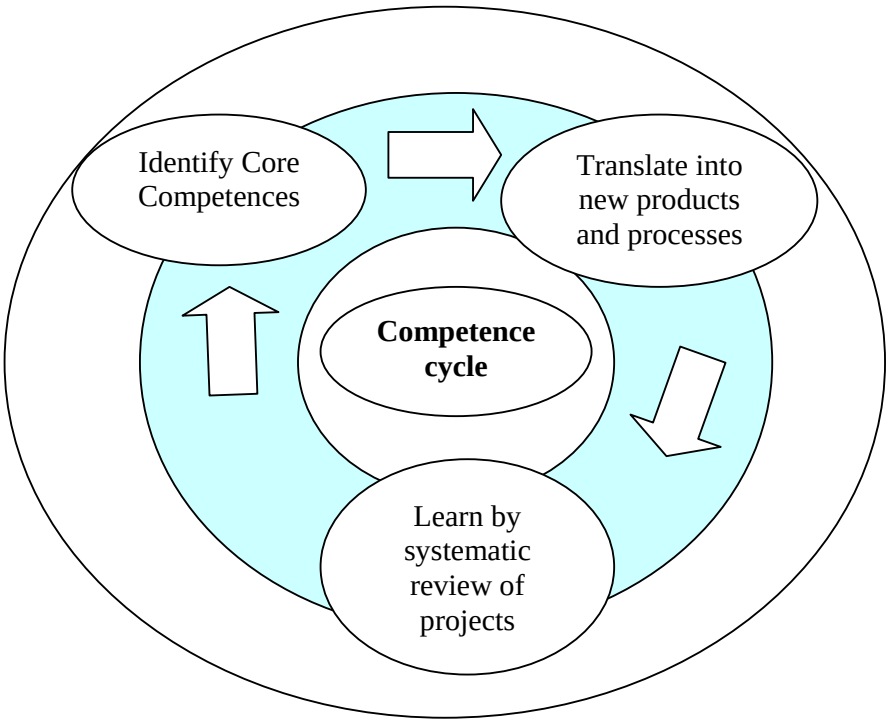
2.6.2 KM as a core competence

Mouritsen (2003) describes a number of 'waves' of KM and different measures and activities emerging and increasing complexity. The first wave focuses on individual knowledge the second wave focuses on categorising knowledge e.g. employees, technologies, customers and processes. Similarly, Snowden (2002) describes various stages of KM of which we are currently in the 'third age' which focuses on studying the paradoxical nature of knowledge in complex systems and understanding knowledge flows and transformations between complex knowable, known and chaos environments. Further, Mouritsen et al., (2005) highlight that performance management systems behave in very different ways and that a shift in strategic focus to manage intangible assets could potentially realise the various organisational conditions that can help mobilise the use of indicators in different ways.

Prahalad and Hamel (1990) argue that competitiveness derives from an ability to build at lower cost and more speedily than competitors, the core competencies that spawn unanticipated products. Prahalad and Hamel (1990) further promote that the real sources of advantage are to be found in management's ability to consolidate corporate-wide technologies and skills into competencies that empower individual businesses to adapt quickly to changing opportunities. The strength of the approach proposed by Prahalad and Hamel is that it places the cumulative development of firm-specific competencies at the centre of the agenda of corporate strategy. However, there are difficulties associated with

identifying and measuring competencies, there is no widely accepted definition or method of measurement of competencies whether technological or otherwise (Tidd, 2000). Figure 2.1 below shows the approach that Tidd promotes to identifying and measuring competencies. It is an evolving cyclical process that takes stock of the level of competency in a domain, measures the processes and products that are generated from these competencies and suggests a systematic revaluation process to assist the redefinition of competency levels.

Figure 2.1: A competency cycle



Source: Tidd (2000)

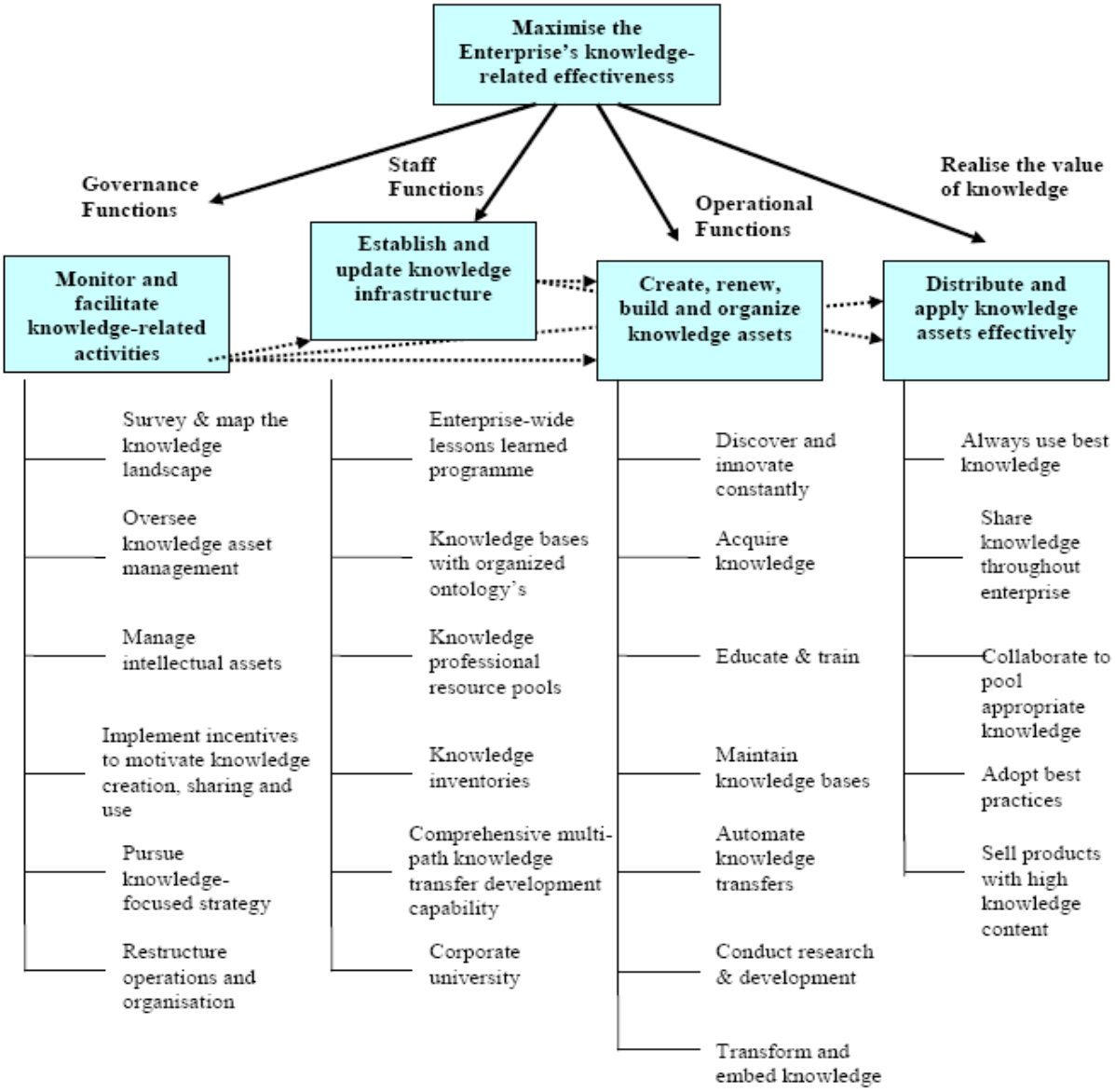
One of the criticisms of this process is that it assumes that there is sufficient time allocated to learn by systematic review of projects, this may not be feasible in all cases. Also measurement types of competencies can vary considerably and inconsistency can arise between levels or units of measurement. This suggests that industry comparisons are difficult. Another weakness of this approach lies in the maintenance of these competencies and the development of new competency types or measures as organisations may need procedures to facilitate this development.

An essential component of what is required to become a knowledge-enabled organisation is to ensure that all employees are able to locate access and utilise the knowledge and skills they need to meet their individual and company goals (Tobin, 1998). This is consistent with knowledge organisation (Stankeviciute, 2002). This implies the assumption that knowledge is valuable to the organisation which is inherent within the knowledge based view of a firm.

Tochterman et al. (2001) suggests that linking KM and management accounting and control can potentially yield benefits for an organisation. However, they affirm that case study evidence to date of problems or benefits encountered during KM implementations or initiatives are limited. Further, they suggest that intangible assets need to be visible for the strategic management of the firm. They suggest that this may be achieved by finding a set of company specific indicators that show developments of intellectual resources, such as process cycle times, customer satisfaction or employee performance. However, no commonly accepted set of indicators has emerged (Sveiby, 1997; Tochterman et al., 2001). Sveiby (1997) argues that simply adopting a pre-selected list of indicators is not possible and suggests that companies have to run through a process that results in identifying indicators specific to their own organisation needs. Thus, without commonly accepted measurements comparisons across organisations is difficult. Potentially by adopting existing performance management frameworks such as Otley (1999), Otley and Ferreira (2005) or Simon's (1990; 1995) it could provide a mechanism to assist the process of managing intangible or knowledge assets.

Figure 2.2 illustrates a four pronged approach to focussing on KM to maximise its effectiveness. It considers four perspectives, control, employee, operations and the value of knowledge. Wiig (1997b) proposes that by emphasising these areas knowledge will be used efficiently. There are many elements consistent with other studies (Grant, 1997; Stankeviciute, 2002; Mathi, 2004; Mouritsen et al., 2005; Akhavan et al., 2006). However, given that Wiig has identified twenty-four functions it would be difficult to implement all functions simultaneously and a prioritisation of focus or a phased approach may be more suitable.

Figure 2.2: Areas of KM emphasis



Source: Wiig (1997b)

2.6.3 Benefits of KM

The benefits of KM can range from faster access to knowledge, better knowledge sharing, cost savings, increased profitability, and shorter time-to-market to new business

opportunities (Skyrme, 2001). It is difficult to conceptualise that faster access to knowledge could open up business opportunities. There may also be an argument that better knowledge sharing could potentially result in higher costs due to time spent sharing knowledge rather than cost savings. Further examples include: KM as a source of value creation; improved customer relations; visibility of intangible resources which assists the strategic management of the firm; improvements to human resource management areas such as the retention of resources which can results in a more stable workforce (Sveiby, 1997; Wiig, 1997; CIMA, 2001).

The link between knowledge and performance was conceptualised in a way that knowledge contributes to performance by better quality and lower cost through product and process innovation (Chang and Ahn, 2005). Potential benefits of KM include but are not limited to the creation of value within an organisation and the reduction of costs within an organisation. For example, innovation processes may provide an opportunity to introduce new knowledge to an organisation and result in new product development. Even though this may not happen it is more likely to happen if there are processes in place to support innovation than areas that may hinder it. KPMG (1998) argue that a lack of KM can be costly, for example failing to transform human IC into organisational IC, in cases such as customer relationships deteriorating due to discontinuation of specific services. From this section it is clear that the benefits of KM are wide and varied and far from definite. These benefits are dependent on both 'soft' enabling factors such as employee attitude and motivation and 'hard' factors such as information technology, structure and processes. Thus mechanisms employed to manage knowledge will need to facilitate and enable these complex factors to triumph over instability, attitude, resistance and other potential barriers.

KM is often referred to as a general improvement practice (Sveiby, 1997; Edvinsson and Malone, 1997; Lynn, 1998). However, there is evidence to suggest that there are unsuccessful KM projects and that there is a degree of risk and side effects to the implementation of Knowledge Management Practices (KMP's) (Storey and Barnett, 2000; Feher, 2002). The next section explores MC and emerging considerations and challenges.

2.7 Management Control Considerations

This section aims to review the MC literature specifically targeting MC mechanisms and models. One objective of the study is to interface MC with KM and identify links between them. Applying a MC lens to the study of KM is deemed suitable for the following reasons. MCSs are often mature and familiar within organisations, thus a new process need not be introduced to the organisation and the organisation can use lessons learned. Knowledge is an organisational resource and can be classified with other organisational resources which will not isolate it from potential dependencies. Management issues that arise in relation to KM may be common across other management perspectives and thus by integrating MC and KM there is potential to leverage previous experiences to overcome any challenges and issues.

The definition of MCS has evolved over the years from one focusing on the provision of more formal, financially quantifiable information to assist managerial decision making to one that embraces a much broader scope of information. Berry et al. (1995) define management control as 'the process of guiding organisations into viable patterns of activity in a changing environment'. MC elements cover a broad range of dimensions. These include external information related to markets, customers, competitors, non-financial information related to production processes, predictive information and a broad array of decision support mechanisms, and informal personal and social controls. By assessing these elements it could be interpreted to closely link MC and KMA. Stankeviciute's (2002) descriptions of KMAs are useful to illustrate this (Appendix D).

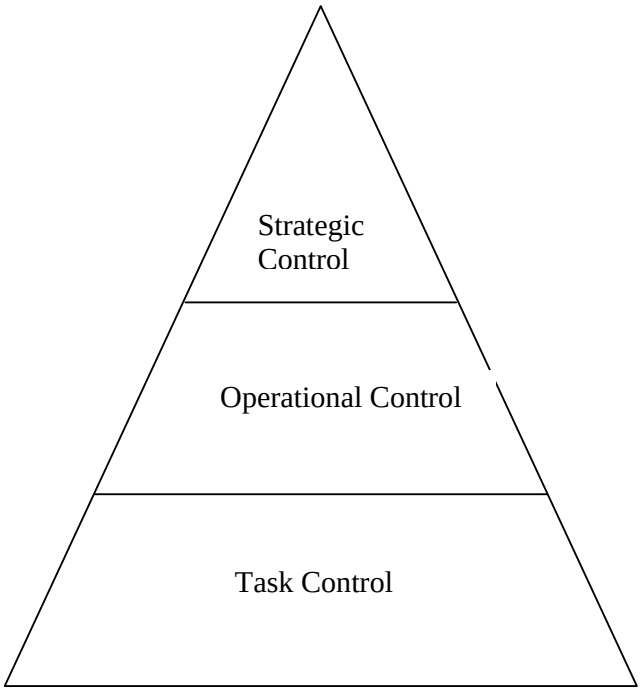
Conventionally, MCS are perceived as passive tools providing information to assist managers (Chenhall, 2003). However, by applying a sociological perspective MCS can be perceived as more active, furnishing individuals with power to achieve their own ends. The literature cites uncertainty, organisational size, alliances and a decline in manufacturing as variables that impact organisational control system design (Otley, 1994; Chapman, 1997; Reid and Smith, 2000; Bouwens and Abernethy, 2000). It is clear that close alignment between individual goals of key resources and business unit goals and corporate strategy is advantageous. Similarly the link to strategy and alignment of goals has been identified in the KM literature as essential (Akhavan et al., 2006, Mathi, 2004).

Chenhall (2003) argues that contingency-based research has focused on aspects such as dimensions of budgeting, formality of communications and systems sophistication, links to reward systems and budget slack. More contemporary innovations in MCS include activity based costing (ABC) and activity based management (ABM), non-financial performance measures, IC statements and economic value analysis (EVA). It can be argued that many of these concepts can be linked with KM, particularly communications, reward systems, non-financial performance measures and IC statements. Within management accounting areas researchers are faced with decisions on whether to build on traditional areas of study or more recent aspects such as balanced scorecards and target costing. Strategy maps introduced by Kaplan and Norton (2001) are mechanisms that describe how an organisation creates value by connecting strategic objectives in explicit cause-and-effect relationship with each other in the four Balanced Score Card (BSC) objectives (financial, customer, processes, learning and growth). Management accounting techniques have evolved from solely operational to include more strategic elements. O'Dea and Clarke (1994) assert that an emphasis has been placed on strategic issues due to competitive pressures, sophisticated technology and a rapidly changing business environment.

2.7.1 The development of management control

Anthony (1965) describes management control as 'the process by which managers assure that resources are obtained and used, effectively and efficiently, in the accomplishment of the organisation's objectives.' Further, Anthony's planning and control model (figure 2.3 below) outlines three levels of control: strategic, management and operational control within a hierarchical framework of control processes.

Figure 2.3: Anthony's planning and control model



Source: Anthony (1965)

He suggested that purpose, effectiveness and efficiency are at the heart of the task of control in an organisation. Efficiency is process related, where inputs are transformed to outputs; effectiveness is only measurable when the output is available. It is useful to include this material even though it is from 1965 as it illustrates the maturity of MC; this contrasts with the KM literature which is relatively immature and could possibly leverage lessons learned and best practice.

Strategic planning and control at the highest level is concerned with determining and actualising methods of achieving long term goals. This is co-ordinated with the external environment and is therefore often constrained by external factors outside the control of the organisation. Task control is at the lower level, it encompasses the routine processes involved in ensuring the efficient and effective implementation of tasks. These processes are by no means mutually exclusive; MC links the two levels. The strategic and MC levels often use a combination of executive information systems, decision support systems and management information systems, whereas task control level and some elements of the MC level use operational information systems such as transaction processing systems,

processing control systems and office automation systems. Anthony intended to broaden the scope of MC beyond accounting information. However, Otley (1999) argues that it was largely unsuccessful in achieving this as Anthony tried to compare organisations which were useing processes that were inherently incomparable at the operational level. However, Anthony did focus on managerial motivation and behaviour issues which influenced much behavioural management work in the succeeding decades.

It should be noted though that Anthony's work did neglect non-financial performance measures and communication mechanisms, these were addressed in subsequent work. A weakness of Anthony's planning and control model is the requirement for multiple phases of MC in an organisation where processes are continuously being revised as the phases are cyclical according to business requirements. Anthony has attempted to address this in the 1998 model where the stability of an organisation is considered (Anthony, 1998).

There is no consensus in the literature regarding the definition of control or a control system. Perspectives range from broad conceptualisations where MC is seen as everything that managers do to achieve the goals of the organisation, to narrow definitions concerning specific aspects of the accounting system, (Anthony, 1965; Lowe and Machin, 1988; Nandan, 1996). Thus this results in inconsistencies within which discipline the study of MCS most appropriately belongs.

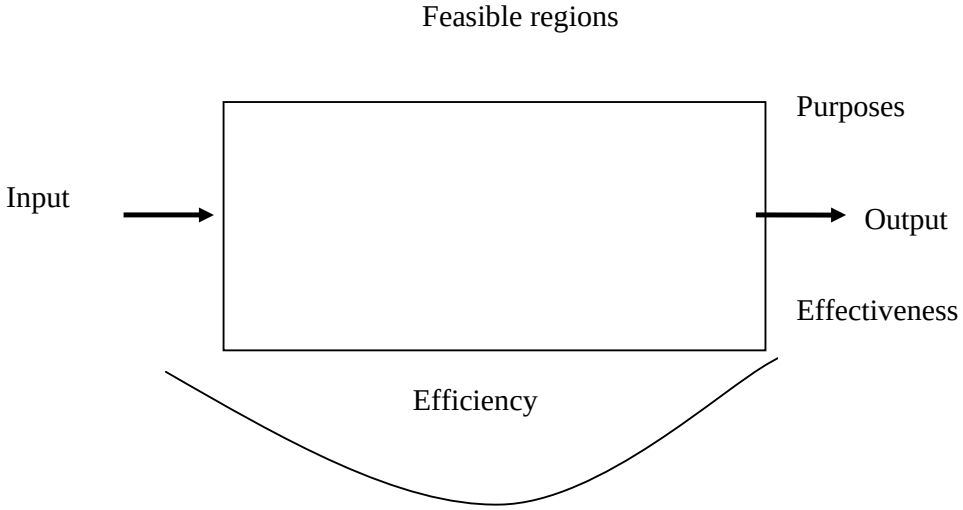
Early research cited goal congruence, efficiency and effectiveness as critical factors in the MC process (Cyert and March, 1963; Anthony, 1965). Potentially these are elements that should also be considered in relation to KM processes. Cyert and March further propound that it may be the goals of the 'dominant coalition' that prevail. Without some control mechanisms organisational behaviour may degenerate into a composite of uncoordinated activities that could potentially result in an organisation's demise.

The nature of organisational control raises fundamental issues in relation to human and organisational behaviour and the activities that occur within organisations. Morris and Schindehutte (2001) assert that as more procedures, systems, and documentation requirements are added over time, managers are increasingly encouraged to micro-manage all expenditure and to establish quantifiable performance benchmarks in as many activity

areas as possible. These metrics can become ends in themselves, while conveying a lack of trust in employees. They argue that a related issue with control systems is that of efficiency versus effectiveness. Efficiency is concerned with minimising the amount of expenditures or resources needed to accomplish a task. Effectiveness is a concern with ensuring that the correct tasks are being accomplished. Control systems have historically placed a heavy emphasis on efficiency, sometimes ignoring or even undermining effectiveness issues. Collier et al. (2003) and Guthrie (2001) argue that the focus needs to be put on management and effectiveness aspects of performance.

Cyert and March (1963) define efficiency as the relationship of outputs to a given set of inputs as illustrated in figure 2.4 below. They affirm that efficiency may be used to measure how quickly a process can transform inputs to outputs and what and how resources are used may be a contributing factor. Unlike Anthony (1965), Cyert and March (1963) relate these efficiency and effectiveness measures at task control level only. Figure 2.4 illustrates that there are constraints to efficiency, the process-oriented model may not be applicable in all regions, thus the diagram illustrates that the model applies to feasible regions.

Figure 2.4: Measures of efficiency

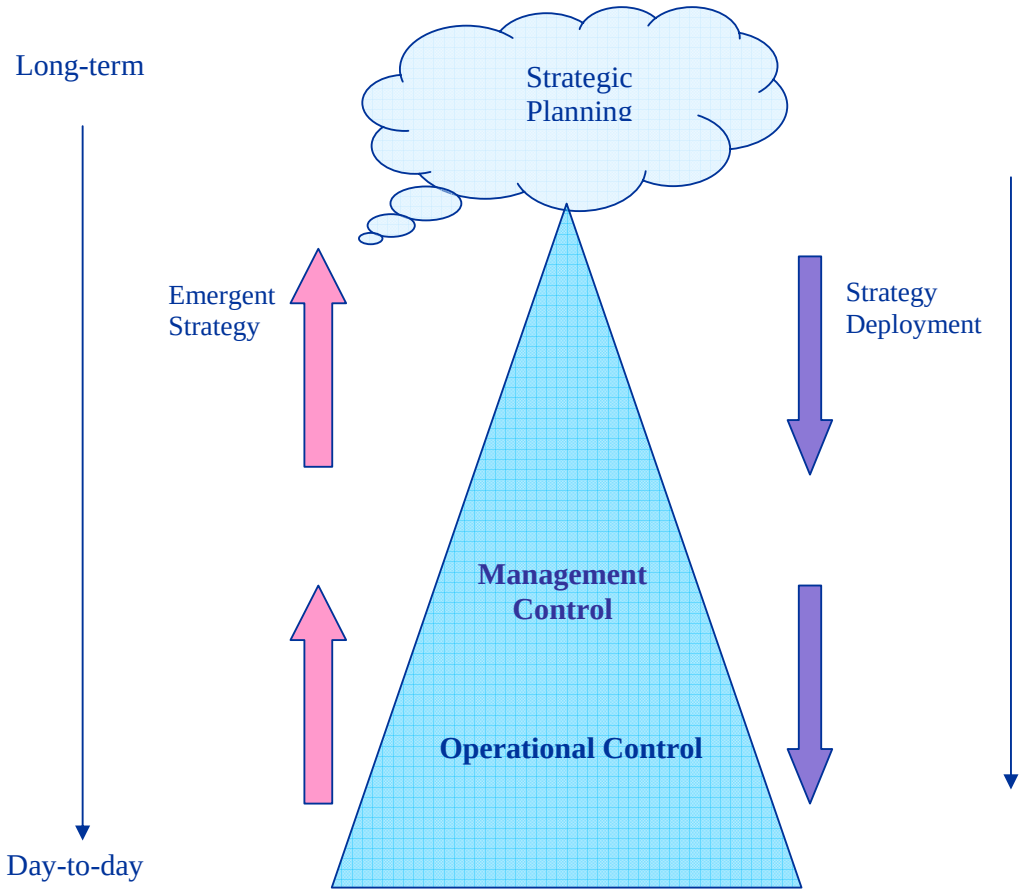


Source: Cyert and March (1963)

They argue that some processes may be unsuitable, or not formal enough to apply the logic that they suggest. This is relevant to KM as it is an intangible resource. The literature suggests that many KM processes may be informal, such as codification of tacit knowledge, generation of an idea to reduce costs, and in many organisations may be at the discretion of the employee (Nonaka and Takeuchi, 1995). Thus it suggests that a more complex model of efficiency may be necessary to usefully measure the efficiency associated with KM processes.

Figure 2.5, Anthony and Govindarajan's control model (1998), illustrates how day-to-day operational control influence strategy formulation and refinement. This could be described as a bottom-up approach.

Figure 2.5: Anthony and Govindarajan's control model

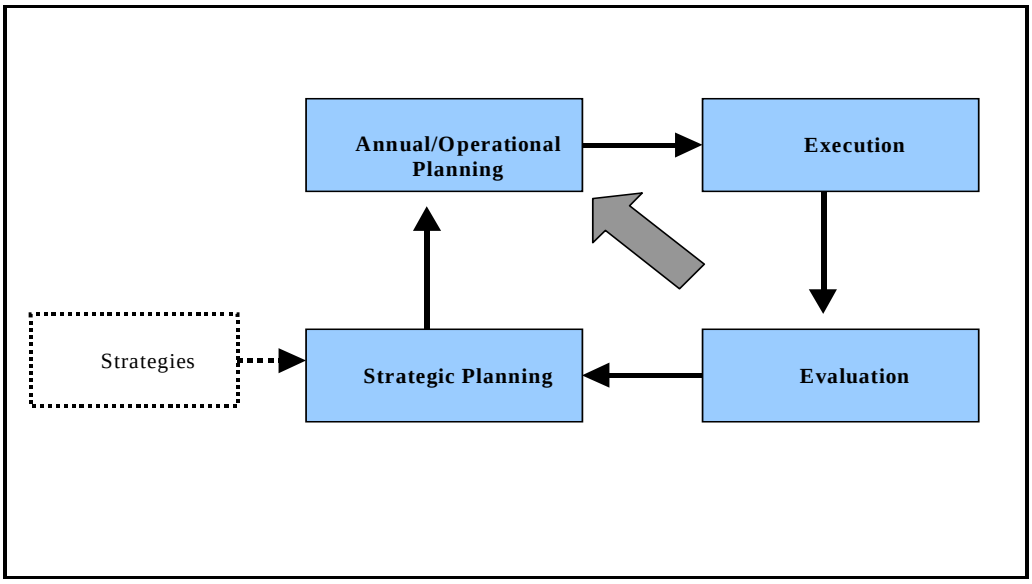


Source: Anthony and Govindarajan (1998)

This may be used as a basis to further investigate the possibility of expanding current models, such as Otley's 5-point framework (table 2.3) or Simon's levers of control model (figure 2.7 and 2.8), to support a KM strategy or management of KM activities or processes. Having reviewed strategy formulation, MC and task control, Anthony and Govindarajan's (1998) control model puts the three levels into perspective by considering organisational structure, strategy deployment and strategy formulation. Many of these factors are also influencing factors on KM (Simons, 1987; Govindarajan, 1988; Johnson and Scholes, 1997). Otley (1999) argues that external factors are not considered in Anthony and Govindarajan's (1998) control model which introduces a weakness to the model as it does not address change sufficiently. The model represents a cyclical process of strategy refinement. For example strategic plans are communicated from a top-down approach and permeate through the management and operational layers. Subsequently information is fed upwards from the operational and management layers that influences the strategy and becomes emergent strategy. This process continues cyclically.

The model has been further expanded by Anthony and Govindarajan (2001) who propose four phases of MC in an organisation: strategic planning, operational planning, execution and evaluation as illustrated in figure 2.6. They have split the management level as described in their 1998 work into two distinct phases, execution and evaluation, in an attempt to introduce a more adaptive model that they argue will be able to react to changes more rapidly.

Figure 2.6: Phases of management control in an organisation



Source: Anthony and Govindarajan (2001)

Figure 2.6 represents a simplification of a complex process; it is iterative in nature and not necessarily sequential. A starting point is difficult to establish, it may be considered when an organisation embarks on a formal MC process. This is common with the KM literature where a knowledge audit is recommend as an initial starting point (Grant, 1997, Akhavan et al., 2006). Within their latest model, existing strategies act as input to the process; existing, new or commonly adopted strategies may have an influencing factor on the strategic planning phase. The cycle is kicked off where strategies are considered as part of the strategic planning phase and these are then driven down to an operating plan level. Subsequently, an execution plan is established and carried out, and then an evaluation of the activities continuously feeds back into the strategic planning phase of the cycle and on some occasions may need to directly feed into the operational planning phase where immediate action is required. The MC process is cyclical and the regularity of completing each cycle may differ between organisations. It could be argued that the process may be too rigid in that if a problem is identified within the execution phase it is not until the process moves into evaluation mode that it can be rectified or influence a change at the operational or execution level. This ability to re-assess plans is addressed to both Simons's (1995) interactive controls mechanisms and Otley's (1999) feedback and feed-forward information loops presented in the next section.

2.7.2 Strategies of control

Cirka (1997) has identified four basic strategies of control: simple control, technological control, bureaucratic control and cultural control. Simple control is the direct personal supervision exercised by the owner over his/her subordinates. Technological control deals with the technological techniques used in production processes. Bureaucratic control covers the formal rules, procedures and policies used in hierarchical organisations. Cultural control deals with the control brought about by shared values, norms and the conformance to the beliefs of social system. Control strategies can be further grouped into behaviour, output and input control (Cirka, 1997). Behaviour control focuses on regulating the activities of organisational members through operating procedures and personal evaluation. Input control regulates the inputs to the organisation based on considerations regarding the most appropriate inputs for attaining the desired state. Output controls set targets for and measure achievement. These MC types could be influencing factors when considering KMAs.

An additional classification of control practices focuses on whether they arise from conscious managerial efforts or from informal mechanisms that emerge through the spontaneous interactions of workers over time. This could be linked to contingency theory which attempts to understand situations in which different control mechanisms are more appropriate. The theory suggests that organisations that can establish a fit between organisational structure and environmental uncertainty will achieve higher organisational performance results (Schlevogt and Donaldson, 1999; Ellis et al., 2002), while a misfit would have a negative effect on organisational performance (Donaldson, 2001). However, contingency theory suggests that there is no ideal design and that variables dictate the more appropriate system design based on specific company circumstances. Factors to take into consideration when designing a MCS might include organisation structure and culture, strategic objectives, technology, external factors such as customers and competitors within the context of the organisation (Maull et al., 2001, Chenhall, 2003). Morris and Schindehutte (2001) argue that a control system that facilitates autonomy among subordinates in an environment where group acceptance and equitable rewards prevail is highly recommended in turbulent conditions as it is more effective in enhancing organisational adaptability and responsiveness. This could be particularly relevant within

the dynamic nature of the 'New Economy.' Potentially a reward and incentive system could motivate employees to participate in KMAs but it could also result in a perception that KMA are isolated from their main responsibilities within their role at an organisation. This could subsequently result in negativity toward KMA if initial incentives and rewards are phased out over time.

Chenhall (2003) argues that MC is moving to being less quantitative in its nature. An example of a less formal and more dynamic model is the balance scorecard (Kaplan and Norton, 1996). Further Chenhall (2003) highlights influences of external information such as markets, customers, competitors, non-financial information such as production processes and informal personal and social controls. Traditionally, MCS have been embedded within the finance function (Collier et al. 2003).

2.7.2.1 KM and management accounting

Johnson and Kaplan (1987) argue that management accounting systems are inadequate for today's environment. In response, management accounting research has been productive in generating alternate mechanisms for performance measurement. Some of these models and frameworks are being developed at this stage (for example, Skandia's Navigator, Simon's Levers of Control, IC Statements, Otley's Performance Management Framework). Some of these models are unproven or tested in relatively limited environments, empirical evidence to support their performance measurement capability is not available or difficult to obtain. Johnson and Kaplan (1987) recommended a revamp of management accounting systems, to be replaced by new initiatives such as process control and product costing systems. There is a debate that the management accounting function is evolving and is facing new challenges the information sought by stakeholders is different to the traditional information or measures sought (Bromwich and Bhimani, 1992; Burns and Scapens, 2000; Pierce and O'Dea, 2003). A chronological analysis has been presented throughout this chapter, however this journey of MC and MCS is still underway. There is also scope that the management accounting function could support KM through the application of its toolkit and its experience in the area of MC.

The Chartered Institute of Management Accountants (CIMA) assert that management accountants are the main custodians of performance data in companies. This suggests that accountants have a role to play in managing the performance of organisational knowledge. CIMA contend that this information needs to be relevant, timely and robust and it has to consist of more than just numbers (CIMA, 2003). This could include KMAs. This study is particularly interested in the internal role rather than the external role that these 'custodians of performance data' play. It may be useful to analyse the traditional role and outputs of management accounting and compare these to the newer requirements that the management of intangible assets may demand. Efforts to accelerate management accounting practices to meet the challenges of changes in internal and external environments have gained momentum within the last few years (Edvinsson, 1997; Hope and Fraser, 1997; Sveiby, 1997; Lynn, 1998; Brennan, 2000). However there are no generally accepted methods or legal requirements established and it may emerge that common methods are not suitable to all scenarios or organisations.

Where market perceptions have differed dramatically from the realistic internal position of the organisation, shareholders may insist that they are able to obtain more than just historic financial information on tangible assets. Economic activity today is knowledge intensive and technology driven and it is re-invigorating interest in defining the scope of management accounting in organisations (Lynn, 1998; Larsen et al., 1999; Tayles et al., 2002). Technology has provided the infrastructure to ensure that information is provided to all stakeholders in a timely manner. It may be sooner rather than later that shareholders insist upon disclosure of intangible assets in order to supplement their decision-making process and thus it has potential to become embedded within the legal requirement frameworks of the future, although there is no evidence to support this proposition at this stage.

The MC literature over time has evolved and encompasses various themes such as the performance management process. It describes the process by which an organisation's performance is managed to meet organisational objectives. Performance measurement is particularly relevant for the analysis of non-financial information, as they are key indicators of how well the chosen strategy is implemented. These indicators may be referred to in several ways: key variables, strategic factors, key success factors, critical

success factors, pulse points and key performance indicators. A performance measurement system aims to implement the organisation's strategy through presenting financial and non-financial information. Elements often contained within a performance management system include but are not limited to; strategy development, management accounting, non-financial performance measures, incentive schemes and personnel appraisals. A performance management framework provides a mechanism to examine control systems, tools and techniques employed by an organisation. Amaratunga and Baldry (2002) suggest that performance management develops participation, awareness, de-centralised decision-making processes and responsibility for achieving the goals that have been set. They suggest that a goal achievement analysis is necessary to draw conclusions about what an organisation is doing particularly well or where improvements can be made and that the performance management system acts as an enabler for a 'circle of learning.'

2.7.2.2 MC Tools and frameworks

Bititci et al. (1997) argue that a learning culture improves an organisation's ability to operate in a dynamic environment. The performance management system is recognised as an enabler to deploy strategic and tactical objectives of the business as well as facilitate a feedback process to decision and control processes. This function of the Performance Management System (PMS) could be extended to support KM decision and control processes. The structure and configuration of the performance management system is critical to the efficiency and effectiveness of the management process. Further, they suggest that 'soft' factors such as culture, behaviour and attitudes are as prominent as the more tangible or 'hard' factors such as reporting structures, responsibilities and information technology. These 'soft' factors introduce ambiguity as there does not seem to be clarity as to how they can be manipulated to become enablers of KM.

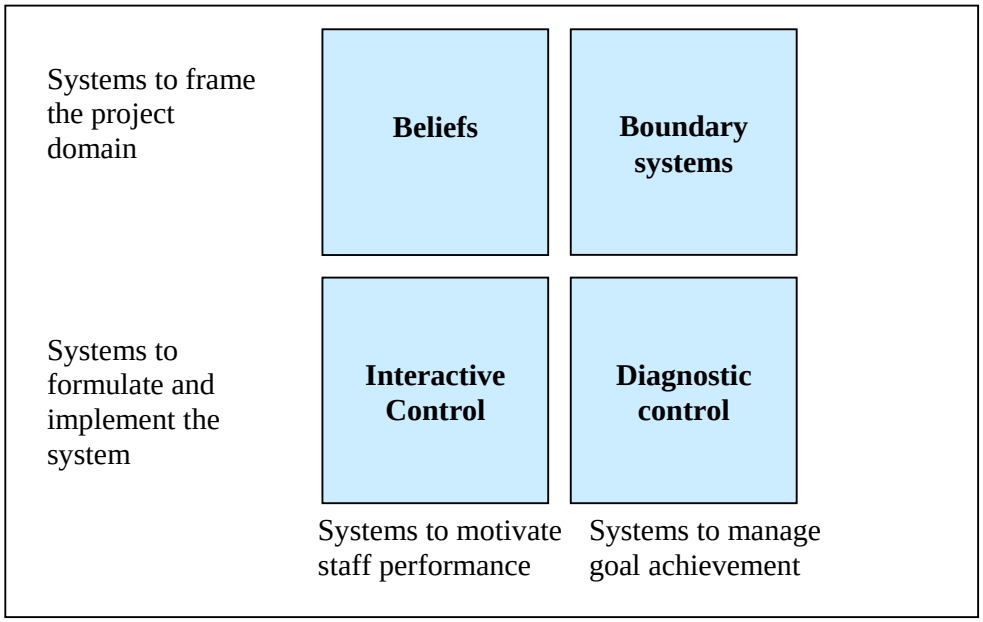
Mwita (2000) stipulates that performance itself can encompass both output (results) and behaviour (organisation processes) and that a performance management system can distinguish appropriate performance measurement devices. It is not clear how these measurement devices are designed and if these are appropriate to all organisations.

Further, a number of influencing factors are recognised: personal (skills and commitment), leadership, team, system (processes and tools), and contextual factors (internal and external environmental pressures and changes). Ultimately the effectiveness of a measurement system depends on actual use of the system and the relevance and accuracy of measures employed (Amaratunga and Baldray, 2002). Historically, performance management systems have been financially driven (Ittner and Larcker, 1998). However, this approach has been widely criticised (Kaplan, 1983; Neely, 1999). PMS such as the BSC (Kaplan and Norton, 1996) is not regarded as the full solution and some pitfalls have been identified such as poor correlation between non-financial measures and results. The BSC has managed to integrate non-financial variables into the PMS arena and this links closely with the objectives of this study with regard to KM. A fully comprehensive model that meets all requirements has not been identified and given the differences in each organisation a hybrid framework may be more appropriate.

Simons (1990) proposes that there is a link between MCS and strategy. Strategy formulation is the process of deciding on new strategies. Strategy formulation is essentially open and systematic, whenever a threat or opportunity surfaces, strategy formulation takes place. Threats or opportunities are not discovered systematically or at regular intervals, thus strategic decisions are unsystematic and thus can arise at any time. Simons (1995) levers of control framework proposed studying the implementation and control of business strategy that considers both ‘soft’ and ‘hard’ influencing factors. Further it observes that in any given situation management manipulates four levers of control, and by emphasising or de-emphasising each of them one can change the management style to suit new circumstances. This introduces a degree of flexibility to the PMS which could enhance its resilience to a dynamic environment. This framework was derived inductively from the material of more than a hundred companies and from his case-study and related discussions with both executives and managers. According to Simons, the framework is an ‘action-oriented theory of control’ that culminated over a period of more than ten years of work. The levers are ‘beliefs systems’, expressed in visions and mission statements; ‘boundary systems’, expressed in rules and limits; ‘interactive control systems’, expressed in face-to-face meetings and debates; ‘diagnostic control systems’, expressed in plans and feedback.

As shown in figure 2.7 below, some of these levers of control are used to motivate staff performance while others are used to manage the achievement of goals. From a different perspective, some are used to frame the project domain while others are used to formulate and implement the system.

Figure 2.7: Managerial use of innovative control systems



Source: Simons (1995)

The manipulation of the levers may have a direct effect on the behaviour of the project team. Behavioural aspects are ingrained embedded with managing knowledge and are regarded as 'soft' factors that have been identified as difficult to manage. The primary function of MC is to help in the execution of chosen strategies. In industries that are subject to rapid environmental changes, MC information can also provide the basis for the emergence of new strategies. Simons (1995) refers to this as interactive control. Interactive MCS focuses organisational attention on strategic uncertainties. Further, Simons asserts that top managers use formal systems to guide the emergence of new strategies and ensure continuing competitive advantage.

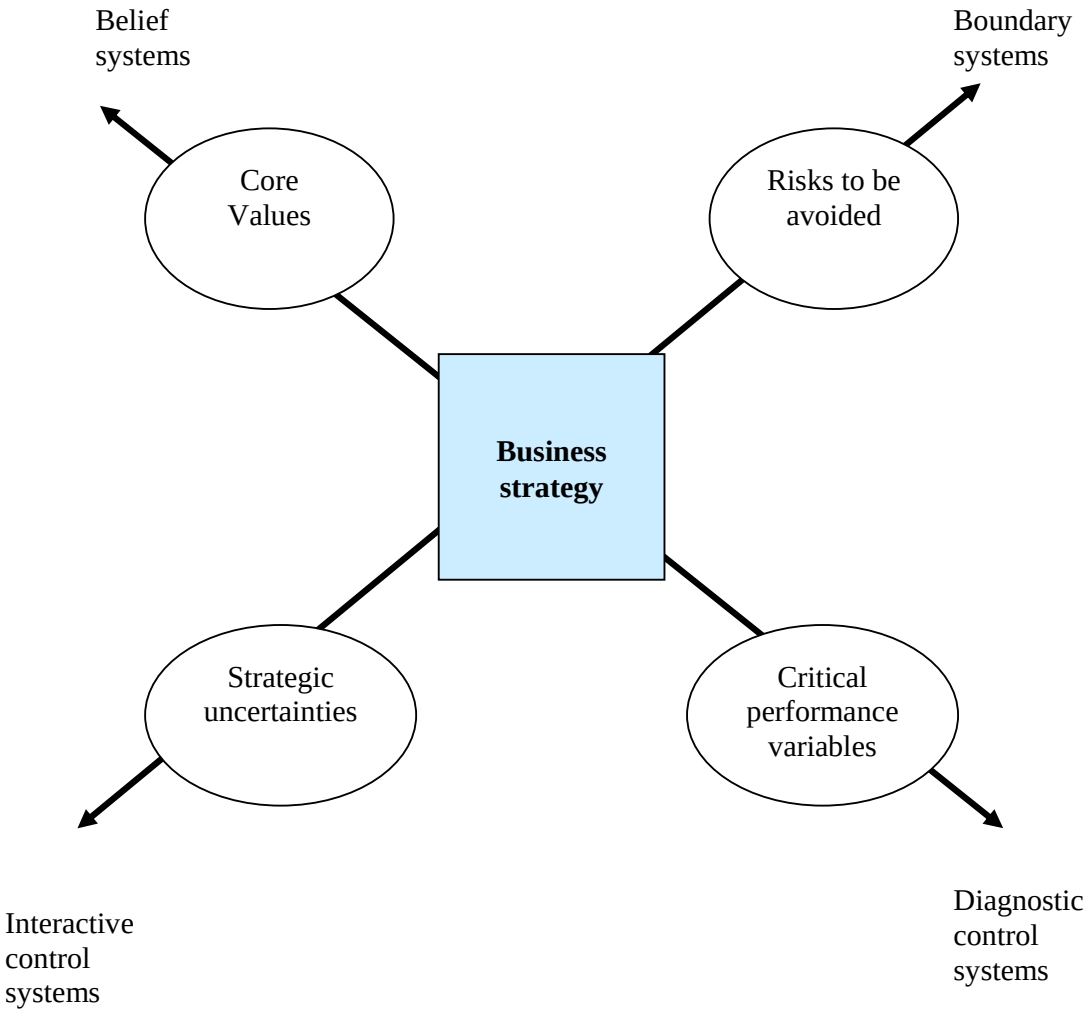
Simons proposes that MCS are integral to strategy formulation. MCS can be defined as more than devices of constraint and monitoring; they are formalised procedures and systems that use information to maintain or change organisation activity. MC activities

include: planning, budgeting, environmental scanning, competitor analysis, performance reporting and evaluation, resource allocation and employee awards (Simons, 1987).

Figure 2.7 above and figure 2.8 below both illustrate Simon's levers of control through different perspectives. Figure 2.7 illustrates the purpose of the different levers and how managers utilise these levers for specific purposes such as framing the project domain and motivating staff. Whereas figure 2.8 depicts the fundamental levers of control model which illustrates the four levers within the context of the business strategy and the mechanisms used within each of the levers, such as vision statements driving the core values and thus the beliefs, critical performance variables driving feedback and thus feeding the diagnostic control system lever.

Otley and Ferreira (2005) note that Simon's levers of control framework is focussed at top management level and its weaknesses are evident when applying it to a subsidiary where beliefs and boundaries are outside the organisation's domain or where informal controls are used, Simon's model is less useful. There is also some ambiguity in some of the concepts used by Simon such as core values; this could lead to subjective interpretation and in some cases it can be difficult to determine if a control tool is part of a diagnostic or an interactive control system. However, it does look at more than a reactive approach (diagnostic) to management in its use of interactive control measures. Simons (1995) model has a broad perspective in that not only does it analyse the set of control tools in use by an organisation, it also examines the purpose for which they are being used and this could potentially uncover why they were introduced initially. It also provides a valuable typology for alternative uses which could identify whether there is an imbalance between positive and negative controls within a control system. When compared with Otley's (1999) framework (described later in this section) it is clear that Simons (1995) has a top-down perspective where strategy and its implications for control systems is evident whereas Otley (1999) does not link the control system to a top level perspective such as vision and mission of an organisation.

Figure 2.8: Simons' levers of control



Source: Simons (1994 and 1995)

There are some common elements between Simon's (1995) levers of control and Otley's (1999) performance management framework. Some elements of Otley's objectives are influenced by some of the beliefs and boundary systems that Simons refers to and Simons's diagnostic control systems are very similar to the feedback loops that Otley advocates and information flows are elements of the dynamics between the four levers control and are one of Otley´s (1999) key issues. The issues of target setting and of rewards, addressed by Otley are concentrated essentially on Simons' diagnostic control systems. Simons describes the personal involvement of top managers as the defining

characteristic of interactive control that strongly influences the incentives to produce and share information. Otley (1994) argues that performance assessment and accountability are fundamental to effective control and that the range of activities that need to be encompassed under the banner of MC is much wider than those considered under traditional definitions.

Table 2.3 below outlines Otley's five point framework for managing performance. Otley argues that the framework assists in buliding context around management challenges and it helps to develop control practices.

Table 2.3: Otley's five-point performance management framework

Otley's Performance Management Framework (1999)
Objectives
Strategies and Plans
Target setting
Incentives
Feedback loops

Source: Otley (1999)

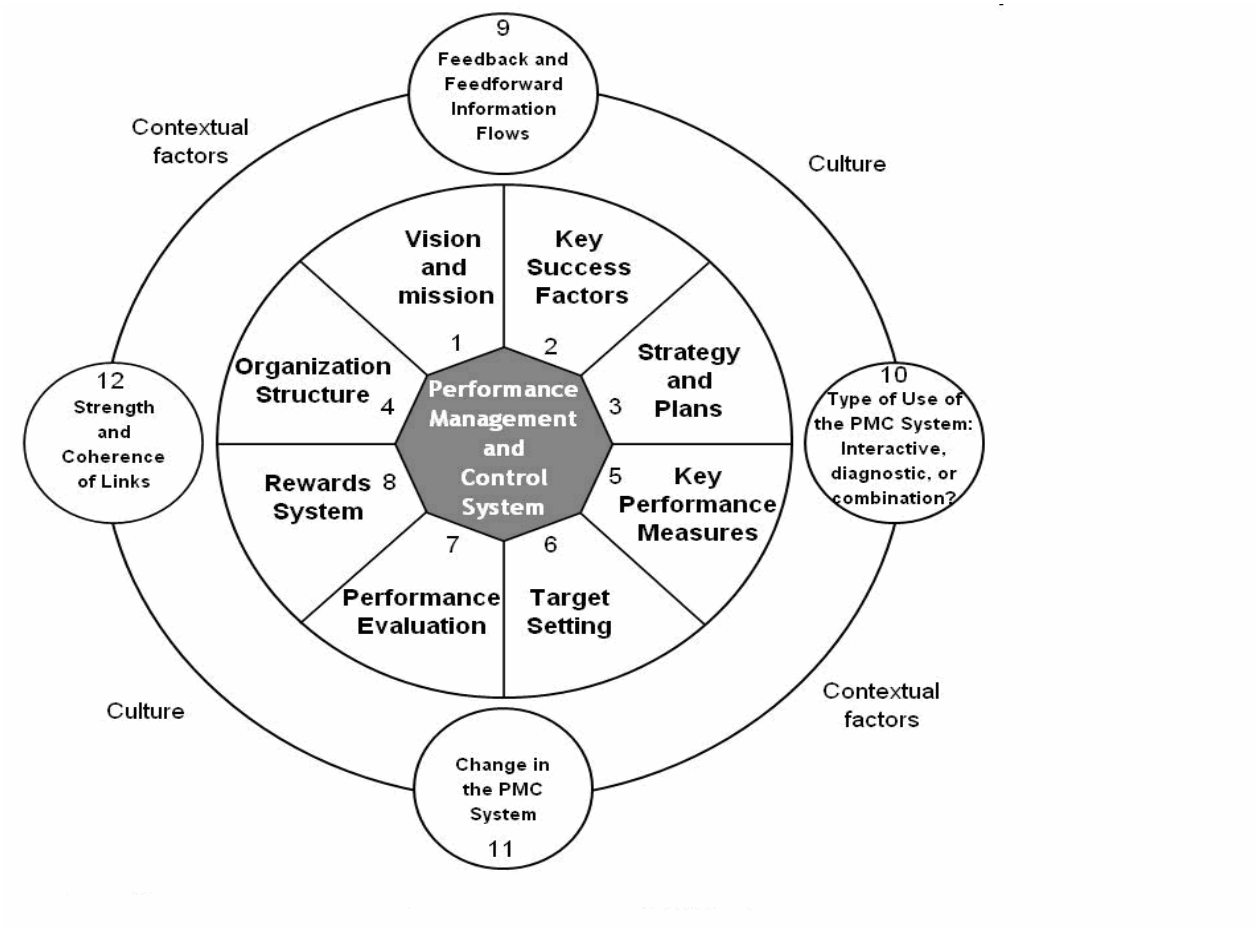
Otley (1999)'s framework for analysing the operation of MCS's is structured around five central themes; objectives, strategies and plans, targets, awards and feedback. Otley proposes to look beyond the measurement of performance to the management of performance and suggests that there is a tendency for management accounting to restrict itself to considering only financial performance drawn primarily from the discipline of economics. Otley also suggests that this does not provide a sufficiently rich picture of the internal activities of organisations to provide reliable guidance to the designers of MCS and those elements such as strategy and operation are neglected.

New financial performance measures such as EVA are being adopted by many organisations. As KM programs becomes more prevalent among organisation it may be possible to uncover how non-financial measures link with existing measures and fit into the overall control system. The opportunity to extend the Otley's framework to include KM may be particularly relevant in an effort to better understand the measurement and

management of knowledge. The advantage of using Otley's framework is that it provides a structure for the analysis of companies' control systems regardless of the type of organisation, rather than only business organisations such as value based management systems. Other frameworks can be used to complement it rather than constrain research in this area, such as Simon's 1995 model. Also it is relatively straight-forward to apply in that each area is clearly understood, however, there may be some argument that it is simplistic and that it needs to provide more levels of detail.

Otley (1999) has been extended and seems to address this in Otley and Ferreira (2005). The extended framework, which is named performance management and control (PMC), represents a departure from Otley's five 'what' questions to ten 'what' and two 'how' questions (figure 2.9 below). Otley and Ferreira (2005) evaluated the usefulness of Otley (1999) and Simons (1995) frameworks. Weaknesses within the two frameworks were addressed and strengths leveraged in the extended framework. These include: high level vision and mission and links at strategic level; explore beyond diagnostic controls; identify how control information is used and focus on dynamics of organisations; and the use of informal controls and clear concepts. There are many additional considerations in the extended model which could potentially add value to the robustness of the tool but could also increase its complexity.

Figure 2.9: Otley and Ferreira's 12 Question framework



Source: Otley and Ferreira (2005)

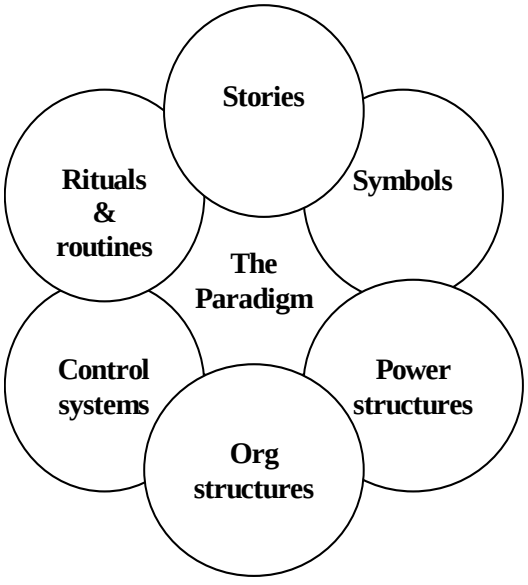
It is important at this stage to consider that MCS may encompass both financial and non-financial performance measures. The degree to which the management team puts an emphasis on either of these performance measures directly relates to the processes and strategy established within the organisation. The recognised barriers to effective KM include resistance from employees to create and share knowledge; however effective incentives schemes as Otley suggests may alleviate this. Otley and Berry (1980) using a cybernetic model outlined four necessary pre-conditions that must be satisfied before any process is controlled: objectives must exist, the output of the process must be measurable and output must be interpretable and a predictive model of the process being controlled is required. These are still valid however Lynn (2000) has identified weaknesses in applying

this approach where difficulties arise in measuring the process surrounding the management of intangible assets.

2.7.3 External factors for managing KM performance

Up to this point, the discussion has focussed on MC theory, mainly internal to the organisation and the need to design and develop MCS's in line with an organisation's goals and strategies. It is useful to reflect on how the external environment affects the design and implementation of MCS. This study does not focus on external influences but they can impact internal operations. The literature suggests that variables relating to external environment, strategy, culture, organisational structure, size, technology, and ownership structure have an impact on the control system (Simons, 1987; Govindarajan, 1988; Chow, et al., 1991). Johnson and Scholes (1997) propose an organisation's culture as a cultural web (figure 2.9) where many elements are inter-connected to form a paradigm or model of the organisation's culture. Control systems, organisation structures and power structures are common entities but symbols, rituals and routines and stories are not as clear and seem to indicate 'soft' or intangible factors within an organisation.

Figure 2.10: A cultural web of interlinking entities



Source**:** Johnson and Scholes (1997)

The interdependencies between entities is not clear, this may be to facilitate flexibility across different types of organisations. For example, the 'paradigm' or model of

organisation culture may be impacted by the MCS's implemented and other elements could be dependent on the MCS or vice versa. Similarly the existing organisation culture, power structures, rituals and routines, symbols, stories and organisation structures may influence the type of control system adopted by an organisation if it is introducing a new MCS. By examining the dominant culture in an organisation prior to implementation of a MCS insight may influence the design or changes required to an adopted framework. This would also be relevant for KM initiatives where specific elements in relation to KMA may be impacted by the underlying culture, stories, rituals and symbols. For example hoarding knowledge may already be integral to organisation routines or knowledge sharing integral to everyone's role. Even though there are no regulatory requirements in relation to KM and IC at the moment it may be a legal implication in the future and thus this may extend the cultural web again. It is worth reflecting that regardless of the type of framework or initiative introduced into an organisation its existing culture plays a dominant role in its implementation and ultimately its success or failure.

2.8 Summary

This chapter describes the nature of managing knowledge by initially considering the context in which knowledge resides within organisations and within the economy. A knowledge-centric view of a firm is presented; this illustrates the characteristics that are inherent within a knowledge economy as identified by Grant (1997 and 2000) and Roberts (1999).

Government policy in Ireland in relation to KM is described which explores supporting networks and processes for KM. An investigation in to the links between strategy and KM is conducted. The path that KM has taken within the last decade is presented to illustrate the current and historic nature of KM. The reasons why KM has emerged are presented; the literature is consistent in the origins of KM which include globalisation, downsizing, Business Process Re-engineering (BPR), technological development and a move to a more service-oriented environment. Benefits of KM are identified which build upon a justification for introducing a KM initiative.

As mentioned KM has emerged as a result of a number of management issues, this chapter reviews the MC literature in an attempt to identify links between KM and MC. It explores the development of MC, the maturity of MCS and how they have evolved to adapt to changing environments. It looks at changing requirements from stakeholders where traditional models are being updated to reflect the 'New Economy.' It forms a basis for the potential inclusion of KM or KMAs within a MC model or framework.

Chapter 3: Opportunities and Challenges of Knowledge Management

3.1 Introduction

'People are difficult to govern because they have too much knowledge.'

Lao-tzu (604 BC - 531 BC)

This chapter describes emerging challenges as the working environment becomes more ubiquitous. The economic shift described previously presents difficulties in managing intangible assets such as knowledge. This chapter describes the impact that the 'New Economy' has had, whereas the previous chapter describes the origins of the 'New Economy.' Different types of KMAs are described and a number of classifications identified in the literature are presented. Elements regarded as critical success factors of KM initiatives are highlighted such as culture, processes, IT and measures. These are helpful but may not be sufficient as each organisation differs. KM hurdles are presented; it is argued that the recognition of these barriers is critical to management's ability to address them. Finally links between KM and IC are explored. KMAs support ICM and it could be perceived that IC provides a gateway to KM to evaluation and reporting of KMAs. By presenting the links between KM and IC it facilitates clarification of some of the boundaries of the study.

3.2 The KM environment

Skyrme and Amidon (1998) state that:

> *'KM is becoming a core competence that companies must develop in order to succeed in tomorrow's dynamic global economy.'*

Cleary (2003) argues further that the central theme emerging in the strategic management resource-based literature is that privately held knowledge is a basic source of competitive advantage. The terminology used in the 'New Economy' is common within the KM literature but it is difficult to ascertain the actual value of knowledge. The 'golden ticket' that organisation's compete for is competitive advantage in the market that they have decided to compete in. Porter (1985) identified a competitive advantage model to use as a

tool to analyse industry structure in relation to competitive advantage. Elenurm (2003) argues that the integration of local knowledge sharing tools in Estonian subsidiaries with data and knowledge bases from their international headquarters, suppliers and customers is in many cases low. Thus remote working conditions, time differences can contribute to the barriers to effective knowledge sharing initiatives.

3.3 Knowledge management enablers, activities and success factors

This section reviews the KM literature in relation to specific KMAs and supporting environmental attributes or processes that enable KM to succeed.

3.3.1 Enablers of KM

Enablers of KM may include: leadership, organisational structure, communities of practice, business processes infrastructure, reward systems, time allocation and recruitment (Oliver and Kandandi, 2006). Enablers facilitate KM and its associated KMAs and provide a suitable environment in which they can flourish. They could be described as environmental aspects that support KM. Stankeviciute (2002) identified over seventy enablers of KM and argues that for activities related to tacit and new knowledge 'softer' enablers were most important such as culture and motivation. Meanwhile more formal technical, structural and managerial conditions are primarily important for activities dealing with knowledge capturing, identification and dissemination. This suggests that technology can assist management of existing knowledge rather than encourage creation of 'new' knowledge. Sveiby (2001) clarifies this distinction between 'hard' and 'soft' aspects of KM where, 'hard' aspects include technology and the 'soft' aspects are people and process based.

3.3.2 Knowledge management activities

The literature suggests that the management of knowledge, due to its intangible nature necessitate the introduction of specific activities. These activities have been coined Knowledge Management Activities (KMAs) and knowledge management practices

(KMPs). These terms (KMAs and KMPs) are used synonymously. Stankeviciute (2002) defines KMAs as 'the activities initiated or actively supported by an organisation in order to ensure efficient development and use of organisational knowledge.' For example, Stankeviciute groups knowledge activities into identification, scanning, organising, dissemination, transfer, acquisition, and creation. This list is not exhaustive and even where adopted may not be sufficient. To understand the value of embarking on these activities one could take knowledge scanning as an example. An organisation pursuing knowledge scanning activities will be searching for market and technology advances in a systematic way, thus their alignment to new products, technologies, tools and process will be closer than others not pursuing knowledge scanning activities. As a result the organisation that focussed on knowledge scanning will be able to react to changes in their environment quicker and potentially seize any opportunities. Previously by not employing proactive activities such as knowledge scanning there is the potential that an organisation may have missed out on some opportunities as timeliness to market is often regarded as a critical success factor.

Bose (2004) identified six KM processes that allow organisations to manage knowledge: create knowledge, capture knowledge, refine knowledge, store knowledge, manage knowledge and disseminate knowledge. Both classifications have similar themes to the dimensions of KM (i.e. storing and organising knowledge). For the empirical collection phase this study adopted Stankeviciute's classification as it is more comprehensive and easily understood with little ambiguity.

Coombs and Hull (1998) presented five exploratory case studies of KMP's specific to research, development and innovation. Each case study included semi-structured interviews with approximately eleven people from each company and in total yielded more than eighty knowledge management practices (KMP's). Coombs' and Hull's (1998) insightful observation that although in studying organisational knowledge it is important to identify different knowledge types, organisational members realise them through: concrete tasks, their sequences (processes), or less formal activities. It is therefore more efficient to explore KM as a set of KMP's. Further they describe activities and tasks that can be grouped within KM and link these to the performance of the firm. This is a

common finding within the literature (Grant, 1997; Larsen *et al*, 1999; Sharpe, 2002 and Stankeviciute, 2002).

Coombs and Hull's (1998) present a model of KMP's which identified four generic components or attributes: 1) processing of knowledge (generation, transfer and utilisation); 2) domain (system or product); 3) intended effect on organisation performance; and 4) format (e.g. Lotus notes or meetings). Within the model the intended effect on organisational performance is highlighted as the most problematic one of the four elements. This identified the difficulties of applying commonly accepted measures for efficiency and effectiveness. Coombs and Hull's (1998) investigated the degree that the knowledge centred model of the enterprise and the evolutionary economic perspective constrain or offer to increase the potential for variety generation within a firm. By focussing on KMP's rather than on the technology itself it has emerged that KMP's are capable in principle of changing the constraints on innovation thus modifying the path dependency and increasing the potential for variety generation within a firm. This is achieved through adoption of a process approach rather than a dependency on technology. It is envisaged that these enablers of KM could be key when implementing a corporate strategy that attempts to build upon an organisation's IC assets.

From the performance management literature, Amaratunga and Baldry (2002) propose that performance management develops participation, awareness, de-centralised decision-making processes and responsibility for achieving the goals that have been set. They suggest that evaluation of achievement is necessary to draw conclusions about what an organisation is doing particularly well or where improvements can be met and that the performance management system acts as an enabler for a 'circle of learning.' It could be argued that this 'circle of learning' is central to the themes within the KM literature specifically in relation to knowledge creation and knowledge sharing.

3.3.3 Critical success factors

Mathi (2004) identified that the critical success factors of implementing KM in organisations are culture, strategy, systems and IT infrastructure, effective and systematic processes and measures. This was also the case for Smith (2004) who noted that a

common finding across the three case studies investigated were the effective codification of processes. Akhavan et al. (2006) identify sixteen concepts that they consider critical to success within KM systems which include: training programs, knowledge architecture, network of experts, knowledge sharing, transparency, knowledge strategy, trust, organisational structure, business process engineering, pilot, knowledge storage, knowledge capturing, knowledge identification, knowledge audit, organisational culture, support and commitment of the CEO. Akhavan et al. (2006) suggest implicitly that the structure of the organisation is an influencing factor and that the commitment of the CEO is imperative; this suggests a top-down approach to KM. Martensson (2000) contends that the first part of KM, the storage of information, is the one most often described, probably because the storage of information is the first and perhaps the easiest phase of KM. It may be important that organisations embarking on a KM initiative give their attention across the different critical elements and avoid leaning only toward tangible elements such as knowledge storage. Culture, leadership and education could be regarded as 'soft' enablers as classified by Sveiby (2001a). Stankeviciute (2002) suggested that the 'softer' enablers such as values, culture and motivation were more important as they related to tacit and new knowledge as opposed to explicit and existing knowledge.

It is clear that the absence of these factors could influence the success of a KM initiative but it is important to also acknowledge that application of these attributes may not be sufficient for a successful KM initiative.

3.4 Knowledge management hurdles

A number of barriers to KM have been identified. Mason and Pauleen (2003) propose that 45% barriers to KM are culture related, 22% leadership related and 16% education related. Forbes (1997) and Koudsi (2000) also argue that the biggest challenge for KM is not a technical one (it can be integrated into any number of IT systems) but a cultural one. It is the difficult task of overcoming cultural barriers, especially the sentiment that holding information is more valuable than sharing it (Anthes, 1998; Warren, 1999). The barriers to the KMAs that are concerned with 'new' as opposed to 'existing' knowledge transfer, acquisition and creation may be non-technical, more people and process related and thus

more challenging to manage as less tangible. This concurs with Warren (1999) and Bassi (1997) who claim that though technology may be necessary for KM, it appears never to be sufficient. De Gooijer (2000) argues that managing the business benefits of KM is difficult, and proposes seven levels of KM skills for demonstrating collaborative behaviour; however these could potentially enable or empower employees to collaborate but may not assist the management of benefits of KM.

Hildreth et al. (2000) suggest that communities of practice can address management issues in relation to the sharing of soft or tacit knowledge, which they describe as difficult to manage. They give some examples of tacit knowledge as; experience, work knowledge which has been internalised and tacit knowledge. They argue that 'hard' knowledge is well established and describe it as knowledge that can be easily articulated and captured.

A European Commission Report (2006b) suggests that unnecessary bureaucratic burdens pose a significant barrier to an innovative and knowledge-intensive economy. They suggest that such burdens particularly harm small and medium-sized enterprises, which account for two thirds of jobs in Europe. This illustrates the scale to which barriers have the potential to affect economic sustainability and could hinder effective KM.

Recognition of these barriers is crucial to understanding the challenges and issues that managers and organisations face with regard to KM. A possible solution may be the introduction of a pilot for any KM initiative as suggested by Akhavan et al. (2006). This could facilitate unearthing of initial reaction to KMAs and could bring any hurdles or barriers to the fore so that potential solutions can be sought in advance of implementation across all areas of an organisation. Having reviewed both the enablers and barriers of KM it is clear that there are actions that could be introduced to encourage KM and also mechanisms established to overcome any resistance or barriers to KM. An awareness and evaluation process to identify the success or failure of any initiative may be a crucial element. The next section investigates links to intellectual capital which ultimately attempts to value KM and KMAs.

3.5 Links to intellectual capital

The links between KM and IC can be further understood if a process-model is used. Input to the process could include information, experience, qualifications; the process could be a KMA such as knowledge transfer from one employee to a team of employees; the output may be referred to as IC as identified in the organisation's annual report. This simple example illustrates how the firm's knowledge assets have increased by facilitating the transfer of knowledge. This research is focussed on KM, the output from KM can be referred to as IC, the scope of the research does not focus on IC but it is relevant to distinguish these concepts and provide some context to their relationship. However, there is no commonly accepted definition of intangibles. Johanson et al. (1999) assert that intangibles can be studied from at least three perspectives (e.g. accounting, statistics, and managerial).

This research focuses on a managerial perspective at both a strategic and operational level. Currently, Irish, UK, American and other international accounting standards, define intangible assets very narrowly, for example, patents and copyrights. In the KM field the term intangible asset is understood in a broader context and includes elements such as human resources, company reputation and customer loyalty. There has been criticism that accounting for knowledge is currently not being addressed within financial statement frameworks (Collier et al., 2003). Rennie (1999) argues that the more intangibles that a company has invested in, the more incomplete its balance sheet is and the more distorted are its reported profits. This leads us into the debate on the relevance of methods used to value an organisation and the emergence of IC management (Brennan and Connell, 2000; Lynn, 1998; Larsen et al., 1999). Within the last decade substantial differences have been recorded between the market and book values of companies. According to Brennan (2001) many of these differences can be explained by intellectual assets not recognised in the company balance sheets.

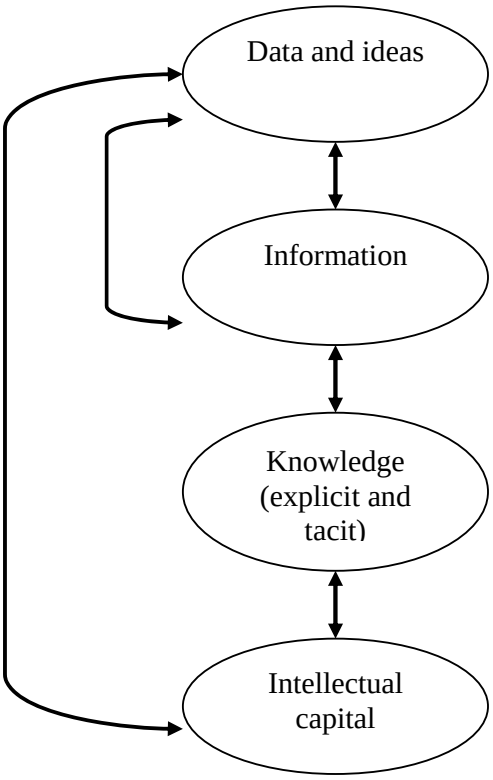
IC has many complex connotations and is often used synonymously with intellectual property, intellectual assets and knowledge assets. Guthrie (2001) suggests that the arrival of the knowledge economy has seen a decline in relative importance of tangible assets, and has led to a paradigm shift to relying on knowledge and IC. Larsen et al. (1998) argue

that IC management facilitates knowledge activities to be visible rather than knowledge itself thus establishing a direct link between KM and IC and assisting the recording of knowledge as an intangible asset often regarded as difficult to measure. Similarly, Guthrie (2001) notes that KM is the management of IC controlled by the company. Some companies have attempted to report the intangible assets of a firm through the use of IC statements, suggesting that the audience for this information may be shareholders external to the organisations management team (Edvinsson and Malone, 1997). Larsen *et al.* (1999) have suggested that there is no set model for IC statements; they are situational and are used to assist implementation of strategies rather than to describe historical results. Therefore, this suggests that the use of IC statements may have multiple facets and differ between organisations and have different drivers and stakeholders.

3.5.1 The emergence of IC

Lynn (1998) illustrates in figure 3.1 the relationship between data, information, knowledge and IC. This is useful to further understand how people, technologies and structures operate as enablers to the conversion of data and ideas to information, information to knowledge and so on.

Figure 3.1: Interrelationships among data, information, knowledge and IC



Source: Lynn (1998)

The diagram shows a cyclical process where data and ideas may be transformed into information, knowledge and IC. The user interaction facilitates this transformation process. Each sphere has a two way process for entry and exit, for example, knowledge can feed into IC and IC can feed back into the knowledge sphere. This indicates that each level is continuously expanding within the cycles. Each level can also feed into the generation of data and ideas, which is the lowest level of the cyclical process. Lynn (1998) has depicted the relationships between these levels while also illustrating the generation of new ideas.

The IC statement movement originated around the 1980's when service industry practitioners began to suggest extending financial reporting. Sveiby (1997), Edvinsson (1997) and Stewart (1997) were largely responsible for establishing the movement and continue to contribute to its development and its application to industry. Table 3.1 below

outlines attributes of three main classifications of capital. Sveiby (1997) and Stewart (1997) use three classification groupings; human, organisation and customer whereas Edvinsson (1997) uses two classifications; human and structural.

Table 3.1: Summary of intellectual capital classifications

	Human Capital	Organisational Capital	Customer Capital
Sveiby (1997)	'Involves capacity to act in a wide variety of situations to create both tangible and intangible assets'	'Internal structure includes patents, concepts, models and computer and administrative systems'	'The external structure includes relationships with customers and suppliers. It also encompasses brand names, trademarks, and the company's reputation or image'
Stewart (1997)	'The primary purpose of human capital is innovation - whether of new products and services or of improving in business processes'	'Knowledge belongs to the organisation as a whole. It can be reproduced and shared…technologies, inventions, data, publications…strategy, structures and systems, organisational routines and procedures'	'Includes ongoing relationships with the people or organisations to which it sells…market share, customer retention and defection rates, and per customer profitability'
		Structural Capital	
Edvinsson (1997)	'Combined knowledge, skill, innovativeness and ability of the company's individual employees. The company cannot own human capital'	'Hardware, software, databases, organisational structure, patents, trademarks. Unlike human capital, structural capital can be owned and thereby traded'	

Source: Sveiby (1997), Stewart (1997) and Edvinsson (1997)

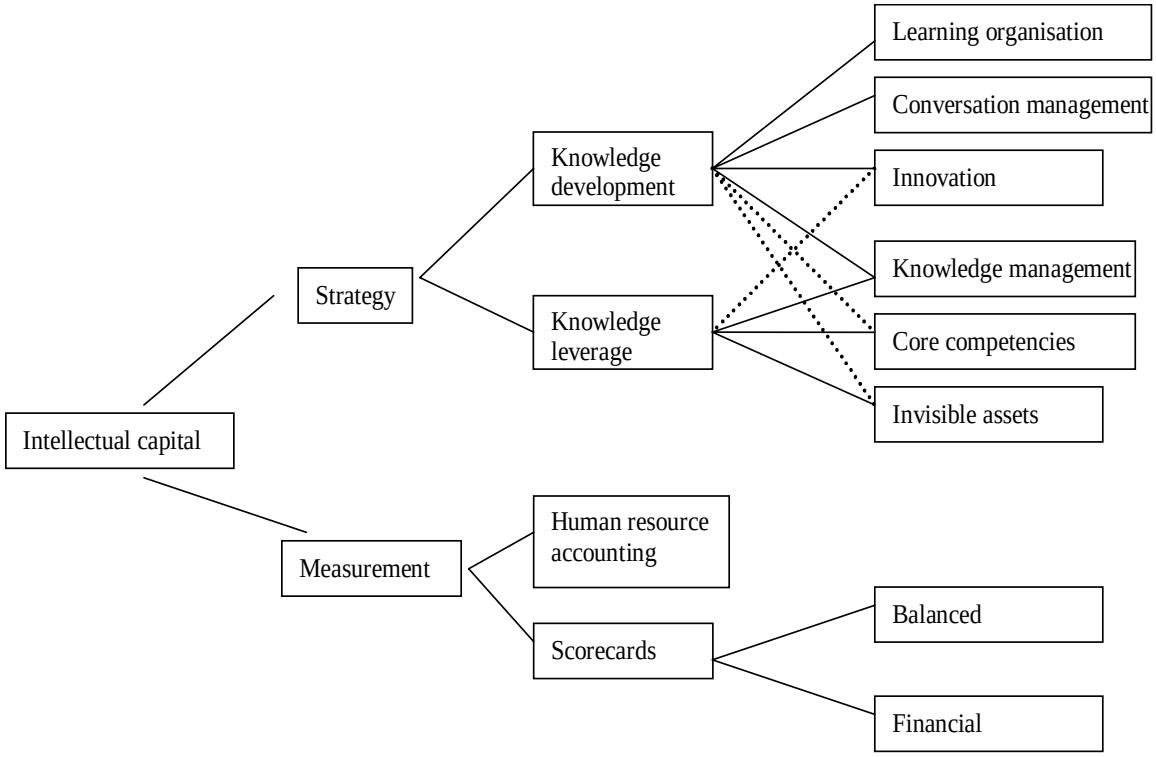
The distinctions presented in the table above have a common theme; some assets are related to employees and are difficult to manage because they cannot be owned nor prevented from leaving the organisation while other assets are those that remain intact

within the organisation such as processes and procedures, databases and customer files. Larsen et al. (1999) identified some complexities involved in producing an IC statement. The evidence suggests that IC statements are situational and that they are used to assist firms in implementing strategies rather than report historical results. Larsen et al. (1999) identify that the 'object' to be illuminated and managed via IC statements is KMA rather than knowledge itself. This describes the probable content of an IC statement but does not assist in describing the mechanism required to collect data from these KMAs. If no guidance or commonly accepted measures are available, difficulties may arise when comparisons between organisations prove impossible as each organisation may have a unique set of measures.

Roos et al. (1997) traced the theoretical roots of IC to two different streams of thought: the strategic stream and the measurement stream as illustrated below in figure 3.2. The strategic stream focuses on the creation and use of knowledge and knowledge as a source of value. The measurement stream concentrates on developing new information systems to measure non-financial data and intangible assets. A possible link between the two streams is a cycle of continuous improvement where the strategy is reviewed and aligned based on the measures recorded. The dotted lines represent elements that cross over between the two processes, knowledge development and knowledge leverage. This study primarily focuses on the strategy stream; creation and use of knowledge and the processes used to leverage the value of knowledge; however measurement is an integral element of overall performance management and is a relevant mechanism in this regard.

Roos et al. (1997) classify IC into structural and human capital, 'thinking' and 'non-thinking' assets. This distinction is due to the different management techniques required for structural and human capital. Structural capital is owned by an organisation, usually in a tangible format, whereas human capital may be tacit, still not converted into organisational value. For example, technology could facilitate storage of structural capital and management may need to implement new systems, support technical initiatives provide resources such as finance for replacement of legacy systems, whereas to support human capital, management techniques may include motivational techniques and reward systems.

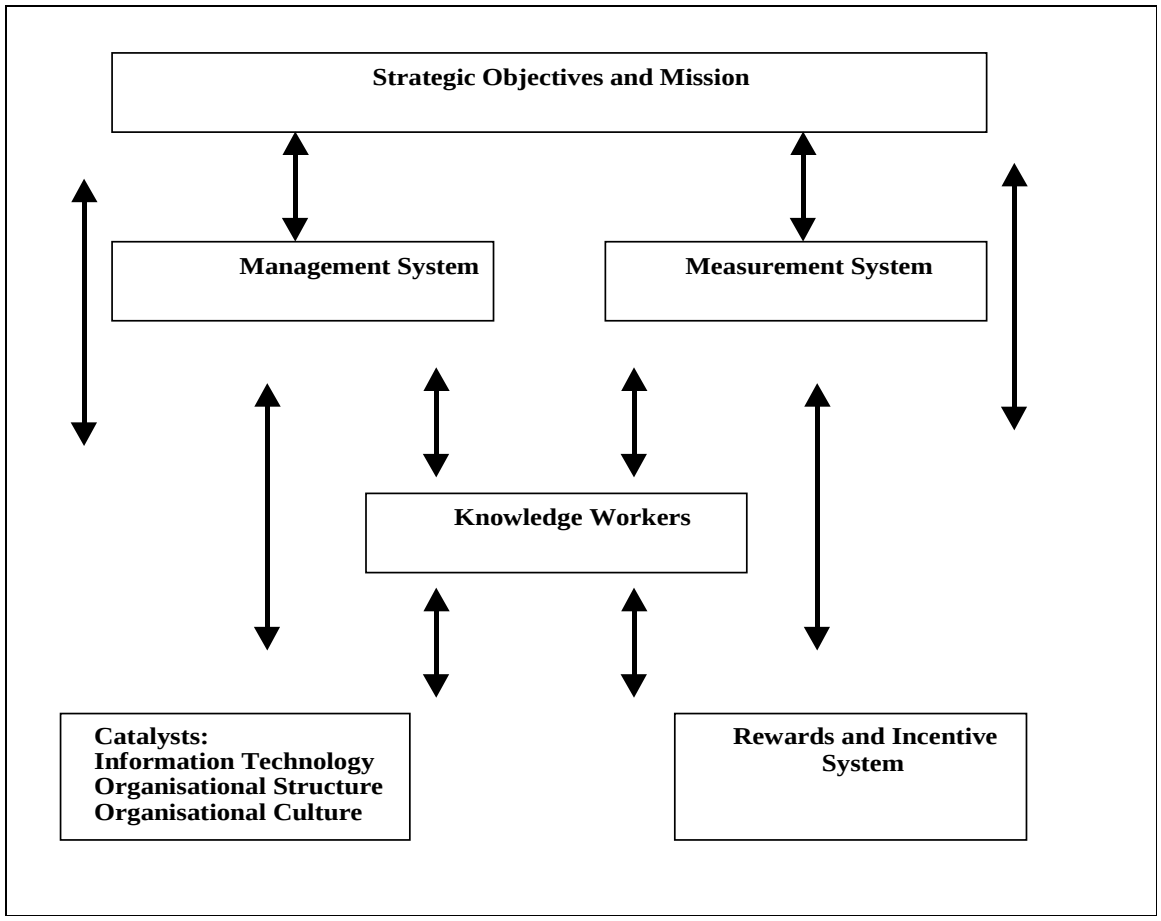
Figure 3.2: The conceptual roots of intellectual capital



Source: Roos et al. (1997)

It may become evident that the activities that are implemented by engaging in a KM initiative may become the building blocks on which to develop and leverage organisational knowledge and refine corporate strategy and expand on an organisation's IC. Knowledge is regarded as an organisation's strategic resource taking the form of an intangible asset and a derived value from an organisation's knowledge activities. Zhou and Fink (2003) argue that knowledge is one dimension of IC and as such KM processes lie within the wider processes of IC management. The Intellectual Capital Web (ICW) (figure 3.3) was designed by Zhou and Fink (2003) to assist organisations to take a systematic approach in managing and measuring knowledge processes for the purpose of creating and maximising IC. It consists of six elements which are: organisational strategic objectives, knowledge workers, management system, measurement system, catalysts and a reward and incentive system.

Figure 3.3: Intellectual capital web (ICW)



Source: Zhou and Fink (2003)

ICW facilitates knowledge capture and transfer (the role of IT, organisational structure and culture); monitoring and measuring knowledge processes (the role of measurement systems); nurturing a knowledge-friendly culture; motivating knowledge sharing; and rewarding knowledge contribution (the role of culture and reward systems). At the centre of the ICW is the people component that is referred to as 'knowledge workers.' Zhou and Fink (2003) argue that this is the most important aspect of the ICW given the role that knowledge workers are playing in KM activities. Overall the ICW presents the possible relationships between IC elements.

Wiig (1997a) distinguishes between KM and IC and highlights their overlapping attributes. Intellectual Capital Management (ICM) focuses on building and governing intellectual assets from strategic and enterprise governance perspectives with some focus on tactics. KM has tactical and operational perspectives and is more focussed on managing knowledge activities such as creation, capture transformation and use. Further, Wiig suggests that both KM and IC complement each other but can only contribute to the enterprise's success and viability if they are renewed continually and used effectively. Thus this distinction will form a basis for this study and KM and the attributes associated with KM is perceived as building blocks to ICM.

3.6 Summary

This chapter presents specific KM techniques; it describes KMAs and enablers that facilitate the management of knowledge. The importance of knowledge as an asset is evident from the literature and some barriers and enablers to managing knowledge as a corporate asset have been identified. Often, the literature relates the importance of knowledge to competitive advantage and innovation which spans new product development, process improvement and cost efficiencies. Culture, technology and processes have been influencing factors for managing knowledge and in many cases technology alone have been cited as insufficient. Much of the analysis ignores the potential for managing knowledge within existing formal control structures. Examining different implementations of KM programs enables us to gain useful insights on KM concerns. It can provide a roadmap or path to understand why knowledge is perceived as difficult to manage and provide an insight into mechanisms or approaches that may be useful in an attempt to address these difficulties.

This chapter presents critical success factors that may be necessary but potentially insufficient as this area develops. The hurdles to effective KM are identified and broken down into their component elements in an attempt to further understanding. Finally, links between KM and IC are highlighted and this helps to understand the boundaries of this study.

Chapter 4: Research Methodology

4.1 Introduction

'We must go beyond textbooks, go out into the bypaths and untrodden depths of the wilderness and travel and explore and tell the world the glories of our journey.'

John Hope Franklin

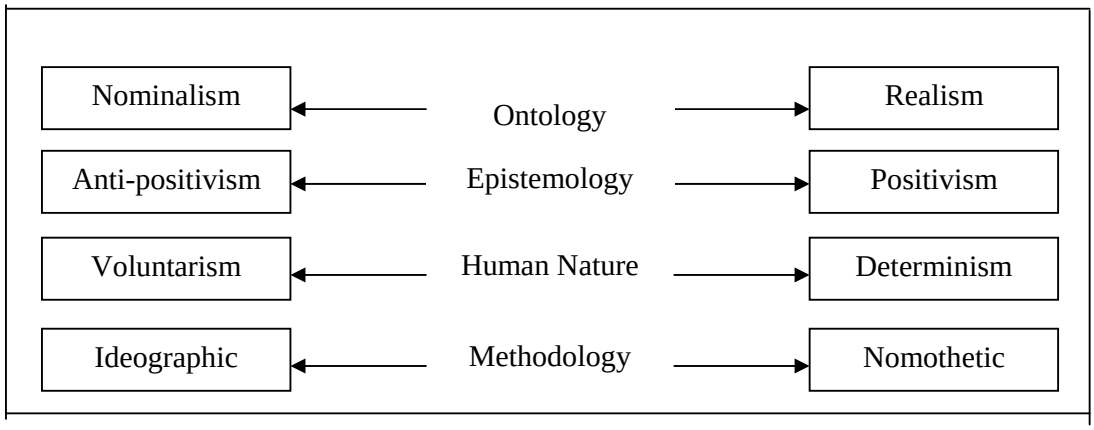
This chapter outlines the research philosophy and methodology adopted for this study. The process applied in this research reflects the major issues debated within the research methodology literature. The alternative approaches are considered and this chapter outlines the chosen research methodology. Argument in favour of the chosen methodology is presented in line with objectives and details of the research process employed. As a combination of quantitative and qualitative research methods were employed, the distinctions between them are described and reviewed. Advantages and limitations of these methods are analysed. The research problem and objectives are presented. Further consideration is given to the data collection approach adopted during the different data collection phases. The design and analysis of the questionnaire is reviewed. The semi-structured interview approach and selection criteria for interviewees are considered and justified. Mechanisms adopted during the data collection phases are described. Finally the issue of triangulation is considered in the overall assessment of the results.

4.2 Philosophical perspectives

Research methods have their origins in the philosophies of social science. As a result of this the philosophical orientation of a study should be established when undertaking research (Easterby-Smith et al., 1991). Thus before outlining the methods of fieldwork, data collection and data analysis utilised within this study, it is important to take into account the philosophical position adopted. In choosing the research paradigm Remenyi et al. (1998) note that the researcher should be cognisant of the weaknesses of their preferred approach as well as being able to satisfy the ontological and epistemological preferences of the researcher. An understanding of philosophical issues is important as it helps to clarify research design (Easterby-Smith et al., 1991). It can also assist the

researcher to recognise the designs that will best facilitate the research undertaking as the researcher can select, modify or even create a new design not based on past experience but on greater understanding and knowledge (O'Keeffe, 2001). Figure 4.1 below illustrates two different approaches in relation to social science, the subjective approaches on the left could be regarded as relating to theory building approaches and the objective approach on the right could be regarded as relating to theory testing approaches.

Figure 4.1: The subjectivist - objectivist approach to social science



Source: Burrell and Morgan (1979)

Burrell and Morgan (1979) suggest that the assumptions about the nature of social science can be viewed as a 'scheme', or two polarised and continuum views ranging from subjective to objective. Figure 4.1 is a reproduction of the model and highlights the differences between the four assumptions that have been rigorously debated in the philosophical literature. This model can be used as a tool to influence a knock-on effect to the philosophical approach taken.

The first assumption deals with the ontological issue that is beliefs concerning the essence of the phenomena being investigated. The question of ontology is whether the 'reality' to be investigated is external to the individual or a product of the individual consciousness. Lee (1999) propounds that the designs of the two types of research are based on differing views of reality: quantitative researchers 'typically assume a single objective world' while qualitative researchers usually have 'multiple subjectively derived realities.'

The second assumption forms part of the epistemology debate, the very nature of knowledge itself, and if it contributes to existing knowledge. Burrell and Morgan ascertain that part of this assumption is 'whether knowledge is something which can be acquired on the one hand, or is something which has to be personally experienced on the other.' A question posed here relates to whether knowledge only constitutes what is learned through fact, or does it include the experiences acquired in the context of that learning? It is also noted that the different forms of research may have different roles for a researcher. Lee (1999) postulates that quantitative researchers remain independent of the variables under investigation, while qualitative researchers assume that interaction with the phenomena is part of the study. The main focus of this assumption is on discovering what does or does not constitute valid and reliable knowledge.

The third assumption deals with the issue of human nature, and how humans interact with their environment. It is important to determine if an individual tends toward voluntarism where an individual simply responds to the circumstances encountered, or whether an individual is actually a creator of their own environment (determinism) and can influence the environment.

The final assumption concerns the methodology adopted for a study, and this is largely determined by the stance taken with the previous three assumptions. The methodological debate centres on the question of whether qualitative or quantitative modes of investigation are most appropriate for the purposes of social science research. This debate is common in many research textbooks. It can be argued that the objective of the study drives this justification for one method against the other. Burrell and Morgan (1979) assert that methodologies treat the social world in different ways. Some treat it as the natural world, hard, real and external to an individual while some treat it in a less concrete, and in a more personal way, swayed by those in it. These perspectives ontology, epistemology, human nature and methodology are presented in detail below.

4.2.1 Ontological perspective

Ontology describes the nature of the world, the essence of things, therefore it poses questions such as is reality external from conscious or a product of individual

consciousness. Is reality given or is it a product of the mind? This debate is split between nominalism and realism. A nominalist derives knowledge from experiencing social phenomena (Burrell and Morgan, 1979). Nominalists do recognise the role that human subjectivity plays in assessing the social world (Easterby-Smith et al., 2002). On the other hand realists perceive that the real world exists outside what individuals observe, regardless of whether the individual understands the external reality (Gill and Johnson, 1991). A realist considers that the role of individuals is irrelevant to the explanation of social phenomena. The question that may be asked, then, is how it is that general properties or abstract objects are related to the world, how they exist in or in relation to individual objects, and how it is that we know them when experience only seems to reveal individual things.

This conundrum is not going to be answered here, if indeed it could ever be answered. The ontological assumptions of a researcher predicate the nature of the research conducted. So, for example, a researcher with a leaning towards an objectivist or realist view of the social world, generally articulate a positivist epistemology, and consequently engage in quantitative types of research. This ontological debate as described by Burrell and Morgan (1979), as nominalism versus realism can also be described as social world objective versus subjective nominalist view. Different ontological assumptions are present at the very core of the methodological debate. For the realist, the social world exists independently of an individual's appreciation of it (Burrell and Morgan, 1979). For realists it is possible to deduce that the world is not the creation of individuals and minds but rather is out there. The traditional realist assumption is that truth is founded on the interactions of observations and studied phenomena, and those facts are concrete elements of the social world (Easterby-Smith et al., 2002).

4.2.2 Epistemology perspective

The epistemological debate has extreme stances regarding whether knowledge is something that can be transmitted between individuals or gained solely from experience of a personal dimension. These stances have been categorised as positivism and anti-positivism or interpretative (Burrell and Morgan, 1979; Gill and Johnson, 1991; Travers, 2001). An understanding of epistemology is necessary to ensure an appropriate approach

to the research with a consideration of the researcher's own knowledge, skills, style and purpose (Evered and Louis, 1981). The positivistic view is that only instances that are founded in an observable context constitute valid knowledge (Travers, 2001). A positivist seeks explanation and prediction about events in the social world, by searching for patterns of behaviour or relationships between the interacting components (Burrell and Morgan, 1979). Table 4.1 highlights distinctions between the epistemological assumptions of positivism and anti-positivism.

Table 4.1: Key features of positivist and anti-positivist paradigms

	Positivist	**Anti-Positivist**
Beliefs	The world is external and objective	The world is socially constructed and subjective
	Observer is independent	Observer is part of what is being observed
	Science is value-free	Science is driven by human interests
Researcher	Focus on facts	Focus on meaning
	Reduce phenomena to simplest levels	Look at totality of each situation
	Formulate hypotheses and test them	Develop ideas through induction from data
Preferred methods	Operationalising concepts so that they can be measured	Using multiple methods to establish different views of phenomena
	Taking large samples	Small samples investigated in depth over time

Source: Easterby-Smith et al (1997)

Many positivists test hypotheses to discover if relationships do exist. This is termed verification of chosen theories and the aim is to substantiate the hypothesis with as much gathered material as possible. However, all verification efforts fail if support is found, in even one instance, which denies or nullifies the hypothesis. Popper and Lipshitz (1993) cited in Easterby-Smith et al. (2002) refers to this as refutation of theory, and deems it an advantageous approach for researchers as it only takes one refutation to falsify a hypothesis. Anti-positivists aim to build new theory rather than test existing theory.

The positivist searches for 'facts' and 'causes' through methods such as survey questionnaires, inventories, and demographic analysis, which produce quantitative data and which allow him or her to statistically prove relationships between operationally defined variables (Bogdan and Taylor, 1975) whereas the anti-positivist searches for meaning, and experiences. Vickers (1999) proposes that this approach is particularly important in relation to qualitative research methodologies in relation to IT development.

4.2.3 Human nature perspective

The human nature debate surrounds the relationship between human beings and their environment. Again this assumption has two diverse views. First is the determinist view. This regards man/woman as being reactionary to his/her environment, with actions and activities ultimately being determined from the social situations encountered. This view is based on the proposition that individuals primarily react to external stimuli and actions are primarily reaction-based not proactive-based.

The other extreme is the voluntarist view, which states that man/woman is completely autonomous and free-willed (Burrell and Morgan, 1979). Individuals actively and voluntarily interact with stimuli in the environment. A researcher seeking to understand the complexities of human activities usually decides about the most appropriate point of view to adopt (determinist or voluntarist). However, Burrell and Morgan (1979) assert that a researcher does not have to choose either one of these mutually exclusive views, but can adopt a ‘transitional’ position, which incorporates the situational and voluntary factors that affect individual interactions with the environment.

Fielding and Fielding (1986) propound that the social world cannot be comprehended entirely in terms of casual relationships, as human actions are founded or expanded upon through social meanings derived, such as attitudes and beliefs. Gill and Johnson (1991) argue that the ‘modes of engagement’ adopted by a researcher for studies are profoundly affected by the philosophical assumptions made. This suggests that there are underlying concepts based on established philosophical assumptions.

4.2.4 The methodological perspective

Debates regarding research methods in the social sciences are linked directly to assumptions about ontology, epistemology and human nature (Morgan and Smircich, 1980). The methodological perspective is polarised between ideographic and nomothetic. For any research method the choice and adequacy of a methodology can be linked to a variety of assumptions about the nature of the phenomena to be investigated (Morgan and Smircich, 1980).

The ideographic approach to social science is based on the view that one can only understand the social world by obtaining first-hand knowledge of the subject under investigation. It thus places great stress upon getting close to one's subject and exploring its detailed background and life history (Burrell and Morgan, 1979). The nomothetic approach to methodological assumptions has its foundation in the importance of basing research upon procedures, techniques and structured lines of enquiry. This approach is usually identified with the testing of hypotheses along scientifically rigorous lines (Burrell and Morgan 1979). Much emphasis is placed on the use of scientific tests and quantitative methods of analysis, with the tools of the nomothetic approach centring on surveys, questionnaires and personality tests. These two approaches seem to have conflicting views of how to approach social science research whereas it is becoming more accepted that multi-method approaches can benefit social science research. Easterby-Smith et al., (1991) state that 'taking a triangulated approach to data collection prevents the research from becoming method-bound.' Lee and Zemke (1993) advocate that different philosophical approaches are mutually supportive, not mutually exclusive.

4.3 Philosophical approach adopted

Upon reflective consideration of the approaches within the methodological literature it is inevitable that there may be trade-offs between validity and reliability due to the strengths and weaknesses of the various approaches. It is necessary to consider the nature and context of the research topic or phenomena to be investigated. The philosophical

approach adopted by the research will drive the mechanisms used to collect and analyse the research data or the 'mode of engagement' (Morgan, 1983).

For the first stage of study the researcher sought to employ an objectivist approach to data collection. Using Burrell and Morgan's continuum or 'scheme', this would suggest an ontological perspective centred on a realist position and an epistemology based in the positivist approach where the world is external and objective. Thus, the researcher would also need to adopt a determinist approach from a human nature perspective with a methodology determined by nomothetic research based upon procedures, techniques and structured lines of enquiry.

The second phase used a qualitative approach in order to investigate the subject matter in a particular organisational context having regard for the outcomes of the initial quantitative phase. Following on from Burrell and Morgan's 'scheme' this would recommend an ontological perspective centred on a nominalist position and an epistemology based on an anti-positivist approach. Thus, the researcher would also need to adopt a volunteerism approach from a human nature perspective with a methodology determined by ideographic research. The difficulty was how to synchronise ontology based on nomothetic methodology in the first stage of research with that of an epistemology based on phenomenological and ideographic methodology in the second stage. Trow (1957) cited in Gill and Johnson (1991) advocated a methodological pluralist approach where 'different types of information with regard to man and society are gathered most fully and economically in various ways and the subject under investigation properly dictates the research methods.' This does imply a possibility of flexibility between methodologies adopted. Gill and Johnson (1997) also advocate a pluralist approach. For this study an ideographic methodology and pluralist approach is adopted.

4.4 Qualitative and quantitative methods

The qualitative approach employs observation techniques, open ended questioning and at times an unstructured approach to data collection. Qualitative research requires flexibility for pursuing answers to questions relative to the context and perceptions of the people

involved in the situation. Qualitative research is difficult to use as a basis for generalising as it is not always repeatable across organisations. The objectives are not usually to test theory but to add to existing theories or create new theories by exploring a subject. Quantitative research is where investigation is measured in quantities and results are generalised across a larger population. Lee (1999) states that the primary difference revolves around the tools used for analysis and that perhaps each method is suited to different types of questions in a study. This suggests that qualitative research leads to theory creation, and quantitative research is applied to theory testing. The use of qualitative methodology came to prominence in field research, predominantly as a result of anthropological research into primitive tribes. Observation was the primary tool used as no other method was feasible where language barriers restricted communication between the researcher and the research subjects.

Qualitative research is deemed to be much more fluid and flexible than quantitative research in that it emphasises discovering novel or unanticipated findings and the possibility of altering research plans in response to such serendipitous occurrences (Bryman and Burgess, 1984). Due to the unstructured nature of most qualitative research with its associated lack of specified hypotheses, except in a very loose sense, qualitative research is inherently exploratory (Bryman and Burgess, 1984). As a result of this emphasis, the qualitative researcher embarks on a voyage of discovery rather than one of verification (Bryman and Burgess, 1984). Qualitative research is any kind of research that produces findings not arrived at by means of statistical procedures or other means of quantification (Strauss and Corbin, 1990). Otley (2001) argues that intensive field based methods of research are much more likely to pick up on the wide variety of control mechanisms deployed by organisations in practice and to ground theoretical development firmly in empirical observed practice.

A qualitative researcher requires: theoretical and social sensitivity; the ability to maintain analytical distance while at the same time drawing upon past experience and theoretical knowledge to interpret what is seen; astute powers of observation; and good interaction skills (Strauss and Corbin, 1990). Research strengths lie in the researcher’s ability to look at change processes over time, to understand people's meanings, to adjust to new issues and ideas as they emerge, and to contribute to the evolution of new theories (Easterby-Smith et al, 1991).

Despite their acknowledged contributions, qualitative methods have their critics. Most criticisms centre around the researchers' effects on the data they collect (Bogdan and Taylor, 1975). Fitzgerald et al. (2000) argue that the qualitative researcher, being the sole instrument, acts like a sieve which selectively collects and analyses non-representative data. Further, they argue that this is common across all forms of research, however, due to its nature the researcher has less influence in quantitative research resulting in less interview bias.

4.5 Research problem and objectives

The focus on assets has changed from physical to intangible (Drucker, 1999), the mechanisms adopted to manage assets and performance of an organisation have been criticised for not addressing current requirements (Kaplan and Norton, 1996). The management of intangible assets generally associated with knowledge intensive organisations is perceived as difficult (Sveiby, 1997; Lynn, 1998; Hildreth et al., 2000; Cormican and O'Sullivan, 2003). The importance of the research problem can be further accentuated by knowledge being regarded as a vital and significant organisational resource that can influence the competitive advantages of the organisation (Alavi and Leidner, 2001). Collier et al. (2003) suggest that even though there is interest in the literature in reporting IC there is little interest in the management aspects. The links between knowledge and performance do not appear to be understood. The literature points to a deficiency in the management of knowledge as a resource which warrants further investigation. There is a paucity of research on KM and MC within an Irish context.

The starting point in all research undertakings is to focus clearly on the ultimate purpose: to contribute to the body of accumulated knowledge. Overall the research objective is to investigate the nature of KM in Ireland. The objective can be further broken down into the following sub-objectives:

1. To explore the prevalence of knowledge management activities

2. To investigate the types of KMAs in use

3. To examine mechanisms employed to manage knowledge as a resource

4. To explore the linkages between managing knowledge and managing performance

Objective one: to explore the prevalence of knowledge management activities. This objective focuses on the pervasiveness of KMAs across the organisations involved in the two data collection phases of this research. It supports objective two which identifies the different types of KMA, both formal and informal, to explore the occurrence and maturity of KMAs within organisations.

Objective two: to investigate types of KM activity in use. In order to meet this objective the researcher recognised it was necessary to collect data from a sample of organisations as types of KMAs may be common across specific industries. Thus a questionnaire was employed. The degree to which an organisation rates the importance or value of different KM activities may also be comparable across organisations. Another element to consider is whether KMAs were formal or informal. To identify informal KM activities and an organisation's perceptions on the relationship between a type of KM activity and value derived therein a case study was deemed most appropriate. Both the questionnaire and interview utilised Stankeviciute's (2002) classification of KMAs; identifying, scanning, organising, dissemination, sharing, creating and transferring. In conclusion both the quantitative method (questionnaire) and the qualitative method (case study) were essential in addressing this objective.

Objective three: to explore mechanisms employed to manage knowledge as a resource. The literature suggests that knowledge is difficult to manage (Sveiby, 1997; Lynn, 1998; Hildreth et al., 2000; Cormican and O'Sullivan, 2003). The questionnaire was used to: identify different mechanisms employed to manage performance within the organisation; to explore whether specialised knowledge staff were employed; to investigate the degree to which organisations depended on technical solutions to manage knowledge and to explore the structure in relation to managing knowledge whether formal processes were established or whether knowledge was incorporated into their existing performance

management processes or models. The semi-structured interviews within the case study were integral to exploring whether there were key performance measures for KMAs. The study investigated the relationship between reward and contribution to organisational knowledge. It inquired whether mechanisms used to manage an organisation's knowledge were informal or formal and whether KMAs were linked to an organisation's vision and mission. Both the questionnaire and the case study explored the degree to which technology contributed to managing knowledge as the literature suggests that although technology may be necessary for KM, it appears never to be sufficient (Warren, 1999; Bassi, 1997).

Objective four: explores the linkages between managing knowledge and managing performance. This objective aims to examine the barriers and enablers associated with KM by interfacing it with MC. Management techniques and challenges in relation to managing knowledge and performance are considered as is the suitability of a performance management framework to manage knowledge.

4.6 Adopted methodology

This section presents the roadmap taken during this study. It introduces a high level overview of the steps taken, identifies sources of secondary data, it describes the methodology adopted and details phase one and phase two of the study. The study is guided by the methodological writing of other researchers in the area (Otley, 2001; Stankeviciute, 2002; Collier et al., 2003; Mouritsen, 2003). Due to the related dimensions of this study, reference was also made to management accounting literature for input to the research design (Atkinson and Shaffir, 1998; Ahrens and Dent, 1998).

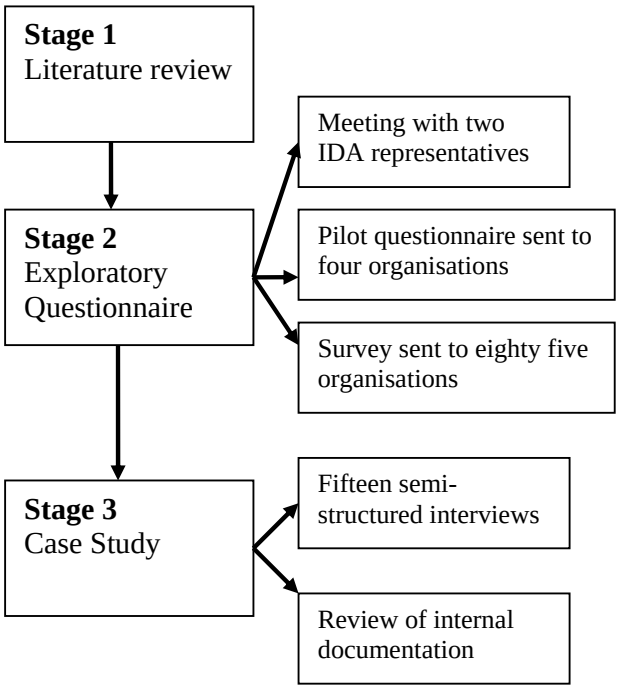
The methodology selection was influenced by other factors in addition to the objectives. There were resource constraints that had to be considered, as this research is located primarily in the South-East region of Ireland, where the population of companies is low. The approach that was adopted included a pilot questionnaire sent to three organisations and the IDA. A questionnaire was sent to the sample population of eighty six organisations and fifteen semi-structured interviews were conducted with participants of

the case organisation. The process was quite iterative in its nature; each element contributed to the next and often changes were made as a result of feedback and observations.

4.6.1 Overview of research process

Sekaran (1992) describes research as 'a systematic and organised effort to investigate a research problem that needs a solution.' In order for a study to be systematic and organised it must follow a systematic process that meets research objectives. The researcher adopted a three-pronged approach to data collection as illustrated by figure 4.2 below.

Figure 4.2: Research approach adopted for this study



4.6.2 Sources of secondary data collection

The secondary sources of data used in this study included books; journals, professional reports and newspapers. Findings from the secondary data collection phase are presented in the literature review chapter. Resources within WIT provided much of these but the researcher also used inter-library loans and visited the University of Limerick and the Dublin Institute of Technology. The internet and remote access to WIT library databases was invaluable as this provided a link to their electronic journal facility. This was particularly relevant as the researcher was in full-time employment and it was crucial to access secondary data through the internet. The literature that was reviewed provided an understanding of the research topic and assisted in identifying gaps in the literature that refined objectives for the primary research collection phase.

4.6.3 Data collection

The data collection phases utilised within this study was further developed by the ability to be flexible throughout the data collection phase and refine the process as needed. It was necessary to decide how the data for each stage of the research would be collected. Sampling was used to select part of the population of interest to represent the whole population. However the initial phase of the study (questionnaire) used a small sample (eighty six organisations) and the selection criteria used was non-random. Therefore the results can not be claimed as representative of the whole population.

Appendix B details agreement by the case organisation to participate in the research. The initial sample for the case study interviews was based on gaining representation from at least three levels of the organisation hierarchy. The case study was also influenced by a snowball effect (Van Meter, 1990). However, the objectives of the research were exploratory rather than attempting to apply the research findings to the whole population and thus the chosen methodology was justified in this respect.

For phase one of this study the population consisted of all multi-national companies operating in Ireland. The sampling frame consisted of IDA registered companies as identified on the IDA website register and a list was obtained from the IDA South East

Business Development Manager. However, this was supplemented by personal contacts from multi-national companies that were not part of the listing received by the IDA (these consisted of approximately eight companies (10%) of the sample). Both manufacturing and service companies were targeted.

Upon meeting with the IDA representative email addresses for all targeted companies and contacts within each targeted company were made available. Eighty six companies in total were targeted. Using email as the main communication mechanism was an advantage to the researcher as it reduced cost and effort and it meant that responses were somewhat easier to track as they were all centrally stored on an email server in Waterford Institute of Technology.

4.6.4 Triangulation

By obtaining supporting evidence from several sources, and combining their individual strengths, one can add credibility to the research work and thus increase the validity of the evidence. This multi-method approach is referred to as triangulation. Denzin (1970) defines triangulation as:

'the combination of methodologies in the study of the same phenomenon'.

A high quality case study describes a story that draws on multiple sources of evidence and their triangulation provides meaning in context (Remenyi et al., 2002). In the literature on triangulation in the social sciences, it is usually Webb et al. (1966) who are attributed with the first use of the term itself. This early thinking and writing was soon to be taken up enthusiastically in research methods textbooks (Denzin 1970; Smith 1975) thus reinforcing the use of triangulation as a legitimate technique within social science research which has continued to this day (Hammersley and Atkinson 1995). Denzin (1970) proposed many typologies of triangulation such as data, investigator, theoretical, methodological, multiple, between-methods and within-methods triangulation.

Data triangulation refers to the collection of data from different sources whereas methodological triangulation involves combining quantitative and qualitative methods of

data collection. Theory triangulation involves borrowing models from one discipline and using them to gain insight in another, triangulation of investigators is a process whereby different people collect data on the same situation and the results are then compared. Triangulation may assist researchers to think outside the box and use alternative triangulation approaches than those in widespread use. Case study research typically uses multiple sources of data (Yin, 1994) and triangulates between these sources (e.g. documentation, questionnaires and interviews). Roche (1997) argues that this enables a researcher to crosscheck inferences between data sources and verify interpretations made thus increasing the reliability of findings.

Triangulation for the most part shares the notion of complementary qualitative and quantitative methodologies rather than competing approaches (Fielding and Fielding, 1986). In the majority of cases to date, triangulation generally denotes a reference to a combination of research methods (Bryman and Burgess, 1984). Use of a multi-method approach improves understanding of the research topic; each technique may reveal facets of the topic that would not be yielded by the use of alternative methods (Riley et al. 2000). However, there are some drawbacks to the triangulation approach. Focus is multi-faceted and therefore the researcher needs to be able to switch between methodologies effectively, for example, each method may influence the other, thus introducing the potential of increased bias rather than limiting it. Lee (1999) argues that the disadvantage of a combination research design is the potential for disjointed results as most researchers are more experienced in one or the other methodology type and that the quality between the two parts of the study may differ considerably. Lee (1999) does however postulate that despite this shortcoming a combined design using multiple lines of enquiry can generate high quality data. Easterby-Smith et al. (2002) contend that a researcher needs to consider that the methodologies chosen may not reflect the complexity of the research topic under examination. This study adopted a three faceted approach to triangulation in that it examined the subject matter through the use of a questionnaire, interviews and internal documentation.

4.7 Evaluation criteria

Research by its nature is subjected to external examination. Easterby-Smith (2002) propose that there is an underlying anxiety amongst researchers that the research will not stand up to outside scrutiny. In order to assess whether research will stand-up to outside scrutiny researchers are often concerned with reliability, validity and ability to generalise findings and conclusions drawn from research studies (Mays and Pope 2000).

Interviews have been considered a source of valid data. Hakim (1987) argues that the great strength of qualitative research is the validity of data obtained as individuals are interviewed in sufficient detail for the results to be taken as true, correct and complete reports of their perceptions and experiences. Bowen (1996) believes that 'as the social science researcher merges quantitative and qualitative methodologies, the internal validity of the research design is strengthened.' In some case concepts such as validity, reliability, objectivity and generalisation are deemed inappropriate for use in qualitative research. Alternative criteria for scientific rigour, initially introduced by Lincoln and Guba (1994) are presented: credibility, dependability, confirmability and transferability.

Slevin and Sines (2000) identify use of rigorous methods to evaluate truth and consistency as a method of ensuring that their findings represent reality. According to Mintzberg (1985) social research has paid dearly for the obsession with rigour in the choice of methodology and that small samples and exploratory research should be encouraged.

This research is as a single case study which stems from a review of underlying theory which has applied a detailed multi-method approach that collected multiple data types from multiple sources using a sample basis as identified. It does have limitations and may not have implications for generalisation. The limitations of this study can be attributed to the sample size for phase one and a one-site case study in phase two; this research adopts a managerial perspective and was conducted over a relatively short period of time, a two year period. However, this study represents an early use of the extended framework by Otley and Ferreira (2005) and an initial attempt to integrate KM and performance management within an Irish context thus subsequent research in this area could further validate and verify the results.

4.8 Phase one: Questionnaire

This section presents the approach taken for phase one of the study. It details the questionnaire design, outlines the process for administering the questionnaire and the method used for analysis of findings.

4.8.1 Questionnaire research approach

A questionnaire is a cost-effective, convenient data collection mechanism Sekaran (1992). There are three main considerations when designing a questionnaire according to Sekaran (1984): the structure of the questions to be included; type and format; and content, as these may influence the responses. Sekaran (1984) suggests that if the researcher considers these three factors they may be able to reduce biases contained in the data and improve the validity of the responses. The qualities of using a questionnaire give it strength in validity and reliability. A questionnaire is highly structured therefore quantitative analysis is easily computed from the data and deemed reliable.

The main limitations associated with quantitative research are that the data collected cannot generally be used to uncover the causality between variables and that it can be difficult to adequately define a concept or variable so that unperceived values do not creep into its measurement (Silverman, 2001). Correlation is necessary but not sufficient proof of a causal relationship. Another weakness is that a questionnaire is considered relatively low in ecological validity. A questionnaire does not usually investigate reasoning as to why certain activities happen. It can be difficult to develop theories based on the survey questions as some of the questions that a researcher would like to ask are not appropriate for a questionnaire, for example, where the nature of a question is too sensitive to ask in a survey, this can affect response rates.

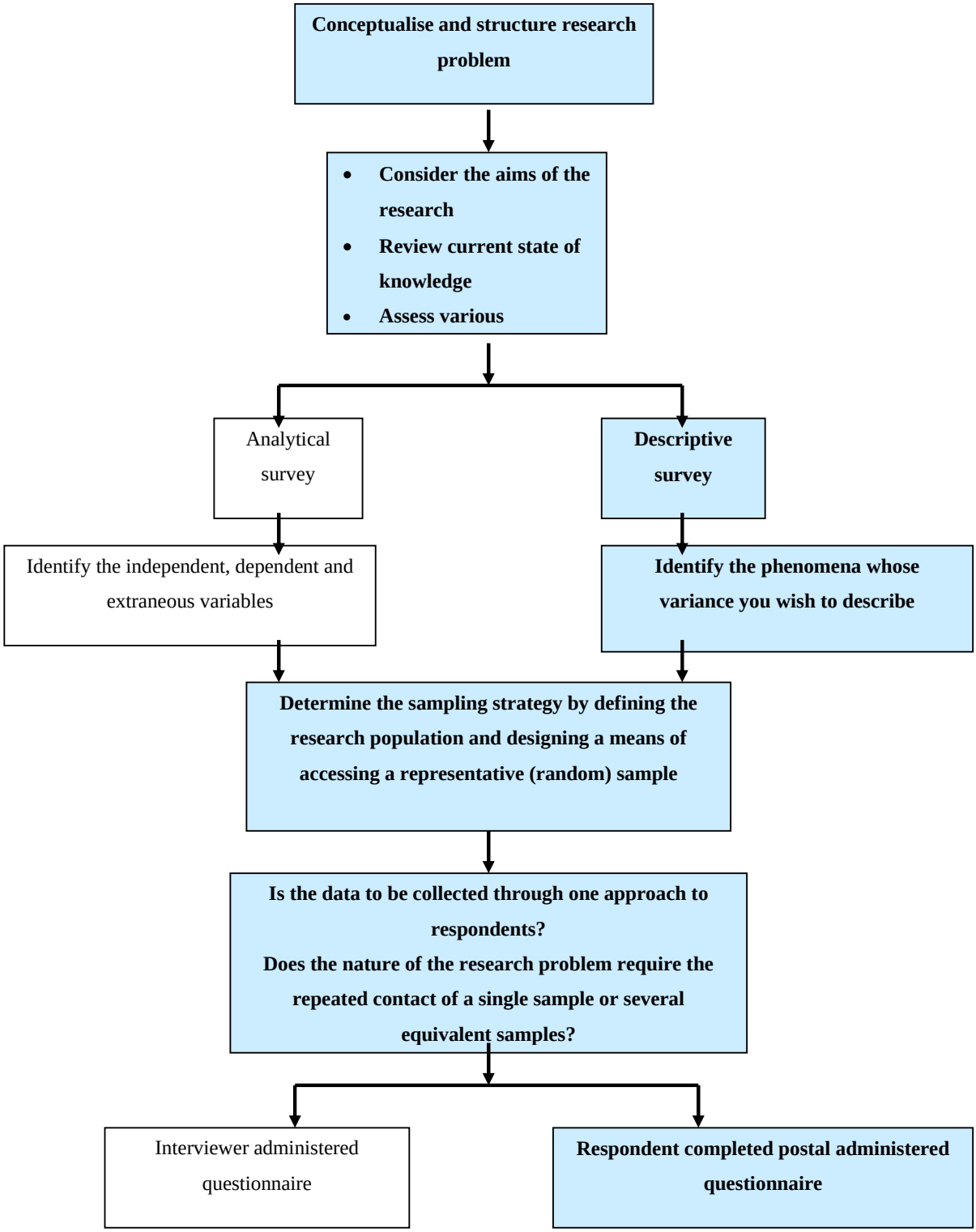
Gill and Johnson (1997) distinguish between two types of survey: descriptive and analytical. This study employs the use of a descriptive survey which uses an array of question formats. It facilitates the assessment of specific attributes of the sample population. The data collected helps to create a broad view of the phenomena under investigation. The questionnaire was designed to identify KM activities, issues,

challenges and mechanisms employed and enablers of KM across the targeted organisations. Although this study used a relatively small sample size, a tentative picture on how knowledge is managed and controlled within MNCs has emerged. However this study is not relied upon for hypothesis testing or statistical analysis.

4.8.2 Designing the questionnaire

The development of the questionnaire followed a descriptive survey as described by Gill and Johnson (1997), as illustrated in Figure 4.3 below. The descriptive survey is concerned with securing a reasonably comprehensive sample of a relevant population so as to examine particular characteristics of interest. The other type of survey is analytical which allows an examination of possible relationships that might exist between independent, dependent and extraneous variables.

Figure 4.3: Structured approach to survey planning



Source: Gill and Johnson (1997)

This study employs a descriptive questionnaire in order to investigate KMAs in multi-national organisations operating in Ireland. Alreck and Settle (1985) assert that issues such as cost and time constraints as well as the length of the questionnaire itself all impact on the decisions regarding sample size. These were taken into consideration when deciding on the appropriate size for this questionnaire. However other limitations were considered for this study as KM is an emerging concept and it brings its own limitations as potential respondents may be deterred from answering questions that relate to a concept with which they are not fully familiar. The researcher attempted to mitigate this risk by introducing the research topic and related concepts both within the introductory letter to participants (see Appendix C) and also in section one of the questionnaire itself (see Appendix D).

Drawing on the main themes from the literature review and the resulting research objectives the researcher started by drawing up a preliminary draft of the questionnaire and grouped the questions into six different sections. Question formats varied within and between sections depending on the nature of the data required and included Likert, closed, open and ranking type questions. The appearance and layout of the questionnaire is important to facilitate ease of completion and understanding by respondents (Kaplan and Duchon, 1988; Sekaran, 1992; Riley et al., 2000). The questionnaire structure included the following sections:

- Organisation profile
- Workforce profile
- Knowledge profile
- External factors
- Performance management and control mechanisms
- Other comments

The closed questions allowed a respondent to choose a response from the array presented with the question. With ranked questions, the respondent was asked to place statements in order of importance, as they deemed appropriate. Open questions were employed where freedom of response was necessary e.g. opinion questions. These questions were used

infrequently in the survey. Likert scale and closed questions were the most common format in the survey.

To ensure clarity and understanding the wording of each question was given careful consideration. The researcher had some previous experience in web design and usability engineering where graphical user interfaces are used and tested to ensure that users are clear and can understand web pages easily. This experience was adapted for the questionnaire design process. Wording was simple, jargon was kept to a minimum, and where it is was necessary an explanation was given. The design of the questionnaire went through a number of iterations.

4.8.3 Piloting and administration of the survey

A pilot test of the survey was conducted to test the questionnaire prior to its distribution. An initial meeting with the IDA South-East Business Development Manager, Brian Conroy and Regional Executive, Celine McHugh, resulted in refinement prior to administering the pilot to sample MNCs operating in Ireland. The pilot phase began in July 2004 where participants from three multi-national companies agreed to become involved. The pilot involved administering the survey to the participants to assess if the structure was sufficient to provide the data required and if the format was understandable and easily comprehended in the intended manner.

Feedback from the pilot was invaluable to the design of the final questionnaire. Changes to the questionnaire included: wording within the cover letter and questionnaire that reduced jargon; elimination of questions that were similar in nature thus reducing the size of the questionnaire and sequence of questions in the questionnaire. This was particularly useful in that it seemed to improve the overall tone of the questionnaire. Restructuring specific sections of the questionnaire was considered appropriate. Elimination of one particular question was deemed appropriate due to its sensitive nature. The questionnaire was redrafted to incorporate feedback from the pilot stage before distribution.

The survey was administered through email using a generic email address supplied by the Waterford Institute of Technology Computer Department. The email address was

kmresearch@wit.ie. It required potential respondents to self-complete the survey although it was recommended in the cover letter (Appendix C) that in order to complete section 2 assistance from their Human Resource department may be required. Email was deemed the most appropriate administrative mechanism due to its ability to reach many locations and that it would also be received by the targeted contact directly in a common format for operational tasks that many potential respondents would be familiar with. The cover letter (Appendix C) outlined the process that the targeted organisation was being invited to participate in. All eighty six companies were sent a cover letter which was found to be a useful tool to introduce the topic and the objectives of the research. It explained the nature and content of the study, some of the terms common to the research topic and was phrased in such a way as to encourage completion. The email also attached a letter of support from the IDA (Appendix B). Confidentiality was assured in the cover letter. Follow-up emails were sent to non-respondents and in some cases follow-up phone calls were made where the respondents had indicated that they required more information and also in the case of personal contacts as reminders to encourage response.

4.8.4 Data analysis process

In assessing methods for data collection during the planning phase it is beneficial to consider what data analysis procedures will be used (Lincoln and Guba, 1985). Eisenhardt (1989) suggests that researchers should overlap data collection and analysis because this will speed up the analysis phase and allow the researcher to refine the data collection especially if issues arise during the data collection. In the course of this research data analysis was carried out in parallel with the data collection phases. For phase one once the final version of the questionnaire was complete and ready to distribute the researcher developed spreadsheets in preparation for the data collection and analysis phase. Each section of the questionnaire was allocated a tab and each question had sufficient space to enter in respondent data; this ensured that calculating averages and analysing responses was not difficult. There was also a section for analysis of respondent data which included positions held by respondents and classification of respondents into service or manufacturing industry. During the data collection phase the researcher kept a log of events in order to ensure accurate records.

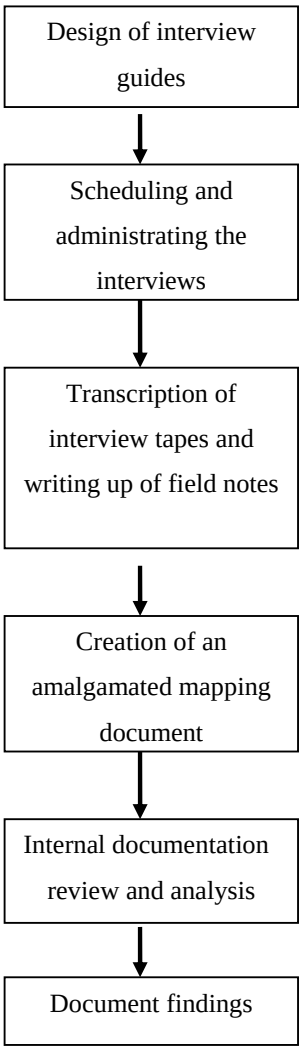
4.9 Phase two: Case study

This section presents the approach taken for phase two of the study. It outlines the case study process which includes the design and administration of interviews and describes the data analysis process adopted. It also describes the documentation analysis undertaken during this study.

4.9.1 Case study approach

Phase two of the research involved a one-site case study. It involved a qualitative approach which involved semi-structured interviews and a review of internal documentation. The interviews expanded the range and depth of topics that were covered in the questionnaire. In this way a deeper understanding of KM within the context of MNCs operating in Ireland was sought. Specifically for the first objective in this study it was considered that interviews with senior personnel may uncover some KM activity types not categorised as KMAs. Objective two explores mechanisms used to manage corporate knowledge. Given its intangible nature a discussion around these mechanisms was deemed more appropriate than the level of data that would be feasible to collect via a questionnaire. For example even though the questionnaire could be useful to determine if there were mechanisms being used, interviews could potentially investigate how and why and to what capacity the mechanisms were being utilised. Given the negative and sensitive nature of barriers to managing knowledge, interviews opened up new dimensions and provided an opportunity for the researcher to probe deeply into problem areas. Interviewees shared their experiences with regard to enablers of KM, activities, processes, and tools that were successful in the case organisation. The interviews provided managerial perceptions on managing knowledge as a resource and links between KM and Performance PM were investigated in detail throughout the case study process. The methodology adopted for the case study traversed a number of steps as illustrated in figure 4.4.

Figure 4.4: Summary of phase two data collection process



Upon gaining agreement (Appendix B) with the case organisation to participate in the research the process was outlined to the senior management of the case organisation. Three introductory meetings were conducted with the Managing Director, Operations Manager and Finance manager in August 2004 to describe the research and its objectives. This attained a level of buy-in and commitment for the research process and resulted in full access to the researcher. The introductory meetings outlined the objectives of the research, the purpose of using the interview as a research technique, confidentiality issues and elements relating to publication and dissemination of research findings. The Managing Director agreed to participate fully with the research by being interviewed

himself and providing full access to resources, experienced personnel and documentation. It is only through arranging full access that the potential of case studies can be fully realised (Baxter and Chua, 1998). The organisation fitted the criteria established for the case study as: it was a multi-national subsidiary; its main business was a service; it had a large proportion of knowledge workers; and the company was willing to participate in semi-formal interviews and provide corporate documentation for review.

In support of the justification for a case study approach a number of recent studies on KM have adopted this approach (Larsen et al, 1999; Beijerse, 2000; Hellstrom et al., 2000; Ford, 2001; Brennan, 2001; Smith, 2004). Interviews and documentation provided primary data sources. Semi-structured interviews provided an ideal mechanism for in-depth discussion and understanding of the views of interviewees (Riley et al., 2000). Documentation was gathered throughout the research; it was advantageous in that it did not impede upon the time constraints of the participants. Using as many data sources as possible is crucial to a strong case study (Yin, 1994). A cross section of the management team was targeted, as the literature suggested that KM may not be a defined part of any one person's role.

There was overlap between the questionnaire and the interviews which provided an opportunity to delve deeper into the perceptions of the interviewees in relation to the findings emerging from the questionnaire. In order to bridge the gap between phase one and phase two of the data collection the researcher analysed the findings of phase one using spreadsheets to collate all responses and created a summary of phase one results.

The case study approach to research is not accepted by some as a valid method, and consequently it is appropriate that this section would defend that choice. Even though the questionnaire was appropriate to find out basic information in relation to a number of organisation's management of knowledge, it was unable to facilitate an in-depth investigation of KM in an organisational context. Thus a triangulation approach, and following the questionnaire with a case study, was deemed the most appropriate approach given the following advantages of case study research within the context of the research objectives. Firstly the topic is exploratory and open-ended questioning would facilitate an opportunity to further investigate an organisation's management processes in relation to

KM. Secondly, KM is complex in nature and is deeply embedded in culture, strategy, systems and IT infrastructure (Sveiby, 1997; De Gooijer, 2000; Mathi, 2004). Thirdly, a case study allows the researcher to get close to the context, the participants and the particulars of their relationships. Easterby-Smith et al. (1999) argue that it allows an opportunity for the researcher to probe deeply, to uncover new clues and secure vital accurate accounts that are based on personal experiences.

Gummesson (1991) presents the following criticisms of case studies: they lack statistical validity, they can be used to generate hypotheses but not test them and generalisations cannot be made on the basis of case studies. Thus, inferences from case studies tend to be theoretical and not statistical. Conversely, another advantage of the case study approach is that of the opportunity for obtaining a holistic view of a specific phenomenon or series of events (Valdelin, 1974, cited in Gummesson, 1991) This was particularly relevant for this study as KM spans many functional areas within an organisation (Martensson, 2000). The interviews in the case study method enable us to: study many different KM aspects; examine them in relation to each other; view the process within its total environment; and also make some comparisons. Easterby-Smith et al. (1999) argue that interviews allow an opportunity for the researcher to probe deeply, to uncover new clues and secure vital accurate accounts that are based on personal experiences.

Yin (1984) states that ‘a case study as an empirical enquiry that investigates a contemporary phenomenon within its real-life context, when the boundaries between phenomenon and context are not clearly evident, and in which multiple sources of evidence are used.’ Gummesson (1991) describes two main types of case studies: the first attempts to derive general conclusions from a limited number of cases; the second type attempts to arrive at specific conclusions regarding a single case. It could be argued that general conclusions may not be drawn from a limited number of cases and those case studies with only a small number of cases can only draw specific conclusions. For this research just one specific case is analysed and thus the conclusions that are drawn are specific to that case.

Multiple data collection methods can include documentation, archival records, interviews, direct observations, participant observation and physical artefacts. This study uses

documentation and interviews. Gummesson (1991) acknowledges that obtaining a holistic view of your research issue through a case study can be a very time consuming job and as such it is generally not possible to carry out more than one or a very limited number of in-depth case studies in a research project.

The aim of this research was to gain depth of insight into the certain aspects of KM as per the research objectives and not to gain statistical validity. The snowball effect was used to a small degree during the case study where participants were asked who they would recommend to be involved in the case study and in some cases the interview was more focused as a result of previous interviews. This has been recognised as snowball sampling (Johnson et al., 1989). Snowball sampling is particularly well suited to identify 'hidden populations' (Van Meter, 1990) rather than extracting a representative subset. This addresses the objectives of the second phase of the study which, as mentioned, sought to gather more in-depth information.

Internal documentation was reviewed (Appendix H). This provided an additional dimension to the case study and is beneficial to crosscheck inferences between data sources and verify interpretations made, thus increasing the reliability of findings (Roche, 1997). By adopting a two pronged data collection approach to the case study it revealed facets of the topic that would have emerged if the internal document review was omitted (Riley et al. 2000). Further Riley et al. (2000) argue that an advantage of using internal documentation is that it is usually easily available and thus does not need much time from research participants to provide it to the researcher. Then the researcher can review it at a convenient time. This was the case during the course of this research and access to such information was obtained on request.

In addition, the case organisation was certified by the International Standards Organisation (ISO) and Capability Maturity Model (CMM) accreditations and it had a large number of procedures that it followed. A sample of these was taken for this review which included management and operational procedures rather than specific technical procedures in line with the research objectives (see Appendix H).

Chapter six describes the organisation structure and indicates which areas the participants of the case study operated in. Collier et al. (2003) notes that the management accountant has an important role in the measuring and management of knowledge. For this study the management accountant (referred to as the Finance Manager) did participate. A brief description of each participant's roles is outlined in Appendix E.

4.9.2 Semi-structured interviews

Semi-formal interviews were conducted in the case organisation offices between January and May 2005. The researcher wanted to conduct an in-depth analysis of the research problem and determined that semi-formal interviews would best facilitate this process. Sekaran (1992) highlights some of the advantages and disadvantages of face-to-face interviews. Within an interview the interviewer can adapt questions as necessary. It is possible to clarify doubts easily and ensure that responses are properly understood by repeating or rephrasing questions. One can pick up non-verbal clues for example, frowns or discomfort. Overall it provides rich data which helps to explore and understand complex issues and by introducing some formality to the process the interviews were kept focussed by intermitted reference to the agenda so that all topics were addressed. Disadvantages outlined by Sekaran (1992) include: the cost and feasibility of conducting interviews at the case organisation location; respondents may feel uneasy about the anonymity of their responses; and by adhering to an agenda it may restrict the participant leading the discussion.

Arksey and Knight (1999) outline some of the limitations attributed to interviews as the quality of data collected is dependant on the researchers' interview skills and the researcher can sometimes gather rambling stories which may have little relevance to the study. The author used the guides to minimise the possibility of this happening. The researcher was trained in interview skills as part of auditing function for software quality; it was perceived that this was an advantage to the data collection phase. The organisation that participated in the case study had agreed during phase one that they were willing to participate in phase two.

According to Lee (1999) interviewing may be the most common qualitative method used in organisational research studies and can vary from fully structured to completely unstructured in nature. A fully structured interview is similar to a questionnaire being completed with the assistance of the researcher and it could be argued that this introduces some inflexibility and can limit the opportunity for rich data. Conversely, unstructured interviews flow with the natural conversation and have the potential to offer new topics for discussion that have not previously been considered but also introduce the risk that the research topic is not covered in sufficient depth. Semi-structured interviews generally have a pre-determined structure however it is used only as a guide and the researcher can pursue topics that arise and probe deeper as the interview develops.

There are some commonly accepted ethical standards applicable to research of this nature. The majority of interviewees are often only made aware of the research from a broad perspective, so as not to limit, influence or incite their responses. However, the trade-off is between fully informing interviewees and achieving 'objective' responses. Introductory meetings and emails can potentially alleviate ethical pressures. Yin (1994) argues that interviews should only be considered as verbal reports and can be subject to bias, poor recall and poor or inaccurate articulation. During this research steps were taken to address these issues, through recording of the interviews on tape.

The researcher obtained a number of sample interview guides and consulted the literature on conducting research interviews (Sekaran, 1992; Cassell and Symon, 1994). When designing the interview guides it was determined that two separate guides would assist the researcher; one guide specifically for the interviewees which was at a high level outlining the topics to be discussed at the interview (see Appendix F) and another guide for the researcher which gave more detail for the questions to be asked at the interview (see Appendix G). The researcher perceived that this process would ensure that the interview was robust in that all areas would be covered and that it would ensure that the interview had the potential to be very focussed on the research topic and the interviewer could guide this process.

Otley and Ferreira's (2005) framework as identified in the literature review was deemed appropriate to inform the design of the interview guides and the framework was used as a

discussion map that would guide the semi-structured interviews. Appendices F and G detail the interview guides.

4.9.3 Scheduling and administering the interviews

When preparing for the interviews, limitations and difficulties as identified in the literature were taken into consideration by the researcher. Cassell and Symon (1994) identified the need for preparing for interviews and argue that the preparation is similar to that carried out for questionnaires i.e. topics need to be selected, questions devised and preparation of a schedule with enough flexibility to meet requests of the interviewees for suitable times and dates. All interviewees were contacted through email, phone or in person initially, detailing the approval by senior management to participate. This contact with participants aimed to gain their support and explain the nature of the research. Prior to the interview, participants were given an interview guide with high level areas for possible discussion (Appendix F) so as to ease their uncertainty about the format and content of the interview. Upon agreement to participate a schedule was drawn up, the researcher recommended that participants choose a time of day that would not be subject to disturbances by operational tasks or priorities. To facilitate busy schedules the researcher made options available such as weekends, outside normal working hours and any location that suited the participants. All participants chose to hold the interviews within the case organisation's offices. Interviews were mainly conducted in the evenings or early mornings with one at the weekend. The researcher was satisfied that all interviews were done in suitable conditions where the location was quiet, with the exception of one interview where there were some disturbances. For that particular interview a production issue arose and the participant had to end the interview without answering the last section so it was concluded by telephone the following day. At the beginning of each interview the researcher highlighted the confidentiality of the research and went through the following protocol (figure 4.5) for the interview with each participant.

Figure 4.5: Protocol adopted for semi-structured interviews

- The role employed by the interviewer for the duration of the interview is as a researcher and not an organisation employee.
- There may be questions that need reaffirmation even if the interviewee assumes that the researcher is already aware of the process.
- The researcher may need direction to documentation location.
- The interview is confidential.
- A request for permission to record on tape was made.
- The researcher is looking for perceptions: there are no right or wrong answers.
- The research output will be available to the case organisation and may assist with further refining of performance management processes.
- At end of meeting, reflect and discuss who else it may be relevant to talk to on this topic.

This presented a consistent approach to each interview and encouraged rapport between interviewee and the interviewer. A diagram illustrating Otley and Ferreira's (2005) framework presented in Appendix G was briefly shown to the interviewees so that the participant could note that the interview would follow a semi-structured path. It is relevant to note that the researcher was an employee of the targeted MNC; thus the protocol adopted for the interviews had to be explicit so that participants were clear that they needed to provide detail to their responses and no assumptions were to be made.

Each of the ten participants in the fifteen interviews gave permission to record the interviews. The key advantage of using transcripts is that they allow much more of the information revealed in the interview to be accurately captured. For this research some note taking was also done to emphasis certain aspects of the interview which were observed and deemed relevant to the research. Once the interviews were transcribed, a cross-reference was done with the notes taken to ensure all aspects of the discussion were captured. Given the security that the interviews were being recorded, it did release the interviewer to reflect more on understanding what was being said within the interview and thereby ask follow-up questions. Where the interviewee response was unclear, the

interviewer attempted to verify the information immediately thus increasing the validity of the data. Appendix E outlines the dates of the interviews and participant roles within the case organisation.

4.9.4 Document analysis

Within the case study in addition to the interviews the researcher obtained access to internal documentation as part of the qualitative data collection phase. Appendix H presents a list of the documents that were used during this research. The case organisation provided access to these internal documents and processes which were particularly useful to the research.

4.9.5 Analysis of phase two

In an attempt to structure the analysis process for the interviews the researcher created a framework upon which to assist the analysis process. The amalgamated mapping document had each participant named on the Y-axis and each question detailed on the X-axis with responses detailed under each question and respondent. This visual tool facilitated a detailed analysis of responses as each response had to be summarised in order for it to be put on the mapping document. It also provided a consolidated summary to identify any commonalities among respondents or significant variances. This was a manual process as it was perceived that given the volume of data collected it would facilitate more accessible options for analysis than purely recording data on spreadsheets and software. When analysing each question or area of discussion a quick reference to other answers was easily obtained. This process also ensured that the researcher became very familiar with the content of the transcripts and an attempt was then made to identify the key themes from the data at an early stage. For this study data analysis was done to a degree in parallel with the data collection. In the course of this research, data analysis presented the opportunity to review relevant documentation that participants referred to and the researcher was able to more clearly articulate the concepts that arose during the interviews to participants given feedback from other participants.

There are two main methods of analysing qualitative data are content analysis and grounded theory. Content analysis involves turning the information into numbers by measuring frequency. Grounded theory uses the researchers feel and intuition to produce themes and patterns from the information (Strauss and Corbon, 1990). This study adopted some elements of content analysis in terms of noting the frequency or infrequency of particular themes that emerged purely from the data itself but the approach was individualistic while using the qualitative analysis principles advocated in the literature.

Analysis of the internal documentation included a thorough review and summarisation of each document or process. Use of internal documentation did not need guidance or assistance from any specific participants within the case organisation and thus was unobtrusive to participants.

4.10 Summary

This chapter outlined the research process, the justification and value of using the chosen methodologies as well as describing the actual process used during this study. It has highlighted pertinent issues within management and social research and outlined the debate within the ontological, epistemology and methodological areas.

The researcher's philosophical perspective was set together with associated methodological implications. The chapter describes the reasons why the researcher adopted a methodological pluralist approach within the context of the study. The two phases of the research were described in detail, along with justification as to why a multi-method approach was chosen to meet the research objectives. The first phase of the study examined KM in selected MNC operating in Ireland via a questionnaire, gaining an insight into the prevalence of KMAs and performance management controls. The second phase of the study involved a single case study and utilised a series of semi-structured interviews and a review of internal documentation. The interviews were used to ascertain in some depth the perceptions of some of the employees within the case organisation in relation to KM and performance management. The documentation provided a mechanism to cross-reference findings and provided a valuable source of data collection. The findings of both the questionnaire and the case study are presented in the following chapters.

Chapter 5: Presentation of Phase One Findings

5.1 Introduction

'It is by doubting that we come to investigate, and by investigating that we recognize the truth.'

Peter Abelard (1079-1142)

In this chapter the results from the first data collection phase are presented across a number of thematic areas; workforce and organisation profile, external considerations, knowledge profile of the firm and performance management and control. The focus of the first phase of data collection was: to explore the nature and extent of KM in MNCs located in Ireland; to identify types of KM in use; to explore mechanisms used to manage corporate knowledge and; to investigate links with performance management activities. Phase one of this study also played a significant role in identifying issues of significance that fed into phase two methodological design and refinement of objectives.

This chapter is divided into six sections; initially a brief analysis of the response rate and thematic areas; workforce and organisation profile; knowledge profile; external factors and; implications of the findings from the questionnaire are presented.

5.2 Analysis of response rate and thematic areas

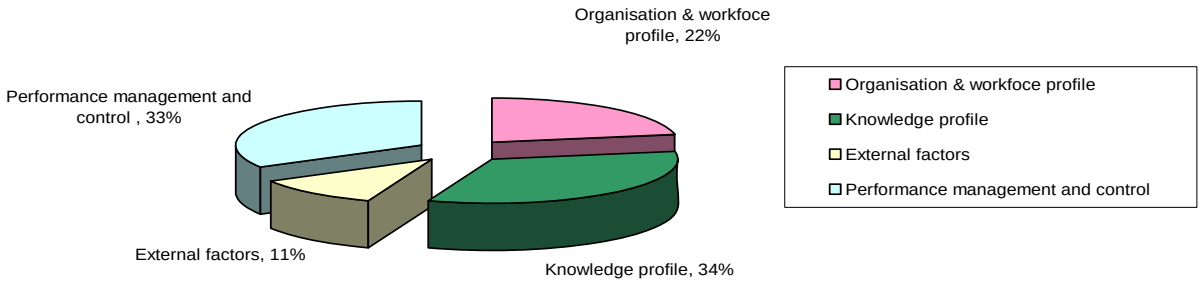
Table 5.1 below illustrates the responses, initially there were six automated replies received where the email address used was invalid or no longer in use. The final valid responses used were 27.6% of the initial questionnaires distributed.

Table 5.1: Response analysis

	Number of questionnaires	%
Total questionnaires distributed	86	100%
Undeliverable (emails returned)	6	7%
Responses	27	31%
Unusable responses (duplicate, incomplete)	3	3.40%
Valid responses	24	27.6%

The findings are presented in line with the thematic structure of the questionnaire except that the first two headings, workforce and organisation profile (section A and B), were amalgamated as they collected peripheral data about the respondents and external considerations. Figure 5.1 illustrates the thematic areas explored during phase one, the weighting corresponds to the number of questions asked within that thematic area. This presents a visual understanding of the balance of investigation within phase one.

Figure 5.1: Weighting of the main themes investigated during phase one

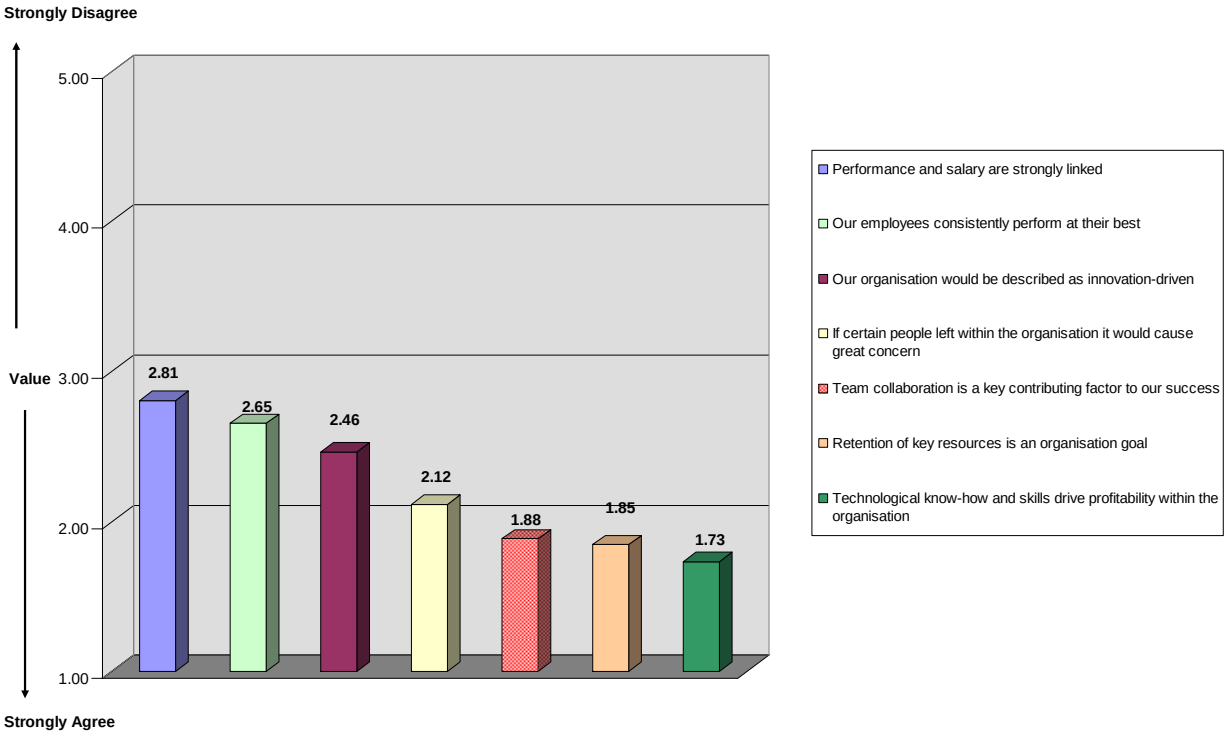


5.3 Workforce and organisation profile

Initially the questionnaire investigated whether or not the participant had an interest in KM or if their current responsibilities included KMAs. 76% of respondents noted that KM was an area of interest for them at the moment and 73% expressed that they have responsibilities that involve managing knowledge. This could suggest that KM is applicable to the manufacturing industry as 54% of respondents were from manufacturing organisations. The organisational profile section posed a number of statements that

reflected knowledge firm characteristics in the literature and required the participant to give their opinion on the statements (figure 5.2).

Figure 5.2: Knowledge firm characteristics



Using Likert scales, where respondents perceived that they strongly agreed with the statement, a rating of 1 was required, where they strongly disagreed a rating of 5 was required. This section gives a high level overview of the perceptions of the respondents in relation to KM. All participants were managers or Team Leads. The majority of organisations (65%) strongly agreed with the statement that if certain people left the organisation it would be a great concern. Newell et al. (2003) interpreted KM initiatives as a response to the effects of BPR and the loss of expert employees. Further, in a subsequent question, retention of employees was rated as six out of ten as a concern for management; thus it did not rate very highly as an area of concern. This suggests that there is a degree of dependency on employees but it is not a concern for managers. Responses indicated that there was little indication that employees were consistently performing at their best as there was marginal disagreement at a score of 2.65 out of 5. This suggests that

respondents were unsure whether employees were performing at their best or not and could potentially highlight a weakness in managing their performance.

Respondents did not rate their organisation as innovation driven (average was 2.46 out of 5). Findings from the literature suggest the importance of innovation (CIMA, 2001; Lynn, 1998); this has the potential to impact a firm's competitiveness. This suggests a lack of knowledge creation within an organisation. The degree to which individual performance and salary are linked together was not indicated by respondents as strong (average 2.81 out of 5). Further insights into how the respondents feel about managing performance through non-financial means and how performance is rewarded and recognised within the organisation may be fruitful during phase two which gives an opportunity to ask open ended questions about employee rewards.

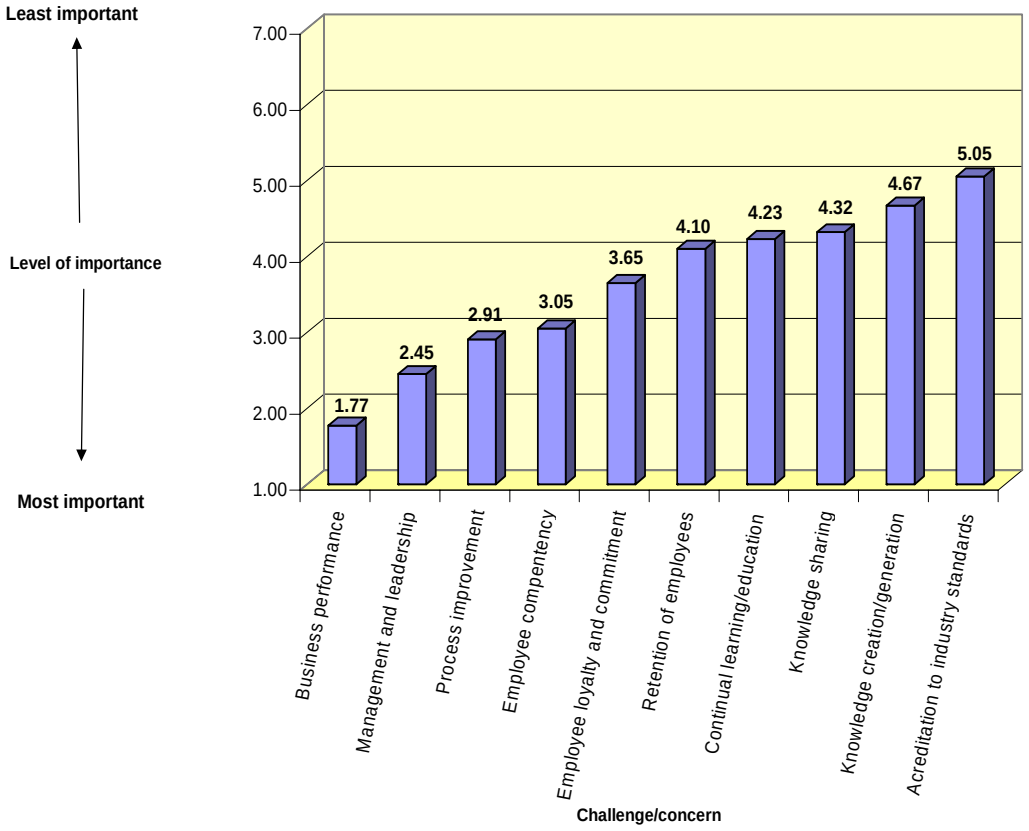
The statement that respondents agreed with most within this section was that technological know-how and skills drive profitability within the organisation. This is interesting as the literature suggests that technology can assist the management of existing knowledge rather than encourage creation of 'new' knowledge (Stankeviciute, 2002). Coombs' and Hull (1998) suggest that technology is but an enabler of KM and that the focus should be on KMP's. It was found that team collaboration rated strongly as a key contributing factor of success.

There are implications evident for the design of phase two interview guides. Keeler (2000) and Mayo (1998) argue that the personal reward systems must support the culture of sharing knowledge whereas the findings suggest that the link between reward and performance is not particularly strong. At the next stage of data collection mechanisms used for team collaboration are examined.

5.3.1 Organisational concerns and challenges

In this section of the survey ten areas of concern or challenges were presented to participants to rank in order of importance to the organisation. As illustrated in figure 5.3, the findings suggest that business performance is the main concern among respondents, whereas accreditation with external standards is the least important attribute.

Figure 5.3: Ranking of organisational concerns and challenges



5.3.1.1 Most important managerial concerns

Subsequent to business performance; management and leadership, process improvement and employee competency all rate highly on the scale of importance. This suggests that there may be some inclination toward ranking the importance of more traditional or tangible variables as high in importance. Managers may perhaps be less inclined to attribute importance to concepts that they are not overly familiar with such as intangible variables.

5.3.1.2 Least important managerial concerns

Surprisingly knowledge activities such as knowledge sharing, knowledge creation, and continual learning were not in the top four areas for concern. Subsequent questions in the survey explored if KMAs were actively pursued within the target organisations. Respondents may already be satisfied with the level of organisational activity in these areas and their effectiveness thus they are merely acknowledging that they are not a concern. However, the results may also indicate that respondents considered them unproven management innovations that do not require attention or specific action.

5.3.1.3 Links to other areas

Findings between team collaboration (figure 5.2) and knowledge sharing (figure 5.3) were inconsistent. Team collaboration was perceived as a key contributing factor to success was rated as high whereas knowledge sharing within the organisation and was not rated highly as a concern or challenge. Perhaps respondents perceive knowledge sharing as already well managed and thus not an area for concern and that it is assisting team collaboration.

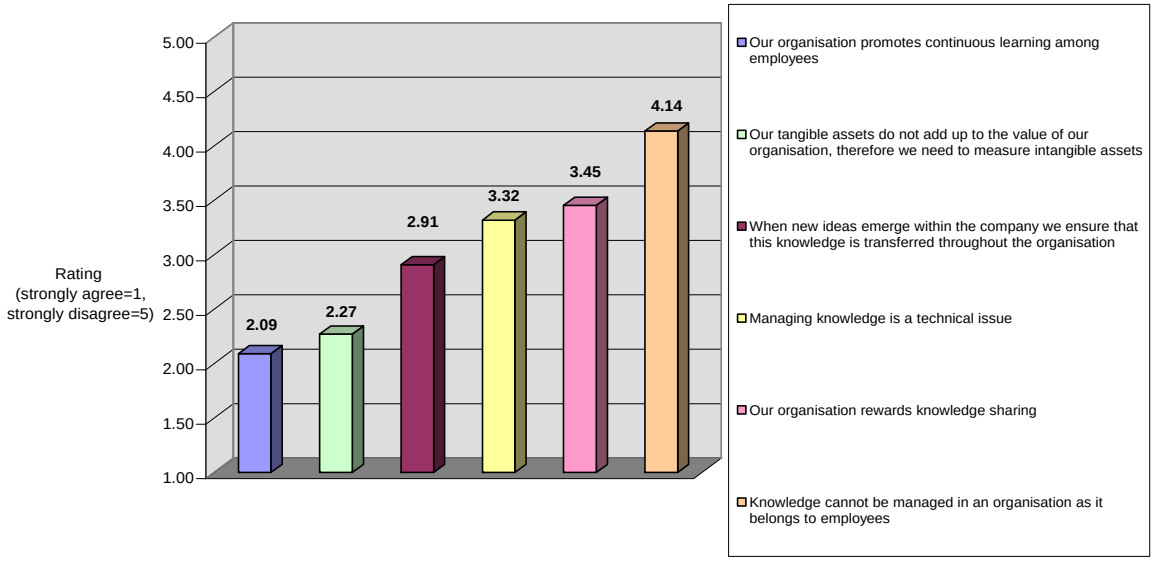
5.3.1.4 Links to case study

How business performance is managed will be explored further by investigating the organisation's performance management processes and mechanisms employed. Also the qualitative data collection may uncover why knowledge sharing, knowledge creation, and continual learning were not rated as important.

5.4 Knowledge profile

This section of the questionnaire focuses specifically on managing knowledge, the themes examined include: perceptions of KM, KMAs and mechanisms used within the organisation. Figure 5.4 displays the results from this section.

Figure 5.4: Perceptions of knowledge within MNCs located in Ireland



Findings from this survey show that 71% of respondents observed that measuring intangible assets is necessary. This supports the literature that notes that KM identifies the measurable variables and the process by which this measurement can be assessed (Wiig, 1997b). There was strong opposition to the statement that knowledge belongs to an employee and not to the organisation as 79% of respondents strongly disagreed. This could imply that the respondents were taking an organisational perspective in that all assets are owned by the organisation. It also suggests that the respondents are confident that knowledge can be managed by an organisation and thus employees would not be considered a barrier to managing organisational knowledge. The literature contrasts with this view and contends that transferring tacit (an individual's) knowledge into explicit knowledge, where it can be codified and converted into an organisational asset, is still at the discretion of the employee (Nonaka and Takeuchi, 1995).

Specifically with regard to knowledge creation (the emergence of new ideas) and its subsequent dissemination throughout the organisation, 25% of respondents agreed that knowledge was being disseminated throughout the organisation and 21% indicated that it was not disseminated. A large proportion of the respondents (54%) did not agree or disagree; this suggests that they are unsure if new knowledge is transferred throughout the

organisation. Subsequent findings show that 50% of respondents note that their organisation rewards knowledge sharing, 17% do not reward knowledge sharing and 33% were unsure. This could indicate that reward is being used as a mechanism to boost knowledge sharing activities.

The statement that managing knowledge is a purely technical activity was rejected with 50% of respondents asserting that it is not a technical issue, 33% were unsure and 17% agreeing that it is a technical issue. This suggests that respondents consider technology as a contributing factor to managing knowledge but not a full solution with respondents leaning toward non-technical. This is consistent with the literature (Stankeviciute, 2002; Warren 1999; Bassi 1997). The high proportion of participants that expressed uncertainty (33%) may be related to unfamiliarity with KM concepts. Respondents perceived that their organisations promoted continuous learning among employees (67% agreed that the organisation did promote continuous learning with just 4% disagreeing). Bititci et al. (1997) argue that a learning culture improves an organisation's ability to operate in a dynamic environment, thus this finding is consistent with the 'New Economy' and dynamic environment that organisations are operating in.

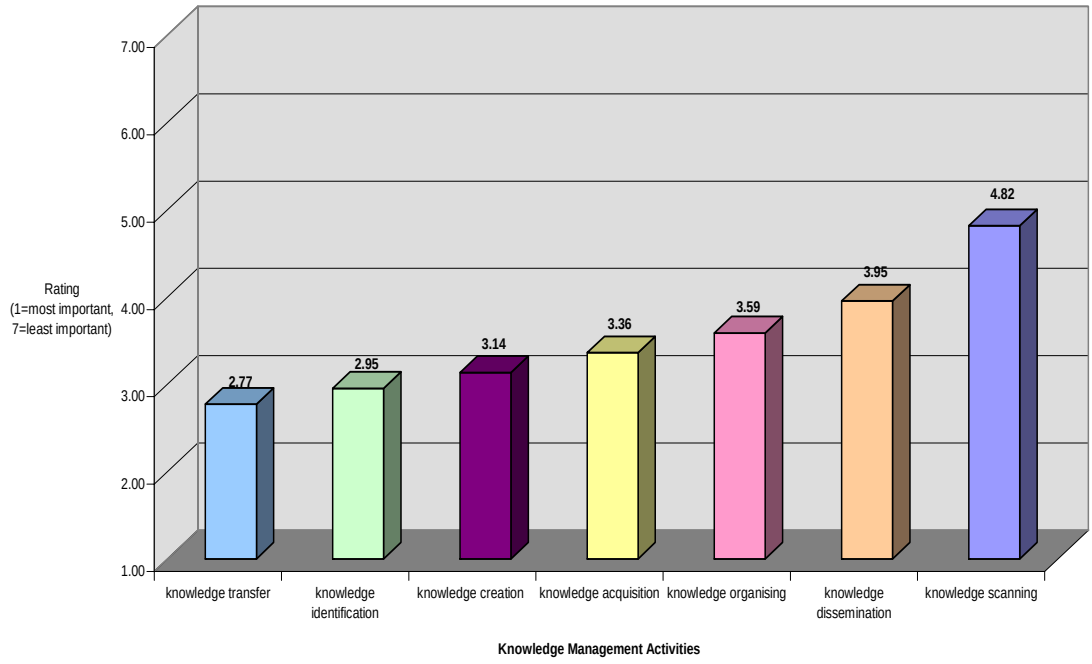
Earlier in the questionnaire the data revealed that continuous learning was not in the top 40% for management concern or challenges, again suggesting that continuous learning is being managed within the respondent's expectations. Perhaps the aforementioned research and development that 63% of respondent organisations are partaking in is an element of their continuous learning initiatives. Continuous learning could be classified as a KMA or KMP, for example as a knowledge scanning process; it has the potential to be used as a mechanism to ensure that knowledge assets are renewed continually. Wiig (1997b) argues that continuous renewal is the only way knowledge assets can contribute to an enterprise's success and viability.

5.4.1 Knowledge management activities

Within the knowledge profile section of the questionnaire participants were asked to rank different KMAs in order of importance in an attempt to identify what respondents perceive as important KMAs and other KMAs that are perceived as less important. The

questionnaire utilised Stankeviciute's (2002) categorisation of KMAs: knowledge identification, scanning, organising, dissemination, transfer, acquisition and creation. Definitions were provided (Appendix D) to ensure that the participants understood what was meant by each term. Figure 5.5 illustrates the findings.

Figure 5.5: Perceptions of the importance of KMAs



5.4.1.1 KMA perceived most important

Knowledge transfer and knowledge identification were rated as of the highest importance to respondents from the results. Findings show that knowledge creation was ranked as the third most important KMA; knowledge creation can be linked to innovation and new product ideas and thus competitive advantage to an organisation. Knowledge acquisition was rated as fourth important. It is not clear during this phase of data collection which KMA would be considered critical to an organisation.

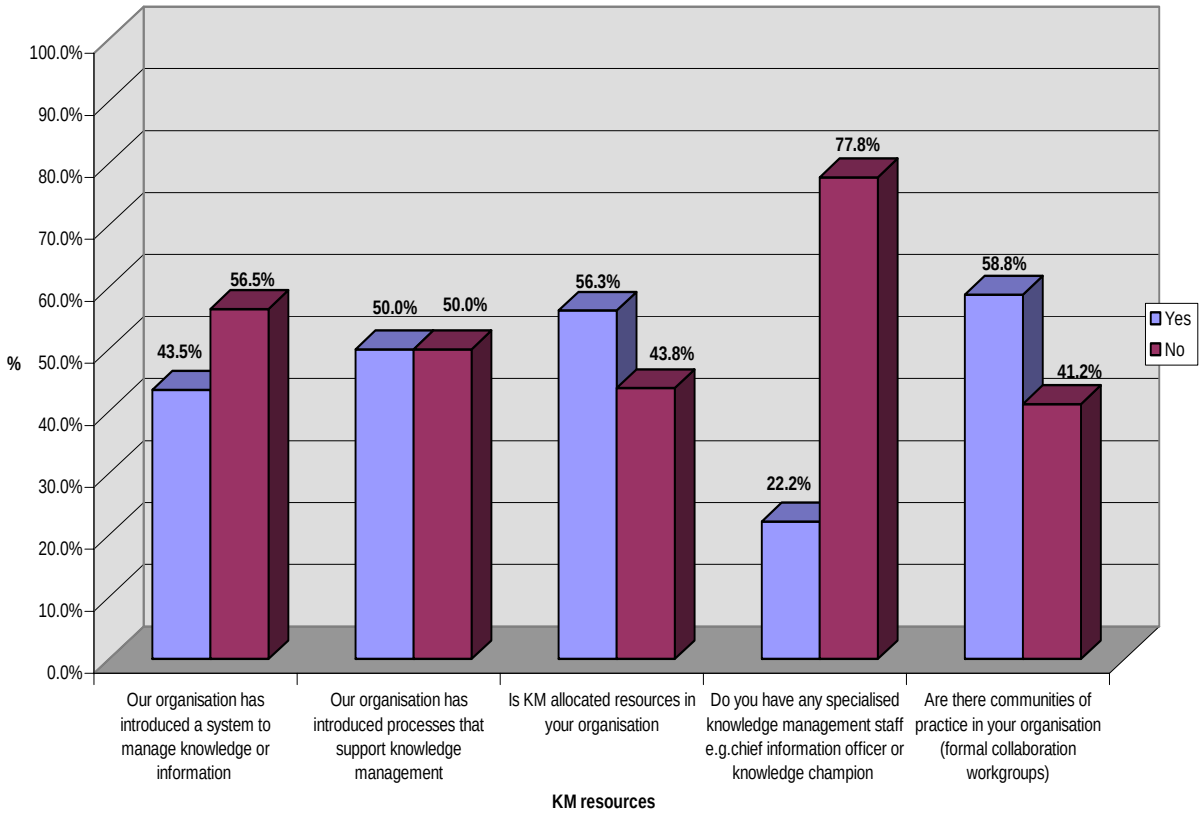
5.4.1.2 KMA perceived least important

Knowledge scanning achieved the overall lowest average 4.82 rating with knowledge dissemination close behind at 3.95. Knowledge organising was rated at 3.59; this could include technical and manual solutions to organise and retrieve knowledge. These tasks could be interpreted as time consuming where the output from these activities may not be as tangible or their value as apparent as other KMAs.

5.4.1.3 Types of KM resources employed

The last question within the knowledge profile section investigated the types of system or processes utilised by the targeted organisations to manage or support knowledge activities (figure 5.6).

Figure 5.6: Knowledge systems or processes employed by organisations



43.5% have introduced a system to manage knowledge or information; however the questionnaire did not differentiate if the system employed was a manual or technical solution. Findings show that 77.8% of organisations involved in the questionnaire did not employ specific KM specialised staff. Potentially this could be attributed to employee role titles rather than specific tasks undertaken. Communities of practice were common across 58.8% of respondents and KM was allocated resources of some type within 56.3% of the results. Overall, the findings are leaning in favour of the introduction of KM processes and systems which is consistent with the assumptions of the study taken from the knowledge-centric view of the firm (Grant, 1997; Roberts, 1999) that knowledge is a valuable asset and warrants effective management. Examples of how knowledge is transferred and the source and beneficiary of this knowledge are dealt with in phase two.

5.5 External factors

Results from the questionnaire identified that organisations regularly monitor research and development within their industry. This suggests that the majority of organisations are focused on finding out market requirements and that organisations have recognised that research and development provides proximity to market proposition.

Figure 5.7: Respondent's perceptions of external influencing factors

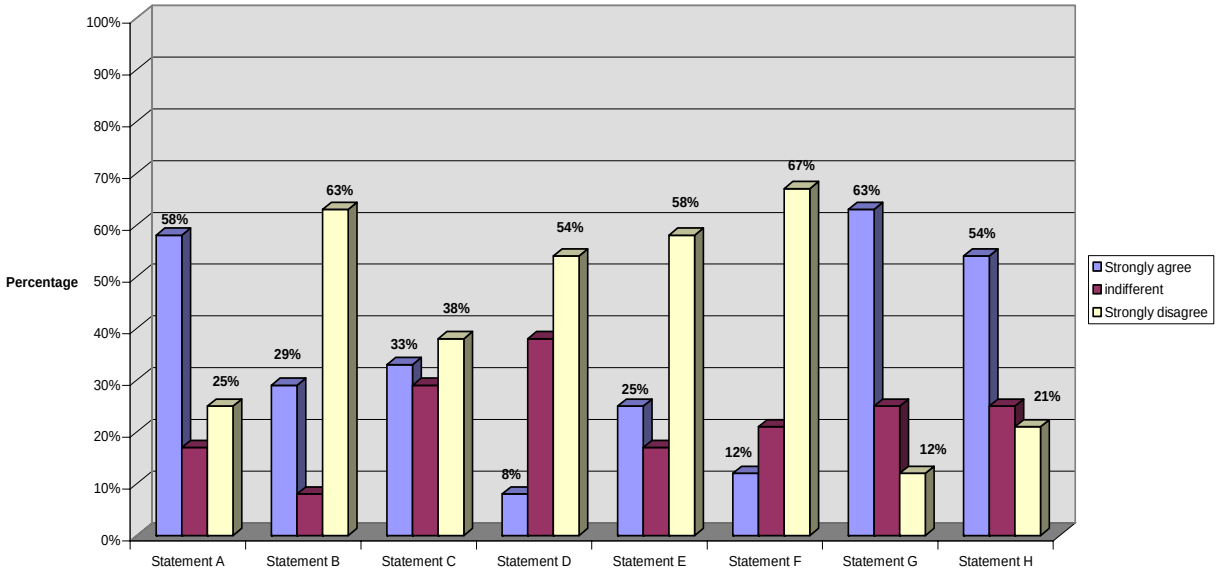


Table 5.2: External factors

Statement	External Factor
A	Customer feedback is shared throughout the organisation
B	Our customers are primarily internal e.g. parent companies
C	We often introduce new ideas but find that our customer do not want it
D	Our competitors drive our objectives
E	Collaboration with educational institutions is part of our strategy
F	Government support plays a major role in our organisation
G	The organisation regularly monitors research and development within our industry
H	Our suppliers are key contributing factor to our competitive advantage

Porter (1985) argues that external as well as internal factors need to be paramount in consideration when striving for competitive advantage. Collaboration with educational institutions and Government support were not deemed highly important; perhaps organisations provide for R and D within their own organisations and thus do not see a requirement for collaboration with these external parties. Government reports (Forfás, 2001; Technology Foresight Review Report, 2000) forecast skill shortages and competencies in the near future but these shortages may be sourced from a growing European Union. Ireland historically does not score well on R and D and the private sector in particular. This was highlighted in the O'Driscoll Report which recommended a strong higher education sector, up-skilling the existing workforce, expanding the workforce with the emphasis on skill-based immigration (Clark, 2004).

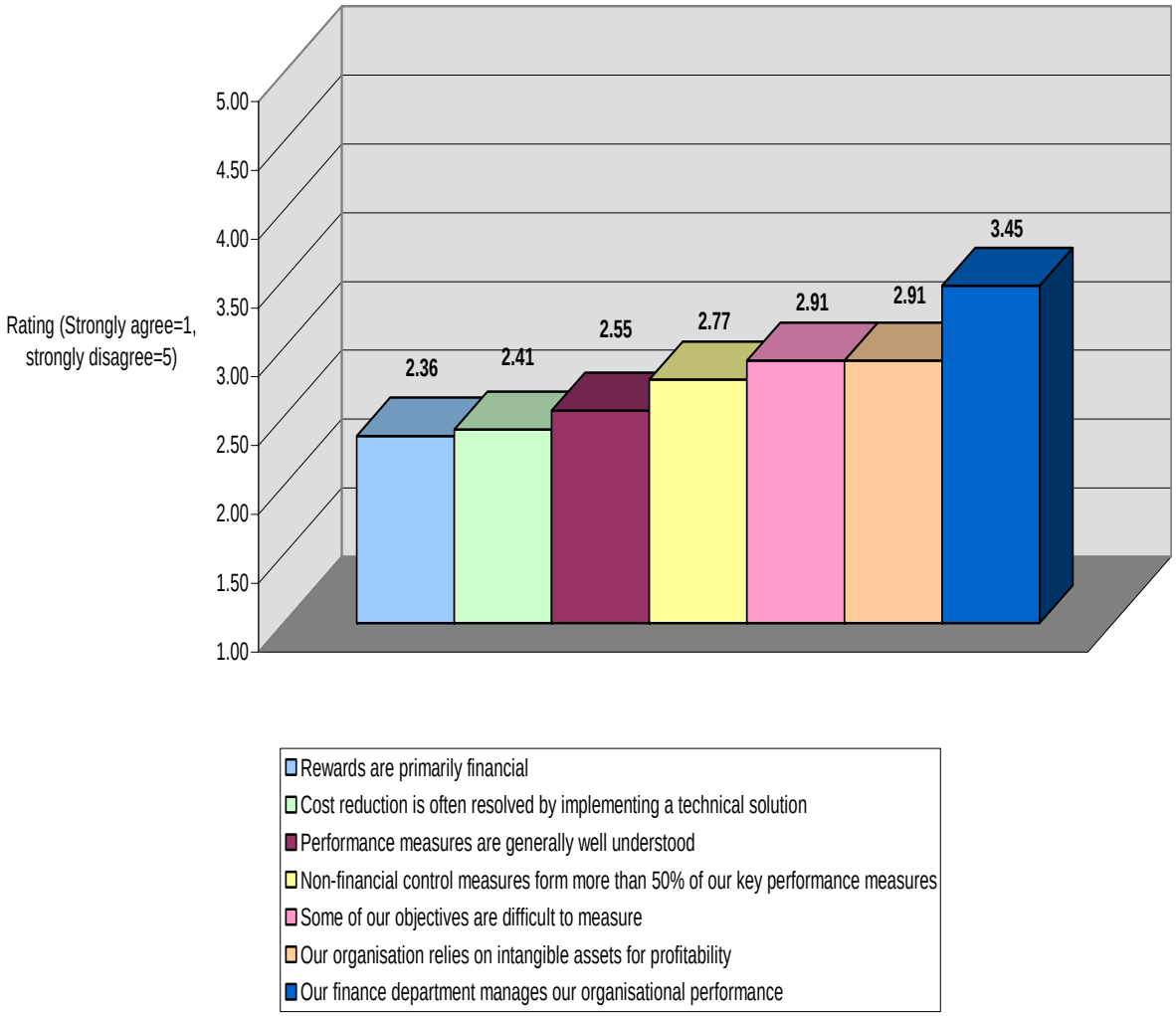
As illustrated in figure 5.7, 25% of respondents reported that customer feedback is not shared throughout the organisation. Customer feedback could include knowledge about customer perceptions, customer beliefs and customer values. By not disseminating this knowledge throughout the organisation it restricts its value as an organisational asset and this could be interpreted as being a barrier to meeting customer expectations particularly where service industries are concerned.

The literature for performance management (Otley, 1999; Simons, 1995; Otley and Ferreira, 2005) argues that feedback is a critical component of monitoring performance. As shown in figure 5.7 above, 33% of respondents perceived that new ideas are often introduced and subsequently not implemented due to customer constraints. This suggests that there could be some barriers to introducing new ideas if in one third of the cases they are rejected by customers, or that the customer attitude to risk is conservative and this is not accurately perceived by the organisation.

5.6 Performance management and control mechanisms

The penultimate section of the questionnaire focuses on performance management and control mechanisms adopted by organisations. Performance is often monitored and managed using commonly accepted tools and frameworks (Anthony and Govindarajan, 1998; Kaplan and Norton, 1996; Otley, 1999; Simons, 1995) linked to key performance indicators. This section explores the mechanisms used and difficulties encountered by the targeted organisations. The results from the questionnaire are shown in Figure 5.8 below.

Figure 5.8: Ratings for performance management and control mechanisms

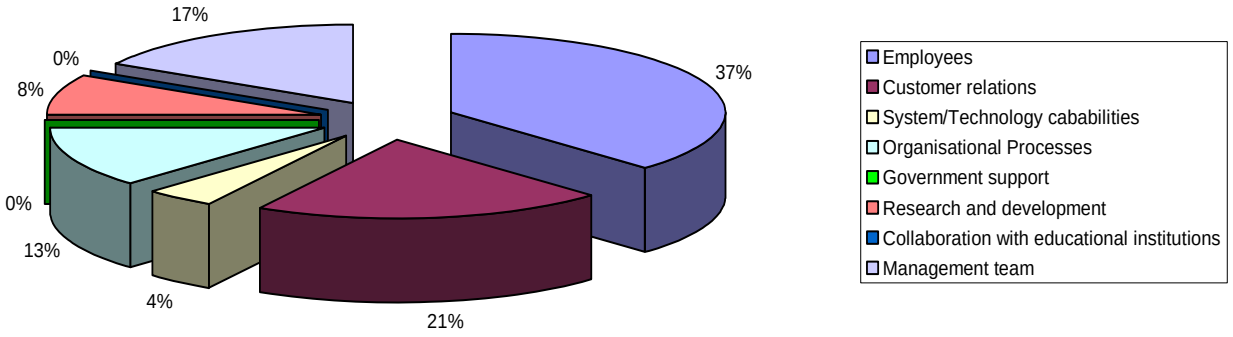


These findings show that 46% of respondents perceive that some objectives are difficult to measure, thus 54% perceive that they are measuring objectives without any difficulties. It is unclear if progress towards these objectives is being measured. This is significant as potentially there may be existing mechanisms that sufficiently meet the requirements for measuring objectives effectively. An overwhelming 71% of respondents strongly agreed that rewards were primarily financial. It was clear from the findings that only 8% perceived that the finance department were responsible for managing organisational performance. However, 54% of respondents were unsure if the finance department was responsible for organisational performance. This suggests that there may be some

uncertainty about links between the finance department and performance management. This is consistent with the literature where the finance departments function as gatekeepers of performance and management is diminishing (Collier et al., 2003; Johnson and Kaplan, 1991).

The next section asked respondents to rank their perceived importance of a number of performance drivers commonly labelled Key Performance Indicators (KPIs) or Key Success Factors (KSFs). Figure 5.9 illustrates the results from this ranking question.

Figure 5.9: Performance drivers



5.6.1.1 Top three performance drivers

Employees, customer relations and management team rated as the top three performance drivers for the targeted organisations. The findings indicate that employees are the main drivers of performance within organisations as 37% perceived employees as most important within the given list. The importance of customer relations was rated as being

the secondary performance driver for 21% of organisations within the study, contrary to the fact that 25% of organisations did not share customer feedback throughout the organisation as reported in a previous section of the questionnaire. The management team was rated as the highest performance driver for 17% of organisations within this study.

5.6.1.2 Other performance drivers

Significantly just 8% of respondents perceived research and development as their most significant performance driver. This suggests that innovation and new product creation were not rated as particularly important. Government support and collaboration with educational institutions were rated as least important; this suggests that Government policy and supporting public organisations are not perceived as driving the performance of the organisations that participated in the questionnaire.

5.6.1.3 Type of performance management system employed

The final question in the performance management section aimed to identify the type of performance management system used by the organisation. Table 5.3 details the results.

Table 5.3: Types of performance management systems adopted

Indicate which statement describes your performance management system	% companies
Entirely based on legal requirements (financial statements)	4%
Based on an Industry standard e.g. ISO certification	13%
Based on an industry model/framework but tailored specifically for our organisations needs	29%
Based on a generally accepted model e.g. balanced scorecard	29%
Designed in-house or bespoke system	25%

The findings show that there is no common performance system among the respondents, however, the majority (58%) of organisations have adopted an industry standard or a generally accepted model such as a balance scorecard and 25% have designed their own system.

5.7 Implications of findings for phase two

Phase one of this study played a role in identifying issues of significance that fed into the phase two methodological design and refinement of objectives. A large percentage of respondents indicated that they had responsibilities for managing knowledge. When taking this into consideration within the context that the respondents to the questionnaire varied in the level or position that they held in their organisation, it was perceived that the it may be useful to include the Team Lead level within the interviews for phase two.

Team collaboration was found to be a KSF within the questionnaire; thus when designing the interview guide for phase two, it included a question on non-financial KSFs. The interview guide also included collaboration among employees as a specific question and asked interviewees to describe the mechanisms used to collaborate.

The results from the questionnaire indicated that the majority of respondents would not consider their organisation as innovation driven; this was regarded as unusual as many of the targeted organisations could be regarded as knowledge-intensive. The literature describes knowledge creation as synonymous with innovation; the interview guide took this input from the questionnaire into consideration and asked the interviewees if there were any specific knowledge activities in relation to knowledge creation at the case organisation. It also queried the type of feed-forward information flows and if they were used to generate new ideas and to recreate strategies and plans.

The survey showed that performance and salary were not linked within the organisations targeted; the interview guide for the phase two data collection looked at other methods for rewarding performance, and explored the evaluation process used and respondents' perceptions of its objectiveness. Keeler (2000) and Mayo (1998) argue that the personal reward systems must support the culture of sharing knowledge whereas the findings

suggest that the link between reward and performance is not particularly strong. At the next stage of data collection mechanisms used for team collaboration are examined further.

Findings from phase one proposed that 50% of organisations reward knowledge sharing. The KSFs, targets and performance evaluation sections of the interview guide investigated if there were specific measures, targets and evaluation process for specific knowledge activities. It seemed appropriate to investigate during the interviews how and if knowledge sharing was rewarded at the case organisation.

The questionnaire was unable to delve deeply into the processes and tools used to manage knowledge even though it did provide some basic information in relation to mechanisms such as objectives and evaluation results. Thus a greater emphasis was employed during the semi-structured interviews to describe these activities in detail.

During phase two the investigation of performance management was widened to include penalties as well as rewards. There is some sensitivity associated with disclosing information about KSFs due to the confidentiality of critical business information. Therefore, it seemed appropriate to investigate this further within the interviews during phase two where confidentiality was further assured.

5.8 Summary

The survey provided valuable information as to what was happening within organisations and perceptions of managers dealing with knowledge in the knowledge economy. The results obtained were examined under the following headings: knowledge profile, performance mechanisms and external factors. These perspectives provide an insight into KM practices in MNCs in Ireland. The focus of the first phase of data collection was to explore the nature of KM in Irish multi-national organisations, to identify types of KMP's in use, explore mechanisms used to manage knowledge and also to investigate performance management activities. Phase one findings yielded a focussed direction for phase two, the case study, which is examined in detail in the next chapter.

The survey suggests that MNCs in Ireland are actively pursuing KMAs. There was a clear indication that managing knowledge is a ubiquitous activity that is perceived as relevant to the majority of the respondents' responsibilities. 73% of questionnaire respondents have responsibilities that involve managing knowledge and similarly 76% expressed that KM is an area of interest for them.

In relation to questions focussed on KMAs, 50% indicated that managing knowledge is not a technical issue, 17% think it is a technical issue and 33% are unsure. 54% of respondents expressed that ideas are not disseminated throughout the organisation. Half of the respondents reward knowledge sharing, 33% do not know if they reward knowledge sharing or not and 17% do not reward knowledge sharing. A high proportion of respondents, 67%, promote continuous learning whereas just 4% do not promote continuous learning. A quarter of respondents ranked knowledge transfer and knowledge identification as the most important KMAs with 17% ranking knowledge creation as most important. Collaboration with Government and education was not deemed important. The majority of respondents, 79%, perceive that knowledge belongs to the organisation and not the employee. 25% of respondents strongly disagreed that customer feedback was shared throughout the organisation. The questionnaire indicated that KMA is prevalent in MNCs operating in Ireland, it does not lend itself to describing how or why certain activities are pursued; these questions were facilitated by semi-structured interviews during phase two.

The questionnaire provided some data as to the type of mechanisms utilised to manage knowledge. Retention of employees is an organisational goal in the majority of organisations however it was not categorised as a main area of concern for managers, it was rated as six out of ten as a management challenge. However, the majority of respondents are concerned about specific people leaving the organisation which highlights an organisational dependency on employees.

There was little cohesion identified between managing knowledge and managing performance at the targeted organisations. Salary and performance were not strongly linked. Respondents expressed that rewards are generally financial and they perceived that employees do not constantly perform at their best. Business performance was identified as the main concern of management, followed by management and leadership and subsequently process improvement. KMAs such as knowledge sharing and knowledge creation were rated low as areas that concern management. Respondents did not describe themselves as innovation driven but team collaboration was identified as a KSF. 71% of respondents expressed agreed that measuring intangibles is necessary. 63% or organisations involved do RandD within their industry

Phase two provides an opportunity to delve deeper into KMAs, mechanisms and tools utilised by the case organisation and management challenges. While phase one was useful in providing some data on KMAs phase two can overcome limitations of phase one.

Chapter 6: Presentation of Phase Two Findings

6.1 Introduction

'We never stop investigating. We are never satisfied that we know enough to get by. Every question we answer leads on to another question. This has become the greatest survival trick of our species.' Desmond Morris

This chapter focuses on phase two of the research, which was qualitative in nature; following on from a questionnaire in phase one. Initially this chapter examines relevant internal documentation (Appendix H). Then using the data collected from a series of semi-formal interviews (Appendix E) within the targeted multi-national organisation it assesses the case organisation performance management system under a number of headings as outlined in the interview guide (Appendix G) with some additional headings that emerged from the interviews.

Ultimately it is the case study that investigates the types of KMAs, mechanisms, tools and processes employed at the case organisation to manage knowledge. It simultaneously explores how performance is managed at the case organisation and evaluates these management techniques and challenges. It then presents the emerging themes from the data collection using dimensions of Otley and Ferreira's (2005) extended performance management framework.

6.2 Company profile

The case study organisation is a financial services organisation headquartered in North America and operating in many markets around the world, including Canada, the United States, the United Kingdom, Hong Kong, the Philippines, Japan, Indonesia, India, China and Bermuda. It offers a diverse range of financial products and services. In 2006, the case organisation recorded a global employee base of around 20,730. As at December 31, 2005, the group of companies associated with the case organisation had total assets under management of €271 billion and total revenue of €15.3 billion. The corporate group mission is to provide lifetime financial security and its vision is to be an international

leader in wealth management and protection. The case organisation has its own mission and vision separate to the parent organisation. This is presented in figure 6.1.

Figure 6.1: Extract from vision and mission statement

Our Vision - what we want to be

To be an International leader in wealth management and protection. We aim to be the leader in the markets in which we choose to compete. We will accomplish this by standing out on the international stage as an organisation whose operational excellence and integrity are second to none. We will prove our excellence in everything we do: by designing, selecting and distributing superior products and services, by focusing on our customers and by measured growth through strategic acquisitions and judicious expansion.

Our Mission - To provide lifetime financial security

We are in business to help people achieve and maintain the peace of mind that comes from having in place sound financial solutions that will evolve and adapt to their changing needs throughout their lifetimes. We accomplish this mission by providing innovative, customer-focused protection and wealth management products and services to individuals directly, or as members of the savings, pension and retirement plans we offer through their employers.

The Irish subsidiary was set up in 1998 in response to the shortage and cost of qualified human resources in North America. The parent company adopted a strategy that set up a subsidiary in Ireland to hire resources in a timely manner to offer a range of IT and processing services at a price that offered cost savings (of approximately 30%) whilst allowing the case study organisation to financially break-even.

Until the late 1990s, Ireland was seen as a provider of low cost, high quality labour and many US companies moved activities here. However, the Euro has appreciated against the dollar in the last decade. Ireland has grown rapidly since then and has been

transformed into one of the wealthiest countries in Europe and the highest exporter of software in recent years (Enterprise Ireland, 2006). One consequence of this growth is an increased cost of human resources due to the shortage of skilled labour. In the past, whilst costs of labour were rising, the Euro was dropping against the dollar however now the dollar is weak which in turn has meant that fewer US companies are seeking to invest significantly in Ireland. New low cost countries such as India and China have become more competitive in some sectors. Within the case organisation the focus is starting to change from a 'lower' cost solution when compared with US cost base to the 'value add' that the case organisation provides to the parent company. Figure 6.2 illustrates the high level organisation structure at the case organisation; it shows the first two layers of the company hierarchy. There are approximately 340 employees at the case organisation, 50% of which are involved in software engineering, and would be considered knowledge workers; this is the targeted department within this study.

Figure 6.2: High level organisation structure at the case organisation

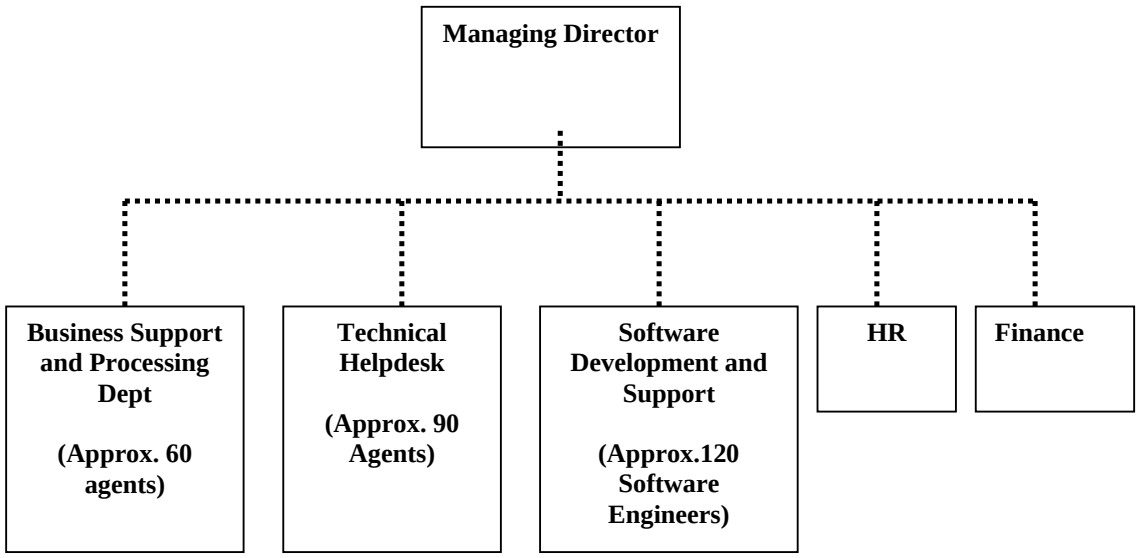
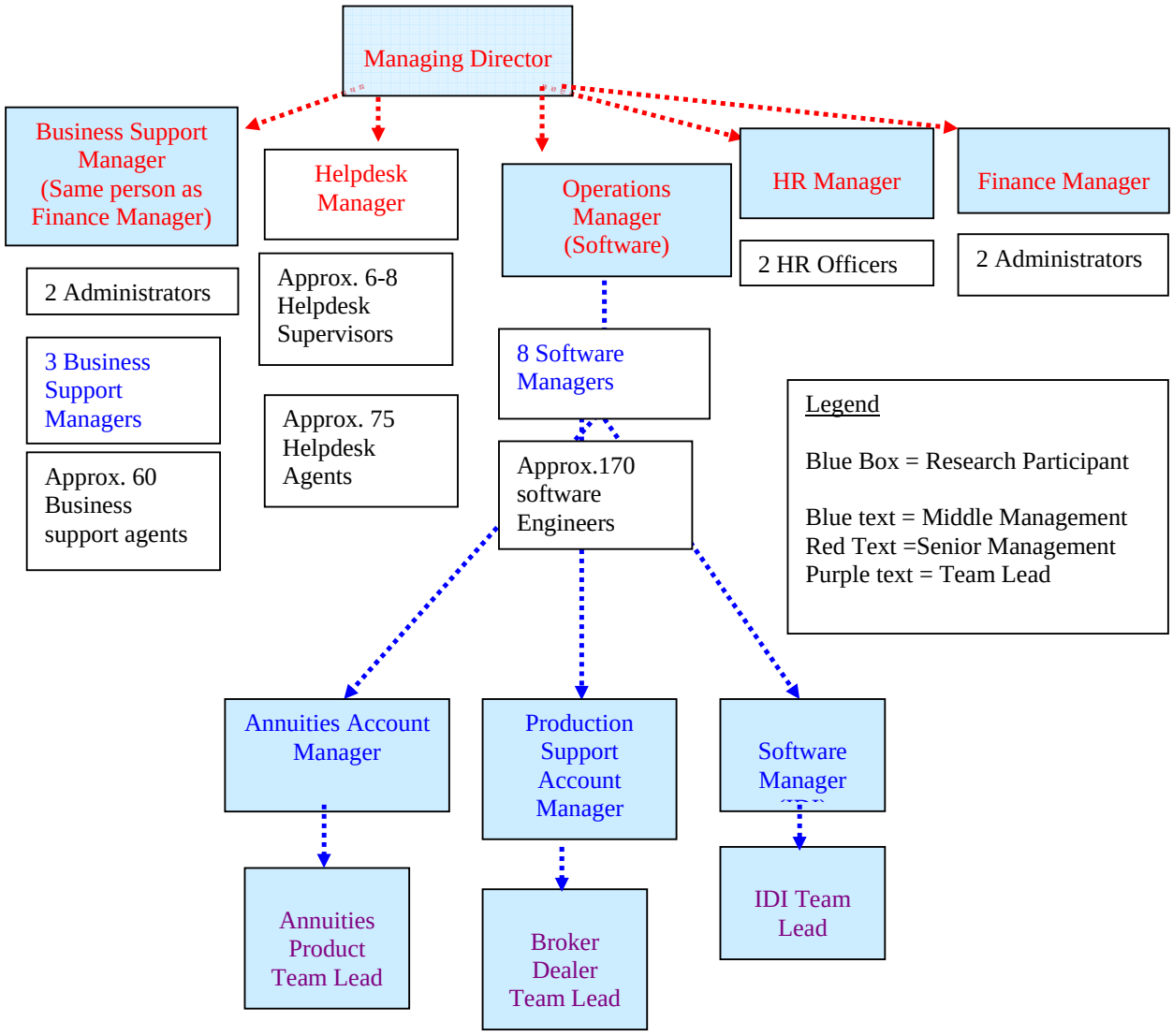


Figure 6.3 below presents a more detailed view of the organisation structure which details the departments and teams that the participants interviewed operated in. Senior

management, middle management and Team Leads were took part in the interviews; thus facilitating a multi-level sample of perceptions within the organisation.

Figure 6.3: Organisation chart

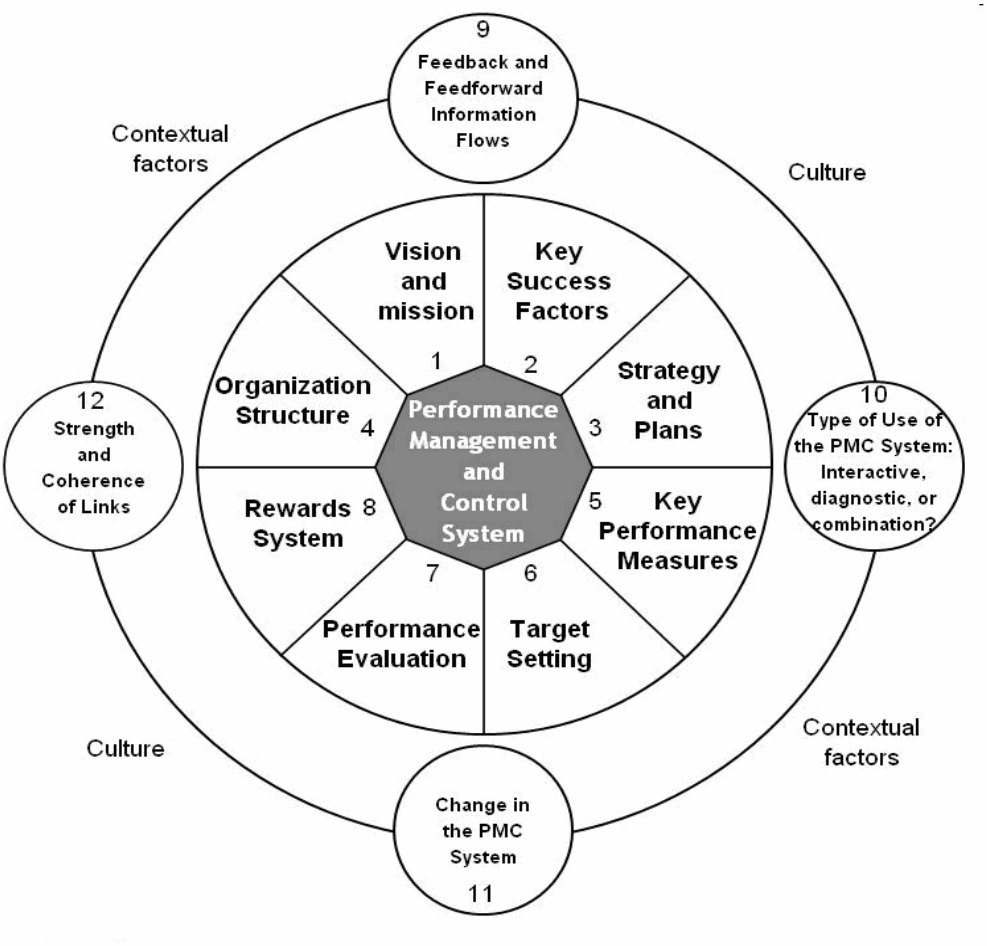


There were ten case study participants and a total of fifteen interviews. Appendix E outlines their respective roles and responsibilities within the case organisation.

6.3 Findings from review of internal process documentation

Within the case study in addition to the interviews the researcher obtained access to internal documentation as part of the qualitative data collection phase. The researcher used the research objectives, Otley and Ferreira framework (2005) and other literature to pinpoint the relevant documents as outlined in Appendix H. The documents and procedures were useful to determine how KM was documented within the case organisation. An advantage to the research was that the case organisation had both ISO and CMM accreditation; thus it was quite process-orientated and procedures were documented formally in many cases.

Figure 6.4: Otley and Ferreira's 12 Question framework



Source: Otley and Ferreira (2005)

6.3.1 Monthly and quarterly reports

The monthly and quarterly reports (Appendix H) were used to share information; this included knowledge transfer and dissemination of best practices and work methods. One of the slides from the quarterly presentation is illustrated below in figure 6.4; this describes infrastructure, security and business continuity process information that was presented at the quarterly meeting.

Figure 6.5: Extract from quarterly report- Q4 results, 2006

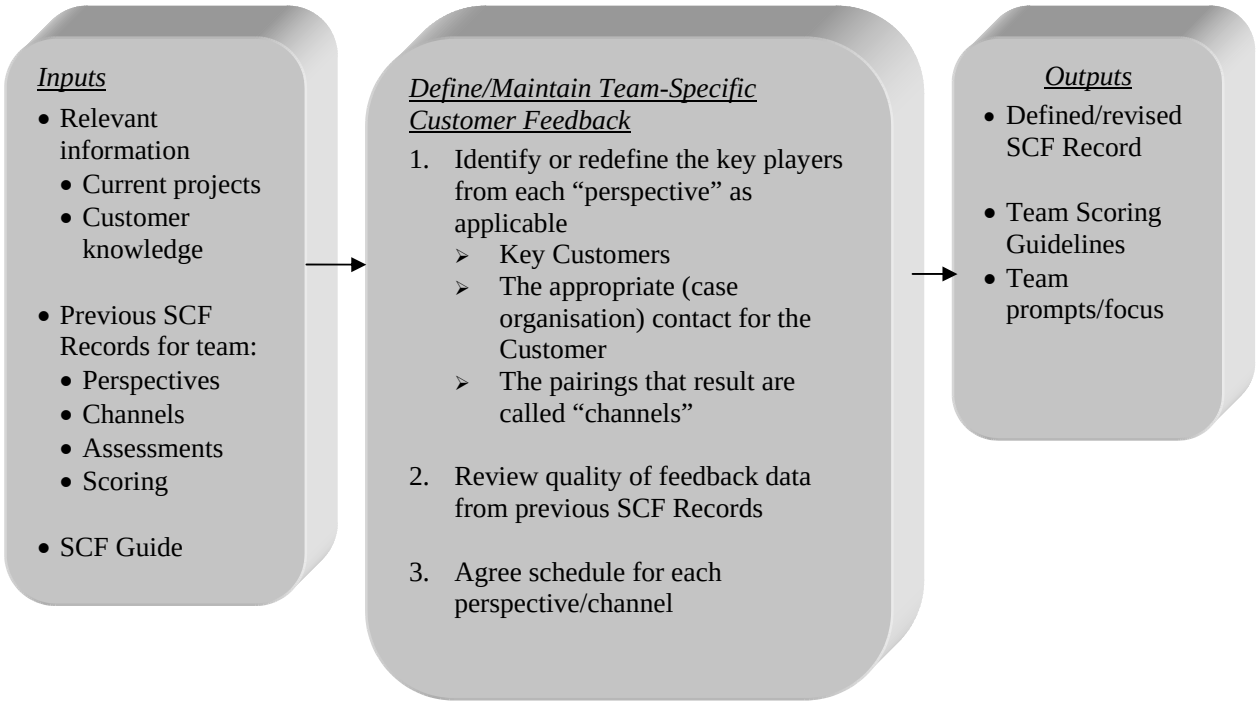
- Infrastructure
  - Successful migration of Lotus Notes databases to IBM servers.
  - Successful load balancing of data on the company file server - improves performance and contingency.
  - Successful rollout of Microsoft Patch in record time to protect against the Zotob worm.
- Security/Business continuity process
  - Security audit this week
  - Crisis Management training completed
  - Please read the Monthly Security updates!
  - Quarter 2 Readiness Report very positive
  - Upcoming BCP tests - planned before year-end from Dublin offsite

The company status updates are done on a quarterly basis where a face to face meeting is arranged in advance and information about headcount, revenue, project milestones, administrative and other items are presented. Team and department reports are left to the discretion of the manager and are not compulsory. Therefore some teams generated a monthly report and others did not; for this study a monthly report from the Quality department was examined. It included content in relation to deliverables and milestones for the projects; it introduced new team members and changes to procedures that were relevant for the department.

6.3.2 Systematic customer feedback

The Systematic Customer Feedback (SCF) process (PROR1090-Appendix H) formalises customer feedback. The procedure instructs employees at all levels of the organisation to formalise verbal and written communications received from the parent company in relation to performance.

Figure 6.6: Extract from systematic customer feedback PROR1090



A rating mechanism has been drawn up which guides employees to rate the communication depending on its informal 'vibe.' This rating is done monthly and is not shared with the customer but is kept as an internal tool for management. It was not clear from the procedure if the information was used for any purpose once collected apart from a reporting mechanism to senior management.

6.3.3 Competitive advantage evaluation

The Competitive Advantage Evaluation process (PROR1091-Appendix H) had only been introduced within the case organisation within the previous year; this process was used by senior management as a mechanism to evaluate competitive advantage. It provides a

framework for the gathering and comparison of data on a quarterly basis for key areas or elements of the case organisation's business where it enjoys advantage in terms of the services it provides. Even though the researcher was given access to review this procedure the corresponding completed evaluation form was not available to review. The introduction to the procedure cited that the case organisation:

> *'enjoys competitive advantage in key areas such as cost savings, quality of service, time zone advantage, workforce flexibility and the availability of top class people. However, changes in the political climate or market conditions can have a serious impact on competitive advantage. The increasing focus on global outsource opportunities is also a serious threat.'*

Thus it may be deduced that these 'threats' may have resulted in the introduction of this procedure as a counter-measure and it may be a reaction to the political climate or market conditions and global outsource opportunities that it cites.

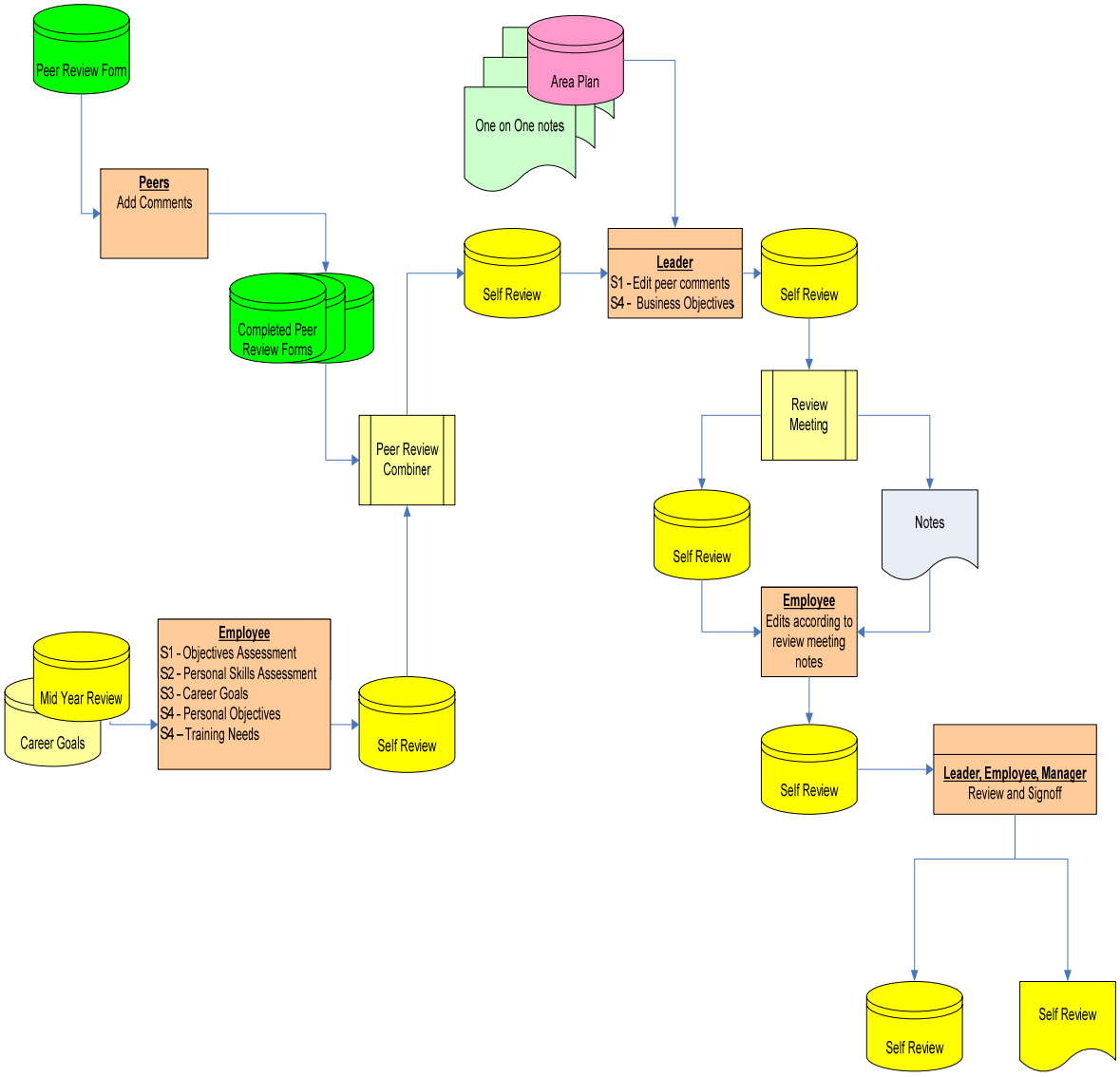
6.3.4 Innovation

The Innovation process (PROR1092-Appendix H) was introduced by the Managing Director as the sponsor who played an active role in reviewing applications. This process was implemented to focus the organisation on leveraging the innovative talent of every individual in the company with a view to improving value to customers. The objective was that ideas would be implemented that lead to significant process improvement, increased efficiency and decreased cost or the creation of new business for the case organisation. A number of application forms and steps needed to be taken before the applications were considered which could have a negative effect and thus become a barrier rather than an enabler of knowledge creation. There was a financial reward at approval stage and subsequent implementation stage.

6.3.5 Performance management

The Performance management process (PRHR3301-Appendix H) is a formal process and includes a large volume of associated documentation; this flow of documentation as illustrated in figure 6.6 below.

Figure 6.7: Extract from performance management process PRHR3301



The associated form (PRHR3301_FM01, Appendix H) that was invoked from the performance management process defined the headings under which the evaluation was assessed (see Figure 6.7). This illustrates a number of headings that could be interpreted as KMAs which include teamwork, developing others and initiative.

Figure 6.8: Extract from the performance management form PRHR3301_FM01

Personal Skills
-Team Skills
    -Teamwork
    -Openness
    -Developing others
-Individual Skills
    -Flexibility
    -Initiative
    -Dependability
    -Decision making
-Business Skills
    -Competency
    -Quality of work
    -Customer service skills
    -Communications

Objectives
-Individual business objectives
-Personal development objectives

Training required to meet the set objectives

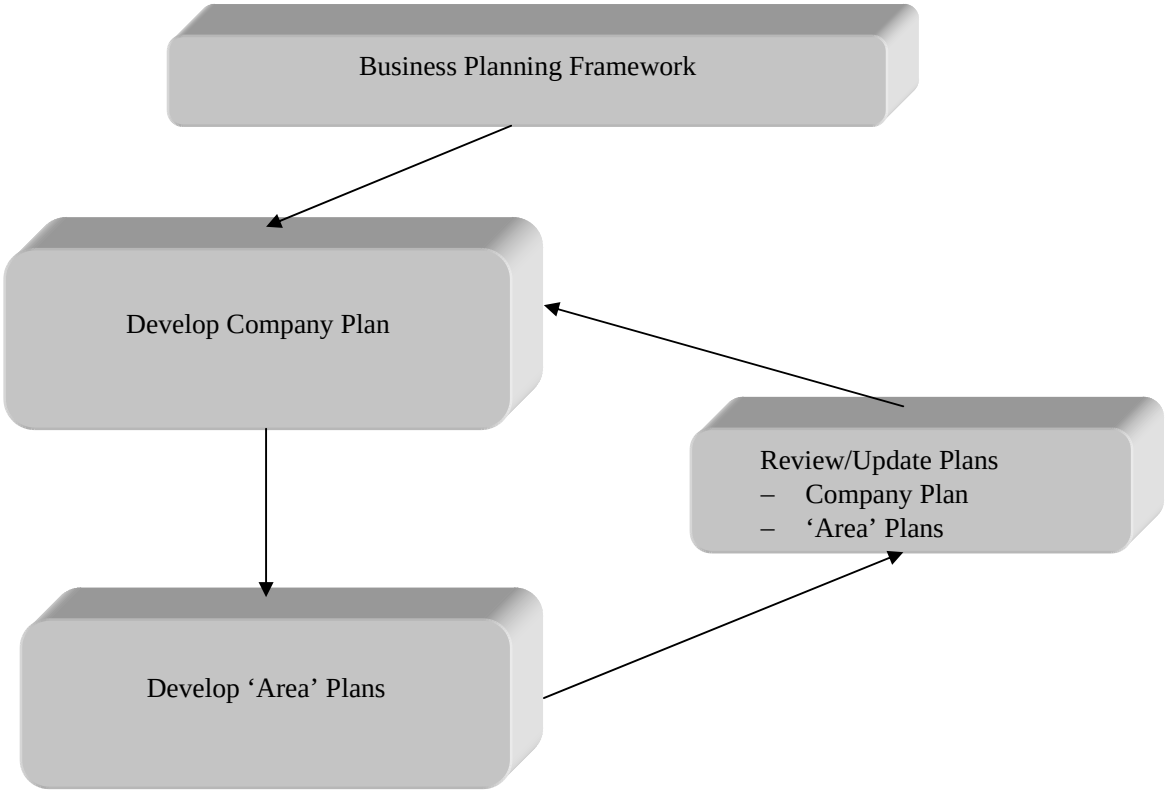
Career Development and /Goals

Once an employee joins the organisation within the first few months objectives are set out at a meeting between the individual and their direct manager or supervisor. Subsequently each January a formal annual review will be carried out using a performance review and development form (PRHR3301_FM01) which is used as a mechanism to evaluate each employee. The performance management procedure PRHR3301 states that objectives should be reviewed regularly at one to one meetings and mid-year. This is further examined during the interviews.

6.3.6 Business planning

The Business Planning process map (PROR1095-Appendix H) outlines the planning process in place in the company to manage business plans. The plans are comprised of 'Company Plans' and 'Area Plans'; area is a similar concept to department. Figure 6.8 below illustrates a high level view of the process.

Figure 6.9: Extract from business planning process PROR1095



The case organisation conducts the planning process in the fourth quarter of the calendar year for the coming calendar year. These are used as planning and evaluation mechanisms and once completed they are reviewed formally mid-year. The overall company plan is used as input to the area plan development and it states that individual performance management forms may be updated as a result. The process steps are quite detailed and it seems that this would indicate that the planning and evaluation process is managed in a formal manner. An example of output from the Business planning process is the Software Operations Generic Plan (detailed later in section 6.3.11). The Business planning process map describes the route the area plans take from inception to general distribution and adoption. The interviews also explore planning processes within the case organisation.

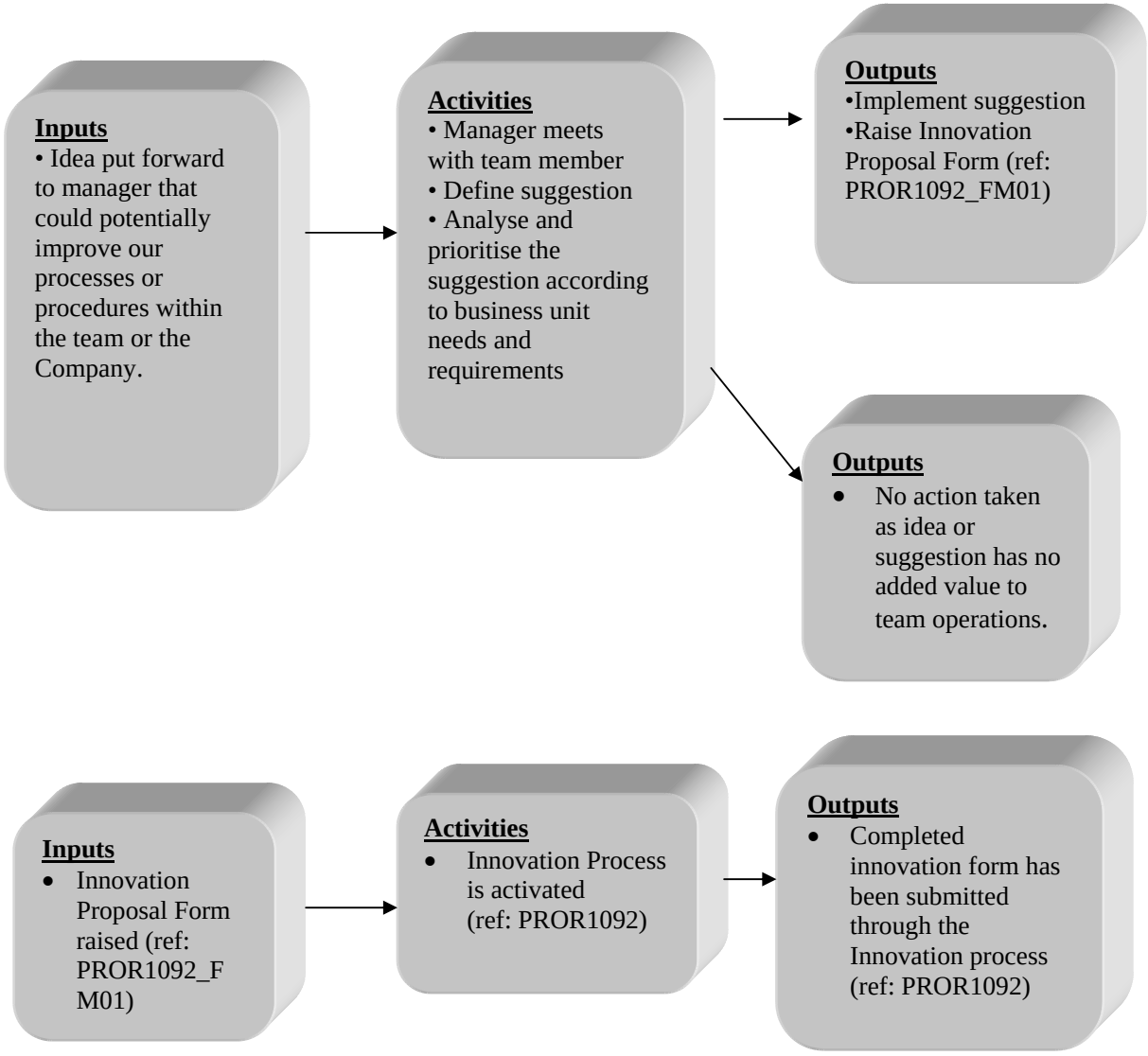
6.3.7 General process improvement

The General Process Improvement procedure (PROR1096-Appendix H) describes its purpose as:

> *'defining the broad based methodology to be used for putting forward ideas within the business units that may lead to implementation of a process improvement.'*

This process is a controlling mechanism for all other processes established by the case organisation. It could be described as a process that can invoke knowledge creation, where ideas and suggestions are put forward for changes to processes. It is also linked to the innovation process which similarly can result in a financial reward if successful. Process improvements are defined as system based and non-system based. Figure 6.9 below illustrates some of the steps involved for non-system related proposed changes.

Figure 6.10: Extract from general process improvement process PROR1096

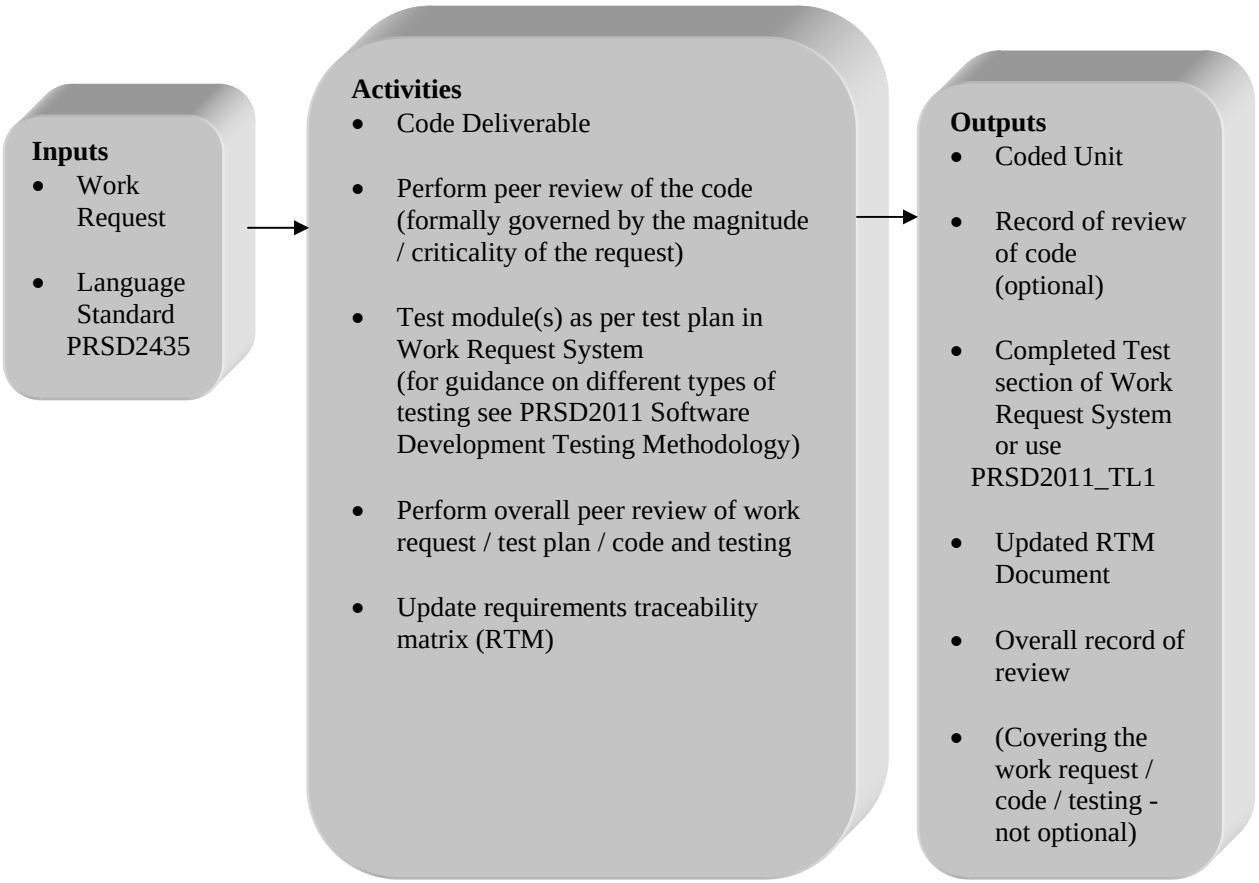


The process seems quite onerous and could become a barrier rather than an enabler of KM. The interviews may investigate this further and explore what motivates employees to engage in this process.

6.3.8 Software service

Within the case organisation the Software Service process (PRSD2013-Appendix H) covers all services undertaken by the case organisation. It encompasses service engagement, estimates, construction, transition and how the service engagement is monitored throughout its lifecycle. It could be described as a control mechanism as it facilitates the maintenance of ISO and CMM standards for software development and attempts to ensure work requests are processed in a consistent way within the organisation. Figure 6.10 illustrates a section on development of software. It is clear that there is a high level of detail within this process.

Figure 6.11: Extract from the software service process PRSD2013



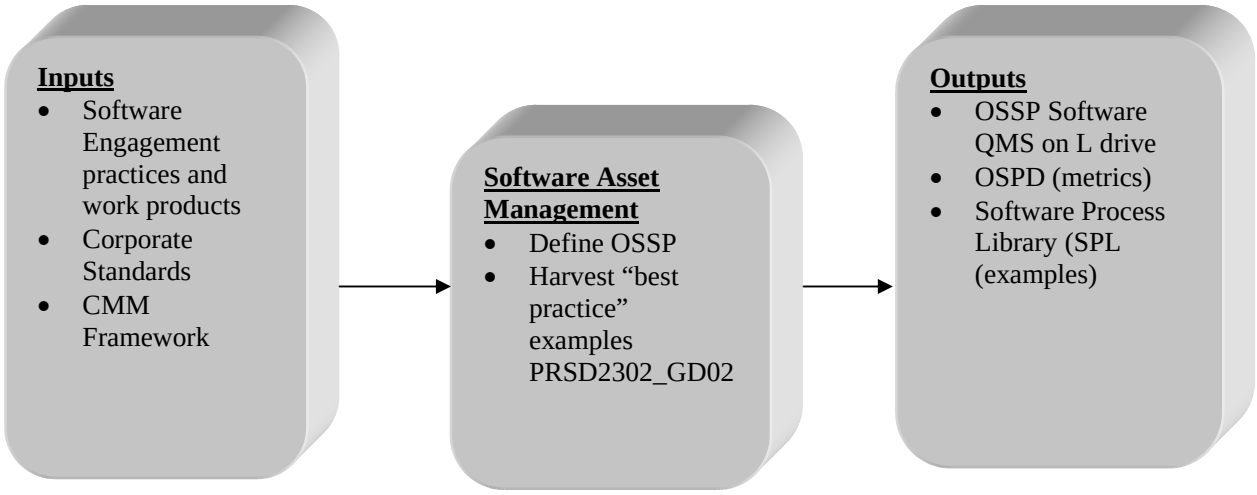
Potentially this level of detail could stifle innovation in such a knowledge intensive organisation where each work request may differ considerably as each new block of code

requires delicate integration with existing systems. However, it could also be argued that it supports knowledge workers in that junior workers can be productive early on in their career by making reference to the documentation in this process.

6.3.9 Software process improvement

The Software Process Improvement process (PRSD2302-Appendix H) defined the methodology to be used for developing and maintaining the Standard Software Process at the case organisation. Figure 6.11 illustrates one of the steps it details for defining the Organisational Standard Software Process (OSSP). It refers to the Software Process Library (SPL) index.

Figure 6.12: Extract from the software process improvement process PRSD2302



The SPL index could potentially be referred to as a KMA; it was designed to assist software engineers to locate examples of templates, design documents, service agreements and all organisation documentations of a specific quality. It is an Excel spreadsheet which identifies the relevant procedure and associated outputs and location of high quality examples ('best practices') which have previously successfully passed an internal review process for quality. It was implemented in the case organisation as a result of implementing CMM accreditation and is the responsibility of the software engineering process group who ensure that it is updated regularly. The interviews investigate its use further.

6.3.10 Vision and mission

The case organisation's Vision and Mission (Appendix H) was discussed in section 1.4, the company profile section. It is detailed and covers all aspects of the organisations business functions and also its parent organisation's vision and mission. However, it does not explicitly refer to KM or IC.

6.3.11 Software operations generic plan

The Software Operations Generic Plan (Appendix H) is a planning and control mechanism used by the case organisation as a template for all business areas. It sets the generic objectives and goals for the software department and managers integrate this into the business area plans for the current planning year. It is also used for a brief evaluation of the previous year and as input for evaluation of the upcoming period. The business process planning describes the path taken by the generic plan and the Software Operations Generic Plan could be described as output from that process. Details within the Software Operations Generic Plan include: maintenance of CMM and ISO accreditation, managing budgets, maintaining KPI measures within specific parameters and achieving a positive SCF rating of at least +3. There seems to be an overlap between the strategies and plans and the targets set by the case organisation, as the annual plans detail specific targets.

Overall, one could classify the internal documentation as very detailed because the steps involved in each of the procedures reviewed were comprehensive and easy to follow and understand. However, the links between the procedures, how they relate to each other and inter-dependencies within the procedures examined was not clear; some of the procedures seemed isolated.

6.4 Presentation of findings from the case interviews.

The findings from the semi-structured interviews are presented in this section. The semi-structured interviews used an interview guide that was sent to participants in advance (see Appendix F) and the researcher also used a supplementary interview guide which included more detail (see Appendix G). The findings are generally presented around the dimensions of Otley and Ferreira's extended Performance Management Framework (2005), in addition to some separate themes that emerged.

6.4.1 Vision and mission

This section aims to explore interviewee's insights into the organisation's vision and mission and potential links to KM. An extract from the Vision and Mission document can be found in section 6.2. Participants were asked to: describe the organisation vision and mission; how they were determined; who was involved in the process; and how the vision and mission were communicated throughout the organisation. There was some consistency in answers across different levels of the organisation; however at lower hierarchical levels interviewees perceived that there was less clarity. The Managing Director identified the organisation vision and mission as:

> *'to provide an excellent service to the parent company, within budget, on time, and at the right cost.'*

The Software Operations Manager described it as:

> *'here to support (case organisation) business by providing high quality service, value added service and meeting customer's needs. Vision is to provide highest level of service quality, service excellence.'*

In contrast the Software Manager (Production Support) expressed that it lacks clarity and effectiveness:

'The vision and mission is not really effective – not the way it is currently written – how people relate to the topics- currently some areas such as defects are the focus whereas this is negative, not positive. Its effectiveness is affected by it being more negative than positive. These documents should be 'live', ever evolving.'

This suggests that the vision and mission were established but not evaluated or updated in line with changing objectives or organisation dynamics. The Annuities Product Team Lead noted that:

'I wouldn't think that people in my team are aware of the company vision and mission – I looked it up on 'The Source' (company intranet) *before I came into this meeting.'*

The Information Delivery Initiative (IDI) Project Manager identified possible improvement areas for the communication of the organisation's vision and mission:

'Currently communicated poorly, it could be done better. It is posted around the building. It is not something that is over emphasised a lot, it probably could be – well it could sit on our source.'

The vision and mission was internal to the Irish organisation with little involvement from head office. The HR Manager affirmed that it was communicated through induction, visually on the walls of the office foyer and at periodic meetings such as the Managing Director's quarterly meeting. A common theme was that it was not effectively communicated and that it should be stored on 'The Source.'

There were no direct comments in relation to knowledge or innovation for the vision or mission even though the actual vision statement does state:

'We accomplish this mission by providing innovative, customer-focused protection and wealth management products and services.'

However, a number of interviewees stated that the vision and mission was to be a world class organisation and to provide a high quality service.

6.4.2 Key success factors (KSFs)

Cost, quality and people were seen as the key success factors by the majority of respondents. The Software Manager (IDI) perceived that the organisation was cost conscious at all times even when there was less of a focus on costs. The Operations Manager attributed the KSFs to cost comparisons with the parent organisation:

> *'Providing a higher level of service at a lower cost than home base or internal competitors (less than 30% of cost in US) in a stable environment.'*

Quality within the case organisation included the technical skills of the workforce and quality accreditations such as CMM and ISO. The Software Manager (Production Support) advocated that the employee's willingness to follow procedures was a key component and that:

> *'a small group of leaders take on ownership and responsibility.'*

The Managing Director stated that:

> *'People, getting the right people with good, appropriate qualifications, experience and attitude, which is most important.'*

Further, his comments on KSF included:

> *'the whole area of people is one that we have not gotten as far as we can get.'*

> *'it is very much down to leadership and maintaining work ethic, it is important to retain through excellence of leadership.'*

Other attributes that the employee's were accredited with were being flexible, young, having a 'can-do' attitude, hard-working and dedicated. The Managing Director, HR Manager and Broker Dealer Team Lead commented that the quality and suitability of people employed by the organisation may be attributable to the HR procedures as they perceived that they differ slightly from other organisations. The recruitment process in the case organisation involved two interviews and included a representative from HR at the interview.

The responses suggest that employee qualifications, experience, attitude and knowledge play a significant role within the organisation's KSFs. It is worth noting that there were no linkages made by respondents between the organisation's vision and mission and the case organisation's KSFs. In summary, the interview findings identify cost, quality and employees as the KSF.

6.4.3 Dynamics of KM at the case organisation

This section presents the interview findings regarding KM processes, KM tools, collaboration techniques and methods used to assign work tasks.

6.4.3.1 Knowledge sharing and knowledge transfer

Participants were asked if they were familiar with KM terms. Knowledge capture and knowledge organisation seemed to be the major association made by the interviewees to KM. An example of understanding these terms given by both the Managing Director and the Software Manager (Annuities) was that there had been a recent attempt within the case organisation to consolidate company information. A US expert came to the case organisation to deliver training and the training was video-recorded so that it could be re-used. Even though this seemed like a novel and effective method for knowledge capture, since then the video recording has never been used for training but the trainer has revisited the case site to conduct similar training. This suggests that face to face communication modes were preferred; this is consistent with other interviewee's comments (IDI Team

Lead, Finance Manager and the Annuities Product Team Lead) where video conferencing was preferred for meetings with remote colleagues.

The interviewees noted that tangible output on shared networks and databases were an effective method for organising knowledge; however the degree to which the employees at the case organisation were able to contribute to this knowledge repository conflicted with customer expectations. The IDI Team Lead suggested that:

> *'Priorities are to complete task level and always are, whereas managing knowledge is seen as a nice to have and is not perceived as a number one priority; this is in the US and Ireland.'*

Another comment from the Operations Manager supports this:

> *'the performance of the company could benefit from knowledge sharing. Knowledge currently tends to be in peoples heads, it needs to be a company wide exercise to be really successful.'*

6.4.3.2 Knowledge Barriers

The Operations Manager identified a number of barriers to knowledge sharing including:

- *'Ease of capture and ability to collate knowledge, to make knowledge widely available*
- *Knowledge in public domain – internal to company*
- *Investment*
- *Emotional barriers – knowledge is power.'*

The Operations Manager perceived that revamping the reward system could address some of the barriers but they would need to be creative. The Operations Manager suggested that knowledge sharing could improve if employees from the parent company mentored employees from the subsidiary and vice versa. The Operations Manager perceived that knowledge transfer needed to be co-ordinated between the parent organisation and the

subsidiary but that staff turnover and staff rotation also contributed to the challenges of knowledge transfer. The Software Manager (Annuities) perceived that the case organisation was not promoting KM.

> *'In this organisation I don't think that we are looking at knowledge assets or intellectual capital measurements at all.'*

To further understand the relationship between the parent and subsidiary company the Software Manager (Production Support) perceived that:

> *'if the relationship with the customer is not going well you could roll-out the big guns* (specific software experts) *and they will solve your problems. It is quite an informal process at the moment but the organisation could leverage or market these traits and skills.'*

The Software Manager (Annuities) perceived that in relation to gaining and retaining new knowledge there were no formal processes in the case organisation but informally there was a lot going on in different teams. A common theme was that KM initiatives were undertaken in isolation. The Software (Annuities) and Software (Production Support) Managers commented that they were only aware of KM initiatives in their respective teams. This suggests that what was being done in one team was not communicated to the other teams. The Software Manager (Annuities) noted that the helpdesk was a more suitable environment for knowledge organising than the software development and support area as there was wide use of a web knowledge base, documented procedures and specific resources employed as technical writers to ensure that the information was maintained accurately.

6.4.3.3 KM processes

The Managing Director stated that effective leadership was a key element of the case organisation's success and that at the operations management level experiences are shared at monthly meetings. According to the Managing Director these monthly operation forum

meetings played an integral part in the management ethos where an open forum was used to share experiences and brainstorm issues. In some cases interviewees believed that the lack of knowledge processes was a constraint to effective working practices. The HR Manager noted that:

> *'where work methods are not documented employees are repeatedly duplicating data entry.'*

The Software Manager (Production Support) commented that employees were fairly good at sharing knowledge and training each other within a team; however, sharing knowledge between teams was poor. The Software Manager (Annuities) noted that in the past when the company was quite small knowledge sharing and storage were not a problem however as the organisation has grown considerably, this was getting problematic and there was conflict as to how to deal with it. Further, the Software Manager (Annuities) perceived that it was difficult to find information if the employee was not involved in similar project areas previously.

Specific KMAs identified by the interviewees included the Innovation Process and steps to improve the SCF Process. A specific example was given by the Annuities Product Team Lead where a knowledge base was being created using Bug Zero, a tool usually used to track software bugs, to store issues and resolutions. However, this initiative was between the US and an Irish team and it was in isolation from other teams in the case organisation.

The Software Manager (IDI) perceived that the Software Quality Assurance (SQA) post project reviews could facilitate knowledge dissemination and knowledge transfer but in its current state it was an ineffective process as it only affected full projects and not large work requests. A Software Process Library (SPL) was introduced into the case organisation and its function was to act as a repository for examples of high quality software artefacts. Many interviewees noted this as a useful concept for knowledge sharing and building on best practices. However, the Broker Dealer Team Lead perceived that this process was not widely adopted and that employees prefer to search the main organisation document repository. The reasons given for non-adoption of the SPL: were that technology was not supporting the process; it was a predominately manual process;

and it was difficult to find relevant material as it was not categorised or indexed well. In many cases interviewees noted that people were allocated similar project areas and they were familiar with previous documentation or discussed best practice with colleagues.

The Software Manager (IDI) commented that when the case organisation recognised that they lacked knowledge within a specific area, they actively sought to acquire this knowledge. The case organisation recruited experts in that area and the organisation has become more self-sufficient in that it has acquired all elements of the software development lifecycle.

6.4.3.4 Collaboration and working environment

The Managing Director asserted that there were numerous collaboration techniques being used which included: sub-committees for specific tasks, use of email, the company intranet and issue resolution in teams.

There were areas highlighted by the Finance Manager that were somewhat poor in regard to collaboration. These included collaboration with external parties such as the local Institute of Technology, FAS, IBEC and the Chamber of Commerce. The Finance Manager noted that:

> '*we talk about linking with external parties but do not do it and have never worked on a project or initiative together even though we maintain a good relationship with these external parties.'*

There was some criticism from the Software Manager (Production Support) that the company had never embraced activities stipulated by CMM level three accreditation and that team's often worked in silos and there was no collaboration between teams. Similarly the Operations Manager perceived that there was huge opportunity for KM tools and collaboration but it was something that the case organisation had not really explored.

The Software Manager (IDI) described two communities of practice within the case organisation, namely a Developers forum and a Business System Analyst (BSA) forum, which he stated are still in their infancy. The developers forum emerged as a solution to a complex design issue and a group of software engineers got together to establish best practice. The BSA forum formed in response to the advantages portrayed by the developer's forum. The Software Manager (IDI) described an existing knowledge base on the case organisations intranet but highlighted some of its weaknesses:

> *'Because it's not searchable, it's intensive and it hasn't been sold that well, it was developed for another team's purposes and has limited functionality.'*

The Software Manager (Annuities) described the monthly operations forum meeting where middle and senior management levels met to share operational information such as staff turnover statistics and he suggested that discussing processes would be more useful.

6.4.4 Strategies and plans

The Managing Director described that teams working together was essential and that knowledge sharing strategies and plans were dispersed through the formation of sub-groups:

> *'that all working as teams, the operation forum is a key forum for sharing information. There are different forums for different purposes e.g. software operations forum and software process engineering group forum and quality forums.'*

The interviewees described strategies and plans specific to KM which included the introduction of the Innovation process and the Competitive Advantage process, the promotion of email and the company intranet, team meetings and sub-forums to share knowledge and encourage knowledge creation. The HR Manager and the Software Manager (Annuities) described some specific strategies and plans in their teams: formalise HR requests through the Source; improve customer feedback mechanisms; introduce new roles such as BSA and Project Managers; maintain existing business; and introduce trending of KPI data. The Operations Manager prioritises strategies and plans as:

'Our strategy is one of driving growth in the organisation here in (case organisation) through high quality value added services – to more of the higher skilled type of work – project management and business systems analysis – higher value skills than just development.'

This strategy of growth was consistent with the Software Managers (Production Support and Annuities). The HR Manager noted specific strategies and plans related to employees which included; staff rotation; internal promotions; cross-training and informal internal training done by colleagues rather than outsourced to training organisations. The Software Manager (Annuities) mentioned 'CHEF', a complex knowledge repository, however it was described as not very dynamic. The Finance Manager noted that physical employee moves (temporary) were useful to develop people and relationships such as extended US travel and similarly employees from the US travelling to Ireland. These could be classified as intangible strategies and plans and form a high proportion of items that interviewees focussed on. The following table illustrates a sample of strategies and plans adopted by the case organisation with descriptions taken from both interviews and documentation mentioned during the interviews.

Table 6.1: Summary of strategies and plans for 2005

Strategies and Plans	Description	Source
Excellence of leadership	Arrange an in-house intensive leadership course for middle management	Interview with Managing Director
Innovation procedures	Process to encourage employees to promote ideas that potentially lead to significant process improvement, increased efficiency and decreased cost or the creation of new business for the case organisation.	Innovation Process PROR1092
Retention of staff	Employee satisfaction survey. Employee turnover statistics.	Interview with HR Manager
Staff rotation	Staff moving from one team to another or taking on a new role within the team.	Interview with Software Manager (Production Support)
US travel periods to be extended	Irish employees travel to the US (parent site) usually for a short period of time (approximately 2-3 weeks) however this is planned to be extended to 6 months.	Interview with Finance Manager
Promote people internally	Promoting people –look internally first	Interview with HR Manager
Training (internal and external)	Implement effective training programs to ensure effective deployment of new staff.	SW Operations Generic Plan 2005
Structured Customer feedback	Achieve a positive average structured customer feedback rating (>+3) across all software areas in 2005.	SW Operations Generic Plan 2005
Formalise HR requests through the Source	HR is supported informally for technical items. Plans for the future include formalising HR requests so that the internal support team can prioritise these formally and may have more capacity to complete these in the future.	Interview with HR Manager
Promote new type of work assignments	To include higher skilled type of work and roles such as BSA (Business System Analyst) or Project Manager	Interview with Operations Manager

Strategies and Plans	Description	Source
Maintain CMM Level 3 standard.	Remain compliant with all key process areas (KPAs) of the CMM Level 3 standard.	SW Operations Generic Plan 2005
Create new business and drive growth	Software service area will grow by 30% in 2005. Drive growth in (case organisation) through high quality and value added service	Interview with Operations Manager, Software Mangers (Production Support and Annuities) SW Operations Generic Plan 2005
Maintain existing business	Maintain costs in line with defined scales. Maintain on budget index (OBI) within 15% of estimate based on verifiable data, and maintain on time delivery (OTD) at 85% of commitments. Strengthening existing business – making sure we don't lose it	SW Operations Generic Plan 2005 Interview with Software Manager (Production Support)

The Software Manager (Production Support) noted that the individual performance management process, the SQA and SEPG functions and Software Improvement process are specific knowledge processes used to support defined strategies and plans. When asked about specific KM tools the Managing Director, Operations Manager and the Finance Manager agreed that the company had not explored KM tools but that they perceived it could provide opportunities. The HR Manager did identify that notice boards, email and 'The Source' could be described as KM tools.

6.4.5 Organisation structure

For this study there was a mixed response as to whether the organisation was flat or hierarchical, many respondents perceived it was a mix, in some cases respondents said that it was flat whereas further into the discussion they perceived it was hierarchical as there were a number of layers as they described it. Figure 6.3 (page 124) outlines the levels within the case organisation. If a software engineer wanted to talk to the Managing Director there are four layers. However, the senior management team have adopted an

open door policy and do promote a collaborative approach notwithstanding the formal hierarchy.

In some cases the Software Managers and Team Leads in Ireland report to US management while the involvement of Senior Irish managers in their operational activities was minimal. The Software Manager (Production Support) describes how little involvement there is from higher levels of management in relation to operational activities:

'a lot of the work comes in externally and skips the first three levels.'

The HR Manager perceived that the 'Excellence through People' programme was useful in establishing a more flat organisation. The IDI Team Lead perceived that performance was directly related to the character of the specific line or middle manager. In some cases good performance came from an excellent manager and other cases where the manager was authoritarian it resulted in poorer performance. Furthermore, the IDI Team Lead suggested that as the organisation had grown considerably in recent years that having teams dispersed in two buildings contributed to less collaboration among teams in Ireland. The Software Manager (IDI) perceived that senior management were approachable and were efficient at resolving and escalating issues to Senior US management. The Annuities Product Team Lead perceived that the US management were very 'hands on' and that the US managed performance in their own informal way.

The most significant factor that needs to be highlighted here is that the case organisation was a subsidiary of a large MNC: the case organisation was influenced largely by this and its control over its performance and operations is a contributing factor within each of the headings examined.

6.4.6 Key performance Indicators

Internally defined metrics and accreditation to ISO and CMM were the predominant mechanisms used to measure performance within the case organisation. These were referred to as key performance indicators (KPIs) by all interviewees. Capability Maturity

Model (CMM) accreditation is a quality mark specific to software organisations which promotes repeatable processes to improve quality levels. There are five levels to the standard; the case organisation had attained level three of CMM for over two years.

In the interviews a number of different types of KPIs were mentioned. This study focuses on software related KPIs and includes generic HR and training KPIs.

Table 6.2: Summary of key performance indicators for software

Software KPIs
Individual targets
Through-put
On time delivery (OTD)
On budget index (OBI) per work item
Customer feedback
High level Budgeting spreadsheets
HR statistics
Training tracker

The software internally defined metrics were defined by the Software Operations manager and included, individual targets, throughput, on time delivery (OTD), on budget index (OBI). The Customer feedback measure was defined by the Managing Director.

6.4.6.1 Tools used to generate KPIs

The HR Manager identified tools used to calculate and generate the HR metrics. These included: '*Training Tracker*' a web-based tool used to track individuals training evaluations; cost; and HR statistics and employee satisfaction monitored through surveys. The HR Manager did note that within the seven year lifespan of the organisation , just two surveys had been administered. Other tools identified by the Software Managers included '*Web time*' a web-based application that recorded employees' time spent on particular tasks and activities within specific projects. Web time was introduced by the US

management and was analysed by them regularly for cost analysis purposes. *'Test Director'* and *'Bug zero'* (web-based applications) monitored defects which were linked to quality although the Broker Dealer Team Lead stated that:

> *'I've never seen anything done with that information. We do not track where it goes; the software quality assessors are pushing to keep a track of rework.'*

The Software Manager (IDI) noted that:

> *'We collect a lot of metrics but we do not spend a lot of time analysing those metrics.'*

The Software Manager (Production Support) identified a *'Work request system'* (WRS) that generated a number of the metrics monitored. However, the Annuities Product Team Lead argued that this was not congruent with the expectations of the parent organisation. The Software Manager (Production Support) supported this:

> *'actual data inserted (into tools) is inaccurate and therefore the figures coming out of the WRS are lies.'*

6.4.6.2 Reliability and Effectiveness of KPIs

The Software Manager (Production Support) and the Annuities Product Team Lead also noted that the KPIs that are measured in the case organisation do not match expectations from the parent company and suggested that the variables used are not effective. The following quote from the Annuities Product Team Lead details suggested measures of success that were perceived to be consistent with parent organisation expectations:

> *'How much work do you get through in Ireland? Are you able to do big projects on your own? The parent organisation measure it by looking at how many successful implementations did we have? Was Ireland involved in that project? Is it effective? No I do not think current mechanisms are effective.'*

Other comments question the validity of the measurement used for customer satisfaction and the Software Manager (Annuities) states that:

> *'At any given time do we know how our customer feels about what we are doing? The service is not being measured, just the product, it is the only thing that's being measured. Thus there is a gap in the measurement process.'*

Further he described the customer satisfaction or feedback metric as:

> *'no way satisfactory – it needs a lot more input, a lot more work, It is very much down to the individual managers as to what is put in which is usually left till the end of month and can be arbitrary.'*

Similarly, the Finance Manager noted that:

> *'For software the main focus is on quality and productivity which are hard to measure, it depends on informal measures such as quality of previous projects. Quality in the software area can be very subjective; again it's important for people to travel to the parent company site to ensure that the quality of the product is akin with customer expectations.'*

The Software Manager (IDI) stated that:

> *'Those particular ones (success factors – flexibility, cost, young workforce) are not measured – we do try to measure but we struggle with it at times.'*

The Annuities Product Team Lead perceived that in software there was no one system to support recording or retrieval of performance measurements:

> *'they should all be in one system along with all our documentation you shouldn't need to go to 1 to 2 to 3.'*

The Broker Dealer Team Lead recognised improvements in KPI measurements:

> *'Definitely metrics systems and annual appraisals were automated as much as possible. I know from running monthly metrics that it's an awful lot easier than before and takes a lot less time so that it gives me more time to spend on what I consider the main areas of my job.'*

When asked what type of key performance indicators were used the Operations Manager replied:

> *'Measures of efficiency are difficult to quantify. It hasn't gotten much further than they have released the software and it has gone in smoothly that is a key informal measure. Good kudos back that the software went live and there were no glitches or that the software was supposed to be released at a certain time and it was – on time delivery.'*

The IDI Team Lead perceived that company performance was primarily budget based:

> *'Company is assessed only for budgets – I am unaware of anything else that they do that takes into account service to the customer and colleagues.'*

KPIs were predominately team based and were collated monthly. Individual and company performance was managed annually on a formal basis where discussions were documented and stored with the HR department and there was also a six monthly informal review, with no documentation required. Five KPIs were team based whereas formal evaluation of team performance was only introduced in the case organisation within the previous year.

It is worth noting that the parent company did collect some intangible information about employees. This included: qualifications, number of years experience in technology and relevant business areas, technical ability rated against a number of pre-identified skills and technologies. This knowledge about employees was gathered by the case organisation following a request from the parent organisation, but was not readily available to the case organisation.

6.4.7 Targets

The interview guide focused on the type of targets set, how they were set and who was involved in setting them. The targets set at the case organisation use KPIs as input to the process; parameters are allocated to the KPIs to ensure they are tangible targets. The following table describes some of the targets set at the case organisation during 2005; some are formal and some informal.

Table 6.3: Examples of targets set at the case organisation

Examples of targets set at case organisation	Description	Source
SMART targets for individuals	These are specific, measurable, achievable, realistic, time-bound targets set during annual appraisal	Interview with HR Manager and also in Performance Management PRHR3301 process.
Project go-live dates	Identified in project plans and/or by project managers informally at meetings.	Interview with Annuities Product Team Lead
Recruiting	Constraints were laid out by the parent company, such as role X must have X years experience and fit within US budget.	Interview with Software Manager (IDI) and HR Manager
Training tracker	All training and costs to be recorded on web application.	Interview with Software Manager (Production Support) and HR Manager
New business	Taking ownership of new business, although not clear if quantifiable.	Interview with Software Manager (Production Support)

Examples of targets set at case organisation	Description	Source
OBI (On budget index)	Budgets was to be within 10% of estimate for work requests	Interview with Software Manager (IDI)
Rework also called defects	Rework was to be within 20% of estimate for work requests	Interview with Software Manager (IDI)
OTD (On time delivery)	Work was to be delivered within the timeframe specified at estimate date.	Interview with Software Manager (Annuities), Software Manager (IDI) and the Finance Manager
Throughput	The number of work assignments complete in any particular period and recorded in the WRS	Interview with Software Manager (Production Support), IDI Team Lead and the Operations Manager

Targets were linked to KPIs and strategies and plans defined by the case organisation in that, the strategies and plans identified high level elements, the KPIs identified how the organisation assesses and measures performance and the targets set the level of performance required to achieve these. Target setting at three different levels: individual, team and company. The findings are presented in relation to these categories.

6.4.7.1 Individual targets

At the individual level targets or annual objectives were set each January for every employee between the individual and their manager or Team Lead. These targets or objectives according to the documented procedure were to be reviewed regularly at one to one meetings, reviewed at six months and formally reviewed again the following January. The IDI Team Lead commented that:

'*For annual review targets are usually achievable although you often have to do them in your own time thus you must do them outside your working day.'*

The Annuities Product Team Lead took a different view to setting individual objectives or targets where it was a more operational than an annual approach.

'We would set individual objectives at our team meetings, for example, we'll have it done by Friday, and thus the process was done informally.'

According to the IDI Team Lead the customer set an unachievable operational target:

'to deliver software on time 100% of the time.'

The Team Lead perceived that it wasn't achievable, and that it illustrated that it is not a participative target as there were outside influences to the process. The Annuities Product Team Lead expressed a major concern:

'*staff motivation is poor and they get so fed up of rushing and rushing and not getting time to understand exactly what they are doing or to test things. They just get fed up of it; it's not effective because it's contributing to staff de-motivation and turnaround of staff.'*

6.4.7.2 Team targets

At the team level some respondents perceived that targets are set by the Team Lead, Software Manager or on a project or at work request level through status meetings. The Annuities Product Team Lead identified that target setting at the team level mainly involved the project manager from the parent company. The IDI Team Lead perceived that project deadlines were usually non-participative although the case organisation may often be asked for input to the process constraints were often already set and agreed at higher levels within the parent company where a date for a product release to new

business had already been established. This involvement was also reflected in the formal team target setting process where it emerged that:

'The customer helped set some team objectives this year.'

This theme continued where it was unclear whether the parent company was involved in target setting or not as it seems to be different for each team. The Operations Manager noted that the targets were set jointly with the parent company. The IDI Team Lead perceived that targets were mostly set by the parent company. The Finance Manager concurred and perceived that targets were:

'Customer driven, the managers themselves do not have that much authority.'

Again this introduces the influences and constraints that the parent company maintained over targets. Generally in relation to targets the Software Manager (IDI) cited that the evaluation process was weak:

'Where we have fallen down is that we haven't reviewed them (targets) *to see if they are software metrics (OBI, OTD, throughput and defects).'*

6.4.7.3 Company targets

At the company level it was clear that middle management (Software Managers) knew that the company plan and objectives were set by the Managing Director with input from senior management but this was not the case for the Team Leads. The Broker Dealer Team Lead stated that:

'We do not see how high level company objectives are set.'

The Annuities Product Team Lead perceived that:

'people do not really want to get involved until it affects their bonuses.'

Targets at the company level included HR targets. In relation to the HR function, surveys were used as input to the target setting process, other HR targets such as metrics for sick leave was regarded as 'industry' specific. Financial targets were set by senior management and were non-participative and communicated to staff. It was suggested by the Managing Director that HR needs more buy-in from other leaders (middle management) as it is more silo'd, the reason attributed to this is that:

> *'Cost is easier to analyse, got to break even whereas HR is more a soft area.'*

6.4.7.4 KM targets

Participants were asked if there were any specific targets in relation to KM. The Software Manager (Annuities) stated that:

> *'we hope to have a different way of storing the information that we have than the current methods of storing. We have evaluated tools for this such as Get Answers* (a repository management tool used in the helpdesk).'

Further the Software Manager (Annuities) identified:

> *'I have mentorship goals for people on my teams, if someone new joined, to measure this we would ask the person who has gotten mentored, we wouldn't be expert in this and it wouldn't be done for everyone.'*

The Operations Manager identified that mentoring was a target which he stated links to knowledge sharing, and teamwork and training targets were identified. The Annuities Product Team Lead noted that:

> *'people hoard knowledge, people do not share it. Why? Sometimes everyone is busy, do not think of what to do with it and just store it somewhere on the network drives. We get a lot of information and do not have time to read it, which is really bad because we do not spend enough time to read the specs properly. Sometimes*

you get 50 million documents in the one email. Sometimes the specs come after we've started coding. Therefore you get into the habit of not looking at it in order to code properly, its really bad, it's the kind of culture which is really bad because when you get into that kind of culture you get used to it and continue on and do it again and again.'

The Broker Dealer Team Lead highlighted targets in relation to the Software Process Library (SPL) and that it could be classified as a KM tool. The Broker Dealer Team Lead identified that it was not easy to find documents using the SPL and commented that the case organisation needed:

'Some formal knowledge management system, easier to use and access than the SPL which is just a folder containing document references.'

The Broker Dealer Team Lead was involved in the organisation since its inception and raised a concern with the customer organisation that:

'*there is still a fear that the Irish subsidiary are taking their jobs over there we know that therefore they may not be as willing to share knowledge as some people perceive us as a threat*'

The HR Manager indicated the following KM targets:

'Promoting people for example look internally first, moving people around, using skill matrices to identify skill levels.'

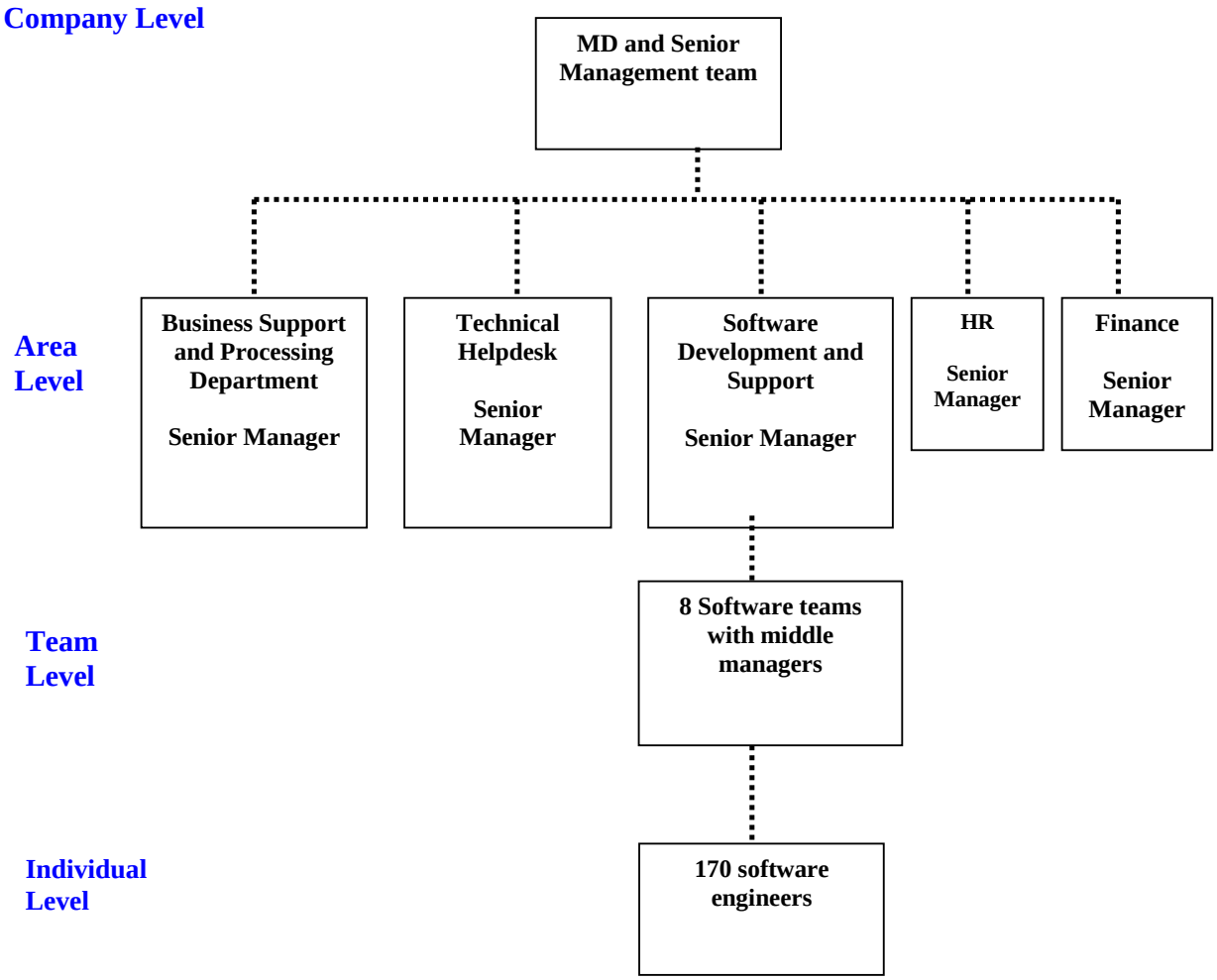
The Software Manager (Production Support) noted:

'Taking ownership of new business, staff training and job rotation.'

6.4.8 Performance evaluation

Interviewees were asked about performance evaluation at the case organisation using three perspectives: individual, team and company. Figure 6.12 presents the hierarchical levels. This study investigated the results and consequences of the evaluation and the reward and penalty process. At the time of this study targets and objectives had been set at three levels for the previous three years whereas there were plans to introduce an 'area' level, this was still in its infancy.

Figure 6.13: Organisation chart illustrating performance evaluation levels



6.4.8.1 Individual performance evaluation

The individual performance evaluation is formal and is governed by PRSD3301 Performance Management Process. The procedure states that objectives should be reviewed regularly at one to one meetings and mid-year. From the interviews it was clear that it depended on the manager as to whether these informal reviews were carried out. The Broker Dealer Team Lead introduced some ambiguity around the process:

> *'I do not know if that's part of the process or if it's just something that we do.'*

The Annuities Product Team Lead perceived that when conducting annual reviews with employees that:

> *'by the time their review comes around you've forgotten what contribution that person gave, unless you keep notes which you should do but not everyone keeps notes. Why not? It is informal and you are not inclined as you are literally not made to do it.'*

On a more operational note the IDI Team Lead illustrated how task-level work was evaluated within the team:

> *'Throughput and quality of work is evaluated every week. We have informal meetings; they are only formal if there was an issue or a requirement for a formal review.'*

The IDI Team Lead noted that:

> *'Fact of once in a blue moon – there are supposed to be one to one's going on- they happen but not as frequently as they should.'*

The HR Manager stated that:

'HR does not want to formalise these yet – may need to get a work group together- a type of sub-group. May need to formalise these more, there are currently no set standards, measurement or controls if employees are not performing.'

The Finance Manager observed that:

'*most of the objectives are not measurable – difficult to see how good a person is.'*

This is consistent with findings from reviewing the performance management form (PRHR3301_FM01, Appendix H) which illustrates a number of intangible elements that are KM specific.

6.4.8.2 Team performance evaluation

At the team level the Managing Director stipulated that the leader and senior management evaluate performance. They had input to that process and had an option to intervene if there were significant issues. The Broker Dealer Team Lead perceived that the team was not evaluated at all:

'I do not think that the team is evaluated as an entity, it's more like the individuals in the team.'

This is consistent with the Operations Manager who identified that team evaluation was merged with the parent company counterparts. According to the Business Planning procedure the process had clear steps that were formal and unambiguous. From the interviews it would seem that most of the respondents were not very familiar with the process. The process documentation stated that:

'Area Plans reviewed at one to one meetings and Area Plans also reviewed at team meetings at least monthly.'

From the interviews there was no evidence that this was happening, although one respondent did mention that it happened ad-hoc every couple of months. The Operations

Manager described monthly meetings as an effective mechanism to evaluate team performance. The IDI Team Lead stated that:

> *'Team weekly meetings are effective and include Ireland and BSA's in US and Ireland – useful to turnaround issues.'*

The Software Manager (IDI) described the process as unclear and stated:

> *'Team evaluation varies – unclear if achieved or not we do set objectives for team and refer to them during the year.'*

The Finance Manager perceived that this was a weakness:

> *'it isn't good that (the case organisation) doesn't distinguish between teams at the end of the year… I like to think that the good people get rewarded.'*

The Annuities Team Lead presented difficulties:

> *'a barrier to evaluating team performance is where goalposts shift depending on which side of the Atlantic that you sit on, almost unfair to measure ourselves as a single team maybe from a subsidiary perspective we could sit back and make our own metrics more tangible?'*

The findings indicate that the process is very much driven by the parent company.

6.4.8.3 Company performance evaluation

At the company level the Managing Director stated that:

> *'Our performance as a company is evaluated by the CEO of the parent company, feedback is informal but continuous.'*

The company evaluation process is informal and involved feedback to the Managing Director while visiting the parent site and also through emails and phone conversations. This feeds into the formal SCF process which the Managing Director regards as a very important process especially with the changes that the case organisation was currently going through. The significance of why customer feedback is more critical right now is because the parent and subsidiary were going through an integration programme to further consolidate operations. One theme that emerged was that the company was mainly evaluated on a financial or budget versus cost basis. The Broker Dealer Team Lead proposed a reason for this:

> *'Company evaluation is on financial results – why- because it's the easiest to measure.'*

The Finance Manager suggested a reason for poor company evaluation:

> *'Evaluating the company can be poor as it is not a very scientific process.'*

Overall the performance evaluation within the case organisation is primarily focussed on a formal individual process that includes many intangible and KM topics, it was not obvious if the company and team level evaluated any KM elements.

6.4.9 Reward and penalty

Otley and Ferreira's (2005) extended PMC framework suggests investigating both financial and non-financial rewards that managers and employees would receive by achieving performance targets or conversely penalties where targets are not achieved. This is particularly relevant in the area of KM where targets may be set in less tangible areas. Again the three levels of levels of the organisation are used for evaluation purposes.

6.4.9.1 Individual level

There was a significant amount of empirical evidence in relation to the consequences of individual evaluations. The Broker Dealer Team Lead noted that the main results impacted individual bonus or the commencement of a disciplinary process:

> *'Yes the annual appraisal is fed into a person's personnel file which feeds into the bonus process. There are consequences if someone is deemed to be not performing or badly performing, we investigate why and work on it. It depends whether disciplinary procedures would be the next step I haven't seen it happen but I would say it does happen.'*

The Annuities Team Lead gave some details of informal non-tangible evidence of reward:

> *'get thank you emails from the states to pass to the team or lunch invites that annoy the team as they can't attend as it's in the US. Sometimes we get a slice of pizza here and it's not really any good. We just continue on if there is good performance.'*

Further she describes a more direct reaction if the performance feedback was negative:

> *'You would have follow-up meetings if there was poor performance.'*

The Software Manager (Production Support) mentioned that there was a budget for a team night out approximately once a year and also mentioned the formal reward and recognition process:

> *'Web-based application for reward and recognition, its OK, unfortunately you have to write an essay. I would prefer if you could say XX did a great job and leave it at that as being genuine instead of having to say how so and so saved the world.'*

The effectiveness of the reward and recognition process was also questioned by the Annuities product Team Lead:

> *'Reward and recognition on source – is this effective? No a lot of people think it's a joke. Its 50 Euro- it has come up in the past that people have put in a stupendous amount of hours like they've lost 100-200 hours for 50 euros. Other people do not think that it's controlled or managed effectively. There is a perception that it's your turn so they are going through the paces.'*

The Software Manager (Annuities) held that the formal reward and recognition process was minimal and that the bonus had tight constraints:

> *'that bonus once a year, approximately 7%, there really isn't a whole lot of room for manoeuvre between excellent and not so good.'*

The Managing Director perceived that performance evaluations:

> *'haven't been severe enough and that they may have been on the soft side, would hope in the next year or two to sharpen up a wee bit.'*

He remarked that salaries and bonuses and promotion opportunities are affected by poor performance. The HR Manager also mentioned that the case organisation is under 'huge' budget constraints. The Finance Manager proposed that a more focussed approach could be taken:

> *'Need to finance good people from taking from other people, salary decisions are very difficult to make. There is an average payout for all staff. Personally I would like to see a more violent approach, the way the system is set up if we want to reward someone who has been very good have to take from others that have performed very well.'*

The HR Manager mentioned a number of mechanisms used to penalise employees. These included:

- *'Employees can be told off'*
- *Flexitime can be reneged*
- *Probation can be extended or refused*
- *Terminations*
- *Disciplinary process or verbal warnings, we haven't had a full case of this here (in the case organisation)*
- *These are all at performance level*
- *Can miss deadlines and talk through with the customer'*

The Managing Director described the full reward package offered to employees at the recruitment stage. This included: salary depending on responsibility levels, bonus, reward and recognition process, Christmas party drinks, sports and social (company contribution), and benefits (pension and health insurance).

A common theme at the individual level was that rewards were limited in scope and the differences between good and poor performance was not really distinguished. Penalties were only administered in severe cases where the disciplinary process had to be invoked although poor performance did limit career opportunities.

6.4.9.2 Team level

The Software Manager (IDI) gave an overview of team reward and penalty:

> *'Unusual to see the whole team awarded, I have seen some for particularly difficult projects.'*

At the team level the IDI Team Lead mentioned a case where bad performance had business consequences. It had resulted in new steps being introduced to a procedure as a preventative measure to ensure that it didn't happen again. Unfortunately in this particular case the US management sent out a global email detailing the error which the IDI Team

Lead suggested that it had a negative impact on team morale. Similarly, the IDI Team Lead perceived that:

> *'If one person doesn't contribute well to the team as a whole, the team can be penalised by new jobs not being brought to Ireland or new projects and high profile tasks not being given to Ireland.'*

Remote working was sighted as a problem area where the IDI Team Lead perceived that it was:

> *'Harder to impress because we are in Ireland and they look for problem and issues that occur in Ireland more, it is a more negative than positive working environment.'*

Reward dimensions were identified by the Software Manager (IDI):

> '*within our team we do verbally congratulate people and at team meetings we would give praise verbally informally. The name on the Source doesn't appeal to people because in a lot of cases it is doing lip service, some people do hard work and get no recognition.'*

The items illustrated in table 6.4 below summarised the rewards and penalties identified during the interviews at the case organisation.

Table 6.4: Examples of rewards and penalties

Reward	Recipient	Organisation Level
Presents, jumpers/fleeces from US	Annuities Product team	Team
Reward and recognition on source - 50 Euro	Product Support team member Broker Dealer team member	Individual
Verbally congratulate people	IDI team member	Individual
Emails	IDI team IDI team member	Team and individual
Lunch invites in the US	Annuities Product team	Team
Bonus process, linked to performance management process	All employees	Individual
Salaries, linked to performance management process	All employees	Individual
Increased training	Annuities team member	Individual
Prestige and status	Identified by Managing Director and Operations Manager	Individual
Increased responsibilities	Identified by Finance Manager	Individual
Christmas party tab	All employees	Company
Sports and social (company contribution)	Identified by Managing Director	Company
Benefits (pension and health insurance)	Identified by Managing Director and Finance Manager	Company

Penalty	Recipient	Organisation Level
Disciplinary procedures –verbal warnings	Broker dealer team member	Individual
Salary, bonus, training, status and responsibility level may be affected negatively	All employees	Individual

A common theme was that reward at the team level was quite poor and many of the participants perceived that this should be explored more within the organisation as described by the Finance Manager:

> *'There are some teams out there that are more successful than others and enjoy a higher reputation with customers than others. That is not freely acknowledged or perceived here in Ireland.'*

6.4.9.3 Company level

There was little evidence in respect to results or consequences of the company evaluation process. The Managing Director suggested that:

> *'It's going to drive your company forward – better company and it's very evident.'*

The Software Manager (IDI) noted that:

> *'Haven't seen the organisation rewarded or penalised at all.'*

The Software Manager (Production Support) recognised an element within the bonus appropriation process where the bonus was directly linked to company performance:

> *'There is a company and individual element but there is a gap for team bonuses.'*

6.4.10 Feedback and feed-forward information flows

The Software Manager (Annuities) indicated that:

> *'Both feedback and feed forward are used.'*

This was consistent with the Software Manager (Production Support) and the Broker Dealer Team Lead. Further the Software Manager (Annuities) observed that:

'feed forward tends to be lessons learned at the end of a project but it should also be the whole knowledge that was learned, that should be put forward for use in future projects whereas it doesn't seem to happen.'

The Software Manager (Annuities) mentioned that some of the people were involved in both projects and were able to feed forward the relevant information. Whereas, Software Manager (Annuities) perceived that if someone new was put on the project, they may not be able to find out the same information. A common thread noted by the IDI Team Lead:

'If I get feedback from the Project manager I would communicate it. If it was bad it would be communicated to the individual involved, if good I would communicate to the team.'

This indicates that there is an informal process that links the type of feedback and its recipient(s). The IDI Team Lead remarked that:

'feed forward communications have helped to improve processes used, take lessons learned for the latest project, a new communication process will be put in place so that all changes are communicated to all concerned parties.'

Further, when asked to describe the information flows IDI Team Lead mentioned that:

'At the moment they are reactive and a bit more operational than strategic, some areas may have more capacity than others. A lot of areas are very busy and priorities may be toward customer assignments more so than in other areas.'

Table 6.5 illustrates a number of different types of feedback and feed forward information flow mechanisms used at the case organisation.

Table 6.5: Examples of feedback and feed-forward mechanisms

Feedback mechanisms
Email /telephone calls
Face to face meetings
Quarterly meetings
Operations forum
US/customer meetings
Performance management process
Feed-forward mechanisms
Post Project reviews
BSA and developer discussion forums

Generally there was a lot of communication evident at the case organisation which facilitated effective feedback and feed-forward.

6.4.11 Performance management system modifications

Interviewees were asked about changes to the performance management system over the last three years. Of the ten interviewees two interviewees noted that they were not in the company long enough to comment on this area.

The performance management system at the case organisation was primarily the individual performance process. This was evident from the documentation reviewed as PRHR3301 Performance Management Process. Thus when asking interviewees about changes the interviewer reminded them that they were to include all levels, to include team and company performance management and evaluation. The Business Planning process (PROR1095) was only introduced in 2003, thus evidence of using the company and area plans was not really available at the time of the research. The Managing Director mentioned that individual performance management was previously done in isolation but it was now integrated to business area plans and company plans. The Operations Manager concurred with this and mentioned that previously performance was not tied to business and individual objectives.

The Operations Manager noted that there have been many changes to the individual performance management system:

> *'The drivers as to why the process was changed were to align the whole process so that objectives (company, business area and individual) were aligned. Attempted to address weaknesses, we gave out some drafts to middle managers, got feedback and refined them. There have been significant changes in the last three years.'*

Further the Operations Manager articulated that:

> *'It is effective now, it has been trimmed down and is easier to complete, and it was quite cumbersome. It is difficult to tell, as it has not gone through a whole cycle but has helped raise awareness.'*

The Software Manager (IDI) recognised an increased involvement level by the parent company:

> *'Our team objectives for this year have changed in that now they go to senior management in Ireland and the US and align to the US objectives.'*

This was consistent with the HR Manager who also recognised involvement by the parent company as significant. The Finance Manager noticed that it:

> *'Had to become more goal orientated, objective specific, as more closely aligned to the company overall objectives. It was refreshing a tired system.'*

The HR Manager remarked that changes were minor and that:

> *'the individual process was done in isolation in the past whereas now team and company now integrated. Didn't have defined area plans thus objectives were not defined in past.'*

The Software Manager (Annuities) identified major changes that were driven primarily by the case organisations CMM accreditation:

> *'KPIs are a big thing we didn't have KPIs three years ago, CMM and SCF are all new within the last three years. KPIs fell out of CMM and there is a lot of that going on – we are doing this because CMM tells us we need to do it – industry standards – training tracker – HR standards. CMM was brought in because of competition – I think that a sister subsidiary located in the Philippines at the time were on CMM level two and at the time we needed to be at CMM level three – one step ahead.'*

This type of competitor analysis is ongoing at the case organisation; this is evident from the company documentation PROR1091 Competitive Advantage Evaluation process. However, this was not mentioned at any of the interviews. The Broker Dealer Team Lead identified a useful tool that assists the performance management process:

> *'New tool to merge peer review documents, very effective, less time consuming, part of innovation process.'*

A relevant point made by the IDI Team Lead was in relation to increased responsibilities and performance expectations are:

> *'that three years ago mistakes were OK whereas now, errors can cause the company millions of dollars. Therefore the performance expectation of an individual is much higher. The amount of work and systems that we are responsible for now has increased and probably the most relevant is that it's changed because the case organisation was originally deemed to be cost effective. A lot of the knowledge people in the States have left and now we are perceived to be the knowledgeable resources. Thus the whole dynamics of the in-sourcing nature of the organisation has changed somewhat.'*

6.4.12 Use of Performance management control system

The Finance Manager found that the nature of software meant that the use of the information from the performance management and control system was diagnostic:

> *'In the business support and helpdesk, its ongoing in software it seems to be more reactive why – because of the measurement system again the measurement of the helpdesk churns out information all the time that can be used to be more pro-active. Volume of projects in the software area e.g. where only two projects are delivered in a year they wait until they are delivered and are then reactive.'*

This suggests that there may be an opportunity lost in gaining new knowledge or new opportunities. The Software Manager (Annuities) affirmed that it was a:

> *'Reactive approach in that we missed the deadline what can we do in the future.'*

The Broker Dealer Team Lead perceived that the processes currently established were diagnostic and described some:

> *'Post project review meeting is run by SQA. This details lessons learned, SQA pushes this feed forward, action items only starting now. SQA is driving this so it should be effective in the future. Post project review document is put on directory and never looked at again, information stops there.'*

The Software Manager (Production Support) was quite vehement in his comments:

> *'The analysis of work isn't given enough time, we are not learning everything, too busy to move onto next work request, there are conflicting priorities, too busy to improve the process. We are reactive we think that we'd like to be pro-active but we're not. We are bad at estimating and we do not tell the truth about our actuals it is a vicious circle the only way to break out of this is to tell the truth.'*

The Annuities Product Team Lead concurred with some of these elements that seem to be related to the parent company:

> *'Reactive. People say that they try to improve processes but nobody takes the time to look at the process to improve it.'*

6.4.13 Strength and coherence of links

Interviewees were asked to describe the strength and coherence of links between the components in their performance and management system. The Operations Manager described that he perceived the link between components in their performance management system was weak:

> *'The current performance management process doesn't really tell us about the organisational performance, it is not related to measures on how organisation is performing e.g. resolving issues. There is a gap here and it may be connected to how the team performs as a whole. It is difficult to tell if we have an effective performance management system.'*

The IDI Team Lead argued that the performance management and control system requires more change as the relationship between the parent company and the case organisation changes:

> *'The whole dynamics of the company has changed. If there is no way you can meet a deadline, if I push back to the Project Manager then I'm on my own it seems that nobody wants to rock the boat.'*

The Software Manager (Annuities) perceived that the links were related to the high level vision and mission:

> *'I think that the vision drives everything and that there is not enough of push on vision, every time someone opens their mouth they should be talking about vision'.*

The HR Manager perceived that tools had a large role to play in linking the components:

> *'Link across all areas Training Tracker, The Source. Everything involves everyone, for example pictures of employees on The Source. Budget defines headcount, salaries are already planned, and everything is collective, not in isolation.'*

6.5 Summary

This chapter has outlined the findings from phase two of the research. It gives details of the semi-structured interviews with the targeted multi-national organisation conducted on-site during January and May 2005. This chapter also includes a review of a sample of internal documentation**.** The company profile is presented to ensure that the reader has some context in which to position the findings presented. It then aligns the emerging themes from the data collection using Otley and Ferreira's (2005) extended performance management framework while integrating specific KM elements. Three levels of the organisation were involved in phase two of the research.

The case organisation's vision and mission were directly related to the parent company's business objectives and the vision and mission documentation mentions innovative products but the interviews did not disclose any specific KM elements in this area. The KSFs of the case organisation were cost, people and quality. Workforce flexibility, the recruitment process, qualifications, experience, attitude, time-zone advantages and language were also mentioned. The link between KSFs and KPIs is not clear in all cases.

The case organisation strategies and plans used a formal setting process. However, operational plans were often pre-determined by the parent organisation and were non-participative even though the case organisation was asked for input in some cases. There were formal processes to establish an annual plan at company, team and individual levels. A business area level had also recently been introduced. At middle management and Team Lead levels there was less visibility of how company plans were established. Strategies and plans specific to KM included the innovation process, structured customer feedback, competitive advantage evaluation process, changes to the performance

management process, staff rotation and cross-training, input to the SPL and post-project reviews. Knowledge repositories, shared networks and databases were established at the case organisation and thus were a part of the organisations plans; however, conflicting priorities constrained the case organisation employees from contributing regularly.

KPIs were used to establish yearly targets at the company and team level of the organisation. The case organisation sought CMM accreditation due to increased competition from a sibling company in the Philippines. CMM accreditation was a primary driver for the introduction of the KPIs. There were nine KPIs measured and evaluated at the case organisation mainly at team level with some at company level. Many of the KPIs were specific to monitoring cost. Supportive tools for KPI collection were dis-jointed and this was recognised as a contributing factor to the lack of analysis of metrics and the collection of inaccurate data. Time required for analysis was deemed insufficient due to conflicting priorities from the parent company in relation to work assignments. Some measures were regarded as ambiguous (e.g. SCF and defects). There were some positive comments in relation to the automation of performance appraisal input. Software was regarded as not simple to measure; comparisons were made to the business support and helpdesk areas where industry standards were easily adopted.

Specific targets were established at individual, team and company level. Annually at the performance management meeting an individual's targets were set for the forthcoming year using a number of headings as identified in the form (PRHR3301_FM01). A number of these headings suggest KMA such as teamwork, initiative and developing others. The target setting process for the company and area plans did not seem to follow the same process as individual plans where SMART objectives were set. The case organisation was constrained by the parent company in relation to managing its performance as the parent organisation influenced changes to objectives, goals and priorities. This SMART methodology used for individual targets was perceived largely as effective. At the team level targets included parameters for the established KPIs and less tangible targets such as cross-training.

While performance evaluation was formal for an individual's performance, it is difficult to determine if the knowledge related items (e.g. initiative, developing others) identified in

the individual performance management form were evaluated or rewarded. The evaluation process at the team and company level were less formal even though the procedure outlined a formal process it did not seem to be followed. If it was completed but not visible to interviewees it may reflect a communications issue. Ongoing performance at all levels was dependant on the specific manager's style as to whether one to one meetings were held or not or if performance was reviewed regularly. The performance procedures provided ongoing review guidelines that were not compulsory. The evaluation of team targets was criticised by interviewees as ineffective. At company level HR specific targets were set and evaluated during the year but other targets were less tangible and the evaluation process for the company was also criticised by the interviewees. Remote working was noted as a barrier to team evaluation as teams often comprised of members from both the case organisation and the parent organisation. Objectives and goals were often changed by the parent organisation.

KMAs were identified in individual and team targets. Some KMAs were done across all teams (e.g. SCF, effective training and effective recruitment) and other KMAs were done by each team separately and in isolation of what was happening in other teams. There did not seem to be much collaboration between teams e.g. newly established communities of practice (CoP) for BSA and developers. A reason for this was given that when the organisation was smaller it was easier to share knowledge informally. There is evidence of knowledge acquisition at the case organisation in relation to recruiting BSAs to strengthen the service offering to the parent organisation.

Reward was mainly at the individual level. This included a bonus, salary, reward and recognition process, promotions, emails sent to the whole company or team. Senior management noted that the case organisation was under huge budget constraints; the middle and Team Lead levels perceived the rewards as insufficient in some cases where extra effort was made. Penalties for poor performance included: verbal warnings, extended probation and commencement of the disciplinary procedure. At the team level there was a yearly team night out, and recognition was put on the intranet for team effort in some cases. A specific element or percentage of each individual's bonus was dependant on the company performance. However this was only identified at one interview.

The case organisation was presented as being flat but there were four distinct hierarchical levels identified. However, senior management were perceived as approachable and good at escalating issues. The most significant factor to consider was that the organisation was a subsidiary of a large MNC and was hugely influenced by the parent organisation.

There was specific feedback processes established to capture lessons learned from projects. However, these were deemed ineffective by some interviewees; it was perceived necessary to include the same resources on related projects to ensure mistakes were not repeated. The SCF process was criticised as it had the potential for manager bias as there was no involvement of the parent company it was deemed subjective by the interviewees. Feed forward processes were also established such as the General process improvement process however this was criticised as there was no buy-in from the parent company on some of these procedures. However, there was a lot of effective communication ongoing both forward and backward. Face to face communications were the preferred mechanism to transfer and disseminate knowledge for training and meetings. Remote working seemed to drive collaboration techniques. These included: use of email; video conferencing; the intranet; and issue resolution in teams. Collaboration was perceived as effective within teams but there was conflicting evidence that this was not the case between teams who were not directly working together.

Generally it was perceived that the case organisation was reactive or diagnostic. This was attributed to involvement of the parent organisation and the changing of priorities as a result. The main changes in the performance management of the case organisation was that it had moved from a process entirely for individuals to now including a company and team level perspective and had plans to establish a business area level. It established more goal orientation at all levels. It had been accredited with CMM in recent years which had impacted many procedures and introduced KPIs. The level of performance expected by the parent company had risen in recent years as the type of work assignment had changed to more knowledge-intensive (complex) work assignments. Barriers to KM were identified such as ease of capture and investment at employee and technology levels. Knowledge organisation was deemed problematic and the interviewees perceived that

initiatives such as the SPL were not sufficiently supported by technology. Weaknesses and plans to improve the SCF procedure were identified.

The following chapter develops these findings and discusses the emerging themes within the overall context of the literature and research objectives.

Chapter 7: Discussion

7.1 Introduction

'Knowledge is the food of the soul.'

Plato (428 BC-348 BC)

This chapter identifies and discusses the emerging themes from the findings in relation to the overall research objective:

'to investigate the nature of KM within the multi-national sector in Ireland.'

The structure of this chapter follows the major themes within the research. These include: i) drivers of KMA; ii) types of KMA; iii) barriers and enablers of KM; iv) processes for managing knowledge and v) links between managing performance and KM. In this penultimate chapter the linkages and relationships between the findings and the literature are examined in order to provide an overall picture of KMA within an Irish context. Managerial perceptions of KM across a sample of MNCs are examined and the nature and extent to which the case organisation has implemented KM initiatives are determined. The research findings are discussed in light of observations made during the literature review and the empirical evidence collected from both the questionnaire and during the field study.

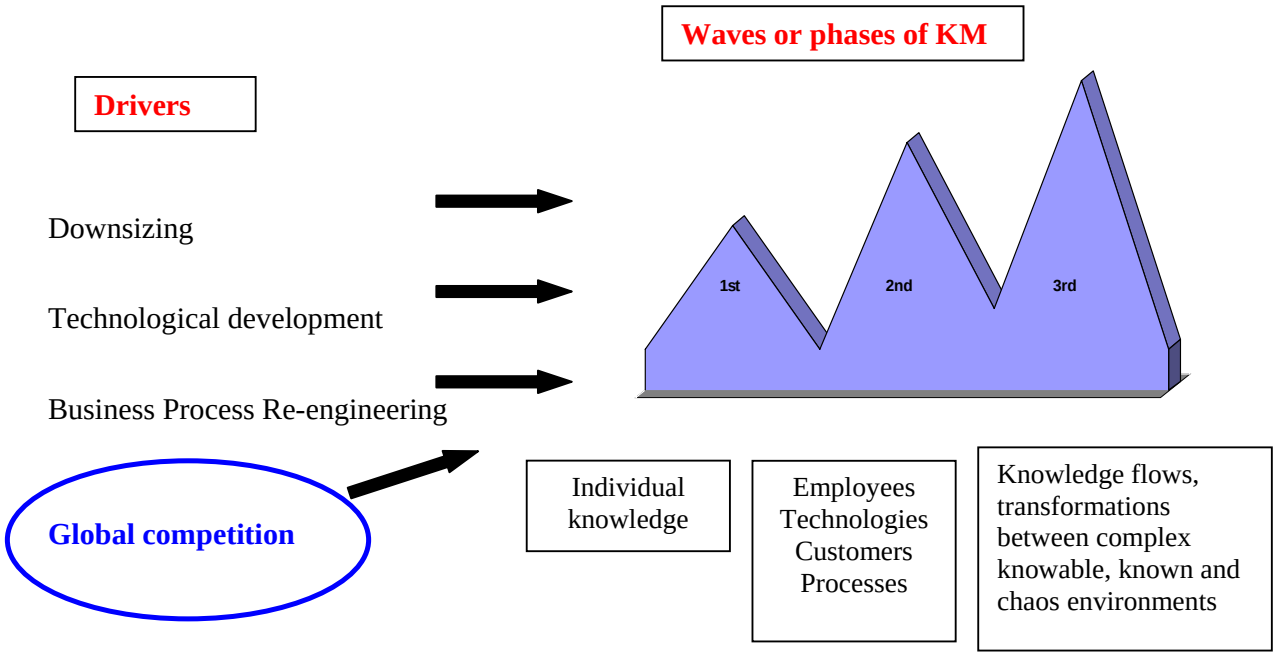
7.2 Drivers of knowledge management

Overall there was a high awareness of KM shown by both respondents to the questionnaire and interviewees from the case organisation. From the questionnaire it seems that managing knowledge is pervasive across industry and hierarchical levels as 76% of respondents to the questionnaire noted that KM was an area of interest for them at the moment and 73% expressed that they have responsibilities that involve managing knowledge. Within the case organisation, knowledge capture, codification of knowledge, organisation and sharing of knowledge were the main areas highlighted by interviewees. However, overall the case organisation seemed to lack an integrated approach to KM and

interviewees perceived that KMAs were often done in isolation and that teams worked in silos on KM initiatives. It could be suggested that one of the reasons for high awareness of KM among respondents could be the attention KM gets in the business press. Awareness of KM as an important resource is widespread within the literature (Stewart, 1997; Drucker, 1999; Roberts, in Bhimani, 2003). Generally the justification for KM initiatives are connected to improved performance, productivity and competitiveness, effective acquisition, sharing and usage of information within organisations, decision making, capture best practices, reduced research costs and delays, and increased innovation (Maglitta, 1995; Cole-Gomolski, 1997b; Ostro, 1997; Bassi, 1997, Mayo, 1998). For this study many of the KM initiatives were introduced to improve competitiveness, reduce costs and capture best practice.

DiMattia and Oder (1997) argue that the growth of KM has emerged from two fundamental shifts: downsizing and technological development. This is consistent with suggestions from Newell et al., (2003) who note that KM is a response to business process re-engineering (BPR). From the field study KMA was triggered by global competition from another subsidiary company. A sibling company in the Philippines had attained CMM level two accreditation. The management team in the case organisation were extremely aware of the possibility of off-shoring software development to this subsidiary instead of the case organisation. Thus a programme of objectives was established to attain CMM level three accreditation. CMM level three initiated many KMAs such as knowledge organising, knowledge transfer and dissemination in the form of post-project reviews, introduction of the SPL and software process improvement. Findings from the case study illustrate that the organisation is process-orientated, therefore it seems that employee activities are documented in detail (See Appendix H e.g. Software services process PRSD2013) and by capturing this knowledge it counteracts some of the risks highlighted by downsizing and BPR. Figure 7.1 outlines potential drivers, and illustrates the progression of KM from the literature to represent the different phases of KM. The findings from the field study suggest that the case organisation has adopted elements of the second wave of KM (Mouritsen, 2003). However, it may be still adapting to the third wave of KM (Snowden, 2002).

Figure 7.1: Phases of KM



Source: Adapted from Snowden (2002), Mouritsen (2003)

The first wave regarded knowledge as tacit and controlled by individuals where the organisation plays a supporting role (Mouritsen, 2003). In the 2nd wave, Mouritsen (2003) describes knowledge management as an organisational resource, found in employees, technologies, processes and customers. There is evidence from the case study of KMA within each of these elements. Snowden (2002) describes a 'third age' which focuses on studying the paradoxical nature of knowledge in complex systems and understanding knowledge flows and transformations between complex knowable, known and chaos environments. These phases are useful to determine where the KM movement originated and challenges encountered through the different phases. The increase in size of each wave represents the maturity and increase in occurrence of KMA.

Findings from the questionnaire presented that 50% of the respondents rewarded knowledge sharing, 33% did not know if they rewarded knowledge sharing or not and 17% did not reward knowledge sharing. This suggests that the respondents were unclear

on their KM policies or practices. It is also difficult to determine if the respondents did not measure knowledge sharing how they were able to reward it. Potentially this may have been a token reward for knowledge sharing rather than a reward equivalent to the level of knowledge sharing, which suggests that the reward may be not commensurate with the effort.

Even though awareness of KM seemed generally high from the empirical evidence the absence of a high level strategy and subsequent plans within the case study seems to suggest a dis-jointed approach to KMAs and this could contribute to its effectiveness.

7.3 Types of KMA

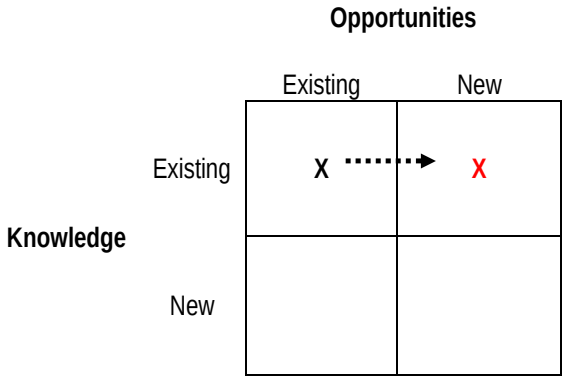
A number of different types of KMAs were undertaken in the case organisation and identified by the questionnaire respondents. The following classification of KMAs was adopted for this study: knowledge creation, scanning, acquisition, identification, transfer, dissemination and organising (Stankeviciute, 2002).

7.3.1 Knowledge creation

Knowledge creation was not hugely evident within the field study but included an innovation process that initiated for example a tool to amalgamate all input to individual performance appraisals and save management time and effort. The Finance Manager perceived that innovation ideas were mainly introduced by middle and senior management and that bottom-up ideas were limited and that the company could be more innovative. Respondents from the questionnaire did not rate their organisation as particularly innovation driven (average was 2.46 out of 5). Overall this suggests a lack of knowledge creation within the empirical evidence as no other specific KMAs in relation to knowledge creation emerged. Roth (2003) suggests knowledge creation activities such as the coordination of knowledge creation initiatives, connecting different knowledge domains within the company and providing the overall direction for knowledge creation in different communities of practice.

Findings from the literature highlight the importance of innovation (CIMA, 2001; Lynn, 1998) and note that it has the potential to impact a firm's competitiveness. This suggests that the knowledge within the case organisation is predominately a firm's existing knowledge rather than new knowledge. This is further accentuated by the competitive advantage process, PROR1091 (Appendix H) as it identifies threats rather than opportunities for the organisation. Figure 7.2 illustrates a potential link between different types of knowledge (existing and new) and different types of opportunities (existing and new).

Figure 7.2: A knowledge and opportunity matrix for the case organisation



From the evidence collected it seems that the case organisation mainly operates in an environment where the knowledge and opportunities already exist. Only two out of ten interviewees gave any indication of knowledge creation at the case organisation. An obstacle to knowledge creation at the case organisation could be the absence of a dedicated research and development facility or team. Potentially the case organisation could move from the first quadrant in figure 7.2, where it is currently exploiting existing opportunities with existing knowledge to the second quadrant where the case organisation could potentially create new opportunities with existing knowledge rather than introduce new knowledge. An example of this was where the Broker Dealer Team Lead presented process improvement that decreased the time to turnaround work assignments and release them for new assignments. This illustrates effective use of existing knowledge to create opportunities albeit an isolated example. Potentially the case organisation could focus more on these opportunities.

From the questionnaire a high proportion of respondents (67%) promoted continuous learning. Mintzberg (1987) and Hart (1992) agree that there is a link between knowledge creation and learning thus one could consider continuous learning as a KMA or as an implicit KMA. However, it may be argued that as the categorisation of knowledge activities has evolved over time, an initial tendency to link learning with knowledge creation may not be still valid. Potentially continuous learning could be categorised using Stankeviciute (2002) classifications of knowledge scanning or knowledge acquisition. Within the case study continuous learning was identified as both a formal and informal mechanism. The HR Manager identified formal continuous learning which involved training, both internal and external.

Overall one can suggest that the case organisation was mainly operating within existing knowledge boundaries with some dependency on its parent organisation to increase its existing knowledge through KM enablers.

7.3.2 Knowledge scanning and acquisition

Knowledge scanning was described by Stankeviciute (2002) as the continuous systematic search and collection of potentially useful information from external and internal organisational environment. There was no evidence of knowledge scanning in the case organisation however as mentioned in the previous section, continuous learning could be interpreted as linked to knowledge scanning. It may be the case that knowledge scanning is considered a corporate activity rather than a subsidiary one; this could facilitate the corporate organisation in determining its own configuration rather than being influenced by the subsidiary and thus would explain why knowledge scanning is not promoted at the case organisation.

Knowledge acquisition was described by Stankeviciute (2002) as the acquisition of new knowledge, renewing existing knowledge, especially through social interaction. The Software Manager (IDI) did present an example of knowledge acquisition where a certain resource type with a particular skill-set and expertise level were targeted and recruited into the organisation in order to meet a strategic need identified by the senior management

team. This was the first case of strategic knowledge acquisition within the organisation so it can be suggested that the organisation is relatively immature in this area. The HR Manager did recognise that recruitment within the organisation was knowledge acquisition but that it followed a process triggered by the parent organisation in that a requirement for a new resource was identified which resulted in a recruitment search for a suitable resource.

7.3.3 Knowledge identification

Knowledge identification was described by Stankeviciute (2002) as composing of knowledge, competencies, experience and expertise possessed by organisational members, their groups and entire organisation. Specific knowledge identification activities within the case organisation included the competitive advantage evaluation process mentioned by the Managing Director and the informal gathering of knowledge pertaining to the skills and experience of the software engineers which was requested by the parent organisation mentioned by the Operations Manager. Knowledge identification activities seemed in their infancy at the case organisation. The Managing Director and the Software Manager (IDI) identified a potential reason as to why this was the case. Historically Ireland was identified as having a low operational cost base, however with recent increases in Ireland's cost base there was an increased prospect of outsourcing to other subsidiaries, that similar to the case organisation provided a lower cost base to the parent organisation. The competitive advantage process was introduced in 2004. The case organisation was still relatively immature in that it had operated in Ireland since 1997 but was now potentially moving out of a comfort zone or incubation period where it would have to be competitive with other subsidiaries. Grant (1997) and Akhaven et al. (2006) conceive knowledge identification in the form of a knowledge 'audit' as an essential task in a knowledge-intensive organisation and Akhaven et al. (2006) propose it as a critical success factor to any KM initiative. Knowledge identification at the case organisation seemed weak as there was no evidence of output from the competitive advantage process and no evidence of the use made from the skills and experience matrix mentioned above. There were no other specific knowledge identification processes identified.

7.3.4 Knowledge transfer and dissemination

Within the case organisation, the interviewees perceived knowledge transfer and dissemination activities as common in the form of structured customer feedback process, process improvement process, meetings, staff-rotation, cross-training, SPL and post-project reviews. The Operations Manager suggested that the effectiveness of these activities was a concern and should be investigated further. This highlights a potential that even though these activities are adopted by an organisation their value to the organisation is not always clear. Grant (1997) suggests that different types of knowledge vary in their transferability.

7.3.5 Knowledge organisation

Knowledge organisation is described by Stankeviciute (2002) as:

> *'codification, structuring and storage, capturing knowledge, experience and expertise of organisational members and their groups in written or electronic form and their storage for later reuse'*

The case organisation revealed many ways of organising its knowledge and these included: knowledge repositories (both online dynamic repositories and relatively static ones), shared networks and central databases (centralised mail server for archiving emails). The Annuities Product Team Lead noted that knowledge organising was problematic:

> *'there is stuff buried on the intranet that we can't get to. Each team has lots of documentation and it's impossible to search for information'*

And

> *'The Source* (company intranet) *isn't effective a lot of the time – emails going around about updates there is duplication a lot of the time'*

Martensson (2000) contends that the first part of KM, the storage of information is probably the first and perhaps the easiest phase of KM. However, the Broker Dealer

Team Lead identified knowledge organisation as problematic. The Software Manager (Annuities) suggested that the size of the organisation and its volume of resources impeded effective knowledge organisation activities, whereas he suggested that a small company may be more effective at KMAs where the body of existing knowledge is less voluminous and easier to manage.

7.4 Barriers and enablers of knowledge management

Having explored the types of KMA it was evident that influencing factors can emerge as both barriers and enablers and these played a significant role in determining the result from KMA. Thus, within this section the barriers and enablers of KM are discussed to assist the level of understanding of the different types of KMA.

7.4.1 The influence of information technology on KM

The case organisation was predominantly a technology based organisation and thus it was not surprising to find that it was supported by many technical applications and solutions. Knowledge repositories, shared networks, central databases and a SPL were established at the case organisation. Many of these systems and their related activities originated from the organisation's objective to attain CMM accreditation and were dependent on technology. The following sections examine the barriers and enablers to KM.

Interviewees found that the complexity involved in using these applications to support metrics required by CMM constrained the management capacity to analyse them and thus their usefulness was not concrete. Even though interviewees noted that the technical applications assisted management functions (for example a tool to amalgamate input to performance appraisals) there was some dissatisfaction with the inability to link the different systems.

Within the questionnaire 50% of respondents perceived that KM was not a technical issue; 17% perceived that it was a technical issue and 33% were unsure if it was a technical issue or not. The literature suggests 'soft' factors such as culture, behaviours, attitudes, people, and processes are more relevant to manage knowledge than technology (Bititci et al.,

1997; Forbes, 1997; Koudsi, 2000; Sveiby 2001, cited in Mason and Pauleen 2003). These 'soft' factors seem to add to the complexity of managing knowledge.

The case study highlights that technology is not perceived as a complete solution to managing knowledge, in some cases its complexity overpowered the managers capacity to analyse the results that were generated. However, it did support KMAs and in some cases a dependency on technology was evident. Stankeviciute (2002) identified that technology and structure is more important for activities dealing with knowledge capturing, identification and dissemination. This suggests that technology can assist the management of existing knowledge rather than encourage creation of 'new' knowledge.

Overall it can be determined that information technology within the case organisation was perceived as both an enabler and barrier to KM, as mentioned within the literature it is specific to the management of existing rather than new knowledge.

7.4.2 The influence of strategy on KM

Having established a relatively clear strategy that was linked to plans, objectives and targets, the empirical evidence from the case organisation suggests that it struggled with the constraints imposed upon it by its parent organisation. Their plans were influenced by the authority of the parent company to over-ride priorities and change plans and objectives without consultation. It seemed that corporate mission and objectives were taken as priority. Thus the structure influenced strategy which in turn influenced KM. This is particularly relevant as it was clear that the parent organisation had authority over resources and funding. Thus priorities and activities were changed and diverted away from KMAs to operational assignments defined by the parent organisation. An overall specific KM strategy was not evident at the case organisation even though there were specific activities introduced by the Managing Director to promote KM; no specific budget or capital investment seemed to be evident for KM. This could be explained by the objective to introduce KM with little or no cost or it could mean that the case organisation is attempting to introduce KM as an integral component to all other activities. This absence of a specific KM strategy seems to have affected the links between the integration

of KMAs within the case organisation as each team pursued their own KMA and goals or in some cases these were absent.

The case organisation had a formal business planning strategy that was criticised during the interviews for evaluating and reviewing the plans only on a six-month basis. Furthermore, though the business planning process was formal from the empirical evidence, evaluation was not always carried out formally. Performance evaluation at the individual level did address KMAs but KMAs at the team and company level were not assessed formally. Teams did introduce KMAs but these initiatives were done in isolation and in many cases one team was not aware if another team was pursuing any KMAs. An example of this is the recent introduction of a developer and BSA forum within one team to discuss best practice and resolve issues; this was an isolated activity which according to the Software Manager (IDI) was not communicated to other teams. The Software Manager (Annuities) noted the isolation of KMA and attributed organisational bureaucracy as a barrier to introduce organisation-wide initiatives. Potentially if there was a clear KM strategy at the company level cohesion between teams on KM initiatives may have been more closely linked and a more structured evaluation of performance of KMA may have been feasible.

Before embarking on a KM strategy Grant (1997) and Akhaven et al. (2006) recommend a knowledge 'audit' as a starting point; this knowledge identification activity was not evident in the case organisation and thus a target or measure for evaluating progress on KM was not evident and this potentially creates a moving target approach. Zack (1999) and Storey and Barnett (2000) found that typically a KM initiative was perceived as a 'nice to have' rather than a mission critical activity. They conclude that it would seem a greater need to ground the KM initiative in the firm's strategy. The success or failure of any initiatives introduced into an organisation need to be part of the strategy, plans, targets and evaluation process if its value is to be assessed accurately. Overall the case organisation did not seem to have a formal KM strategy; thus an evaluation of KMA was not evident. Even though the introduction of many KMAs was evident they were introduced on a piece-meal basis rather than collectively and this further disjointed the approach and contradicts the empirical evidence in the literature that suggests a KM strategy is critical to its success.

7.4.3 The influence of MC on KM

The structure of the case organisation was predominately described as flat even though there were four distinct hierarchical levels. This suggests that interviewees perceived that the culture promoted a flat organisation. Of particular relevance were the constraints placed upon the case organisation by its parent organisation. During the interviews the parent organisation was referred to as the customer. From the evidence the relationship seems to represent a parent-child relationship rather than a customer-supplier relationship. Empirical evidence from the interviews illustrate that the parent organisation had authoritative ability to change the focus of both strategic and operational activities. It also highlighted that many KMAs were constrained by the priorities of the parent company. The Annuities Product Team Lead noted that:

> *'The Customer (parent organisation) can be a barrier as they don't give enough time to introduce pro-active things to try to improve things.'*

This influence by the parent organisation on KMA was further described by the Software Manager (IDI):

> *'rather than do post project reviews there is a tendency to say, that's done move onto the next task and the post project review can be seen as a waste of time, they (the parent organisation) like to work in a reactive environment all hands on deck a quick pat on back and move onto the next one.'*

> *'there are conflicting priorities where the volume of work is impacting the ability to complete process stuff.'*

Within both the questionnaire and the case organisation collaboration with Government and education was not deemed important. In many cases multi-nationals have pre-existing networks along their supply chain and support can stem from parent organisations. This implies that these organisations are not dependent on local support networks.

The case organisation was categorised as a cost centre and not a profit centre. This may have influenced the authority and control that the parent organisation had over the case organisation. The Operations Manager noted:

> *'our main customer is the (parent) offices and they are the ones we are competing with in terms of service costs, which is why we were set up, lower cost.'*

The parent organisation may not consider that the subsidiary will be a prime contributor to new knowledge, new products or innovation given its distance from the core business of the organisation. This is further supported by descriptions of the parent organisation requesting the case organisation to move onto new tasks promptly rather than record lessons learnt.

Within the field study the Broker Dealer Team Lead who was involved in the organisation since its inception raised a concern with the customer (parent) organisation that:

> '*there is still a fear that the Irish subsidiary are taking their jobs over there, we know that therefore they may not be as willing to share knowledge as some people perceive us as a threat.'*

This could be interpreted as a major barrier to knowledge sharing. The Operations Manager highlighted that there was a dependency on the parent organisation for business knowledge whereas the Operations Manager perceived that the case organisation had equivalent technical knowledge to the parent organisation.

7.4.4 The influence of culture on KM

Findings from the case organisation highlighted trust as an important factor when working remotely with their parent organisation. Trust is also one of the sixteen concepts Akhaven et al. (2006) identified and consider critical to success with KM initiatives. The case organisation was still relatively immature as it had operated in Ireland only since 1997; thus its culture was still influenced by its parent organisation to a large extent. Within the case study there was at least nine KPIs recorded; four of which could be categorised as

KM specific. A common problem that the interviewees recognised was insufficient time and priority to analyse these. In determining its own identity the case organisation introduced these KPIs in isolation to KPIs collected by the parent organisation. In the interviews the focus was on establishing measures and collecting data regardless of their effectiveness and subsequent use. The Software Manager identified that the process to generate these metrics was complex and time-consuming and that the managers did not share information on how to generate this data efficiently.

Within the case study the Software Manager (Production support) noted that bureaucracy was a barrier to introducing organisation-wide initiatives. Bureaucracy was highlighted as a potential barrier to a more innovative and knowledge-intensive economy by a European Commission Report (2006b). Morris and Schindehutte (2001) deduct that through procedures, systems, and documentation, managers are increasingly encouraged to establish quantifiable performance benchmarks or KPIs in as many activity areas as possible. These benchmarks can become ends in themselves, while conveying a lack of trust in employees.

Within the case organisation the Annuities Product Team Lead identified that some individuals 'hoard' information and the Broker Dealer Team Lead noted that in some cases the parent organisation was resistant to share their information as there was a risk to their job security. This self-interest could be a major factor as employees may expect reward or a premium attached to the value they perceive their knowledge to be worth. The type of control mechanism that can manage this propensity to hoard is not clear but transparency and a culture of openness within an organisation can act as an enabler (Akhaven et al., 2006). Warren (1999) and Anthes (1998) suggest that this hoarding of knowledge is common as there is a sentiment that holding information is more valuable than sharing it. The sensitivity attributed to individual knowledge is a major factor that is difficult to overcome, there may be a reward or risk to sharing this information and this is subject to an individual's assessment.

Overall, interviewees from the case organisation described all KMAs identified by Stankeviciute (2002) except knowledge scanning activities which were not explicitly identified at the case organisation. Stankeviciute (2002) describes scanning as the

continuous systematic search and collection of potentially useful information from external and internal organisational environment. It could also be interpreted as the extent to which a firm seeks to align itself with the market or technology advancements. As the case organisation was operating as a subsidiary and cost centre it may perceive that it is not required to align itself to the market but it may be relevant to align itself to advancements in technology. This could be linked to the recent introduction of the competitive advantage process that aims to identify threats to the case organisation. There was no evidence from the interviews in relation to scanning internally for market or technical knowledge.

7.5 Processes used to manage knowledge

This section discusses the different business and technical processes employed at the case organisation and identified by the questionnaire respondents to manage knowledge. These include internal processes and externally validated processes.

7.5.1 Internal processes

Chapter six presents the findings from a review of internal processes from the case organisation. During the field work it emerged that these processes (such as the SPL and post-project reviews) played an integral function as mechanisms in which to manage knowledge. Specifically, the innovation process promoted knowledge creation. The competitive advantage process supported knowledge identification. The software process improvement process supported knowledge transfer and dissemination. The business planning process facilitated the formal objective setting process adopted by the case organisation that revealed some KM objectives in relation to training and continuous learning. Overall, one can suggest that the internal processes may have been driven by the externally validated processes that influenced a culture of process-orientation. As the case organisation utilised these internal processes to drive the company strategy and plans and if KM was part of the organisation's formal strategy or plans this could have had a knock-on effect. Potentially as KMAs were documented at the case organisation but practice of KMAs was not strong it could suggest that the reward structure for KMAs was not

supporting this activity or that the culture at the case organisation was resistant to these activities.

Bititci et al. (1997) argue that a learning culture improves an organisation's ability to operate in a dynamic environment; learning was supported by the case organisation's business plans and continuous learning was linked to knowledge creation (Mintzberg, 1987; Hart, 1992). Mwita (2000) stipulate that performance is influenced by the processes and tools of the organisation. This suggests that performance in relation to KM can also be influenced by processes and tools that support KM. The case organisation adopted formal technical, structural and managerial conditions in its approach; this is relevant for an organisation that focuses on activities dealing with knowledge capturing, identification and dissemination rather than knowledge creation (Stankeviciute, 2002). This further supports the notion that the case organisation mainly deals with existing knowledge rather than new knowledge which ultimately could result in limiting its capacity for new opportunities. New opportunities at the case organisation could include increased work assignments from parent and other subsidiaries or adding to new areas of expertise.

The questionnaire also provided some data as to the type of mechanism utilised to manage knowledge that could be related to an organisation's internal processes or objective setting process. A general retention of employee policy was regarded as an organisational goal in the majority of organisations. However, it was not categorised as a main area of concern for managers; it was rated six out of ten in terms of management challenges. It can be argued that retention often causes tensions within an organisation as it can have a positive and negative affect. Conversely, it can be argued that turnover creates opportunities and refreshes the organisation but it creates more rework for teams with regard to retraining. The majority of respondents were concerned about specific people leaving the organisation which highlights an organisational dependency on employees. If retention of employees was rated as an internal goal within the organisation's plans the risk to the organisation could be minimised by introducing measures within the internal processes to deal with retention or replacement of employees. This finding suggests that there is a degree of dependency on employees but it was a moderate concern for managers. Within the case study measures were taken within the firm's strategy and plans to retain staff, this included cross-training and documentation of procedures. It seems that even though KM

emerged from issues associated with downsizing and a loss of key resources the issues still remain and the supporting KMAs or processes to counteract these losses are not always visible.

7.5.2 Externally validated processes

In this case study it has emerged that an important factor that facilitated KMA was external accreditation. Thus participation in an external accreditation scheme can serve as a platform for developing KM. By highlighting the impact that the externally validated processes had on KM at the case organisation three advantages to pursuing KM in tandem with such accreditation have emerged. These included: external credibility, tangible output in respect of investment and increased competitive advantage by positioning itself above other subsidiaries.

The case organisation had introduced a CMM objective to attain level three as a reactive measure to potential competition by another subsidiary company. It received this accreditation in 2003. CMM is a software quality accreditation mechanism that illustrated certain KM attributes in the case organisation. It also forms part of the overall goals of the case organisation annually to maintain its level three status thus making certain KMAs compulsory and under continuous revision. These activities included the SPL, post-project reviews, and the introduction of metrics, the process improvement process and the evaluation of training through the 'Training Tracker' tool. These activities act as mechanisms to manage knowledge as they assist knowledge transfer and dissemination. Within the empirical evidence collected at the case organisation interviewees provided some suggestions to enhance these activities such as increased technical support for the SPL.

7.6 Links between managing knowledge and performance

There were some links identified between managing knowledge and managing performance at the targeted organisations but it was not to any large extent. This may have been due to the fact that the case organisation had not targeted KM or KMAs in a formal manner through its strategies and plans and thus the strength of the links were

weak. This section discusses elements of the performance management framework (Otley and Ferreira, 2005) that were relevant to KMAs at the case organisation.

7.6.1 Performance management

Performance management at the case organisation was investigated in detail through the interviews. Specific elements of a performance management framework that were identified as particularly relevant to KM were the vision and mission, strategies and plans, KSF, reward and penalties and evaluation.

7.6.2 Vision and mission

During the interviews at the case organisation there were no direct comments in relation to knowledge or innovation for the vision or mission even though the actual vision statement does state:

> *'We accomplish this mission by providing innovative, customer-focused protection and wealth management products and services.'*

One could expect that the vision and mission of a knowledge-intensive organisation would include KM principles or innovation guidelines which could then be used to develop organisation objectives and goals. The Annuities Product Team Lead noted that:

> *'I wouldn't think that people in my team are aware of the company vision and mission, I looked it up on the Source* (company intranet) *before I came into this meeting.'*

The IDI Project Manager identified possible improvement areas for the communication of the organisation's vision and mission:

> *'Currently communicated poorly – could be done better it is posted around the building it's not something that's over emphasised a lot it probably could be – well it could sit on our source* (company intranet).*'*

Values, beliefs and vision become critical when people are the key value drivers, as they guide and align the behaviours of employees (Collins and Porras, 2000; Davidson, 2002). Otley (1999) argues that a clear vision and mission is critical for an effective management control system. Evidence from the field study suggests that the vision and mission was not a driver of operational activity or business planning and thus its inclusion or exclusion of KM was irrelevant. However, the case organisation was a subsidiary that operated as a cost centre with its parent organisation's global operations. The influence its vision and mission had on the organisation may not be strong due to the influence of its parent organisation. In contrast Zack (1999) and Storey and Barnett (2000) describe KM as a mission critical activity.

7.6.3 Strategies and plans

The case organisation used a formal business planning process to develop its strategies and plans but the evidence suggests that both a formal and informal process were used to determine the direction of the organisation. Chapter six presented the findings from the case study in relation to a number of strategies and plans adopted by the case organisation for 2005. There were a number of KMAs identified; this facilitated the subsequent monitoring and management of these activities through the performance management process used by the case organisation. Akhavan et al. (2006) propose that knowledge strategy is a critical element of a successful KM implementation. This study concurs with that proposal in that where the KM strategy and plans are identified at the outset it may be evaluated and managed more successfully. Amaratunga and Baldry (2002) claim that a performance management system acts as an enabler for a 'circle of learning.' It could be argued that this 'circle of learning' is central to the themes within the KM literature specifically in relation to knowledge creation and knowledge sharing. The case organisation illustrated continuous learning and also the use of forums for different roles within the organisation to promote or facilitate learning.

7.6.4 Key Success Factors (KSF)

The main KSFs at the case organisation included cost, quality and people. Cost is a tangible element it may be influenced to a small degree by KM but to a lesser extent than quality or people. The quality and people elements are less tangible than cost and more specific to the KMAs. The Managing Director of the case organisation noted that:

> *'getting the right people with good, appropriate qualifications, experience and attitude was a KSF and this was facilitated through the recruitment processs.'*

Experience and attitude levels are difficult to manage from a performance perspective as they are relatively intangible compared to cost or throughput. This example was reflected in the Software operations generic business plan for 2005 but specific targets such as turnaround time for recruitment were not identified. The Software operations generic business plan notes:

> *'Support successful recruitment of new staff on time and in line with required experience and educational levels.'*

The Operations Manager noted:

> *'Those particular KSFs* (flexibility and adaptability to technology changes) *are not measured, we do try to measure but we struggle with it at times'*

This suggests that the performance management system has not adopted elements (such as flexibility and ability to adapt to changing technology) that were raised as KSF and thus a complete performance measurement process is not evident in that the organisation is not measuring aspects that are core to its perceived success. The Software Manager (Production Support) advocated that the employee's willingness to follow procedures was a key component and that:

> *'a small group of leaders take on ownership and responsibility (of the KSFs).'*

This suggests that there is a dependency on key resources. This links with phase one findings where 65% of questionnaire respondents strongly agreed with the statement that if certain people left the organisation it would be a great concern. This aspect of taking on responsibility is difficult to manage as it is not easy to quantify. Within the questionnaire responses indicated that team collaboration was a KSF and that the firm's employees do not perform consistently at their best. Again it is difficult to determine exactly what an employee's 'best' contribution to an organisation is and this links back to the self-interest concept discussed earlier. For the case organisation team work was integrated into their PMS at the individual level (PRHR3301_FM01, Appendix H) and thus added to the complexity of determining its value in relation to other areas of the PMS.

Mathi (2004) identified that the critical success factors of implementing KM in organisations are culture, strategy, systems and IT infrastructure, effective and systematic processes and measures. This was also the case for Smith (2004) who noted that a common finding across the three case studies investigated were the effective codification of processes. Akhavan et al. (2006) identify sixteen concepts that they consider critical to success within KM systems these include: training programs, knowledge architecture, network of experts, knowledge sharing, transparency, knowledge strategy, trust, organisational structure, business process engineering, pilot, knowledge storage, knowledge capturing, knowledge identification, knowledge audit, organisational culture, support and commitment of the CEO. Table 7.1 (section 7.6.6) links these KSFs to KM at the case organisation as an overall KM tool in regard to the case study findings.

7.6.5 Reward, penalties and performance

At the case organisation reward was primarily at the individual level and only formed an element of the individual performance management system. The HR Manager noted that financial reward was subject to huge budget constraints. It was perceived by the Finance Manager that there was little difference in reward for high performers and average performers. Reward was primarily financial in the form of salary and an annual bonus. Non-financial rewards included: an annual team night out, emails sent to the whole company, recognition on the 'Source' (company intranet), promotions and increased responsibility. Feedback from the interviewees indicated that these non-financial rewards

were insignificant where considerable effort had been deployed and in some cases this had a negative effect on morale. Responsibilities and roles were outlined at the outset of each individual's performance management meeting but were informal during the year.

Keeler (2000) and Mayo (1998) argue that the personal reward systems must support the culture of sharing knowledge. Within the case organisation the reward system only supported knowledge sharing where it was clearly identified within the individual's performance objectives and even then the process was arbitrary where even if an individual was rated poorly on knowledge sharing they may still receive full reward based on the average overall performance. Potentially, should the organisation have specific KM elements identified within its vision and mission and strategy and plans it could be suggested that all employees might contribute to KM within the organisation and set aside a specific percentage of the reward for KMAs. The results from the questionnaire indicated that the link between reward and performance was not particularly strong. This is consistent with the case organisation.

Reward or penalty at the team or company level were not identified as significant by respondents even though the annual bonus scheme contains a specific element that links a percentage to company performance.

7.6.6 Performance evaluation

A complete KM perspective in relation to performance evaluation was not clear, evidence from the case organisation indicated that KMAs were evaluated only at the individual level. However, table 7.1 could be used as a mechanism to describe the maturity of the case organisation in relation to KM. The KM success factors were identified by Akhavan et al. (2006) where they stipulate the necessity of these success factors to be part of an overall successful KM implementation. The classification or rating mechanism was based upon the case data.

Table 7.1: Knowledge maturity guide

KM success factors	Not applicable	introductory	intermediate	advanced
Training programs		x		
Knowledge architecture		x		
Network of experts			x	x
Knowledge sharing		x	x	
Transparency		x		
Knowledge strategy		x		
Trust		x		
Organisational structure			x	
Business process engineering			x	
Pilot	x			
Knowledge storage				x
Knowledge capturing			x	
Knowledge identification		x		
Knowledge audit	x			
Organisational culture		x		
Support and commitment of the CEO		x		

Source: Akhavan et al. (2006) and case study findings

The research that has been conducted in relation to this case study may form a basis for developing this type of template or evaluation scorecard. It could be further developed as a self-assessment audit tool or bench-marking mechanism. In some cases a single classification was not determined (e.g. network of experts). This can be explained by the ad-hoc nature in which some teams within the case organisation were advanced in these areas and others were rated as intermediate. A specific knowledge strategy, pilot on KM or a knowledge audit were not evident at the case organisation and were thus considered N/A or absent from the data. Overall the case organisation could be determined as in an introductory stage of KM implementation.

Performance management at the case organisation was perceived as problematic. There was no facility to compare performance across departments or teams, as metrics were designed in-house and the Operations Manager identified that there were no suitable industry-standard measures to adopt. Other contributory factors are that there was insufficient time allocated to analyse the results from the performance management system due to conflicting parent organisation constraints. In some cases the accuracy of

performance data collected was questionable and priorities and tasks were changed by the parent organisation regularly.

The Finance Manager identified that team evaluation was weak. In support of this the IDI Team Lead described a situation in which poor team performance resulted in less strategic tasks assigned to that team and a reduction in responsibility levels. This is a concern that may not be visible at senior management levels as it does not follow a formal evaluation and reporting process.

Overall individual performance evaluation was considered strong. Through a review of the individual performance management form (PRHR3301_FM01, Appendix H) it included a multitude of sections including specific KM sub-topics. Thus it was difficult to determine if the overall reward or penalty was attributed to KM or any other particular area as only an overall assessment rating was determined.

7.7 Summary

This chapter discussed findings in regard to the overall and sub-objectives of this research study. It explored the findings in relation to the different types of KMA and their meaning within the context of the case organisation. It discussed the drivers of KMAs and awareness both within the case organisation and also within the MNCs involved in the questionnaire. It discussed the barriers and enablers of KM and mechanisms used to manage knowledge. Major barriers to KM included the overriding influence that the parent organisation had on the case organisation, the self-interest of employees which resulted in 'hoarding' knowledge in some cases and the complexities and difficulties of managing software. Integration of a KM strategy or KMA across the parent and subsidiary organisations could potentially overcome this barrier. External accreditation emerged as an enabler of KM as did supporting tools and processes including information technology mechanisms. The case study analysed the links between managing performance and managing knowledge. It found that in the absence of a formal KM strategy at the case organisation it was applying an informal KM strategy through its performance management system. A framework is suggested that could be used as an evaluating tool to determine the maturity of KM in an organisation; it adopted the critical success factors of KM initiatives as identified by Akhavan et al. (2006) and merged these with the case study findings using a rating system.

Overall the extended framework presented by Otley and Ferreira (2005) facilitated an analysis of KMAs within the case organisation. The case study provided an opportunity to apply this framework. Similar to the findings in Otley and Ferreira (2005) beliefs and boundary systems were largely beyond the organisation's domain as it was a subsidiary of a large MNC. In addition this was found to be a large influencing factor on KM and performance management within the case organisation.

Chapter 8: Research conclusions and recommendations

8.1 Introduction

'To be conscious that you are ignorant is a great step to knowledge.'

Benjamin Disraeli (1804 - 1881)

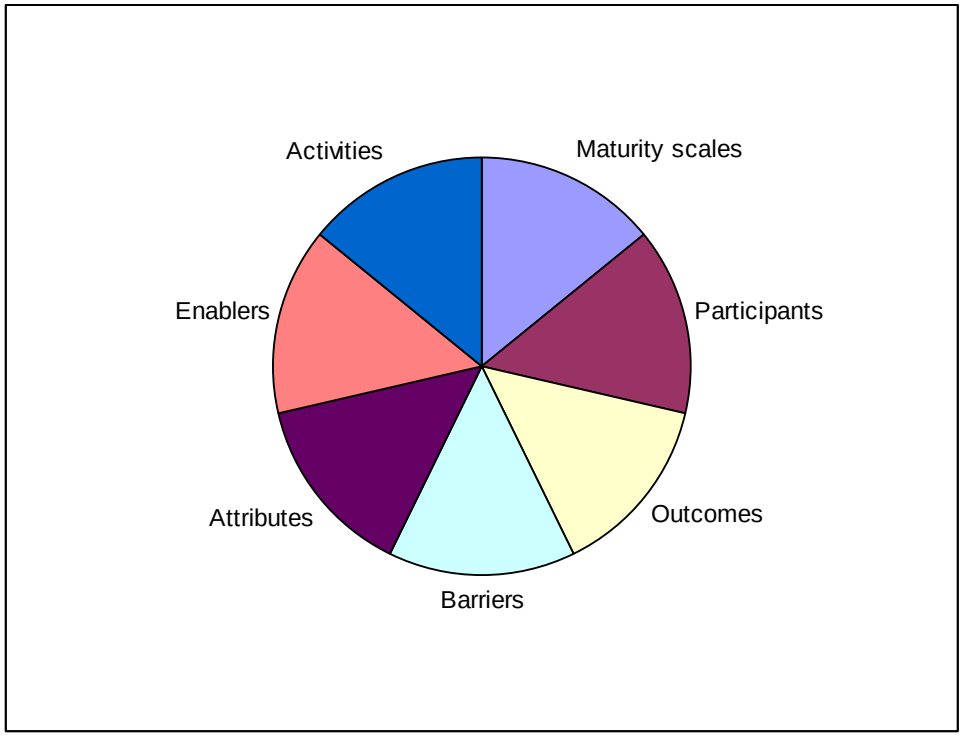
This chapter develops conclusions based on the literature and empirical evidence discussed previously. It considers the overall research objective 'to investigate the nature of KM in Ireland' within the defined limitations of the study. Routes for future research are suggested having emerged by examining gaps in the literature and findings.

8.2 Conclusions

The most significant emerging areas related to external accreditation as a vehicle for promoting KM, the corporate impact and parent-subsidiary relationship, links between KM and PM and the identification of drivers and complexity of KM. This section is divided into these sub-headings.

Figure 8.1 illustrates how KM could be conceptualised to further understanding of the related components. Each of the elements of the conceptual model is described in the study. These elements may be necessary for a KM initiative but may not be sufficient. Additional research in this area may develop this further.

Figure 8.1: A conceptual model of KM



8.2.1 External accreditation

Within the case study external accreditation was identified as a driver of KMA; it raised the justification level for KM and highlighted multiple areas for return on investment. It had credibility; it was evaluated externally and adopted widely within industry. By adopting a KM initiative that also included external accreditation it resulted in a tangible output which could facilitate justification for resources initially. It raised the profile of the case organisation and thus its competitive advantage among other subsidiary holdings. In contrast, this was not the case for the questionnaire where external accreditation was rated the least important management concern or challenge.

8.2.2 Corporate impact

The evidence from the case organisation indicates that the organisation was constrained by its parent organisation. Inevitably the parent organisation had control over the subsidiary

and demonstrated this control by prioritising activities at the subsidiary. The scope of this research did not investigate any knowledge management aspirations of the parent organisation. This control impacted the case organisation's KM plans. Examples were given where employees were not able to spend time documenting lessons learned or best practices as they were requested to move on to new assignments.

By breaking down KM into modular components, the concept as a whole can be further understood. Overall one can suggest that the case organisation is mainly operating within existing knowledge boundaries with some dependency on its parent organisation to increase its existing knowledge through KM enablers.

What was unexpected was that as a technology-based organisation the supporting systems and technical tools were complex and required a major effort to record measures that were identified as KPIs. This constrained the usefulness of these metrics. Evidence indicated that these were not analysed and did not feed into operational activities. However, the case organisation depended on information technology to a great extent. Technology provides functionality that a MNC operating in a global dynamic environment requires and thus can be perceived as more of an enabler than a barrier. Overall, there was little evidence in relation to how an organisation measures the value of its KM. This could be attributed to its lack of maturity.

8.2.3 Links between performance management and KM

Otley and Ferreira's (2005) performance management framework guided the investigation into KM at the case organisation. The topics included in their framework covered many organisational aspects that were influenced by KM. The framework was suited to an overall KM strategy and could potentially be adapted to suit a subsidiary perspective. There was some overlap identified between KSF, KPI and targets and this created some ambiguity. Thus it may be more useful to assess these three areas in tandem to get a complete picture. There were a number of KMAs identified within the strategies and plans for 2005 and targets attributed to these activities. This facilitated the subsequent monitoring and management of these activities through the performance management process used by the case organisation.

Performance management at the case organisation had focused on individual performance management until recently and thus team and company performance management were weak irrespective of KM elements. Individual performance management did include specific KM components, the team skills category included three sub-headings: teamwork, initiative and developing others. However, as the evaluation process included many variables the impact of these KM components on evaluation and reward or penalty were not major. KMAs were identified at team and company level but integration of KMAs was weak. Often activities were done in isolation. This suggests that overall best practice and lessons learned were not shared within the organisation in relation to KM.

A KM maturity guide or audit tool was presented (see figure 7.1, page 197). This facilitated an analysis of the maturity of the case organisation in relation to specific elements adapted by Akhavan et al. (2006) that were regarded as critical to KM. This could be useful as a mechanism to evaluate the current starting position of an organisation before embarking on a KM initiative. It could assist planning and resource allocation requirements for KMAs. It may also generate discussion and debate that could further our understanding of KM.

Knowledge scanning was not evident in the case organisation. Perhaps this is a result of viewing it primarily as a corporate activity as it aligns the organisation to market trends and technology developments. Overall this could be seen as a restricting activity on the case organisation as direction continues to be driven by the parent organisation.

With regard to reward and penalties at the case organisation, the basic package was perceived robust by the interviewees. Thus, the introduction of a highly complex bonus system may not be warranted. The bonus system attempted to reward all areas identified in the performance evaluation form (PRHR3301_FM01, Appendix H). As the evaluation form assessed twelve topics and the reward system did not distinguish between which topics that were rewarded this could be considered ambiguous. It suggests that KM policy in relation to reward could be determined as immature. Some discretionary elements of reward were constrained by cost pressures; thus a focus on non-financial and interaction with employees may be more effective.

The questionnaire collected data on what activities were being carried out by respondents but it was not able to determine the value that the respondents attributed to these activities. Findings from the questionnaire were compatible with the case study where customer feedback was not shared throughout the organisation; the organisation was dependent on specific individuals and continuous learning was promoted within the organisation.

Table 8.1 illustrates the links between the PMC framework dimensions and KM within the case organisation. Overall there were four elements where the links could be considered strong and seven that were considered weak. This is consistent with the overall assessment that the case organisation could be considered immature in relation to KM and for all perspectives. This framework could be used as an assessment or evaluation tool to determine the current maturity of KM in an organisation.

Table 8.1: Links between PM and KM at the case organisation

Performance management dimensions	Absent	Weak	Moderate	Strong	Comment
Vision and mission		X			Evidence from the case study interviews found that the vision and mission did not incorporate any KM elements. However, the supporting vision and mission document stated that the case organisation will provide innovative products.
Key success factors		X			KSFs identified were cost, quality and people. Within the people category, experience, qualifications and attitude were highlighted. These characteristics can be linked with knowledge identification. Quality and external accreditation was linked with knowledge organising, transfer and dissemination. Thus some links with KM were evident.
Strategies and plans				X	The case organisation had a strong process for setting strategies and plans. KM related strategies and plans were established at each layer of the organisation i.e. individual, team and company. However the different layers seemed to operate in isolation rather than as an integrated approach to KM.
Organisation structure				X	The case organisation was a subsidiary of a MNC. This strongly influenced KM and highlighted some constraints. The case organisation was split between two buildings this was identified as contributing to the complexities of KMAs.
Key performance measures		X			There were key performance measures identified at the individual level in relation to KM. There was only one KM performance measure at team and company level (SCF). The focus of key performance measures seemed to be on cost.
Target setting			X		There were targets set in relation to KM at the individual level under the sub-headings, teamwork, and initiative and developing others. Other KM targets at team and company level included recruitment, new mechanisms to store knowledge and new areas of business.
Performance evaluation		X			This was weak within the case organisation particularly at the team and company level but also at the individual level. The individual KM elements were embedded with all other individual performance elements, if weighted as being a priority it may have been more effective.
Reward system	X				The reward system did not specifically address KM; it was linked to individual performance evaluation but specific links to KM elements were unclear.
Feedback and feed-forward information flows			X		The feedback and feed-forward mechanisms utilised at the case organisation were key in knowledge transfer and dissemination activities.
Types of use of the PMC system		X			The use made of PMC system was reactive. Thus when linked with KM it suggests that it could be weak as there is a potential for lost opportunity in gaining new knowledge and new opportunities.
Changes in the PMC system				X	The changes over the last three years at the case organisation can be linked closely to KM and seemed to have a positive affect on KM at the case organisation.
Strength and coherence of links		X			In some cases the link between PMC framework elements were strong such as target setting and evaluation at the individual level. However, overall the respondents perceived many elements isolated in relation to KM.

8.2.4 Drivers and complexities of KM

A new area identified as a driver of KM was global competitiveness between subsidiaries. Within this subsidiary, competition was a high priority as indicated by the Managing Director and the introduction of a Competitive Advantage Evaluation process (PROR1091-Appendix H). In this scenario this competitiveness from another subsidiary promoted adoption of external accreditation which acted as an enabler or facilitator for KM. Trust emerged as both an enabler and a barrier to KM and in particular knowledge transfer and sharing. The subsidiary was identified as a threat to job security within the parent organisation. This affected the trust relationship between the parent and subsidiary and affected the willingness of employees from the parent company to share their knowledge. Trust also emerged as a considering factor within the literature. Akhavan et al. (2006) recommended a KM pilot so that the benefits of KM can be visible to all concerned parties prior to a full implementation which may promote trust.

Within the case study, people and attitudes were identified as key success factors and these are also recognised in the literature (Bititci et al., 1997; Forbes, 1997; Koudsi, 2000; Sveiby 2001b). However, self-interest was also identified as paramount to employee objectives and in some cases employees were identified as 'hoarders' of knowledge. It is difficult to identify measures or actions to counteract this type of behaviour, although an incentive scheme may have an influence

Overall the case study and the literature perceived knowledge as difficult to manage (Sveiby, 1997; Lynn, 1998; Hildreth et al., 2000; Cormican and O'Sullivan, 2003). Within the case study a distinction was made that the software area was more difficult to manage than other business operations such as the helpdesk and business processing area. This was attributed to the adoption of industry standard metrics for the helpdesk and business processing areas which were unavailable for the software area.

Mouritsen (2003) and Snowden (2002) describe various stages or phases of KM and Snowden (2002) argues that we are now in the 'third' stage. This phase focuses on knowledge in complex systems and understanding knowledge flows and transformations between complex and chaotic environments. This study has highlighted some

complexities and challenges that are emerging in relation to KM i.e. parent-subsidiary relationship, evaluation of KMAs and the argument of whether knowledge should be rewarded or is innate to a person's job.

8.3 Recommendations

This study has highlighted a number of recommendations from both a practitioner and stakeholder perspective.

8.3.1 Recommendations for practitioners

It may be beneficial for managers within an organisation to understand a small number of measures rather than focus on a wide number of measures. By concentrating on a small number of measures managers may be able to focus their activities on developing a deeper understanding of the meaning and significance of the adopted measures. The evidence from this study suggests that time constraints encountered by managers resulted in their inability to analyse and utilise the gathered metrics to guide them in their management activities. It is also worth considering that implicit measures such as mentoring skills may be more difficult to manage than explicit measures and that managers need to recognise these challenges.

Managers could benefit if mistakes made within the organisation are highlighted, not as problems that require a penalty but rather as an opportunity for improvement and a chance to learn. Even if there are conflicting priorities to document lessons learned a manager could facilitate the process by being the median through which this knowledge is disseminated. Ideally the organisation should promote a blame-free environment so that employees are encouraged to be creative and experiment and not an environment where employees are reprimanded for 'bad behaviour.'

Recognition of challenges specific to subsidiaries could enable the Irish management to address parent-subsidiary conflicts proactively so that employees of a subsidiary do not feel dis-empowered.

An organisation may find it useful to complete the Knowledge maturity guide as identified in table 8.2 as a mechanism to assess current levels of knowledge management activity within an organisation and as a tool to move toward a more advanced level of maturity. As a planning tool the knowledge maturity guide could facilitate both short and longer term strategy identification in relation to knowledge management.

Table 8.2: Knowledge maturity guide

KM success factors	N/A	introductory	intermediate	advanced
Training programs		x		
Knowledge architecture		x		
Network of experts			x	x
Knowledge sharing		x	x	
Transparency		x		
Knowledge strategy		x		
Trust		x		
Organisational structure			x	
Business process engineering			x	
Pilot	x			
Knowledge storage				x
Knowledge capturing			x	
Knowledge identification		x		
Knowledge audit	x			
Organisational culture		x		
Support and commitment of the CEO		x		

Source: Akhavan et al. (2006) and case study findings

8.3.2 Recommendations for the HR function or Line Manager

There were a number of weaknesses identified within the study within the objective setting and evaluation process. Objectives and performance evaluation at the team and company level were weak. Ideally the overall goal should be development of well integrated measures from strategic to operational level. The researcher perceived that if the organisation applied (SMART) rules to the company and team levels (similar to the process used for individuals) when setting objectives it could make the evaluation process more effective. It is also recommended that the value of introducing the KM initiatives is highlighted by aligning them to the firm's strategies and plans in order to ensure buy-in at all hierarchical levels of the organisation.

Performance evaluation at the individual level included KMAs but they were not evaluated at the team and company level. Teams did introduce KMAs but these initiatives were done in isolation and in many cases one team was not aware if another team was pursuing any KMAs. Evaluation of these KM initiatives was not clear. The Software Manager that noted this isolation of KMAs attributed it to organisational bureaucracy and difficulties in implementing organisation-wide initiatives. Potentially if there was a clear KM strategy at the company level, cohesion between teams on KM initiatives may have been more closely linked and a more structured evaluation of performance of KMAs may have been feasible. Thus this process needs to become less cumbersome if KMAs are to be introduced in an organisation-wide way.

It may be beneficial to link promotion to KM or other rewards within an organisation so that employees can visualise an advantage to partaking in KMAs and potentially some disadvantages if they 'hoard' knowledge or are resistant to KMAs.

8.3.3 Recommendations for a parent organisation

MNCs commonly adopt a multi-site strategy to leverage a number of advantages, e.g. decrease the risk of major disaster, and leverage time-zone advantages. It may be worth considering common KM strategies across all sites. Further research could investigate feasibility, cost and benefits to implementing these types of initiatives. An integrated approach may offset many of the barriers identified in this case study. The control framework (table 8.1, page 205) could potentially facilitate this high level strategy and it could be customised for subsidiaries that may not need to consider all elements of the framework.

In order to get additional benefit of research results going forward, an interdisciplinary and holistic approach is required which goes beyond focussing on narrow technological issues. Future research will shed more light on the complexities of managing knowledge as the shadows remain significant in this domain.

8.4 Limitations of the study

It is beneficial to outline the boundaries of this study to understand the scope of this research and identify perspectives that were not examined in this study but could be considered for further research. These boundaries include methodological limitations, the adopted perspective, and time constraints.

The chosen methodology introduced some limitations to this study within both of the data collection phases. Within phase one the sample of MNCs selected was relatively small and within phase two the research was limited to a one-site case study. Thus the findings cannot assist implementation of KM initiatives to a wide range of contexts and settings. However, they do represent a sample within Ireland where similar environments exist between knowledge-intensive organisations that are subsidiaries to remote MNCs.

This research adopted a managerial perspective; it examined KM through a performance management lens whereas KM encompasses a kaleidoscope of disciplines. Thus it is useful to outline other lenses that may be used within a KM study e.g. organisational behaviour, a human resource perspective or a technical perspective that includes technical KM systems and tools. It may be argued that that by adopting a managerial perspective it leads to a skewed representation of organisational reality. However it can also be argued that this is not a major weakness if both the author and the reader are clearly aware of the adopted perspective.

The research was conducted over a short period of time; thus it is a snapshot of operations at the case organisation. Ideally a longitudinal study may uncover further understanding. Operations at the case organisations have more than likely evolved since then and many elements that were examined may have changed. The study was not longitudinal and did not focus on impacts of changes within the case study organisation. Thus the findings are limited to perceptions of managers at a specific point in time.

8.5 Implications for further academic research

This study has highlighted a number of areas for further academic research. There is a global dimension to this research; the parent organisation had a multi-site strategy as identified by the Finance Manager, which included the subsidiary as just one branch. From the evidence collected in the case study there were specific concerns in relation to the distance between the parent organisation and the subsidiary. As mentioned the subsidiary posed a threat to job security at the parent company. This introduced resistance to share knowledge with employees from the case organisation. Within the overall structure of the MNC the competition across work assignments, expansion plans and cost pressures was strong. This was evident from the Software Manager (Annuities) who mentioned that CMM was introduced as a result of competition from a subsidiary in the Philippines. There are many subsidiaries operating in Ireland who may be experiencing similar obstacles. Further research in this area could identify ways of overcoming this obstacle or at least highlighting it as a potential issue for debate.

Further research could investigate the usefulness of the KM maturity guide or audit tool that was identified within this research (see table 7.1, page 197). It has potential to facilitate an analysis or a feasibility study to determine the current spectrum of KM operations prior to commencement of a KM initiative. It may assist the planning, scheduling and budgeting process to determine required resources for an initiative of this type. The attributes identified as critical to KM as detailed in table 7.1 may not be sufficient, new areas may emerge upon further research.

External accreditation emerged as a facilitator of KM in the case organisation but was not highly rated within the questionnaire. Further research could explore this to identify if external accreditation as a facilitator is common across other organisations. This could be proposed as a platform for justification of resources for KM as it encapsulates a number of tangible benefits e.g. external credibility, tangible output and increased competitive advantage. A KM initiative could potentially have more of an impact if it can provide immediate results, financial results and easily measurable results. External accreditation could potentially facilitate this process.

This was an early use of the extended framework by Otley and Ferreira (2005) and thus subsequent research in this area could further validate and verify the results.

Trust between organisations emerged as an enabler and a barrier to KM and in particular knowledge transfer and sharing. Trust and relationships in a globalised firm environment was recognised as paramount to successful KM implementations both from the literature and the case study (Akhavan et al., 2006). Transparency can be difficult across multiple sites and trust may be needed to be addressed directly. Further research could investigate issues and challenges in relation to trust in globalised firms, particularly at the foundation stages.

Appendices

Appendix A - IDA Letter of support

Zeta Dooly
Post Graduate Researcher
School of Accounting and Economics
Waterford Institute of Technology
Cork Road
Waterford

IDA South East Regional Office
IDA Industrial Park
Cork Road
Waterford

February 2004

Research on Knowledge Management and Management Control

I refer to the above research project which you are undertaking in pursuit of a Masters degree at Waterford IT under the supervision of Sean Byrne and John Maher.

IDA Ireland supports your initiative as studies like this play an important role in deepening the level of management expertise in Ireland. It also strengthens academic and industry links, which is essential for enriching the content of courses, ensuring that graduates are meeting industry expectations.
As discussed during the last meeting I will assist your progress where possible and look forward to learning of your results.

Yours sincerely,

_____

Mr. Brian Conroy,
IDA, South East Regional Development Manager

Appendix B - Case Organisation Letter of consent

Ref:
Letter of consent for Research Project conducted by Ms. Zeta Dooly, School of Business, Waterford Institute of Technology

Research on Knowledge Management and Management Control

Dear Managing Director,

I refer to our recent meeting regarding my research project which is now in the critical write up phase of development.

Best practice in this process requires agreement with the host organisation for the use of the research data in the dissertation and later published work. Following discussions with my supervisors Seán Byrne (tel 302464) and John Maher (tel 302457), I am writing to obtain this consent. Please feel free to contact either of them if you wish to clarify any aspect of this dimension of the research.

Your organisation's participation in the project involved completion of a survey, face to face interviews and a review of some company documentation. I wish to obtain your consent for the academic use of the material and information provided by you. In return I undertake to treat such material with the high degree of confidentiality appropriate for the commercial sensitivity it commands. This means that the primary data will only be used for academic purposes.

It is meaningful for the research to mention the host site name and positions/responsibilities of those who participate but the not names of those interviewed. Therefore I propose to include reference to *(case organisation name)*, and give an overview of the organisation in Ireland. If you wish I will submit this to you for review prior to submission of the dissertation to internal/external examiners as part of the examination process. In addition, their attention will be drawn to these assurances.

The research data will be used only for academic research purposes and will be maintained for as long as is required by academic standards designed to uphold the integrity of findings and publications. These protocols assist in reducing risk exposures that may exist.

Other academic outputs from this project may include conference papers and presentations, peer reviewed journal articles, contributions to professional journals such as those published by the relevant accounting or technical bodies, and research monographs for Waterford Institute of Technology. This is only possible if the participating firm provides consent for this purpose.

I am now a Research Project Manager at TSSG in Waterford Institute of Technology and my telephone number is 051-302943 and my email address is zdooly@tssg.org. Through this research, I look forward to expanding our respective knowledge bases, thereby making an economic and social contribution to the community and building its intellectual capital.

On a personal note I would like to express warm appreciation to you and my ex colleagues who facilitated this project. Indeed I hope that further opportunities for mutually satisfactory cooperation will emerge in the future.

Best regards,

Yours sincerely,

_____

Zeta Dooly
TSSG, WIT

Consent Form

Research on Knowledge Management and Management Control

We have read the consent letter attached and our firm hereby agrees to participate in the research.

We agree that our firm will be identified in publications by (please tick box):

Generic sector only e.g. software services, manufacturing	✓
Specific industry sector	✓
Name	✗

We agree to the preparation of a draft case study for educational purposes, which will be submitted to us for review, and will only be published after our written consent to an agreed case text (please tick box).

Permission for draft case study	YES ✓
	NO

Signed: _____ Date: _____

Managing Director

Firm Name: *Not to be disclosed*

Signed: _____ Date: _____

Researcher

Appendix C - Initial questionnaire – cover letter

Dear Participant,

Research in knowledge management has suggested a link to competitive advantage. This topic is not very mature in Ireland and I am requesting that you assist by participating in this brief survey. The objective of this study is to investigate links between performance management and knowledge management practices in an Irish context. I have received a letter of support from IDA Ireland in respect of this work, a copy of which is attached (as done by e-mail).

Knowledge management is the management of processes such as knowledge creation, acquisition, learning and sharing (transferring) in order to control knowledge assets and to develop new opportunities. This research is aimed at information managers or financial managers. Section A, may also require the assistance of someone in your HR department.

Your participation in this research study is very much appreciated. The completion of this questionnaire is very important to the overall study and should take you less than 15 minutes to complete. Please be open and candid with your responses. All information you provide will remain confidential to my supervisors and will not be disclosed to third parties. The results will be available to you should you wish to participate. I would appreciate if you could return the completed questionnaire within 2-3 weeks to the return email address – kmresearch@wit.ie. If you have any further queries please contact me directly on 087 9477769 or email kmresearch@wit.ie.

Thank you for your time and effort on this matter.

Yours sincerely,

_____

Zeta Dooly
Post Graduate Researcher
Waterford Institute of Technology

*Please note this research is being supervised by Sean Byrne and John Maher, Lecturers in Accounting and Information Management, they can be contacted on 051-302464 and 051-302457.

Appendix D - Questionnaire

1. General information and instructions:

For the purpose of this study please consider the following explanation of knowledge and knowledge management.

Data (e.g. raw facts or measurements) becomes information when it is transformed into information by users and its value and meaning increases. Where information is then applied to experiences and tested over multiple experiences knowledge is derived and value and meaning to users are further increased.

Knowledge management is the management of processes such as the creation, acquisition, learning and sharing (transferring), in order to control knowledge assets and to develop new opportunities.

While answering this questionnaire, please make sure that you take on the role as your firm's representative as your responses are taken as being indicative of the firm's overall status.

These results will be available to you upon request. Again, thank you for your participation, it is my hope that the timely completion and return of this questionnaire is representative of your support for this type of research

Questionnaire items

1. Organisation profile

This information is for administrative and comparative purposes and responses are confidential.

Organisation Name		
Industry		
Contact Name		
Position		
Email		
Phone number		
Number of years experience with current organisation		
Educational qualifications		
Please circle your answer		
Is knowledge management an area of interest for you personally at present?	Yes	No
Do you have any responsibilities that involve managing knowledge?	Yes	No
If yes please describe		
Please indicate if you are willing to participate in further research for this study	Yes	No

	Organisation profile	Strongly agree				Strongly disagree
1	If certain people left within the organisation it would cause great concern	1	2	3	4	5
2	Our employees consistently perform at their best	1	2	3	4	5
3	Technological know-how and skills drive profitability within the organisation	1	2	3	4	5
4	Retention of key resources is an organisation goal	1	2	3	4	5
5	Performance and salary are strongly linked	1	2	3	4	5
6	Our organisation would be described as innovation-driven	1	2	3	4	5
7	Team collaboration is a key contributing factor to our success	1	2	3	4	5

Please rank these areas of concern within your organisation (1 representing the most concern and 7 the least)	
	Ranking
Retention of employees	
Employee loyalty and commitment	
Continual learning and education	
Business performance	
Knowledge sharing	
Knowledge creation, generation	
Employee competency	
Management and leadership	
Process improvement	
Accreditation to industry standards	

2. Workforce profile

This information is for administrative and comparative purposes and responses are confidential. You may need to consult with your HR department for this information.

	Managerial	**Others**
Average age in years		
Education level (1=certified professional level/masters, 2=degree, 3=cert/diploma, 4=leaving cert)		
Number of layoffs/terminated employment in last 12 months		
Number of people who have left voluntarily (resigned) in last 12 months		
Typical number of hours worked weekly		
Total training costs in last 12 months (average per person)		
Number of additional positions filled in last year (excluding replacements)		

3. Knowledge profile

Please drag the red circle over one response per item (1= Strongly agree, 5=Strongly disagree)

	Knowledge Profile		Strongly agree				Strongly disagree
1	Our tangible assets do not add up to the value of our organisation, therefore we need to measure intangible assets		1	2	3	4	5
2	When new ideas emerge within the company we ensure that this knowledge is transferred throughout the organisation		1	2	3	4	5
3	Knowledge cannot be managed in an organisation as it belongs to employees		1	2	3	4	5
4	Managing knowledge is a technical issue		1	2	3	4	5
5	Our organisation rewards knowledge sharing		1	2	3	4	5
6	Our organisation promotes continuous learning among employees		1	2	3	4	5

Please rank these categories of knowledge management activities in order of importance with 1 representing the most important and 7 the least important **(**Stankeviciute, 2002)		
Knowledge identification	**Identification** of knowledge, competencies, experience and expertise possessed by Organisational members, their groups and entire organisation.	
Knowledge scanning	**Scanning –** continuous systematic search and collection of potentially useful information from external and internal organisational environment.	
Knowledge organising	**Organising (codification, structuring and storage)** – capturing knowledge, experience and expertise of organisational members and their groups in written or electronic form and their storage for later reuse.	
Knowledge dissemination	**Dissemination** of knowledge, best practices, and useful information among organisational members, groups, and units.	
Knowledge transfer	**Transfer** of expert knowledge, best practices, competencies, technologies, and work methods between organisation members, their groups, and units, ensuring their successful assimilation.	
Knowledge acquisition	**Acquisition** of new knowledge, renewing existing knowledge, especially through social interaction.	
Knowledge creation	**Creation** of new ideas, concepts, products, processes, technologies involving social interaction.	

Please place the red circle on the answer that you agree with			
Our organisation has introduced a knowledge management system or database		Yes	No
Our organisation has introduced processes that support knowledge management		Yes	No
Is knowledge management allocated resources in your organisation?		Yes	No
Do you have any specialised knowledge management staff e.g. chief information officer or knowledge champion		Yes	No
Are there communities of practice in your organisation (formal collaboration workgroups)		Yes	No

4. External Factors

Please drag the red circle over one response per item (1= Strongly agree, 5=Strongly disagree)

	External factors		Strongly agree				Strongly disagree
1	Customer feedback is shared throughout the organisation		1	2	3	4	5
2	Our customers are primarily internal e.g. parent companies		1	2	3	4	5
3	We often introduce new ideas but find that our customers do not want it		1	2	3	4	5
4	Our competitors drive our objectives		1	2	3	4	5
5	Collaboration with educational institutions is part of our strategy		1	2	3	4	5
6	Government support plays a major role in our organisation		1	2	3	4	5
7	The organisation regularly monitors research and development within our industry		1	2	3	4	5
8	Our suppliers are a key contributing factor to our competitive advantage		1	2	3	4	5

5. Performance management and control mechanisms

Please drag the red circle over one response per item (1= Strongly agree, 5=Strongly disagree)

	Performance management and control mechanisms		Strongly agree				Strongly disagree
1	Some of our objectives are difficult to measure		1	2	3	4	5
2	Cost reduction is often resolved by implementing a technical solution		1	2	3	4	5
3	Our finance department manages our organisational performance		1	2	3	4	5
4	Our organisation relies on intangible assets for profitability		1	2	3	4	5
5	Performance measures are generally well understood		1	2	3	4	5
6	Rewards are primarily financial		1	2	3	4	5
7	Non-financial control measures form more than 50% of our key performance measures		1	2	3	4	5

Please rank the following drivers of performance, key success factors for your organisation

(1=most important, 8=least important)	**Ranking**
Employees	
Customer relations	
System/Technology capabilities	
Organisational processes	
Research and development	
Collaboration with educational institutions	
Management team	
Government support	

Please indicate which of the statements below best describe your performance management system/processes (mark with X)	
Entirely based on legal requirements (financial statements)	
Based on an Industry standard e.g. ISO certification	
Based on an industry model/framework but tailored specifically for our organisations needs	
Based on a generally accepted model e.g. balanced scorecard	
Designed in-house/bespoke system	

6. Other Comments

Please comment on any area related to this topic

Thank you for participating in this research

Appendix E - Case organisation interview and participant details

Position in Company	Date Interviewed
Managing Director	25/08/04 10/1/2005 1/2/2005
Software Operations Manager	28/08/05 18/01/05
Human Resource Manager	16/01/05 22/01/05
Finance Manager	27/08/04 28/01/05
Software Manager (Annuities)	14/02/05
Software Manager (Production Support)	29/04/05
Software Manager (IDI)	17/05/05
Broker Dealer Team Lead	10/5/2005
Annuities Product Team Lead	19/05/05
IDI Team Lead	26/05/05

Senior Management	Main responsibilities
Managing Director	• Overall running of the organisation • Strategic management and liaison with Senior US and Canadian Management on direction of organisation
Software Operations Manager	• Running the software development and support department • Liaison with software management in US and Canada
Human Resource Manager	• Recruitment and employee queries • Industrial relations
Finance Manager	• Managing budgets, costs and payroll of the organisation • Managing business support teams
Middle Management	
Software Manager (Annuities)	• Operational management of software projects for Annuities department • Staff recruitment, development and performance management
Software Manager (Production Support)	• Operational management of Production Support for Annuities department • Staff recruitment, development and performance management
Software Manager (IDI)	• Operational management of software projects for IDI department • Staff recruitment, development and performance management
Team Leaders	
Annuities Team Lead	• Status reporting • Work assignment • Technical expert on Cobol and Annuities products
Broker Dealer Team Lead	• Status reporting • Work assignment • Technical expert on Cobol and Annuities Broker Dealer products
IDI Team Lead	• Status reporting • Work assignment • Technical expert on databases

Appendix F - Interview guide (Participants)

(Prompts sent to participants)

- Vision and mission
- Key success factors
- Strategies and Plans
- Organisation structure
- Key performance measures
- Targets
- Rewards
- Feedback and feed-forward information flows
- Changes to performance management and control system(s)
- Links between above components

Appendix G - Interview guide (Interviewer)

(Prompts for interviewer)

Vision and mission

- Describe the organisation's vision and mission
- How are they determined?
- Who is involved in determining the organisation's vision and mission?
- How is the organisation's vision and mission communicated to managers and employees?

Key success factors

- Describe what you perceive as the organisation's key success factors (KSF)?
- How are the KSF measured? Describe the process used.
- Is the process for measuring KSFs formal or informal?
- Is there a formal tracking process used within the organisation?
- Can you describe it?
- Would you consider the organisation's KSFs as primarily financial or non-financial?
- Can you describe some of the non-financial KSFs in your organisation?
- Are there any specific knowledge related factors? Describe them if there is.

Strategies and plans

- Describe the strategies and plans within your organisation.
- Are there any specific to KM activities such as knowledge sharing or knowledge creation?
- What are the processes and activities that your organisation adopts to ensure success?
    - Are there any specific KM processes? Describe.
    - Are there any KM tools? Describe.
    - Is collaboration among employees common in your organisation? Describe mechanisms used to collaborate.
- Describe how direction for job responsibilities and tasks is given to employees.
- Would you describe your performance management system as interactive or diagnostic (reactive)?

Organisation structure

- Describe your organisation's management structure.
- Would you describe it as flat or hierarchical?
- Would you perceive the organisation structure having an impact on performance management? Describe the impact.

Key performance measures and KM

- Describe KPIs and how they were determined. Are they effective?
- Discuss their assessment and measurement.
- Discuss your familiarity and understanding of KM.
- Discuss your familiarity and understanding of performance management.
- Discuss the following KM terms:
    - Knowledge economy
    - Knowledge assets
    - Intellectual capital
- Are there any specific KM activities happening within your organisation?

Targets

- How are targets set within your organisation?
- Who is involved in the target-setting process? Finance, HR, Operations?
- Would you describe the target-setting process? Is it a participative process?
- What types of target set within your organisation?
- Any there any specific to knowledge or knowledge assets?
- Any there any specific to knowledge repositories or technical tools such as databases?
- Any there any specific to knowledge activities such as knowledge creation or knowledge sharing?
- Do you think that they are achievable? Based on your previous experience within the organisation?
- Do you think that the targets set within your organisation are effective?

Performance evaluation

- Describe the process for evaluating individual, group and organisational performance within your organisation.
- Does your organisation use a process to monitor results against targets set?
- Please describe it?
- Once targets are evaluated against actual results what actions are taken? What are the consequences of this process?

Rewards

- Describe the reward process within your organisation.
- Describe specific financial rewards under the following headings.
    - Individual
    - Team
    - Organisation
- Describe specific non-financial rewards under the same headings.
    - Individual
    - Team
    - Organisation
- Describe the process used to determine rewards.
- Are rewards given at management discretion?
- Is the process used to determine rewards objective?
- Discuss any penalties where targets are not met.
- Describe any process for awarding bonuses within your organisation.

Feedback and feed-forward information flows

- Describe feedback processes within the organisation.
- What tools and mechanisms are used?
- What sort of feedback information flows have been created for monitoring current performance and bringing about adaptation of current behaviour?
- What type of feed-forward information flows (if any) have been formulated to enable the organisation to learn from its experience, to generate new ideas and to recreate strategies and plans?

- Would you describe the information flows within your organisation as reactive to events that have happened or pro-active in informing employees of upcoming events or information?
- Is there a mix of operational and strategic information fed to employees within your organisation?
- Describe the mechanisms used within your organisation for information flows.
- Describe use made of feedback and feed-forward information. Would you be aware of actions taken as a result of feedback or feed-forward information? Describe these.

Change to performance management or control system

- Describe any changes implemented within last three years to the organisation's performance management or control system?
- Describe the process used to refine it?
- Describe reasons why it was changed, if appropriate using the following headings:
    - Environment
    - Dynamics
    - Competition

Types of use of the PMC system?

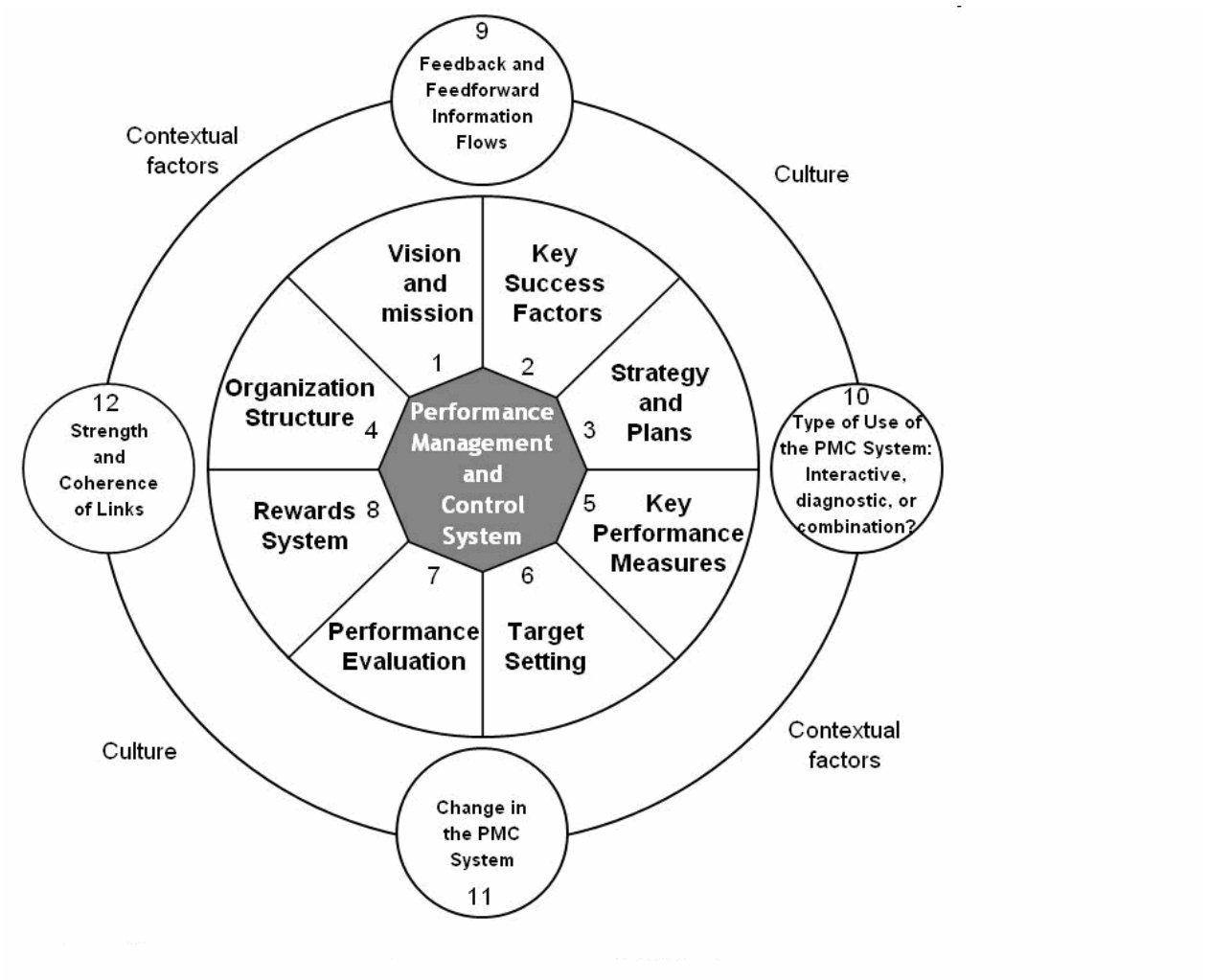
- Can you describe the use given to the information and controls? Would you describe these as interactive, diagnostic or a combination of both?

Links between components of the performance and control management system in the case organisation

- Can you describe the strength and coherence of links between the components in the performance and management system?

Appendix interview guide– for reference only

Otley and Ferreira's Framework 2005 - 12 Question framework



Appendix H - Internal documentation summary

Document Name	Document reference	Relevance
Monthly Report– Quality Assurance Services, September 2004 Quarterly Report- Q4 Results, 2006	N/A	Feedback/ feed forward Knowledge transfer Knowledge dissemination Performance evaluation
Systematic customer feedback	PROR1090	Feedback /feed forward Mechanism for KM Control mechanism Performance evaluation
Competitive advantage evaluation	PROR1091	Control and planning mechanism Performance evaluation
Innovation process	PROR1092	Knowledge creation
Business planning process map	PROR1095	Control and planning mechanism Performance evaluation
General process improvement	PROR1096	Mechanism for KM Barriers/enablers Knowledge creation/dissemination/transfer
Software services process	PRSD2013	Control mechanism Barriers/enablers
Software Process Improvement process	PRSD2302	Process improvement
Software Process Library index	PRSD2302_TL01	Type of KMA Knowledge sharing/identification/transfer and dissemination
Case organisation Vision	N/A	Communications

Document Name	Document reference	Relevance
and Mission		
Performance management procedure	PRHR3301	Individual Performance evaluation
Performance Review and Development Form	PRHR3301_FM01	Individual Performance evaluation form
Software Operations Generic Plan 2005 v1 draft	N/A	Control and planning mechanism Performance evaluation Barriers and enablers

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