UNIVERSITY OF SOUTHERN QUEENSLAND

Knowledge Management Practices in Multimedia Super Corridor Status Companies in Malaysia

A dissertation submitted by

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ABSTRACT

Knowledge is recognised as being an important asset in organisations these days. Despite this, many organisations are not doing enough to effectively manage this important asset for its competitive advantage. In response to this, knowledge management which is defined as a process that effectively creates, captures, shares and uses organisation-wide knowledge to improve the organisation's performance was conceived and has since gained widespread acceptance the world over. Despite its widespread acceptance, little is known about the current levels of knowledge management practice within the Malaysian context, in particular amongst the Multimedia Super Corridor status companies in Malaysia. In view of this, the research problem formulated for this study is: *'How and why do Multimedia Super Corridor status companies in Malaysia practise knowledge management?'*

Based on this research problem, three research questions that look specifically at the knowledge management enablers, knowledge management processes and knowledge management outcomes were identified based on the literature review. The literature review provides an overview of knowledge and the different types of knowledge. It then chronicles the developments of knowledge management and canvasses extant literature on knowledge management within the Malaysian context. It found that there are various enablers of knowledge management that may impact on the level of knowledge management practice in Malaysia. These enablers can be broadly categorised as culture, structure, people and information technology infrastructure. To further comprehend the knowledge creation process, this study utilised Nonaka and Takeuchi's (1995) socialisation, externalisation, combination and internalisation (SECI) model for knowledge creation. In addition to this, organisational efficiency, competitive advantage, maximisation of organisational potential, and better management of knowledge assets were identified as key knowledge management outcomes in organisations. These knowledge management enablers, processes and outcomes were used to develop a preliminary theoretical framework upon which this research was based upon.

This exploratory research employs the use of qualitative multiple case studies operating within a critical realism research paradigm. This research uses a total of four cases with three interviews each giving a total of twelve interviews. The literature review and two in-depth convergent interviews were the basis upon which the interview protocol was formulated. This interview protocol was then administered to a pilot case involving three interviews. This process was repeated in the main data collection stage on three different cases with three interviews per case.

The main findings of this research are the ten different enablers of knowledge management that either take on the roles of inhibitor or facilitator. The facilitators of knowledge management are collaboration, mutual trust, learning, leadership, incentives and rewards, IT infrastructure and T-shaped skills. The inhibitors of knowledge management are centralisation and *kiasu*-ism. Another variable – formalisation has both positive and negative effects on knowledge management as it acts as an inhibitor to the socialisation knowledge creation process but acts as a facilitator to the other three knowledge processes. This research also found that all four knowledge processes – socialisation, externalisation, combination and internalisation are being used by all cases to create knowledge with preference given to socialisation and combination. In addition, knowledge management is found to positively affect the organisations' competitive advantage, organisational efficiency, maximising organisational potential and effective management of knowledge assets. Further research utilising a quantitative approach to test the theory developed from this study apart from analysing the new variable *kiasu*-ism and the concept of *ba* were suggested to better comprehend the practise of knowledge management in Malaysia.

CERTIFICATION OF DISSERTATION

I certify that the ideas, results, analyses and conclusions reported in this dissertation are entirely my own effort, except where otherwise acknowledged. I also certify that the work is original and has not been previously submitted for any other award, except where otherwise acknowledged.

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1   INTRODUCTION

This study investigates the current levels of knowledge management practice among Multimedia Super Corridor (MSC) status companies in Malaysia. In particular, this study explores the various enablers (or influencing factors) of knowledge management, knowledge processes, and knowledge management outcomes of Multimedia Super Corridor status companies in Malaysia. This study draws upon research on knowledge management enablers, knowledge processes and organisational performance conducted in other countries to gauge the level of knowledge management practice in Multimedia Super Corridor status companies. Based on the findings obtained in this study through the application of a systematic methodology, a research model that represents the various factors influencing knowledge management practices in Malaysia and their inter-relationships is formulated.

This chapter introduces the study by providing background information relating to the nature of the Multimedia Super Corridor status companies in Malaysia followed by knowledge management in general. It highlights the need to explore the current levels of knowledge management practice among these organisations to allow for a better understanding of the current trends and issues relating to knowledge management practice in Malaysia. Next, the research problem and the corresponding research questions are stated. This is then followed by a summary of the research methodology employed. The justification for this study encompasses both the theoretical and practical contributions made by this it. Key definitions of terms used in this study are also explained. Finally, the delimitations of scope and key assumptions of this study are stated and the structure of this dissertation is outlined.

1.1   Background and significance of the study

The Multimedia Super Corridor (MSC) project was initiated by the Malaysian government as part of Malaysia's long term plan to become a fully-developed nation and knowledge-rich society by the year 2020 (MDC 2005). As part of the strategy to achieve this vision, Malaysia has embarked on a plan to leapfrog into the information age by providing intellectual and strategic leadership by investing in an environment collectively known as MSC that encourages creativity and innovation, assists companies, both local and foreign to reach new technological and innovation frontiers, partnering global information technology players such as IBM, Microsoft, Acer, Sun Microsystems and providing the opportunity for mutual enrichment and success (MDC 2005).

The Multimedia Super Corridor status is awarded to both local and foreign companies that develop or use multimedia technologies to produce or enhance their products and services and for process development (MDC 2005). Applicant companies must meet the qualifying criteria and successful companies must observe the conditions attached to the MSC status recognition (MDC 2005). Based on current figures, there are 1385 approved MSC status companies made up of 1007 Malaysian-owned, 341 foreign-owned and 37 joint-venture companies (MDC 2005). Out of these companies, the Multimedia Development Corporation (MDC) (2005) classifies 69 of them as being 'world-class', companies that are acknowledged as world leaders in their respective fields. These companies include Bloomberg, Ericsson, Alcatel, Shell, Intel, IBM, Nokia, Siemens, Sun Microsystems, NEC and Fujitsu (MDC 2005).

The creation of the Multimedia Super Corridor and the establishment of these Multimedia Super Corridor status companies in Malaysia have resulted in a surge in the demand for knowledge workers and effective knowledge management practices (Chong & Amat Taap Manshor 2003; MDC 2005; Raja Suzana Raja Kasim 2005). The *2004 Impact Survey* which outlines the key impacts of the Multimedia Super Corridor initiative to the country reveals that a total of 21,270 persons are employed by Multimedia Super Corridor status companies and that 86% of them are can be classified as knowledge workers (MDC 2004). The bulk of these companies are involved in

software development, soft design, Internet-based solution and content development (MDC 2005).

Due to the nature of the activities and foci of these MSC status companies being knowledge-driven, it is therefore acknowledged that effective knowledge management practices need to be employed to enable them to create and maintain their competitive advantage, apart from achieving the desired organisational outcomes (Chong & Amat Taap Manshor 2003; Hafizi Muhamad Ali & Zawiyah Mohammad Yusof 2004; Haryani Haron & Noor Zaidi Sahid 2005; Hishamuddin Md Som, Norlisa Mohd Salleh, Azlah Mohd Ali, Siti Zaleha Omain & Thuaibah @ Suaibah Abu Bakar 2004; MDC 2005; Raja Suzana Raja Kasim 2005; Ramanathan Narayanan, Richardson & Abdul Latif Salleh 2003; Rumesh Kumar 2003). Furthermore, Lee and Choi (2003) argue that knowledge is increasingly being recognised as an important commodity for sustaining competitive advantage. To this end, many organisations the world over have begun to place emphasis on knowledge and have started to manage their organisational knowledge (Lee & Choi 2003). Nowadays, effective knowledge management is considered the key to success of contemporary organisations (He, Lee & Hsu 2003). This aspect is currently receiving a lot of attention from both practitioners and researchers (He, Lee & Hsu 2003).

A review of the literature indicates that it is difficult to define what knowledge is and that many different perspectives on knowledge exist today (Awad & Ghaziri 2003; Barquin 2001; Davenport & Prusak 2000; Hertog & Huizenga 2001; Kakabadse, Kakabadse & Kouzmin 2003; Lee & Choi 2003; Liebowitz 1999; Ong 2003; Spiegler 2000). He, Lee and Hsu (2003, p. 1269) contend that researchers view knowledge as being 'complex, accumulated expertise that resides in individuals and is partly or largely inexpressible' to 'much more structured and explicit content'.

According to Turban and Aronson (2000, p. 347), '… knowledge management is not new' and has been practised since ancient times. However, '… the formal acknowledgement of knowledge as an intellectual asset to be created, captured and utilised deliberately to a company's advantage is new' (Turban & Aronson 2001, p. 347). In a nutshell, knowledge management is defined as a '… process that helps organisations identify, select, organise, disseminate and transfer important information and expertise that are part of the organisational memory that typically resides within the organisation

in an unstructured manner' (Turban & Aronson 2001, p. 347). However, it must be stressed that various definitions and frameworks of knowledge and knowledge management exist which has resulted in a 'less coherent and more fragmented' view of this domain (He, Lee & Hsu 2003, p. 1269). A more thorough discussion of knowledge and knowledge management is provided in Chapter 2.

Against such a backdrop, the key objective of this study is twofold. First, it attempts to provide a deeper and clearer understanding of knowledge management research trends by reviewing and synthesising previous research. The second objective is to investigate and analyse the current levels of knowledge management practice in Malaysia, with particular emphasis on the Multimedia Super Corridor status companies to allow for better understanding of knowledge management initiatives in these companies and to pave the way for more detailed research in this field in Malaysia.

In particular, as indicated in an earlier paragraph, this study shall focus on identifying the enablers, processes and organisational outcomes of knowledge management among these Multimedia Super Corridor status companies in Malaysia. Hence, this study would be able to provide meaningful implications to both knowledge management researchers and practitioners in Malaysia and in other developing countries.

It is also envisaged that the results of this research will help fill the gap that exists in relation to the practice of knowledge management in Malaysia, in particular amongst Multimedia Super Corridor status companies (Fazian Hashim & Ahmad Othman 2005; Hafizi Muhamad Ali & Zawiyah Mohammad Yusof 2004; Hishamuddin Md Som et al. 2004; Ramanathan Narayanan, Richardson & Abdul Latif Salleh 2003; Rumesh Kumar 2003; Syed Omar Sharifuddin Syed-Ikhsan & Rowland 2004a; Tan 2004). Furthermore, it will also allow organisations to understand the various enablers and processes involved in knowledge management in greater depth and to formulate appropriate knowledge management strategies for competitive advantage. The next section explores the research problem identified for this study and states the research questions formulated.

1.2   Research problem

This research seeks to investigate the current levels of knowledge management practices among MSC status companies in Malaysia. As such, the following research problem was formulated based on the gaps identified in the literature:

'How and why do Multimedia Super Corridor status companies in Malaysia practise knowledge management?'

This study aims to identify the various enablers (or influencing factors) of knowledge management, knowledge processes, and the outcomes of knowledge management in Multimedia Super Corridor status companies in Malaysia. The review of the literature and related materials provided an insight into the knowledge management practices (enablers, processes and outcomes) associated with knowledge management in different countries and in different industries. Building on prior theory based on existing literature and frameworks, the following three research questions were developed:

RQ1:   What are the enablers of knowledge management (cultural, structural, people and technology) in Multimedia Super Corridor status companies in Malaysia?

RQ2:   What is the process involved in creating knowledge in Multimedia Super Corridor status companies in Malaysia?

RQ3:   How do the current levels of knowledge management practice in Multimedia Super Corridor status companies affect their organisational performance?

In summary, this section identified the research problem and the three corresponding research questions. These research questions will form the basis for data collection and analysis to address the research problem. The next section provides a brief overview of the methodology utilised in this study. The research questions and methodology are discussed in detail in subsequent chapters.

1.3   Methodology

This research will utilise an exploratory research design using the ***qualitative multiple-case study research approach*** within the critical realism paradigm (Perry, Riege & Brown 1999; Yin 1994).The selection of the research methodology was influenced by the research problem and its corresponding research questions, and the current state of this field of study as indicated in the literature review (Carson, Gilmore, Perry & Gronhaug 2001; McPhail 2003; Perry 2001a; Yin 1994; Zikmund 2000). In view of the limited amount of literature covering knowledge management enablers, processes and its outcomes, there is little precedence and direction to explore the research problem identified for this study using empirical or quantitative methods (Healy & Perry 2000a; McPhail 2003; Perry 2001a; Zikmund 2000).

Due to the contemporary nature of this study as opposed to being a historical one, Yin (1994) recommends the use of the case study method. The case study method explores and analyses real-life issues in their own setting and uses a wide variety of evidence (McPhail 2003; Perry 2001a). These include the use of in-depth interviews, internal documentation, corporate literature, websites, articles in magazines and newspapers to provide a basis for extensive and thorough discussion of the research problem (Perry 2001a; Perry & Coote 1996). As such, this study employs a qualitative multiple-case study approach which is covered in greater detail in Chapter 3 of this dissertation. The case study method and its application to the problem, beginning with the exploratory phase to build prior theory and then moving on to pilot interviews and specific main case analysis is briefly introduced in the subsequent sections (McPhail 2003; Perry 2001a).

Literature review. A well-defined research problem is required before the researcher can commence the process of research design and subsequent data collection (Yin 1994). To achieve this, prior theory on knowledge management practice used for this study was derived from the review of the existing literature in academic journals, books, conference proceedings, dissertations and practitioner magazines (Darke, Shanks & Broadbent 1998; McPhail 2003; Perry 2001a). Based on the review, existing constructs and theory were elicited and forms the foundation upon which the research problem was formulated (Darke, Shanks & Broadbent 1998; Perry 1998, 2001a; Yin 1994).

Exploratory convergent interviews. Using the prior theory gathered earlier, two exploratory convergent interviews with experts in the field is then used to develop the research questions and the interview questions that form the core of the initial interview protocol. The first interviewee is an academic researching in the field of knowledge management in Malaysia, and the other is the IT Manager of a large multinational company in Penang. These largely unstructured, conversational interviews were geared towards building on and contrasting them to the literature findings, to better structure the confirmatory stages of the main cases (Carson et al. 2001; Perry 2001a).

Pilot case study. Next, three pilot interviews were conducted to improve the data collection processes prior to the commencement of the main case studies (Yin 1994). These pilot interviews served as a 'dress rehearsal', in which the intended data collection plan is used faithfully as possible as a final test run (Perry 2001a; Yin 1994). For this study, three pilot interviews were conducted in the selected pilot case located in Selangor, Malaysia which is a large Multimedia Super Corridor status company in the field of computing technology. These interviews were held with the Section Leader (IT), Business Analyst and IT Analyst of the company. This pilot case was selected to ensure that it is similar to those analysed in the main case analysis (McPhail 2003).

Main case analysis. Nine in-depth interviews were conducted in the main case study stage, with three interviews being conducted in each main case. For each case, an IT manager or CIO/CKO, an executive level IT personnel and an executive level business personnel were interviewed using the case study protocol which was developed and refined in the exploratory convergent interviews and pilot case study stages. The interviews commenced with open and general questions, and later on went to focus identified issues based on the three research questions formulated for this study (Perry 2001a). In short, the use of multiple case studies and multiple sources of evidence allow for a more complete understanding of the phenomenon in question apart from affording the ability to triangulate and validate the results emanating from the research (Yin 1994). The next section shall provide and discuss the justification for this study.

1.4   Justification for this research

By investigating the current level of knowledge management practices in Multimedia Super Corridor status companies in Malaysia, this study adds to the existing body of literature on knowledge management in Malaysia and also benefits both business and information technology practitioners. The justifications for this study in terms of its contribution to research and to practitioners are outlined in this section.

1.4.1   Contribution to research

The output of this research is expected to add to the existing body of knowledge relating to knowledge management practices. This study makes three major contributions to research. First, it addresses a lack of knowledge management practice research from a Malaysian perspective. Second, this study contributes to research by extending previous studies on knowledge management practice. Third, this study draws together previous research on the individual elements of knowledge management practice and examines their influence on the organisation as a whole. These three contributions are discussed further.

Addressing a lack of knowledge management practice research in Malaysia is the key contribution of this study. Although many past research studies have been conducted on knowledge management, none of these relate specifically to the practice of knowledge management in Multimedia Super Corridor status companies in Malaysia using a qualitative study. Most of these were quantitative studies that were conducted on Malaysian organisations using scales that were adapted from past research conducted elsewhere (Abdul Halim Abdul Karim 2005; Asleena Helmi 2002; Badruddin A Rahman 2004b; Bontis, Chua & Richardson 2000; Chong & Amat Taap Manshor 2003; Fazian Hashim & Ahmad Othman 2005; Norizah Supar, Azizi Ali Ibrahim, Zainal Abidin Mohamed, Mastura Yahya & Mohani Abdul 2005; Rumesh Kumar 2003; See 2002; Tan 2004; Tan, Mohammad Yusof & Hamdan 2005).

Due to the dynamic nature of field being investigated and the influence of local culture and practices, there is a need to localise the research to suit the Malaysian setting (Carson et al. 2001; Perry 2001a; Robbins, Millet, Cacioppe & Waters-Marsh 2001; Yin 1993).

This is difficult to achieve with quantitative studies, and should be preceded with qualitative studies which could then be extended upon using quantitative studies (McPhail 2003; Perry 2001a; Yin 1994; Zikmund 2000).

In addition, information technology research has been criticised by many for narrowly and economically focussing on investigating technology, design methods, computers, implementation, production tools and communications technology with little regard or emphasis on the people factors involved in information technology environments (Avison & Fitzgerald 1991; Thomas, Kellogg & Erickson 2001). Thomas, Kellogg and Erickson (2001) posit that knowledge management is not a matter of managing information. They argue that it is instead very social in nature and must be approached using both social and human factors into account (Thomas, Kellogg & Erickson 2001). As such this study takes on a holistic view of knowledge management practice by examining both the 'hard' and 'soft' aspects of knowledge management, investigating both the technical issues as well as the often neglected human issues (Thomas, Kellogg & Erickson 2001; Willcoxson 2003).

Extending previous studies. This study extends previous research on knowledge management by looking at how knowledge management is perceived to affect organisational performance of organisations (Ong 2003). A study by Ong (2003) and Norizah Supar et al. (2005) looked at how knowledge management improved effectiveness in handling tasks in Malaysian organisations. This study extends their work by examining how knowledge management practices affect the organisations from an internal and external perspective, by looking at issues such as organisational efficiency, competitive advantage, maximising organisational potential and effective management of knowledge assets.

Bringing together previous research. In addition to extending previous studies on knowledge management practice, this study takes on a holistic and comprehensive approach to studying knowledge management practices in the Multimedia Super Corridor status companies in Malaysia. The existing literature has investigated the different components of knowledge management in isolation and has not studied them as a set of inter-related components within an organisational unit in Malaysia. To address this knowledge gap, this study attempts to propose a research model that includes the

knowledge management enablers, knowledge management creation processes and its organisational outcomes in Multimedia Super Corridor companies in Malaysia. This study also draws upon previous research on knowledge management enablers such as collaboration, leadership, formalisation and information technology infrastructure together to obtain a clearer picture of the practice of knowledge management in the organisations being investigated (Leonard-Barton 1995; Ong 2003; Pervan & Ellison 2003; Ramanathan Narayanan, Richardson & Abdul Latif Salleh 2003; Takeuchi & Nonaka 2004; Tan 2004; Thomas, Kellogg & Erickson 2001; Tiwana 2000; Williams 2003).

Based on the three broad categories of contribution to research outlined, this study will facilitate better understanding of knowledge management practices in Malaysia. Furthermore, due to the qualitative nature of multiple case study research methodology adopted, the output from this study is expected to enhance and deepen the body of literature and act as a foundation upon which further quantitative research can be conducted.

1.4.2   Contribution to practice

The previous section outlined three contributions this study makes to research. This section outlines its benefits to practitioners. These benefits stem from three sources: better understanding of the knowledge management enablers, insights into how knowledge is created in organisations, and identification of the perceived knowledge management outcomes.

Better understanding of the knowledge management enablers. This study proposes a model which incorporates the key components of knowledge management enablers. The enablers included in this study are culture, organisational structure, people and information technology infrastructure. In many instances, individuals are not aware of their own culture such as mutual trust, learning, leadership and collaboration; and its impact on the organisation (Cormack 2001; Smircich 1985). Interestingly, culture is said to be sometimes hidden from its own members (Cormack 2001; Dubinskas 1992). By understanding these enablers, practitioners would be able to identify the absence or

inadequacy of the enablers in their knowledge management initiatives and take adequate measures to consider their inclusion for improved effectiveness (Cormack 2001; Dubinskas 1992).

Insights into how knowledge is created in organisations. By understanding how knowledge is being created in organisations, the management of these organisations and the CIO/CKO/IT Head would be able to identify the different forms of activities that take place to create knowledge in the organisation and how it could be enhanced to the organisation's benefit. Knowledge creation activities that are currently not being practised or are not emphasised in the organisation could receive more attention and focus from the management (Nonaka & Takeuchi 1995; Takeuchi & Nonaka 2004).

Knowledge management outcomes. Apart from providing insights on how knowledge is created in organisations, the perceived knowledge management outcomes identified in this study can be better understood by the management, especially the top management. This is crucial in ensuring that top management commitment for knowledge management programs in the organisation is enhanced if not continued (Ambrosio 2000; Cecez-Kecmanovic & Kay 2002; Davenport, De Long & Beers 1998; Dixon 2000; Hatten & Rosenthal 2001; Williams 2003; Yu, Kim & Kim 2004). This is because the benefits and returns accrued from knowledge management initiatives are not always tangible and is difficult to quantify (Malhotra 2002; Peyman Akhavan, Mostafa Jafari & Mohammad Fathian 2005; Sanchez 2001; Williams 2003). With this study, it is envisaged that top management would have a better understanding of the role and importance of knowledge management in enhancing organisational performance (Williams 2003).

It is also hoped that this study would assist in the formulation of knowledge management policies or guidelines that can be effectively utilised by relevant industry organisations or government agencies such as the Multimedia Development Corporation (MDC), Ministry of International Trade and Ministry of Human Resources to promote and cultivate effective knowledge management practices in organisations to ensure that the maximum potential of knowledge management can be leveraged by these organisations. Having discussed the contributions of this study to research and practice, the next section will provide definitions to the key terms used in this study.

1.5   Definitions

This section introduces definitions of key terms used in this study. This is important as definitions adopted by researchers tend to vary, so there is a need to define them and to establish positions taken in this study (Perry 2001b). These definitions are discussed and justified in more depth in Chapter 2.

The ***Multimedia Super Corridor*** is part of Malaysia's long-term plan (Vision 2020) to become a fully-developed nation and knowledge-rich society by the year 2020 (MDC 2005). It is also meant to leapfrog Malaysia's development through the creation of an ideal multimedia environment for world-class companies to use as a regional hub (Bala Ramasamy, Anita Chakarbarty & Cheah 2002; MDC 2005).

The ***Multimedia Super Corridor status*** is awarded to both local and foreign companies that develop or use multimedia technologies to produce or enhance their products and services and for process development by the Multimedia Development Corporation (MDC) after satisfying stringent application requirements (MDC 2005).

'***Knowledge*** is a fluid mix of framed experiences, values, contextual information, and expert insight that provides a framework for evaluating and incorporating new experiences and information' (Davenport & Prusak 2000, p. 5). It originates and is applied in the minds of knowers. In organisations, it often becomes embedded not only in documents or repositories but also in organisational routines, processes, practices and norms (Davenport & Prusak 2000).

Tacit knowledge entails knowledge that is difficult to express, formalise or share (Sveiby 1994, 1997; Takeuchi & Nonaka 2004). Individuals experience tacit knowledge as intuition, rather than as a body of facts or instruction sets that one is conscious of having and can explain to others (Lubit 2001).

Explicit knowledge is knowledge that can be easily expressed in words, numbers or sound, more often than not stored and shared within the organisation in the form of data, scientific formulae, visuals, audiotapes, product specifications or manuals (Takeuchi & Nonaka 2004).

Knowledge management is a process that effectively creates, captures, shares and uses organisation-wide knowledge to improve the organisation's performance and to gain competitive advantage (Davenport & Prusak 2000; Liebowitz & Beckman 1998; Sveiby 1997; Tiwana 2000; Turban & Aronson 2001; Wiig 1997).

Knowledge management enablers are organisational mechanisms for fostering knowledge consistently which stimulates knowledge creation, protects knowledge and facilitates knowledge sharing within an organisation (Lee & Choi 2003; Turban & Aronson 2001). These knowledge management enablers can be broadly categorised into cultural, structural, people and technology factors (Lee & Choi 2003; Turban & Aronson 2001).

Collaboration is defined as the degree to which people in a group actively assist one another in their task (Hurley & Hult 1998; Lee & Choi 2003).

Mutual trust exists in an organisation when its members believe in the integrity, character and ability of each other (Robbins 1998; Robbins et al. 2001).

Learning is 'any relatively permanent change in behaviour that occurs as a result of experience' (Robbins et al. 2001, p. 124).

Leadership is defined as the ability to influence and develop individuals and teams to achieve goals that have been set by the organisation (Robbins 1998; Robbins et al. 2001; Wood, Wallace, Zeffane, Schermerhorn, Hunt & Osborn 1998).

Incentives are something that has the ability incite to determination or action by employees in an organisation (Robbins 1998; Robbins et al. 2001). ***Rewards*** on the other hand can be broadly categorised as being either extrinsic or intrinsic to reinforce a particular behaviour or action by an individual or group of individuals (Wood et al. 1998).

Centralisation refers to the degree to which decision making is concentrated at a single point, normally at higher levels of management in the organisation (Robbins et al. 2001; Wood et al. 1998).

Formalisation refers to the written documentation of rules, procedures and policies to guide behaviour and decision making in organisations (Wood et al. 1998).

T-shaped skills refer to the skills of employees that are both deep and broad (Leonard-Barton 1995). Employees who possess T-shaped skills not only have deep knowledge of a particular discipline but also how their discipline interacts with other disciplines (Iansiti 1993; Leonard-Barton 1995).

Knowledge processes are ways in which knowledge are managed effectively in the organisation (Turban & Aronson 2001). Knowledge creation process includes key activities such as creation, sharing, storage and use in the organisation based on the SECI model (Awad & Ghaziri 2003; Turban & Aronson 2001).

Organisational outcomes describe the degree to which the organisation achieves its stated goals and objectives (Lee & Choi 2003).

1.6 Delimitations of scope and key assumptions

Given that the study of knowledge management practices has a broad focus, it needs to be constrained both in terms of its scope and extent due to time and cost constraints of a four-credit unit Masters dissertation. This section outlines three delimitations of scope related to this study. The generasibility of the findings of this study is limited by these delimitations. These delimitations of scope for this study include focus on Multimedia Super Corridor status companies in Malaysia, information technology focus and perspective, and knowledge creation process.

Multimedia Super Corridor status companies in Malaysia. This research shall focus on the practices of knowledge management in the selected Multimedia Super Corridor status companies in Malaysia from an information systems perspective. A total of four organisations will be studied, one in the pilot case study and three in the main case analysis phase. This was done to ensure that the study would be able to study the phenomena in-depth, provide greater detail as well as for coverage on a wider set of issues (Cavaye 1996; Perry 2001a). As such, the generalisability of the findings of this

research is limited by this delimitation and it would not be possible to generalise the findings to other contexts or industries (Perry 2001a; Yin 1994). Further research would be required if the findings of this study are to be applied to other organisations in Malaysia or in other countries.

Information technology focus and perspective. This study will emphasise on the information technology-related aspects of knowledge management. It shall look at the research problem with the key aim of understanding and therefore improving the information systems setting of knowledge management initiatives. This is because a wide range of social and human issues would come into play in the study of knowledge management practices and would make it unfeasible to study, taking into consideration the various constraints affecting this research effort. As such, this study will investigate the key knowledge management enablers that emerge from the literature review (detailed in Chapter 2) which include collaboration, mutual trust, learning, leadership, incentives and rewards which are grouped under culture, organisational structure which can be categorised into formalisation and centralisation, T-shaped skills (skills that are both deep and broad) and information technology infrastructure. It shall not investigate a wider range of issues and enablers that are present to maintain the focus of this study.

Knowledge creation process. To study the knowledge creation process in organisations, this study will adopt Nonaka and Takeuchi's (1995) Socialisation-Externalisation-Combination-Internalisation (SECI) model of knowledge creation. This model is composed of four key phases in which knowledge in converted from one form to another (Nonaka & Takeuchi 1995; Takeuchi & Nonaka 2004). The four phases of the SECI model are socialisation, externalisation, combination and internalisation (Nonaka & Takeuchi 1995; Takeuchi & Nonaka 2004).These four phases will form the backbone of the study of knowledge creation processes in this study. The SECI model appreciates the dynamic nature of knowledge and knowledge creation besides providing a comprehensive framework for the management of knowledge-related activities (Nonaka & Takeuchi 1995). Apart from that, another key reason why this model was chosen is its widespread use and application in information systems research on knowledge creation processes (Lee & Choi 2003; Poh 2001; Tan 2004). The next section outlines the structure and organisation of this dissertation.

1.7   Structure and organisation of the dissertation

This dissertation is structured as follows:

Chapter 2 Literature Review provides a review of the literature relevant to knowledge management leading to the knowledge management enablers, processes and organisational performance. It presents the main theory used to orientate the research and reviews other literature and models relevant to the research problem identified for this study. Based on the literature, the relevant variables and factors affecting knowledge management practices are identified. The research problem and research questions are presented based on the gaps that exist. In addition, a conceptual framework for this study is proposed.

Chapter 3 Research Methodology identifies and describes the methodology used to explore the research problem. This chapter begins with the justification of the critical realism paradigm and exploratory research design. The case study research method is then introduced and justified. The case study process which is made up of the literature review, exploratory convergent interviews, pilot case study and main case analysis are detailed. Methods used to collect and analyse data are also outlined. Issues and implications brought about by validity, reliability, limitations and ethical considerations are also discussed in this chapter.

Chapter 4 Findings and Analysis presents the results of the multiple case studies conducted. Findings are presented in tables that assist in establishing the existence of relationships so as to achieve consistent and meaningful interpretation with regard to the research questions.

Chapter 5 Conclusions and implications shall discuss the findings of the study by comparing and contrasting it with the literature and provide conclusions on three research questions. After having covered all the research questions, it will then address the research problem formulated for this study. The theoretical and practical implications and contributions of this study are discussed and outlined in this section. Finally, this study's limitations and suggestions for future research are discussed.

1.8   Summary

This chapter has laid the foundation for this dissertation within the framework of the research problem identified. First, a background to knowledge management and the Multimedia Super Corridor status companies in Malaysia is provided. The research problem for this study has been identified as 'What are the current levels of knowledge management practice in Multimedia Super Corridor status companies in Malaysia?'. Based on this research problem, three research questions which look at different aspects of knowledge management practice were developed. These research questions examine the knowledge management enablers, knowledge creation processes and knowledge management outcomes of these Multimedia Super Corridor status organisations. In addition to that, this chapter also outlined the significance, justified by this study's potential contribution to both theory and practice. Key definitions used in this study as well as its delimitations of scope were also explained. The final section of this chapter presented an overview of the various chapters of this dissertation. The next chapter reviews the relevant literature on knowledge management, in particular the enablers of knowledge management, knowledge creation processes and knowledge management outcomes.

2   LITERATURE REVIEW

This chapter provides an overview of the published literature on knowledge management and enablers of successful knowledge management programmes. The chapter commences with an overview of knowledge and the various views of it from the literature. Next, it discusses the different types of knowledge that exist. It then chronicles a brief history of knowledge management research and praxis before providing a working definition to the term 'knowledge management'. It then surveys the extant literature on knowledge management within the Malaysian context and briefly details the Multimedia Super Corridor initiative by the Malaysian government. Having understood the state of knowledge management in Malaysia, the relevant factors enabling knowledge management, knowledge management processes and its outcomes are detailed. Based on the literature, the research problem is revisited with the three relevant research questions. An initial research model investigating the research problem which incorporates the relevant factors identified in the literature review is then proposed for this study.

2.1   Knowledge overview

Knowledge is increasingly recognised as being the crux and of key importance to organisations these days, especially in view of the dynamic and at times turbulent nature of the world economy (Assudani 2005, p. 76). Interestingly, knowledge has a dual role with regards to competition for organisations. It can be considered to be both a cause and a cure or solution to competition faced by most organisations (Assudani 2005).

Knowledge management is a key concern for many organisations as poor management of knowledge has been recognised as the contributor to loss of organisational knowledge, expensive duplication of knowledge creation activities, high costs associated to knowledge and skills, and reduced organisational competitiveness (Chase 1997b;

Davenport & Prusak 2000; Hariharan 2002; Martin 2000; Nonaka & Takeuchi 1995; Rampersad 2002; Stewart, Baskerville, Storey, Senn, Raven & Long 2000; Takeuchi & Nonaka 2004). Stewart et al. (2000) and Chase (1997) assert that effective management of knowledge has consistently resulted in those organisations enjoying higher levels of corporate success and value compared to others who do not. Hence, knowledge is one of the most important resources in organisations and is a key differentiating factor in today's highly competitive business environment.

Recognising the importance of knowledge to organisational performance is not sufficient to ensure success (Hariharan 2002; Stewart et al. 2000). Organisations need to first understand what they are dealing with and the types of organisational knowledge that they should manage (Hariharan 2002; Stewart et al. 2000). The following section will provide an overview of knowledge and its importance to organisations.

2.1.1   What is knowledge?

The study of human knowledge has been a central focus of philosophy since the ancient Greeks (Drucker 1993; Hirschheim 1985). Plato first defined the concept of knowledge as 'justified true belief' in his work – *Meno, Phadeo and Theaetetus* (Plato 1953). Hirschheim (1985) discussed some fundamental aspects of the theory of knowledge epistemology from the Greek perspective that divided knowledge into two types: *doxa* (believed to be true) and *episteme* (known/proven to be true). From a methodological viewpoint, science was the process that converted *doxa* into *episteme*. Drucker (1993, p. 24) believes that this view arose from Socrates and Protagoras who held that knowledge was self-knowledge and its purpose was to make the 'knower' more effective.

Following this line of thinking, Drucker (1993, p. 24) believes that until mid 1700s, the western definition of knowledge was that knowledge was 'being or existing', not the 'ability to do' or the possession of a particular skill or competency. He suggests that there have been three distinct eras during which human understanding of knowledge changed from one of generalized knowledge to one of highly specific 'knowledges' which operate within particular domains (embedded within disciplines or professions) with a clear focus on action (doing and the skills required for action) (Drucker 1993).

These three distinct eras as identified by Drucker (1993, pp. 17 – 42) are summarized below:

- **From 1750-1850:**

  Knowledge was applied to tools, processes and products and created the industrial revolution – which was characterized by explication of crafts and skills. That is skills were translated into 'knowledge'.

- **From 1880-1938:**

  Knowledge was applied to work processes and the focus was on increasing productivity.

- **From the end of 1945:**

  Knowledge has been applied to knowing about and knowing how and is known as the management revolution.

In addition to these, ancient Eastern philosophers such as Lao Tzu and Confucius in China and their contemporaries in India, have an equally long and well-documented tradition of emphasizing and understanding knowledge for the conduct of spiritual and secular life (Kakabadse, Kakabadse & Kouzmin 2003). More recently, academics and researchers have seen a rediscovery of the knowledge debate, starting with scholars from economics (Arrow 1962; Hayek 1945; March & Simon 1958), organisational theory (March & Simon 1958) and philosophy (Habermas 1972; Polanyi 1958; Popper 1972). These scholars were concerned with the characteristics of human knowledge and its inherent role in organizations (Kakabadse, Kakabadse & Kouzmin 2003).

Since then a variety of definitions and explanations of knowledge exists today. Some of these different definitions emerged since ancient times and have since kept philosophers of the past and researchers of recent times busy (Awad & Ghaziri 2003; Hertog & Huizenga 2001; Ong 2003). The difficulty that exists in defining this important organisational resource is because knowledge is a self-evident concept (Barquin 2001; Hertog & Huizenga 2001; Ong 2003). In addition, the fact that knowledge sits on a

continuum with two other related concepts – data and information further complicates the situation (Barquin 2001; Hertog & Huizenga 2001; Ong 2003).

The meaning of the word 'knowledge' can be clarified and easily understood when compared with two other related concepts – data and information. Some people tend to confuse knowledge with information and data which are often used interchangeably in the literature and praxis (Kakabadse, Kakabadse & Kouzmin 2003). Much of the confusion in the literature regarding definitions of knowledge derives from the misuse of the terms 'knowledge' and 'information'. Due to the misuse of these two terms, some people are of the opinion that knowledge management is a fad and is a re-branding of information management (Yau 2003). In actual fact, these concepts are not interchangeable as they are not synonymous with the other. However, a very pertinent relationship exists among data, information and knowledge which can be observed from understanding how each concept builds upon the other.

Data are defined by Davenport and Prusak (2000, p. 2) as a '… set of discrete, objective facts about events'. Awad and Ghaziri (2004) contend that data are just unorganised and unprocessed facts that are static in nature. As such, data carry no meaning unless one understands the context in which the data were collected. When one understands the relationship between different data elements with reference to a particular context, one would then move along the continuum toward information (Misra, Hariharan & Khaneja 2003).

Information extends the concept of data in a broader context. Awad and Ghaziri (2004) explain that information means shaping and forming the data to arrive at a meaning in the eyes of the perceiver. It is an aggregation, reformatting and processing of data that allows for easier decision making by individuals (Awad & Ghaziri 2003; Misra, Hariharan & Khaneja 2003). Unlike data, information has meaning, purpose and relevance to the individual (Ong 2003).

Information is relatively static as it is not tied to a particular context and cannot be applied to other contexts in this state (Misra, Hariharan & Khaneja 2003). When information is combined with past experiences, insights, values, expertise and beliefs, knowledge is created (Misra, Hariharan & Khaneja 2003; Nosek 2004; Webb 1998).

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Turban and Aronson (2001) explains that knowledge is information that is contextual, relevant and actionable meaning that knowledge has strong experiential and reflective elements that clearly distinguish it from information. This can be observed in Figure 2.1 which illustrates the inter-relationship between data, information and knowledge.

Figure 2.1   Data, information and knowledge
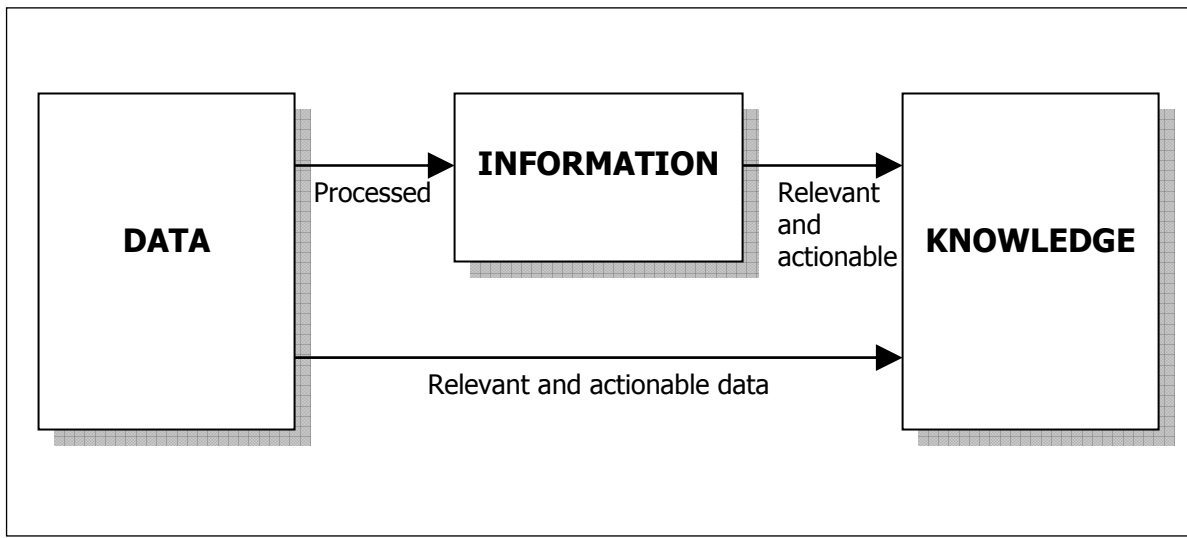
(Source: Turban & Aronson, p. 349)

A plethora of definitions exist in the literature and praxis to explain what is knowledge as can be observed in Table 2.1, but the most exhaustive and pertinent definition of knowledge which will be adopted by this study is the one put forth by Davenport and Prusak (2000, p. 5):

> Knowledge is a fluid mix of framed experiences, values, contextual information, and expert insight that provides a framework for evaluating and incorporating new experiences and information. It originates and is applied in the minds of knowers. In organisations, it often becomes embedded not only in documents or repositories but also in organisational routines, processes, practices and norms.

The definition by Davenport and Prusak (2000) outlines three important characteristics of knowledge. Firstly, it is knowledge that lends meaning to information, thereby rendering it useful for effectively responding to new situations. Secondly, people are not merely users of knowledge, they act as both producers as well as consumers of

knowledge. Thirdly, knowledge may exist as tangible documents that exist in files, databases and manuals, or as intangible knowledge that resides in human memory.

Wiig (1997) defines knowledge as the insights, understandings and practical know-how that individuals possess and that knowledge is the fundamental resource that is required of an individual in order to function and perform intelligently. Another pertinent definition of knowledge is the one made by Housel and Bell (2001, p. 2) whose view is that knowledge is a conceptual construct rather than a physical construct.

Housel and Bell (2001) explain that knowledge is produced only through human mental processes and that knowledge encompasses important and unimportant thoughts (not constrained by valuation or relative usefulness); proven and unproven ideas (not constrained by logic or proof); morally approved or disapproved ideas (not constrained by moral philosophies); individually or widely held ideas (not constrained by distribution); beliefs, attitudes, speculations, predispositions, lifestyle choices and mental habits that have rational, irrational and emotional elements (Housel & Bell 2001). Because of this, knowledge is inherently subjective as it is dependent upon a number of social and cultural factors of the individual.

Housel and Bell (2001) also contend that knowledge can be embedded within information or products and that knowledge includes ideas held in the mind as well as ideas included within a tangible format which corresponds exactly to what was put forth by Davenport and Prusak (2000) regarding the tangibility of knowledge. Davenport and Prusak (2000) also explain that as knowledge is being shared and disseminated throughout the organization, knowledge increases in its value.

While all three concepts can be seen as valuable assets to organisations, it is knowledge that provides a higher level of understanding and comprehension about data and information (Turban & Aronson 2001). This is because knowledge conveys meaning which makes it more valuable and yet more ephemeral. A summary of the various descriptions of data, information and knowledge are detailed in Table 2.1 to provide a clearer picture of the delineation and differences between them.

Table 2.1   Summary of descriptions for data, information and knowledge

Data	Information	Knowledge
Unsorted bits of facts (Dixon 2000) A representation of fact, number, word, image, picture or sound Measurements (Applehans, Globe & Laugero 1999) A discrete, objective fact about events (Davenport & Prusak 2000) Unorganised or unprocessed facts (Awad & Ghaziri 2003)	Data that have been sorted, analysed and displayed (Dixon 2000) Data that has been assigned a meaning (Liebowitz 1999) Potential for action; resides in the user (Malhotra, Yogesh 1998) A statement of fact about measurements (Applehans, Globe & Laugero 1999) Data that makes a difference (Davenport & Prusak 2000) A flow of meaningful messages (Nonaka & Takeuchi 1995) Text that answers the questions – who, when, what or where (Quigley & Debons 1999) Facts organised to describe a situation or condition (Wiig 1997)	Meaningful links people make in their minds between information and its application in action in a specific setting (Dixon 2000) The whole set of insights, experiences and procedures that are considered correct and true and that, therefore, guide the thoughts, behaviour and communication of people (Liebowitz 1999) Ability to turn information and data into effective action (Applehans, Globe & Laugero 1999) A fluid mix of framed experiences, values, contextual information, and expert insight that provides a framework for evaluating and incorporating new experiences and information (Davenport & Prusak 2000) Commitments and beliefs created from meaningful messages (Nonaka & Takeuchi 1995) Text that answers the questions why and how (Quigley & Debons 1999) Truths and beliefs, perspectives and concepts, judgements and expectations, methodologies and know-how (Wiig 1997)

(Source: developed for this study)

Based on Table 2.1, the key distinctions between data, information and knowledge can be seen on various aspects such as content, meaning, context, people orientation, ease of access and visibility (Nelson 2004). Although there is some confusion in the use of data, information and knowledge as discussed in the preceding sections, it is generally agreed that knowledge is the ultimate result of the capture of raw facts (data), applying specific context and purpose to data to produce information, and finally applying an individual's own terms of reference to produce knowledge within the minds of individuals. In short,

data is the source of information, which in turn shapes or models knowledge (Awad & Ghaziri 2003; Davenport & Prusak 2000; Nelson 2004; Sveiby 1997; Turban & Aronson 2001).

2.1.2   Types of knowledge

Knowledge as described by Davenport and Prusak (2000) is not only embedded in documents or repositories but also in an organisation's routines, practices, processes and norms. Due to this, knowledge can be broadly classified into two categories which are explicit and tacit knowledge (Davenport & Prusak 2000; Nonaka & Takeuchi 1995; Takeuchi & Nonaka 2004). Work on the explicitness and tacitness of knowledge is largely influenced and grounded upon Michel Polanyi's (1958) notion of knowledge which has since been further developed by contemporary researchers like Nonaka (1995, 1998, 2004), Sveiby (1994, 1997) and von Krogh and Roos (1995).

2.1.2.1   Tacit knowledge

Tacit knowledge, mooted by Polanyi (1966) in his book, *The Tacit Dimension* initially made little headway compared to explicit knowledge. He put forth the idea of tacit dimension of knowledge to explicate the process of scientific discoveries and then concluded that individuals tend to know more than one can tell (Polanyi 1966). The importance of tacit knowledge took prominence once again when Nonaka and Takeuchi (1995) used Polanyi's dichotomy of knowledge (explicit-tacit) in their landmark book on Japanese knowledge-creating companies. According to Nonaka and Takeuchi (1995, p. 8):

> They [Japanese companies] recognise that the knowledge expressed in words and numbers merely represents only the tip of the iceberg. They view knowledge as being primarily "tacit" – something not easily visible and expressible.

Tacit knowledge entails knowledge that is difficult to express, formalise or share (Sveiby 1994, 1997; Takeuchi & Nonaka 2004). Individuals experience tacit knowledge as intuition, rather than as a body of facts or instruction sets that one is conscious of having and can explain to others (Lubit 2001). Tacit knowledge tends to be deeply rooted in

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personal insights, values and feelings which can hardly be completely communicated or shared with others (Dixon 2000; Fuller 2002; Ives, Torrey & Gordon 1998; Nonaka 1998; von Krogh & Roos 1995).

According to Cortada and Woods (1999), tacit knowledge is often intuitive and demonstrated more in how people go about with their work in a knowledgeable way, even though this knowledge is not in a recorded format or is written down anywhere. It is unconsciously acquired from the experiences one has while being immersed in a particular environment or organisational setting. It then develops when unconscious, inductive mental processes create a representation of the structure of the environment showing the important variables that come into play and their relationships (Lubit 2001). In view of this, Lubit (2001, p. 166) posits that individuals '…can have unconscious abstractions, that is, people can learn about the underlying complex structure of systems without being conscious of doing so or being able to articulate their understanding'.

Tacit knowledge has two dimensions. The first is the technical dimension which encompasses the kind of informal and 'hard-to-pin-down' skills or crafts also termed as 'practical know-how' (Nonaka & Takeuchi 1995). The second dimension is the cognitive dimension which is made up of 'schemata, mental models, beliefs and perceptions so ingrained' that individuals take them for granted. This cognitive dimension reflects an individual's image of reality (what is) and his/her vision for the future (what ought to be) (Nonaka & Takeuchi 1995).

To acquire tacit knowledge, often requires the individual to have considerable experience in performing a particular activity or task, preferably while working with experts (Liebowitz & Beckman 1998; Lubit 2001; Poh 2001). By observing how experts formulate and solve problems they encounter, together with practice in addressing these problems and receiving feedback on the way the problem was addressed by an individual fosters the development of tacit knowledge in organisations (Lubit 2001; Poh 2001). This allows individuals to absorb guidelines on the data that need to be focussed on, how factors are causally related and how to address problems both consciously and sub-consciously.

Though not in a tangible format, tacit knowledge is vital to organisations because organisations can only learn and innovate by leveraging on the tacit knowledge of its employees (Cortada & Woods 1999; Ko 2003; Nonaka & Takeuchi 1995). It is argued that organisational innovations that fuel competitive advantage germinate from the seed of tacit knowledge (Nonaka & Takeuchi 1995; Poh 2001). It is theorised that a manager's possession of tacit knowledge is a prerequisite for his/her success (Lubit 2001). For example, the most advanced and state-of-the-art computer-based information systems on their own do not generate new knowledge, only human beings led by tacit know-how have the capability to do so (Choo 1998). The tacit knowledge of all individuals in an organisation is the most important factor in the successful creation of new knowledge in the organisation (McAdam & McCreedy 1999).

Interestingly, it is argued that tacit knowledge forms a background against which all other forms of knowledge are constituted (Kay 1999; Polanyi 1966). This implies that all knowledge therefore rests in a tacit dimension.

In short, tacit knowledge is distinct from explicit knowledge which is conscious and can be expressed in words (Lubit 2001; Nonaka & Takeuchi 1995). In short, tacit knowledge can be summed up as 'knowing how' knowledge whilst explicit knowledge is 'knowing that' knowledge (Lubit 2001).

2.1.2.2   Explicit knowledge

Explicit knowledge is knowledge that can be easily expressed in words, numbers or sound, more often than not stored and shared within the organisation in the form of data, scientific formulae, visuals, audiotapes, product specifications or manuals (Takeuchi & Nonaka 2004). Explicit knowledge can be readily transmitted to individuals formally and systematically (Liebowitz 1999; Takeuchi & Nonaka 2004). Due to the nature of explicit knowledge being a physical entity that is measurable and distributed, it can be more easily identified in organisations compared with tacit knowledge (Awad & Ghaziri 2003). Therefore, explicit knowledge can often be reused within the organisation for decision making purposes.

Choo (1998) explains that explicit knowledge can be either object-based or rule-based. Object-based explicit knowledge may be found in examples such as product specifications, patents, software codes, computer databases, technical drawings, tools and prototypes (Choo 1998). Rule-based explicit knowledge on the other hand is knowledge that is codified into rules, routines or standard operating procedures that have been developed by organisations based on its experience and the specific domain or environment in which it operates in (Choo 1998).

It is important to understand that 'knowledge is not *either* explicit or tacit' despite being categorised in a dichotomous nature of either being tacit or explicit (Takeuchi & Nonaka 2004, p. 4). Instead, Takeuchi and Nonaka (2004) succinctly state that knowledge is both explicit and tacit, hence being inherently paradoxical as knowledge is made up of what appears to be distinct opposites of each other.

2.2   Knowledge management

Knowledge, recognised as being an important resource to organisations these days needs to be effectively and efficiently managed for organisations to leverage on it to obtain competitive advantage to achieve success in the dynamic business environment (MDC 2005). The new, knowledge-based economy places great importance on the creation, use and effective diffusion of knowledge (Mannington 1999; Martensson 2000; Metaxiotis, Ergazakis & Psarras 2005; Nonaka & Takeuchi 1995; Salojarvi, Furu & Sveiby 2005; Spiegler 2000; uit Beijerse 1999). This makes it an imperative for organisations to concentrate on maintaining and developing the knowledge capital that they possess in order to innovate and remain competitive. The organisation's 'ability to learn, adapt and change, becomes a core competency for survival' (Metaxiotis, Ergazakis & Psarras 2005, p. 6).

Due to the relative infancy of this emerging field, various definitions and frameworks of knowledge management exist which has resulted in a 'less coherent and more fragmented' view of this domain (He, Lee & Hsu 2003, p. 1269). To appreciate the reasons for this 'fragmented' view of knowledge management that exists today, it is

important that the background and history of knowledge management be surveyed before a working definition of the term – knowledge management is provided.

2.2.1   History of knowledge management

Knowledge management has its roots deeply ingrained in the study of knowledge which was a deeply contested issue since ancient times (Drucker 1993; Turban & Aronson 2001). However, knowledge management as a field of study itself is relatively a new concept which surfaced in the early 1990s (Drucker 1993; Metaxiotis, Ergazakis & Psarras 2005, p. 7; Prusak 2001, p. 1003).

The growth of knowledge management can be largely attributed to two fundamental shifts which were downsizing of organisations and technological development (Martensson 2000). During the 1980s, downsizing was the popular action taken by many organisations to reduce overheads and increase profits. While being successful in the short term in achieving these goals, many organisations later realised that being 'lean and mean' has its disadvantages, particularly in the loss of knowledge that took years to accumulate that vanished from the organisation when employees left (Di Mattia & Oder 1997; Piggot 1997). With time, organisations have come to realise this error that had already been committed and were now determined to protect themselves from such a recurrence (Di Mattia & Oder 1997; Piggot 1997; Syed Omar Sharifuddin Syed-Ikhsan & Rowland 2004b).

Technological developments in the 1980s and 1990s have heightened the interest in knowledge management through two main sources: (i) the growth of information resources such as the Internet and the World Wide Web, and (ii) the accelerating pace of technological change (Hibbard 1997). With increased access to information and knowledge made possible with new information technologies, it was therefore necessary for organisations to find ways to cope with it and to effectively leverage on it in the workplace (Di Mattia & Oder 1997; Hibbard 1997). With these two fundamentals shifts, knowledge management emerged against a multi-disciplinary backdrop in the early 1990s.

Knowledge management has its origins in a number of business improvement areas such as total quality management (TQM), business process re-engineering (BPR), information systems (IS) and human resource management (HRM) (Kakabadse, Kakabadse & Kouzmin 2003; Metaxiotis, Ergazakis & Psarras 2005; Ponzi & Koenig 2002). Like many emerging multi-disciplinary fields like systems engineering, organisational learning and decision support systems that were emerging during that period, sceptics contended that knowledge management is a mere fad that would fade in time with the likes of many management fads of the past. An empirical study by Ponzi and Koening (2002) dispels the claims made by sceptics and established that knowledge management grew steadily since 1995 with rapid expansion from 1997 to 1999, contracting a little in 2000 and then rebounding in 2001. With studies suggesting that fads normally last for approximately five years, knowledge management has definitely weathered this five-year mark and has indeed become an addition to current management practice (Ponzi & Koenig 2002).

Knowledge management development as a field of study can be broadly grouped into three generations ranging from 1990 till today. The period from 1990 to 1995 can be called the first generation of knowledge management which saw many initiatives by researchers on defining knowledge management, investigating the potential benefits of knowledge management to organisations and designing specific knowledge management projects (Nonaka & Takeuchi 1995; Ponzi & Koenig 2002; Wiig 1993). Influences from artificial intelligence such as knowledge representation and storage played a part in contributing to knowledge management then (Ponzi & Koenig 2002).

From 1996 to the early 2000s, many organisations started creating new jobs for knowledge management specialists and chief knowledge officers (CKOs) (Earl & Scott 1999; Ponzi & Koenig 2002). Different sources of knowledge management were also combined and absorbed in everyday organisational discourse and practise (Ponzi & Koenig 2002). During this generation, knowledge management research focussed on issues such as definition, management philosophies (McAdam & McCreedy 1999; McAdam & Reid 2001), information systems (Alavi & Leidner 1999), knowledge management frameworks (Holsapple & Joshi 2002) and practices (Pervan & Ellison 2003). This era also focussed on systemic organisational change with the co-

development of tools, content management, metrics and management practices (Holsapple & Joshi 2002; Pervan & Ellison 2003; Ponzi & Koenig 2002).

Having acquired and developed new insights and practices of knowledge management, a third generation emerges now with new methods being devised yielding results to organisations (Ponzi & Koenig 2002). It is argued that the third generation is deeply integrated with the organisation's philosophy, strategy, goals, practices, systems and procedures (Wiig 2002). Knowledge management at this stage has become part of each employee's daily routine and motivation, proving that knowledge is not only possessed by individuals but acted on by them (Wiig 2002). A summary of the key developments and characteristics of each knowledge management generation is detailed in Table 2.2.

Table 2.2   Major developments in each knowledge management generation

Generation	Major developments
First (1990-1995)	▸ Definition of knowledge management (Nonaka & Takeuchi 1995; Ponzi & Koenig 2002; Wiig 1993)) ▸ Investigation of potential knowledge management benefits (Nonaka & Takeuchi 1995; Ponzi & Koenig 2002; Wiig 1993). ▸ Design of specific knowledge management projects (Nonaka & Takeuchi 1995; Ponzi & Koenig 2002; Wiig 1993). ▸ Heavily influenced by artificial intelligence, especially with regards to knowledge representation and storage technologies (Ponzi & Koenig 2002).
Second (1996-2004)	▸ New jobs for knowledge management specialists and chief knowledge officers (CKOs) (Earl & Scott 1999; Ponzi & Koenig 2002). ▸ Different sources of knowledge management also became combined and absorbed in everyday organisational discourse and practise (Ponzi & Koenig 2002). ▸ Research focussed on definition, management philosophies (McAdam & McCreedy 1999; McAdam & Reid 2001), information systems (Alavi & Leidner 1999), knowledge management frameworks (Holsapple & Joshi 2002) and practices (Pervan & Ellison 2003). ▸ Systemic organisational change with the co-development of tools, content management, metrics and management practices (Holsapple & Joshi 2002; Pervan & Ellison 2003; Ponzi & Koenig 2002).
Third (Now)	▸ New knowledge management methods are being devised yielding results to organisations (Ponzi & Koenig 2002). ▸ Knowledge management is now deeply integrated with the organisation's philosophy, strategy, goals, practices, systems and procedures (Wiig 2002).

(Source: developed for this study)

2.2.2   Definition of knowledge management

With a relatively short history to its current development, knowledge management is still a turbulent and 'noisy' field which is used to refer many things. A host of working definitions of knowledge management are circulating in the literature and around companies worldwide (Kakabadse, Kakabadse & Kouzmin 2003). Some researchers are of the opinion that the complexity behind defining knowledge management is partially attributed by the challenges in identifying knowledge itself as discussed in the earlier sections of this chapter (Choo 1998; Cortada & Woods 1999; McAdam & McCreedy 1999; Metaxiotis, Ergazakis & Psarras 2005). With many different views of knowledge and the cross-fertilisation of many different fields that contribute to the emerging field of knowledge management, it is necessary to canvass the literature to uncover the main agreements to what is knowledge management.

Wiig (1997) proposes that knowledge management is the systematic and explicit management of knowledge-related activities, practices, programs and policies within the enterprise. Another definition by Sveiby (1997) posits that knowledge management is the art of creating value to organisations by leveraging intangible assets. Malhotra (1998, p. 58) defines knowledge management as catering to the

> … critical issues of organisational adaptation, survival and competence in face of increasingly discontinuous environmental change… Essentially, it embodies organisational processes that seek synergistic combination of data and information processing capacity of information technologies and the innovative capacity of human beings.

A widely-accepted view on knowledge management is by Davenport and Prusak (2000) who propose that knowledge management is largely concerned with the exploitation and development of the knowledge assets of an organisation with the view of furthering the organisation's objectives. It is also explained that the knowledge assets mentioned in their definition include both explicit, documented knowledge and tacit, subjective knowledge of the organisation (Davenport & Prusak 2000).

It is also argued that knowledge management improves an employee's comprehension in a specific knowledge domain through the systematic and organised process of finding, selecting, organising, distilling and presenting knowledge (Davenport & Prusak 2000; Poh 2001; Tidd 2001; Wiig 1993, 1997, 2002). Knowledge management helps an organisation gain insights and further understanding from its own experience (Davenport & Prusak 2000; Despres & Chauvel 1999; Poh 2001; Takeuchi & Nonaka 2004; Wiig 1997). Knowledge management activities can assist the organisation on acquiring, storing and utilising knowledge for things such as problem solving, dynamic learning, strategic planning and decision making (Sveiby 1997; Takeuchi & Nonaka 2004). In addition, knowledge management has the ability to protect intellectual assets (also referred to as knowledge assets) from decay and loss (Armistead 1999; Awad & Ghaziri 2003; Cecez-Kecmanovic & Kay 2002; Davenport, De Long & Beers 1998; Lang 2004; Poh 2001).

A review of scholarly and praxis-based definitions reveals that there is general agreement on what knowledge management is. A consistent theme in all espoused definitions of knowledge management is that it provides a framework that effectively builds on past experiences of the organisation and provides an avenue for new mechanisms for knowledge transfer and creation to emerge (Chase 1997a; Choo 1998; Kakabadse, Kakabadse & Kouzmin 2003; Takeuchi & Nonaka 2004).

Researchers and practitioners alike agree that knowledge management effectively creates, captures, shares and uses organisation-wide knowledge to improve the organisation's performance and to gain competitive advantage (Barquin 2001; Coulson-Thomas 1997; Davenport & Prusak 2000; Despres & Chauvel 1999; Fuller 2002; Gottschalk 1999; Ives, Torrey & Gordon 1998; Liebowitz & Beckman 1998; Malhotra, Y 1998; Metaxiotis, Ergazakis & Psarras 2005; Storey & Barnett 2000; Sveiby 1997; Tiwana 2000; Turban & Aronson 2001; Wiig 1997; Zack 1999). This all-encompassing working definition of knowledge management shall be adopted for this study.

In general, there are two broad approaches to knowledge management. One approach focuses on the 'hard' aspects of knowledge management while the other looks at the 'soft' aspects of it (Mason & Pauleen 2003). The 'hard' aspect of knowledge management looks at the deployment and use of information technologies to enable

knowledge management activities to be conducted within the organisation(Mason & Pauleen 2003). Sveiby (1997) argues that the management of information is a crucial factor in knowledge management whereby he views knowledge as objects that can be handled by information technologies.

The goal of this 'hard' approach to knowledge management is to increase access to knowledge through enhanced methods of access and reuse through hypertext linking, databases and searches (Malhotra 2000; Tiwana 2000; Turban & Aronson 2001). New information technologies like networks, groupware, data mining and data warehouses are key solutions that drive this approach (Sveiby 1997; Tiwana 2000). The 'hard' view is based on the idea that voluminous amounts of knowledge harnessed through technology will make knowledge management work in the organisation (Malhotra 2000; Sveiby 1997; Tiwana 2000; Turban & Aronson 2001).

Willcoxson (2003) provides a comprehensive categorisation of tools to facilitate this 'hard' approach by detailing the various knowledge management applications and their corresponding enabling technologies. These technologies are referred to as the knowledge management spectrum which classifies applications into one of six categories: transactional, analytical, asset management, process, developmental, and innovation and creation (Willcoxson 2003).

The 'soft' aspect on the other hand investigates the capture and transformation of knowledge into a corporate asset by the organisation (Mason & Pauleen 2003). This approach views knowledge as a process composed of a complex set of dynamic skills and know-how that is constantly evolving and changing. As such, it views the knowledge problem as being largely a management issue which can be solved via creativity and innovation in the organisation resulting in what is termed as a 'learning organisation' (Mason & Pauleen 2003).

As opposed to the 'hard' view of knowledge management, the 'soft' approach requires a holistic view of the organisation and acknowledges that it is necessary to get employees to share what they know to make knowledge management work (Gupta & Govindarajan 2000). More importantly, it stresses that it is not the technology that makes knowledge management work, instead it is the processes that matters most (Gupta & Govindarajan

2000; Mason & Pauleen 2003; Spiegler 2000). Specific details of these 'soft' and 'hard' aspects of knowledge management is provided in Table 2.3.

Table 2.3   Knowledge management spectrum: technologies and applications

	Transactional	Analytical	Asset management	Process	Developmental	Innovation and creation
Knowledge Management Applications	▪ Case based reasoning ▪ Helpdesk applications ▪ Customer service applications ▪ Order entry applications ▪ Service agent support applications	▪ Data warehousing ▪ Data mining ▪ Business intelligence ▪ Management information systems ▪ Decision support systems ▪ Customer relationship management ▪ Competitive intelligence	▪ Intellectual property ▪ Document management ▪ Knowledge valuation ▪ Knowledge repositories ▪ Content management	▪ TQM ▪ Benchmark ▪ Best practice ▪ Quality management ▪ Business process re-engineering ▪ Process improvements ▪ Lessons learned ▪ Methodology ▪ SENCMM ▪ ISO 9XXXX ▪ Six sigma	▪ Skills development ▪ Staff competencies ▪ Learning ▪ Teaching ▪ Training	▪ Communities ▪ Collaboration ▪ Discussion forums ▪ Networking ▪ Virtual teams ▪ Research and development ▪ Multi-disciplined teams
Enabling Technologies	▪ Expert systems ▪ Cognitive technologies ▪ Semantic networks ▪ Rule-based expert systems ▪ Probability networks ▪ Rule induction ▪ Decision trees ▪ Geospatial information systems	▪ Intelligent agents ▪ Web crawlers ▪ Relational and object DBMS ▪ Neural computing ▪ Push technologies ▪ Data analysis and reporting tools	▪ Document management tools ▪ Search engines ▪ Knowledge maps ▪ Library systems	▪ Workflow management ▪ Process modelling tools	▪ Computer-based training ▪ Online training	▪ Groupware ▪ e-mail ▪ Chat rooms ▪ Video conferencing ▪ Search engines ▪ Voice mail ▪ Bulletin boards ▪ Push technologies ▪ Simulation technologies
Portals, Internet, intranets and extranets						

(Source: Willcoxson 2003)

In a nutshell, effective knowledge management requires a holistic approach that addresses the culture, organisation, process and technology, and the creation of new knowledge for competitive advantage.

2.3   Knowledge management in Malaysia

Knowledge management is undoubtedly a crucial activity that needs to be effectively exercised by organisations the world over. In Malaysia, knowledge management has been identified to be a key factor in ensuring organisational success. Prior studies have highlighted the importance and benefits to local organisations (Asleena Helmi 2002; Badruddin A Rahman 2004a, 2004b; *Bank Negara Malaysia* 2005; Bontis, Chua & Richardson 2000; Chong & Amat Taap Manshor 2003; Hafizi Muhamad Ali & Zawiyah Mohammad Yusof 2004; Hishamuddin Md Som et al. 2004; Ndubisi 2004; Niza Adila Hamzah & Woods 2004). Among the key reasons identified for the importance of knowledge management to Malaysian organisations is the need for organisations to develop new areas of growth in knowledge-intensive areas in view of the nation's shift to the knowledge economy (*Bank Negara Malaysia* 2005; Ramanathan Narayanan, Richardson & Abdul Latif Salleh 2003). The need to harness knowledge possessed by organisations is brought about by the fact that reliance on manufactured goods and the export of traditional commodities will not be sufficient to generate future growth for the Malaysian economy (*Bank Negara Malaysia* 2005).

In order for organisations to remain competitive and for Malaysia to effectively compete for foreign direct investment, there is a need for a smooth transition from a labour and technology intensive economy to a knowledge-based economy (Yu 2003).Yu (2003) stressed on the need for many factors to allow this smooth transition, one of which is the need for knowledge management practices adopted by organisations in the country to be aligned with the overall business environment in which they operate in. A thorough examination of knowledge management practices in Malaysia is required to ensure competitive advantage of knowledge and its manipulation (Ko 2003; Nonaka & Takeuchi 1995).

2.3.1   The Multimedia Super Corridor

Realising the importance of knowledge and the need to transform the country's economy, the Malaysian government has embarked on a bold move by developing the Multimedia Super Corridor (MSC), launched on 27 June 1996 (MDC 2005). The MSC is modelled after the Silicon Valley in California, with inputs from various science parks worldwide (Bala Ramasamy, Anita Chakarbarty & Cheah 2002). The development of technopoles or science parks such as the Singapore Science Park and the Kanagawa Science Park in Japan have been made in line with the respective government's plan to spur knowledge-intensive activities in the economy (Bala Ramasamy, Anita Chakarbarty & Cheah 2002).

The MSC is seen by many as an effort to stem the erosion in the massive economic growth that Malaysia experienced based on a labour cost advantage it enjoyed in computer and telecommunications hardware production in the 1980s and 1990s (Bala Ramasamy, Anita Chakarbarty & Cheah 2002; Mosco 1997). Having lost that advantage to other developing Asian nations such as Bangladesh, Vietnam and China, the Malaysian government believes it can pioneer in knowledge-intensive activities such as software and product development (Mosco 1997).

The MSC project is part of Malaysia's long-term plan (Vision 2020) to become a fully-developed nation and knowledge-rich society by the year 2020 (MDC 2005). It is also meant to leapfrog Malaysia's development through the creation of an ideal multimedia environment for world-class companies to use as a regional hub (Bala Ramasamy, Anita Chakarbarty & Cheah 2002; MDC 2005). The MSC is a 15 by 50 km zone, stretching from the Petronas Twin Towers in the centre of Kuala Lumpur to the Kuala Lumpur International Airport (MDC 2005). It comprises several administrative, industrial and technological development clusters. Among the clusters are (1) Putrajaya - the newly built seat of the federal government, (2) Cyberjaya – an intelligent city which houses ICT industries as well research centres and the Multimedia University, and (3) Technology Park Malaysia – a technology park located in the centre of the MSC providing engineering and IT facilities to entrepreneurs, investors and industries (MDC 2005). Previous industrial development projects such as the free trade zone in Petaling Jaya, manufacturing hubs in the outskirts of Kuala Lumpur and the city's financial centres also

fall within the MSC (MDC 2005). In 2005, the MSC has been extended to include Penang as the first of its many new intelligent cities (MDC 2005).

By providing the infrastructure and the necessary environment that encourages innovation and creativity, Malaysia is paving the way to be a platform for growth and advancement as well as a leader in ICT (MDC 2005). The MSC is developed specifically to explore the frontiers of information and multimedia technologies, revealing its full potential through the creation and implementation of cyberlaws, cutting-edge technologies and excellent infrastructure (MDC 2005). The organisation that has been specifically set up to oversee the development of the MSC and the formulation of relevant policies is the Multimedia Development Corporation (MDC). The MDC awards MSC status to both local and foreign companies that develop or use multimedia technologies to produce or enhance their products and services and for process development (MDC 2005).

Applicant companies must meet the qualifying criteria and successful companies must observe the conditions attached to the MSC-status recognition (MDC 2005). The main criterion to being awarded MSC status is being a knowledge-intensive organisation that employs a substantial number of knowledge workers and supports Malaysia's k-economy initiatives (MDC 2005). These companies enjoy a set of incentives and benefits from the Malaysian government backed by the ten *Bill of Guarantees*. Based on current figures, there are 1 261 approved MSC-status companies made up of 908 Malaysian-owned, 320 foreign-owned and 33 joint-venture companies (MDC 2005). Out of these, the Multimedia Development Corporation classifies 67 of them as being 'world-class', companies acknowledged as world leaders in their respective fields (MDC 2005). The bulk of these MSC status companies are actually involved in software development, software design, Internet-based solution and content development (MDC 2005). It is estimated that there are 22 293 persons employed in these MSC status companies with approximately 16 000 of them being classified as knowledge workers (MDC 2004, p. 7). Based on the large number of MSC status organisations and the number of knowledge workers that they employ, it is exigent that ways in which how they manage their knowledge is understood further.

2.3.2   Knowledge management practices in Malaysia

Understanding knowledge management within the Malaysian context is difficult as there have been very few published work on it. In addition, a majority of the work written on knowledge management in Malaysia tend to be conceptual or theoretical with no primary research being conducted. Some of these papers attempted to achieve prescribing measures that have been found to be successful in other countries without fully understanding what is happening within the local context. However, some of the empirical research conducted has indicated that some key differences exist in managing knowledge in Malaysia.

One of the earliest studies on knowledge management in Malaysia indicated that Malaysian organisations tend to be slow in the uptake of knowledge management and that levels of knowledge management is still in the infancy stage (Salleh Yahya, Lailawati Mohd Salleh & Goh 2001). Within the manufacturing sector, it was found that knowledge sharing was done at a moderate level and there existed significant relationship between organisational culture and technology with knowledge sharing (Hishamuddin Md Som, Low & Zaleha 2002).

A subsequent study by Rumesh Kumar (2003) on electrical and electronics-based organisations in Malaysia revealed that there is no clear explicit and identifiable knowledge management strategy in place. This finding is crucial as these organisations would not be able to sustain their efforts in knowledge management which requires for an alignment of an explicitly identified knowledge management strategy with the organisation's vision, mission and structure (Hishamuddin Md Som, Low & Zaleha 2002; Rumesh Kumar 2003; Tiwana 2000).

The primary challenge faced by organisations in Malaysia is changing the employees' behaviour and practices. Apart from this, it is difficult for organisations to retain talented employees leading to knowledge loss (Ramanathan Narayanan, Richardson & Abdul Latif Salleh 2003). It was also found that organisations in Malaysia tend to be highly bureaucratic and have a centralised decision-making structure with lower levels of knowledge management applications and systems in place (Hishamuddin Md Som et al. 2004; Ramanathan Narayanan, Richardson & Abdul Latif Salleh 2003). Furthermore,

Malaysian organisations that operate in more competitive environments tend to have more comprehensive knowledge management systems in place (Hishamuddin Md Som et al. 2004; Ramanathan Narayanan, Richardson & Abdul Latif Salleh 2003).

A recent study of knowledge management in 25 award-winning Malaysian organisations reveal that there is greater awareness on the need for and importance of knowledge management (Tan 2004). These organisations have also taken steps to incorporate knowledge management concepts within their organisations but these measures tend to take on a more 'human-oriented' approach that focuses on the sharing of tacit knowledge which may prove to be unsustainable in the long term (Rumesh Kumar 2003; Tan 2004).

Despite there being some research on knowledge management in the past few years, none has specifically looked at the MSC status companies. In addition, almost all prior research utilised survey questionnaires based on foreign studies which may not be fully applicable to the Malaysian context at this exploratory stage of research (Hishamuddin Md Som, Low & Zaleha 2002; Ko 2003; Ramanathan Narayanan, Richardson & Abdul Latif Salleh 2003; Rumesh Kumar 2003; Tan 2004). Due to these reasons and the fragmented and scant amount of literature on knowledge management practice in Malaysia, it is exigent that studies on knowledge management practices in Malaysia be conducted. Furthermore, the move by the Malaysian government in transforming Malaysia's economy to one that is knowledge-driven and with its bold Multimedia Super Corridor initiative currently in progress, it is necessary to understand the extent of knowledge management practice in MSC status companies in Malaysia. Based on the need to understand these critical factors, the following research problem was identified for this study:

Research Problem: *'How and why do Multimedia Super Corridor status companies in Malaysia practise knowledge management?'*

To address the research problem, this study shall adopt an integrative view of knowledge management in which it shall attempt to understand the three key factors affecting knowledge management practice in MSC status companies in Malaysia. The three key factors appear to be knowledge management enablers, knowledge creation process and outcomes (Lee & Choi 2003; O'Dell & Grayson 1999).

Knowledge management enablers are organisational mechanisms for fostering knowledge consistently which stimulates knowledge creation, protects knowledge and facilitates knowledge sharing within an organisation (Lee & Choi 2003; Turban & Aronson 2001). Knowledge processes on the other hand are ways in which knowledge are managed effectively in the organisation. Knowledge creation process includes key activities such as creation, sharing, storage and use in the organisation based on the SECI model (Awad & Ghaziri 2003; Turban & Aronson 2001). Organisational outcomes describe the degree to which the organisation achieves its stated goals and objectives (Lee & Choi 2003). These outcomes can be in the form of financial benefits, advantages and competencies gained from deploying knowledge management (Chase 1997b; Chong & Amat Taap Manshor 2003; Suliman Al-Hawamdeh 2002; Tidd 2001). These factors identified for this study result in the development of an initial integrative research framework to be adopted by this study as shown in Figure 2.2.

Figure 2.2   An integrative research framework for this study
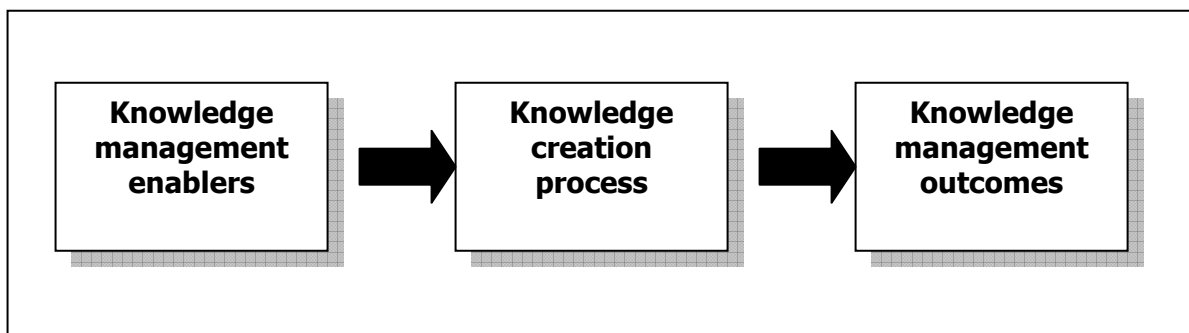
(Source: developed for this study)

Based on the research framework adopted and a thorough review of extant literature on knowledge management practices, three specific research questions were developed for this study. These research questions are raised in the following sections which attempt to identify the various enablers of knowledge management, the different knowledge creation processes and the outcomes of knowledge management.

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2.4   Enablers of knowledge management

A review of the literature reveals that there are many enablers that are known to influence knowledge management practices. Among these enablers identified from the literature, this study will look at culture, structure, people and information technology infrastructure. These enablers can be broadly classified into either a social or technical perspective, with the latter covering information technology infrastructure. The social perspective of knowledge management enablers plays an important role as it has been widely acknowledged that a greater emphasis on people-centric perspectives must be adopted as technology can only go so far (Smith 2004; Wiig 1993).

2.4.1   Culture

Culture defines not only the value of knowledge but also internal organisation of this knowledge for sustained competitive advantage (van Zolingen, Streumer & Stooker 2001). An appropriate culture should be established within the organisation to encourage employees to create and then to share knowledge amongst themselves (Lee & Choi 2003). Creating and sustaining this sharing culture is not an easy task and requires the cooperation of all parties.

Although many cultural factors have been identified in the literature, a majority of these factors were based on Western countries and environments which are different from the Asian context (Chan & Ng 2003; Chaudry 2005). Studies need to be conducted in Malaysia to determine the role of these cultural factors.

2.4.1.1   Collaboration

Collaboration is an important feature in knowledge management adoption. It is defined as the degree to which people in a group actively assist one another in their task (Hurley & Hult 1998; Lee & Choi 2003). A collaborative culture in the workplace influences knowledge management as it allows for increased levels of knowledge exchange, which is a prerequisite for knowledge creation. This is made possible because collaborative

culture eliminates common barriers to knowledge exchange by reducing fear and increasing openness in teams (Lee & Choi 2003).

Collaboration between team members also tightens individual differences which can help shape a shared understanding about the organisation's environments through supportive and reflective communication (Fahey & Prusak 1998). Without shared understanding among team members, very few knowledge creation activities are conducted (Fahey & Prusak 1998; Lee & Choi 2003).

2.4.1.2   Mutual trust

Mutual trust exists in an organisation when its members believe in the integrity, character and ability of each other (Robbins 1998; Robbins et al. 2001). Trust has been an important factor in high performance teams as explained in organisational behaviour literature. The existence of mutual trust in an organisation facilitates open, substantive and influential knowledge exchange (Abrams, Cross, Lesser & Levin 2003; Lin 2006; Nahapiet & Ghoshal 1998; O'Dell & Grayson 1999; Robbins 1998; Robertson & Hammersley 2000; Shapiro 1987). When team relationships have a high level of mutual trust, members are more willing to engage in knowledge exchange (Mayer, Davis & Schoorman 1995; Nahapiet & Ghoshal 1998; Robbins 1998; Shapiro 1987).

It has been found that low levels of mutual trust is a key barrier to knowledge exchange in teams (Szulanski 1996). When knowledge exchange activities can be increased via mutual trust, knowledge creation occurs (Lee & Choi 2003; Takeuchi & Nonaka 2004). Trust encourages an environment that promotes knowledge creation as it reduces the fear of risk. Hence, high levels of trust can reduce this risk in teams (Lee & Choi 2003). When team members trust one another, they are less apprehensive to share ideas and thoughts with each other, sparking off a spiral of knowledge creation through the SECI process (Takeuchi & Nonaka 2004). However, Robbins (1998) cautions that although trust may take a long time to build, it can be easily destroyed and would therefore require careful attention by management.

2.4.1.3   Learning

Learning is defined as 'any relatively permanent change in behaviour that occurs as a result of experience' (Robbins et al. 2001, p. 124). In organisations, learning involves the dynamics and processes of collective learning that occur both naturally and in a planned manner within the organisation (Millet & Marsh 2001; Robbins et al. 2001).

Learning is crucial in knowledge management as it provides an avenue for the organisation to be infused with new knowledge (Lee & Choi 2003; Nonaka & Takeuchi 1995; See 2002). With an emphasis on learning and continuous development, knowledge creation activities will increase and employees can play an active role in the process (Lee & Choi 2003). Lee and Choi (2003) posit that for successful knowledge creation to occur, organisations should develop a deeply ingrained learning culture and have education, training and mentoring programmes available to encourage learning. In addition to that, it is important for the organisation to have tolerance for mistakes and view them as opportunities for learning and problem solving (van Zolingen, Streumer & Stooker 2001).

Developing and maintaining organisational learning capabilities is critical for guaranteeing core competence enhancement and sustained competitive advantage for the organisation (Simonin 1997). This has been backed by an empirical study by See (2002) who found that organisational learning culture is a key factor in predicting knowledge creation activities which consequently affects organisational performance.

2.4.1.4   Leadership

Leadership is often stated to be a driver for effective knowledge management in organisations (Ambrosio 2000; Crawford 2003; Hishamuddin Md Som et al. 2004; King, Marks & McCoy 2002; Mohamed Khalifa & Liu 2003; Peyman Akhavan, Mostafa Jafari & Mohammad Fathian 2005; Yu, Kim & Kim 2004). Leadership is defined as the ability to influence and develop individuals and teams to achieve goals that have been set by the organisation (Robbins 1998; Robbins et al. 2001; Wood et al. 1998).

According to Yu, Kim and Kim (2004), adequate leadership can exert substantial influence on organisational members' knowledge creation activities. The presence of a management champion for the knowledge management initiative in order to set the overall direction for knowledge management programmes and who can assume accountability for them is crucial to effective knowledge management (Yu, Kim & Kim 2004).

In many organisations, this champion is often the Chief Knowledge Officer (CKO) or Chief Information Officer (CIO) (Mohamed Khalifa & Liu 2003). More specifically, leaders can be categorised as being transactional or transformational (Robbins et al. 2001). The former refers to leaders who guide and motivate subordinates in the direction of established goals by clarifying role and task requirements (Robbins et al. 2001; Wood et al. 1998). On the other hand, transformational leaders are those who possess charisma and provide individualised consideration and intellectual stimulation to subordinates (Robbins et al. 2001; Wood et al. 1998). Studies have shown that transformational leadership is strongly correlated to knowledge management (Crawford 2003). Failure in ensuring adequate leadership appear to have resulted in the failure of many knowledge management initiatives (Ambrosio 2000).

2.4.1.5   Incentives and rewards

Incentives and rewards that encourage knowledge management activities amongst employees play an important role as an enabler (Bartol & Srivastava 2002; Bock & Kim 2002, 2003; Ko 2003; Robertson & Hammersley 2000; Yu, Kim & Kim 2004). Incentives are something that has the ability incite to incite to determination or action by employees in an organisation (Robbins 1998; Robbins et al. 2001). Rewards on the other hand can be broadly categorised as being either extrinsic or intrinsic (Wood et al. 1998). Extrinsic rewards are positively valued work outcomes that are given to the employee in the work setting whilst intrinsic rewards are positively valued work outcomes that are received by the employee directly as a result of task performance (Wood et al. 1998). It is found that both intrinsic and extrinsic rewards have a positive influence on knowledge management performance in organisations (Yu, Kim & Kim 2004).

However, some contradictory arguments over the effects of rewards in knowledge management exist. It was found that artificial or extrinsic rewards that are not supported by the culture of the organisation are likely to be ineffective and may lead to employee cynicism (O'Dell & Grayson 1998). Knowledge sharing activities within the organisation is said to be negatively impacted by 'expected' rewards of employees, hence thwarting knowledge management activities in the organisation (Bock & Kim 2002, 2003).

2.4.2   Structure

Organisational structure plays an important role as it may either encourage or inhibit knowledge management (Niza Adila Hamzah & Woods 2004; Nonaka & Takeuchi 1995). The structure of the organisation impacts the way in which organisations conduct their operations and in doing so, affects how knowledge is created and shared amongst employees (Lee & Choi 2003; Nonaka & Takeuchi 1995). Realising this, this study will consider organisational structure from the perspective of centralisation and formalisation.

2.4.2.1   Centralisation

Centralisation refers to the degree to which decision making is concentrated at a single point, normally at higher levels of management in the organisation (Robbins et al. 2001; Wood et al. 1998). The concept of centralisation includes only formal authority - that is rights inherent in one's position (Robbins et al. 2001). An organisation is said to be highly centralised if the top management makes the organisation's key decisions with little or no input from lower level employees (Robbins et al. 2001).

When decision-making authority is centralised, spontaneity, experimentation and freedom of expression which are key elements of knowledge creation are greatly reduced (Graham & Pizzo 1996; Lee & Choi 2003). In addition, a centralised structure hinders interdepartmental communication and sharing of new ideas (Bennet & Gabriel 1999; Delmonte & Aronson 2002). Without a continuous flow of ideas and communication, knowledge creation does not occur. A decentralised organisation structure has been found to facilitate an environment were spontaneity in knowledge creation occurs (Stonehouse & Pemberton 1999). Hence, decreased centralisation in an organisation can

lead to increased creation of knowledge (Lee & Choi 2003; Stonehouse & Pemberton 1999; Teece 2000).

2.4.2.2   Formalisation

Formalisation refers to the written documentation of rules, procedures and policies to guide behaviour and decision making in organisations (Wood et al. 1998). When an organisation is highly formalised, employees would then have little discretion over what is to be done, when it is to be done and how they should do it, resulting in consistent and uniform output (Robbins et al. 2001). Formalisation though impedes knowledge management activities. This is because knowledge creation requires creativity and less emphasis on work rules as the range of new ideas that emerge from a highly formalised structure is limited.

Flexibility and informal communications can allow employees to work in better ways and generate new knowledge (Bennet & Gabriel 1999; Delmonte & Aronson 2002). Therefore, increased flexibility in an organisation can result in increased creation of new knowledge (Bennet & Gabriel 1999). Low formalisation also allows for variation and openness, which are crucial to knowledge creation. Formalisation also tends to stifle communication and interaction within departments and across departmental boundaries within an organisation (Bennet & Gabriel 1999; Delmonte & Aronson 2002). Many organisations are also finding that 'water cooler' types of conversation are key mechanisms for the transfer of knowledge related to effective problem-solving (Anthes 2000; Delmonte & Aronson 2002).

2.4.3   People

People are the heart of creating organisational knowledge as it is people who create and share knowledge (Lee & Choi 2003). Therefore, it is crucial that the organisation recruits and effectively manages its employees to create and share knowledge (Lee & Choi 2003). Knowledge, skills and competence can be acquired by the organisation through recruiting people with desirable skills, in particular those with T-shaped skills (Leonard-Barton 1995).

2.4.3.1   T-shaped skills

Most teams are composed of individuals who operate from a base of deeply specialised knowledge (Davvy 2006; Leonard-Barton 1995; Rumesh Kumar 2003). These individuals need mechanisms to translate across the different 'languages' that exists in organisations (Ford & Staples 2006 ; Leonard-Barton 1995; Rumesh Kumar 2003; Tan 2004; Tan, Mohammad Yusof & Hamdan 2005). This brings rise to the need for employees with T-shaped skills which mean that they possess skills that are both deep and broad (Leonard-Barton 1995). Employees who possess T-shaped skills not only have a deep knowledge of a particular discipline (like financial auditing) but also how their discipline interacts with other disciplines (like risk analysis, investment analysis and derivatives) (Iansiti 1993; Leonard-Barton 1995). Iansiti (1993) states that the deep knowledge in a particular discipline is aptly represented by the vertical stroke of the 'T' whilst knowledge of how this discipline interacts with other disciplines is represented by the horizontal top stroke of the 'T'. This is illustrated in Figure 2.3 below.

Figure 2.3   T-shaped skills
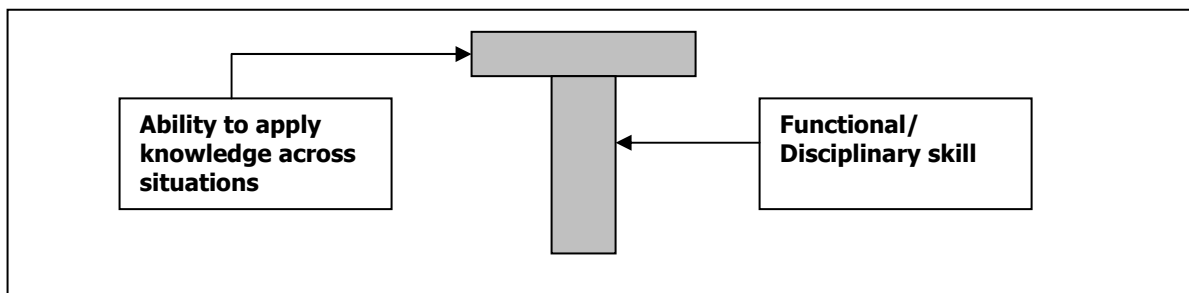
(Source: Leonard-Barton 1995, p. 76)

Employees with T-shaped skills are extremely important in knowledge creation activities as they possess and can integrate diverse knowledge assets to improve organisational performance (Leonard-Barton 1995). They possess the ability both to combine theoretical and practical knowledge and to see how their discipline of knowledge interacts with others (Johannenssen, Olsen & Olaisen 1999; Lee & Choi 2003). These skills allow employees to expand their competence across several disciplines and thus create new knowledge for the organisation (Johannenssen, Olsen & Olaisen 1999; Lee & Choi 2003; Madhavan & Grover 1998). Possession of T-shaped skills allows employees to have synergistic conversations with one another (Madhavan & Grover 1998).

2.4.4   Information technology infrastructure

Technology plays an important role in knowledge management. Technology infrastructure includes information technology and its capabilities which are considered to assist organisations to get work done, and to effectively manage knowledge that the organisation possesses (Hishamuddin Md Som et al. 2004; Holsapple 2005; Ko 2003; Okunoye & Karsten 2002; van den Hoof & de Ridder 2004). The information technology infrastructure within an organisation can be broadly categorised into hardware technologies and software systems (Hishamuddin Md Som et al. 2004; Holsapple 2005; Ko 2003; Okunoye & Karsten 2002). It has been found that information technology infrastructure plays a crucial role in knowledge management as it allows for easy knowledge acquisition and facilitates timely communication amongst employees (Okunoye & Karsten 2002). Information technology infrastructure also speeds up the pace of knowledge creation and assists in the process of building organisational memory (Okunoye & Karsten 2002).

Common information technology applications that support knowledge management include the Internet, intranets, extranets, office automation systems, meeting systems, knowledge directories, knowledge-based systems, document management systems and electronic publishing systems (Hishamuddin Md Som et al. 2004; Tan 2004; Willcoxson 2003). These information technology applications support a wide array of organisational tasks related to knowledge management which is classified by Willcoxson (2003) as transactional, analytical, asset management, process, development and innovation and creation.

Recent studies in Malaysia show that the Internet, intranet and office automation systems are widely used to support knowledge management activities and the need for more user-friendly systems to be deployed to facilitate its use (Badruddin A Rahman 2004a; Hishamuddin Md Som, Low & Zaleha 2002; Hishamuddin Md Som et al. 2004; Tan 2004). Other applications like groupware and decision support systems were less often used in Malaysian organisations (Tan 2004). Information technology infrastructure is generally agreed to be a key enabler of knowledge management. However, it is important to point out that by itself, information technology infrastructure does not guarantee

knowledge management success but it plays a crucial role in supporting the entire organisation in its knowledge management initiative (Yu, Kim & Kim 2004).

A wide range of factors that have been attributed to enable knowledge management activities have been identified in this section. These enablers can be broadly classified into two broad dimensions – a social dimension and a technical dimension. The social dimension includes factors such as organisational culture, structure and people while the technical dimension looks at the information technology infrastructure that is in place to support knowledge management initiatives. To further understand the knowledge management enablers that play a significant role in MSC status companies in Malaysia, the first research question for this study is proposed:

> ***RQ1:*** ***What are the enablers of knowledge management (cultural, structural, people and technology) in Multimedia Super Corridor status companies in Malaysia?***

2.5   Knowledge creation process

The knowledge that individuals possess today will not solve tomorrow's problems (Awad & Ghaziri 2003). This has profound implications to organisations as they must not only possess knowledge, but also find ways in which they can develop and convert what they know into new knowledge. Organisational knowledge therefore needs to be constantly updated. In knowledge creation literature, the importance of tacit knowledge is widely recognised and emphasised (Lewis 2003). Knowledge creation is a social process which is embedded in a particular set of relationships among individuals, teams and organisations (Nonaka & Nischiguchi 2001). It is argued that knowledge creation is therefore not merely the compilation of facts or data, but is a '… uniquely human process' which involves human feelings and belief systems (von Krogh, Ichijo & Nonaka 2000, p. 6).

Many knowledge creation theorists treat both tacit and explicit knowledge as separate categories (Nichols 2000; Nonaka, Konno & Toyama 2001; Nonaka & Takeuchi 1995). At the same time, these two categories of knowledge are seen complementary – interacting and engaging with each other. Realising the paradoxical and yet complementary nature of both tacit and explicit knowledge as described in the preceding section, it is exigent that organisations are competent in converting and creating the different types of knowledge it needs in order to remain competitive. The conversion of tacit knowledge into explicit knowledge is crucial as it is needed to drive innovation and new product development in organisations (Choo 1998; Nonaka & Takeuchi 1995). Choo (1998) explains that tacit knowledge becomes valuable to an organisation when it is converted into explicit knowledge and turned into new capabilities, products or services.

According to Nonaka and Takeuchi (1995), the key to knowledge creation lies in the ability in mobilising and converting tacit knowledge into explicit knowledge. Once created, this new knowledge needs to be disseminated and later embodied within the organisation, in its products, services and systems. This recognises that once knowledge is created within a particular context, it needs to be disseminated or spread across the organisation and linked to practice (Lewis 2003).

Several different models of knowledge conversion and creation have been formulated by researchers. These include the ACT model of knowledge conversion (Anderson 1983; Singley & Anderson 1989) and the SECI model of knowledge creation (Nonaka & Takeuchi 1995). In the ACT model, knowledge is divided into 'declarative knowledge' that is expressed in the form of proposition and 'procedural knowledge' that is used in such activities as remembering how to ride a bicycle (Anderson 1983). Often, declarative knowledge is used to refer to explicit knowledge and procedural knowledge to refer to tacit knowledge (Anderson 1983). The ACT model hypothesises that declarative knowledge has to be transformed into procedural knowledge in order for cognitive skills to develop (Anderson 1983).

The limitation of the ACT model is that transformation of knowledge only involves the transformation from declarative to procedural knowledge, while the transformation from procedural to declarative knowledge is neglected (Anderson 1983; Singley & Anderson

1989). This explains one of the major differences between Nonaka and Takeuchi's (1995) conceptualisation and Anderson's (1983) account that the former perceives knowledge conversion (from tacit to explicit) as bi-directional while the latter regards it as unidirectional.

The SECI model appreciates the dynamic nature of knowledge and knowledge creation besides providing a comprehensive framework for the management of knowledge-related activities (Nonaka & Takeuchi 1995). In view of the widespread acceptance of the SECI model by Nonaka and Takeuchi in various disciplines such as organisational learning, new product development and information systems, their model shall used for this study (Lee & Choi 2003; Poh 2001; Tan 2004). In addition to that, the SECI model is comprehensive in that it includes aspects of knowledge transfer and knowledge creation (Nonaka & Takeuchi 1995). These two aspects are important to organisations and should therefore be considered in knowledge management (Lee & Choi 2003).

2.5.1   The SECI model of knowledge creation

Nonaka and Takeuchi's model of knowledge conversion and creation has four modes. They are (1) socialisation – converting tacit knowledge to tacit knowledge; (2) externalisation – converting tacit knowledge to explicit knowledge; (3) combination – converting explicit knowledge to explicit knowledge; and (4) internalisation – converting explicit knowledge to tacit knowledge (Nonaka & Takeuchi 1995).

According to Nonaka, Konno and Toyama (2001), successful knowledge conversion and creation requires *ba* (a Japanese concept which translates roughly into space) which provides a shared space for emerging relationships. This is because knowledge needs a physical context for it to be created as it does not just exist in an individual's cognition, but rather it is created in situated action (Hayek 1945; Suchman 1987). Takeuchi and Nonaka (2004, p. 101) stress that the '… knowledge creating process is necessarily context-specific in terms of time, space and relationship with others' and that knowledge '… needs a place where information is given meaning through interpretation…'. Hence, *ba* is defined as a 'shared context in motion, in which knowledge is shared, created and

utilised' (Takeuchi & Nonaka 2004, p. 102). The extended SECI model based on current literature is detailed in Figure 2.3.

Figure 2.4   The extended SECI model of knowledge creation
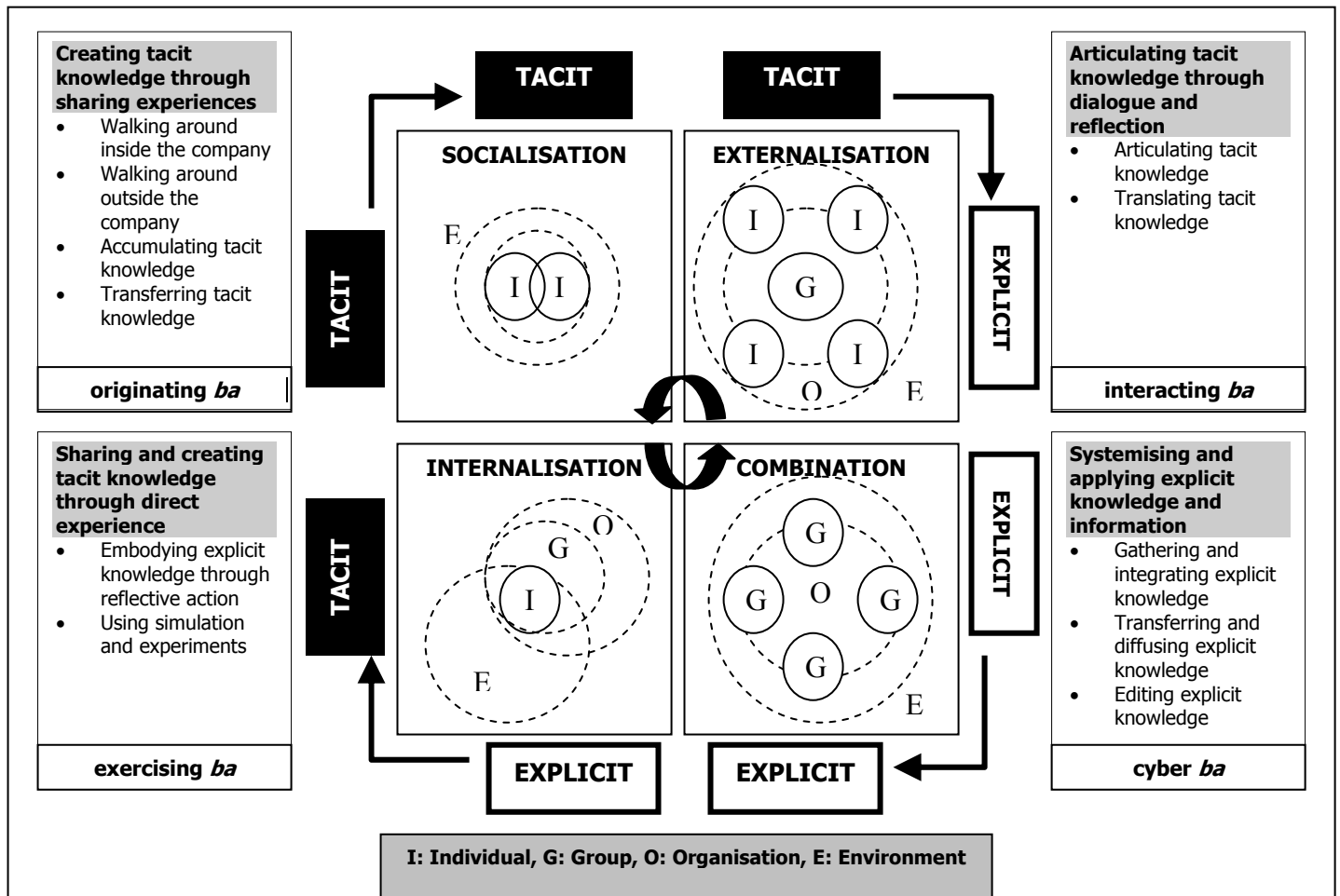
(Adapted from: Nonaka & Takeuchi 1995, pp. 62-73; Takeuchi & Nonaka 2004, pp. 96-106)

2.5.1.1   Socialisation – From tacit to tacit

Socialization includes the shared formation and communication of tacit knowledge between individuals in an organisation which requires the originating *ba* (Nonaka, Konno & Toyama 2001; Nonaka & Takeuchi 1995). The originating *ba* is where an individual sympathises or further empathises with others, removing the barriers between the self and others (Nonaka & Konno 1998). It is the primary *ba* from which the

knowledge creation process begins (Gray & Densten 2005; Nonaka, Konno & Toyama 2001).

Knowledge sharing at this stage is often done without ever producing explicit knowledge. At this stage, tacit knowledge is still primarily the personal possession of individuals in which sharing would occur between people who share a common culture or shared experience (Takeuchi & Nonaka 2004). Without some form of shared experience, it is extremely difficult for a person to project oneself into another individual's thinking process (Nonaka & Takeuchi 1995).

A typical activity in which tacit knowledge sharing can take place is a team meeting during which experiences are described and discussed, with much communicated between the lines (Nonaka & Takeuchi 1995). Nonaka and Takeuchi (1995, p. 63) note the importance of brainstorming sessions (*tama dashi kai*) that provide informal settings in which detailed discussions to solve difficult problems in projects are discussed (Nonaka & Takeuchi 1995). Apart from this aspect, tacit knowledge can also be effectively transferred through direct experience and apprenticeship in this stage (Nonaka 1998). Another activity that has proven to be useful is interaction between the project team and its stakeholders to ensure that improvements can be made to its products or services. Due to this, Nonaka and Takeuchi (1995) stress on the importance of socialisation for organisations.

2.5.1.2   Externalisation – From tacit to explicit

By its nature, tacit knowledge is difficult to convert into explicit knowledge. Through conceptualization, elicitation, and ultimately articulation, typically in collaboration with others, some proportion of a person's tacit knowledge may be captured in explicit form (Choo 1998; Takeuchi & Nonaka 2004). Externalisation is the process by which tacit knowledge is converted into explicit concepts through the use of metaphors, hypotheses, analogies or models which requires the presence of the interacting *ba* (Nonaka, Konno & Toyama 2001; Nonaka & Takeuchi 1995; Poh 2001).

Externalisation also represents the exchange of knowledge between the individual and a group (Seufert, von Krogh & Bach 1999). The interacting *ba* is more consciously

constructed, as compared to originating *ba* in the socialisation stage (Nonaka & Konno 1998; Nonaka, Konno & Toyama 2001). Selecting people with the right mix of specific knowledge and capabilities for a project team, taskforce, or cross-functional team is critical in the externalisation stage (Nonaka, Konno & Toyama 2001). Typical activities in which tacit knowledge is captured as the first step towards the conversion are in dialogue and collective reflection among team members, in responding to interview questions or through the elicitation of stories (Nonaka & Takeuchi 1995). This is most often seen in the concept creation phase of new products or services using both deduction and induction (Nonaka & Takeuchi 1995)

2.5.1.3   Combination – From explicit to explicit

Combination involves systemising concepts and combining different bodies of explicit knowledge into a knowledge system (Nonaka & Takeuchi 1995). In this stage, it is necessary to combine different fields of explicit knowledge with each other and to make new knowledge available on an organisation-wide basis (Seufert, von Krogh & Bach 1999). The combination stage requires the cyber *ba* (Nonaka & Konno 1998; Nonaka, Konno & Toyama 2001; Nonaka, Toyama & Konno 2002). The cyber *ba* is a place of interaction in a virtual world instead of real physical space and time. Explicit knowledge can be shared in meetings, via documents, e-mails or through education and training (Nonaka & Takeuchi 1995).

The use of technology to manage and search collections of explicit knowledge is well established (Takeuchi & Nonaka 2004). Hence, there is a further opportunity to foster knowledge creation, namely to enrich the collected knowledge from within and outside the organisation in some way, such as by reconfiguring and combining it, so that it is more usable and yield crucial knowledge for the organisation to succeed (Takeuchi & Nonaka 2004). The combination mode is a preferred mode of knowledge conversion amongst Western organisations (Takeuchi & Nonaka 2004).

2.5.1.4   Internalisation – From explicit to tacit

In order to act on information, individuals have to understand and internalize it, which involves creating their own tacit knowledge with the exercising *ba* (Nonaka & Konno 1998). Internalisation involves the conversion of organisation-wide explicit knowledge into the implicit knowledge of the individual (Seufert, von Krogh & Bach 1999). By reading documents, individuals can to some extent re-experience what others previously learned. By reading documents from many sources, individuals also have the opportunity to create new knowledge by combining their existing tacit knowledge with the knowledge of others (Choo 1998; Gray & Densten 2005; Nonaka & Takeuchi 1995).

However, the internalisation stage is becoming more challenging because individuals have to deal with ever-larger amounts of information these days. Focused training with senior mentors and colleagues consists primarily of continued exercises that stress certain patterns and working out of such pattern (Nonaka & Takeuchi 1995). Rather than teaching based on analysis, learning by continuous self-refinement through on the job training or peripheral and active participation is stressed (Nonaka 1998). Thus the internalisation of knowledge is continuously enhanced by the use of formal knowledge (explicit) in real life or simulated applications (Nonaka & Takeuchi 1995).

The tacit knowledge developed in the internalisation stage can be shared again through the socialisation process between individuals, so that the knowledge creation spiral may be set in motion once more for the benefit of the organisation as a whole (Nonaka & Takeuchi 1995; Seufert, von Krogh & Bach 1999).

2.5.2   The knowledge spiral

Based on the SECI model of knowledge creation and conversion, another key concept put forth by Nonaka and Takeuchi (1995) is the knowledge creation spiral detailed in Figure 2.5. The SECI model provides a comprehensive explanation on how knowledge work processes comprise both social interaction and communication purposes at the level of the individual or the group, which can then advance for knowledge evolution and growth to larger contexts, namely at the organisational and inter-organisational levels (Dixon 2000; Poh 2001; Seufert, von Krogh & Bach 1999; Takeuchi & Nonaka 2004).

The knowledge spiral according to Nonaka and Nishiguichi (2001, p. 4) is '… a spiralling process of conversions between tacit and explicit knowledge involving the four stages of socialisation, externalisation, combination and internalisation'.

Figure 2.5   Spiral of knowledge creation
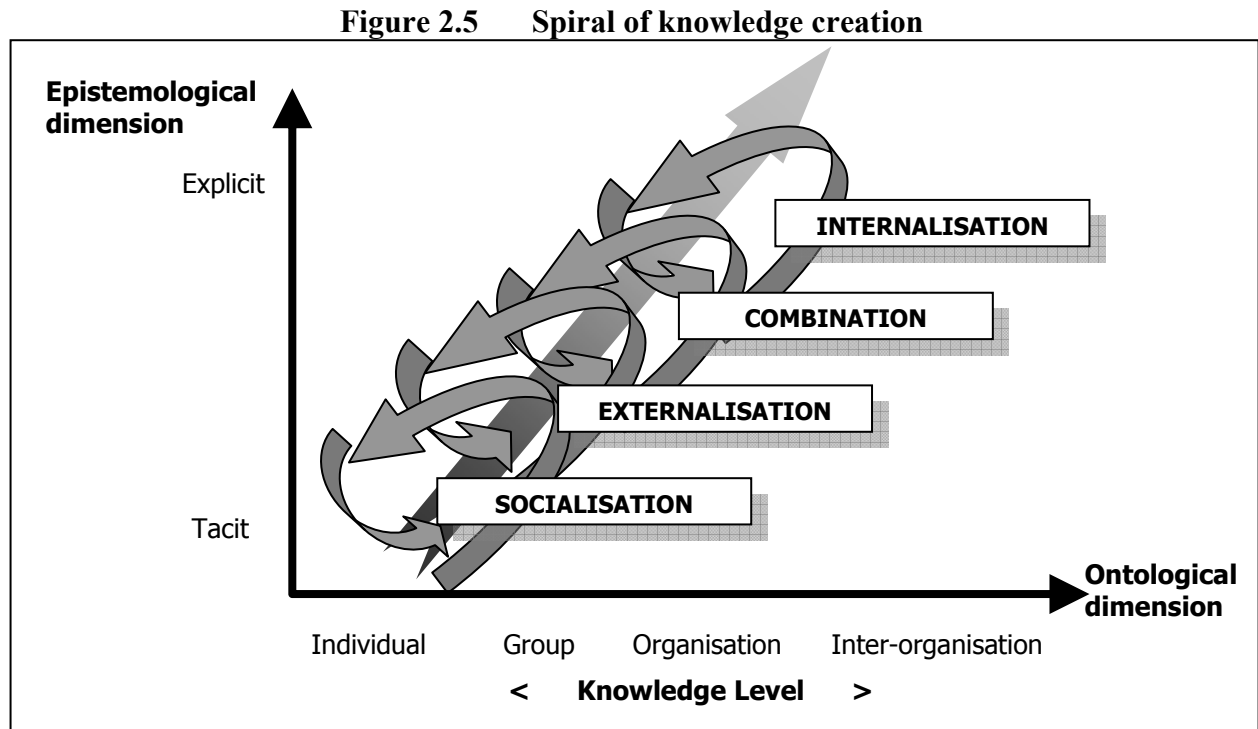
(Adapted from: Nonaka & Takeuchi 1995, pp. 70-3; Seufert, von Krogh & Bach 1999, p. 185)

As illustrated in Figure 2.5, the knowledge spiral process commences at the individual level and involves a community of interacting individuals at various levels of the organisation and mental models going through the socialisation, externalisation, combination and internalisation modes to create new knowledge (Nonaka & Konno 1998; Nonaka & Takeuchi 1995; Seufert, von Krogh & Bach 1999). The new explicit knowledge created would then need to be re-experienced and re-internalised as new tacit knowledge in the organisation (Lee & Choi 2003; Nonaka & Takeuchi 1995)

While new knowledge is unearthed through the dynamic interaction between explicit and tacit knowledge at different levels of the organisation, specific triggers are needed to prompt shifts between the different stages of knowledge creation and transfer (Choo 1998; Nonaka & Takeuchi 1995; Takeuchi & Nonaka 2004) . The socialisation stage is

triggered by the 'field of interaction' where experiences and mental models can be shared amongst individuals (Nonaka & Takeuchi 1995).

The externalisation stage on the other hand is triggered by 'collective reflection or meaningful dialogue' where group members use figurative language to articulate tacit knowledge (Nonaka & Takeuchi 1995). Combination is triggered by 'networking or linking' newly created explicit knowledge and existing knowledge from other sections of the organisation (Nonaka & Takeuchi 1995). Finally, 'learning by doing' triggers the internalisation process (Nonaka & Takeuchi 1995).

Based on the literature, it is shown that socialisation has been identified to be an important mode of knowledge conversion whilst many Western organisations preferred the combination mode of knowledge conversion where explicit knowledge is transformed into new explicit knowledge and disseminated to the entire organisation (Nonaka & Takeuchi 1995).

In the Malaysian context, there appears to be no clear mode of knowledge conversion that is adopted (Tan 2004). However, there is a slight preference for internalisation, followed by externalisation and combination respectively, with very little socialisation activities involved (Tan 2004). On the job training is the most common knowledge conversion activity employed by Malaysian organisations (Tan 2004). Apart from this, knowledge was created or transformed through rules and procedures, learning by doing, problem solving with supervisors, learning through observation and job aids from peers and supervisors (Tan 2004).

As such, not much is known about the types of knowledge creation activities that take place in Malaysian organisations, in particular those that are knowledge-intensive. In view of this and to further comprehend the extent of knowledge creation activities in Malaysia, the second research question for this study is advanced:

> **RQ2:   What is the process involved in creating knowledge in Multimedia Super Corridor status companies in Malaysia?**

2.6   Knowledge Management Outcomes

Knowledge management has become increasingly important in today's highly competitive business environment (Yelden & Albers 2004). Knowledge assets of organisations have played a crucial in this shift and are becoming increasingly more important to them these days (Yelden & Albers 2004). This is because the knowledge assets of an organisation are the key to innovation and differentiation which are undoubtedly engines for competitive advantage. Exploratory studies on knowledge management outcomes in Malaysia indicate that the perceived benefits include better decision-making, better understanding of customers, improved skill base, better quality and efficiency, better outputs and innovation (Rumesh Kumar 2003). In view of the importance of knowledge management to organisations these days, a brief survey of some of the key outcomes of knowledge management shall be examined to allow for a better understanding of the need for effective knowledge management. These include achieving organisational efficiency, competitive advantage, maximising organisational potential and better management of knowledge assets.

2.6.1   Organisational efficiency

In the new economy, speed and responsiveness are key determinants for success, especially with the advent of new information technologies (Suliman Al-Hawamdeh 2002). In addition to these, organisations also face competition in the globalised marketplace. Davenport and Prusak (2000) stressed that with the new economy, consumers are now spoilt for choice and organisations would need to reach out to the consumers to survive. Responsiveness is indeed a key to organisational survival these days and organisations have no choice but to make the quantum leap with regard to their services such as time-to-market, time-to-solution and time-to-delivery or risk being forced out of business (Suliman Al-Hawamdeh 2002). These requirements can be effectively addressed by strategic actions by the organisations which include knowledge management initiatives (Rumesh Kumar 2003; Suliman Al-Hawamdeh 2002).

Further, knowledge management provides an effective means of organising their data, information and knowledge to facilitate and support operations. Organisations also need to generate, access, store and analyse their knowledge assets in a timely and prompt

manner (Conceicao, Gibson & Shariq 1997; Dixon 2000). Information management tools enable the effective manipulation of data and information but is not able to capture the complexity of context and richness of knowledge which is the key ingredient in attaining organisational efficiency (Suliman Al-Hawamdeh 2002). As such, knowledge management is needed to support organisational improvement and innovation (Suliman Al-Hawamdeh 2002). Reusing existing knowledge is also a crucial factor in attaining organisational efficiency (Nonaka & Takeuchi 1995; North, Reinhardt & Schmidt 2004).

2.6.2   Competitive advantage

To keep abreast of competition and to ensure continued competitive advantage, organisations need to fully understand both their customers and competitors (North, Reinhardt & Schmidt 2004; Suliman Al-Hawamdeh 2002). Customers are an integral component of the organisation's intellectual capital and is the reason for the organisation's existence (Stewart 1997). To ensure that an organisation effectively leverages on this intellectual capital with regards to their customers, information technology solutions such as customer relationship management (CRM) are useful to manage whatever knowledge of the customers that the organisation possesses (Probst, Raub & Romhardt 2000; Stewart et al. 2000).

Having understood the customers, another facet that requires due attention is its competitors. An organisation needs to know its competitors to stay ahead of the competition (Martensson 2000; Suliman Al-Hawamdeh 2002). This results in the need for extensive market intelligence activities to be conducted by the organisation which would then need to be managed effectively to ensure that the information and knowledge acquired can be put to good use (Martensson 2000; Suliman Al-Hawamdeh 2002). Therefore, knowledge management plays a crucial role in managing customer relationship better and providing competitive intelligence by managing bits and pieces of knowledge assets for competitive advantage.

Corporate strategies that acknowledge and place importance on knowledge have proven to be successful (Ash 1998; Davenport, De Long & Beers 1998; Martensson 2000; Millet, Mattsson & Johnston 2005). A study of 500 firms by KPMG illustrated that 80%

of senior executives feel that knowledge management is strategic to their organisation and 78% feel that they have missed business opportunities due to the lack or absence of knowledge management in their organisation (Kok 2004). A survey by Williams (2003, p. 8) reveals that 87% of European business directors believe they could enhance their company's competitiveness with improved knowledge management and 76% believe that building and sharing knowledge is crucial to their organisation.

 As such, organisations should adjust their resources and skills to a constantly changing environment whilst fine tuning their strategies to give due emphasis on knowledge management as a vehicle for competitive advantage (Ash 1998; Martensson 2000; Williams 2003). In addition, they should give due recognition to knowledge which is organisation's most valuable and yet more often than not under-used resource, and place knowledge assets at the centre of what the organisation does (Davenport, De Long & Beers 1998; Martensson 2000).

2.6.3   Maximising organisational potential

For knowledge-intensive organisations, the main driver in maximising the value of its research and development endeavours and investments is through recycling and reusing experiments and results they obtain (Suliman Al-Hawamdeh 2002). Companies such as 3M and BP maximised from effective knowledge management to achieve successes in the competitive industries that they are in (Cortada & Woods 1999). For example, 3M prides itself for being able to effectively 'learn' from its past mistakes in making the 'Post-it notes' which emerged as one of 3M's most successful products (Cortada & Woods 1999; Suliman Al-Hawamdeh 2002). Lee and Choi (2003) concur with this view as their study indicated that knowledge management results in organisational creativity which in turn improves organisational performance for their organisation is more successful, growing faster, more profitable and innovative, and has a greater share of the market compared to its competitors with knowledge management. However, it is noted that overemphasis on organisational creativity alone may lead to a 'creativity paradox' whereby creativity is encourages and reinforced at the expense of operational behaviours (Lee & Choi 2003, p. 215).

Knowledge management is useful in addressing the corporate memory loss associated with staff turnover or transfers (Davenport & Prusak 2000). The knowledge scarcity resulting from downsizing exercises can prove to be very expensive for organisations to compensate as corporate memory loss can lead to failed processes (Di Mattia & Oder 1997; Suliman Al-Hawamdeh 2002). Luring back laid-off employees or looking for alternative knowledge sources may prove to be a very expensive exercise for the organisation (Davenport & Prusak 2000).

2.6.4   Managing knowledge assets

Stewart (1997) posits that knowledge has become a central focus of most organisations these days. As a result of this, managing knowledge assets – finding, cultivating, storing, disseminating and sharing them has become the most important economic task of employees in any organisation (Stewart et al. 2000). The importance of knowledge management in effectively managing knowledge assets were predicted by Drucker in the 1980s when he foresaw future organisations as being knowledge-based, composed of specialists who direct and discipline their own performance through organised feedback from colleagues, customers and management (Drucker 1988). Drucker (1988) went on to stress that organisations needed to change the way they work and transform themselves into organisations of knowledge specialists to survive the dynamic business conditions that they will face in the not too distant future.

The ageing population in many industrialised countries is a further driver to knowledge management initiatives (Mitchell 2005). If not captured, knowledge accumulated over many years by experienced employees will be lost when they retire. This will result in detrimental effects to organisations. With proper knowledge management initiatives in place, knowledge sharing will occur, resulting in the expansion of the organisation's knowledge assets whilst avoiding loss of precious knowledge assets (Mitchell 2005). Unlike physical assets, knowledge assets will increase in value with use and is the major source of organisational creativity (Mitchell 2005; Newman 1997). Gray and Densten (2005) postulate that organisational success is not so reliant on the static 'stock' of knowledge assets it has, but rather on the dynamic social processes through which knowledge is enhanced and renewed.

Knowledge that can be transferred needs to be effectively codified and preserved through documentation or database storage and then linked to employees on a just-in-time or on-demand basis (Suliman Al-Hawamdeh 2002). This may be cumbersome and even impossible with conventional information systems. With proper knowledge management systems and applications (detailed in Table 2.3), this can be achieved with much ease (North, Reinhardt & Schmidt 2004).

To further understand the knowledge management outcomes in MSC status companies in Malaysia, the third research question is formulated.

RQ3:   *How do the current levels of knowledge management practice in Multimedia Super Corridor status companies affect their organisational performance?*

2.7   Summary of literature

Based on the literature reviewed, it can be observed that various factors can act as either facilitators or inhibitors to knowledge management. Apart from this aspect, the various forms of knowledge creation processes and knowledge management outcomes were also identified and summarised in Table 2.4.

**Table 2.4   Summary of factors reviewed in the literature**

Category	Factor	Source(s)
Knowledge management enablers	Collaboration (+)	Hurley & Hult (1998); Lee & Choi (2003); Fahey & Prusak (1998)
	Mutual trust (+)	Nahapiet & Ghoshal (1998); O'Dell & Grayson (1999); Robbins (1998); Szulanski (1996); Lee & Choi (2003); Shapiro (1987); Takeuchi & Nonaka (2004); Mayer et al. (1995); Abrams et al. (2003); Lin (2006)
	Learning (+)	Lee & Choi (2003); See (2002); Simonin (1997); Nonaka & Takeuchi (1995); van Zolingen, Streumer & Stooker (2001)
	Leadership (+)	Ambrosio (2000); Crawford (2003); Hishamuddin Md Som et al. (2004); Mohamed Khalifa & Liu (2003); Yu, Kim & Kim (2004)
	Incentives and rewards (+)	Ko (2003); Yu, Kim & Kim (2004); O'Dell & Grayson (1998); Bock & Kim (2002); Bock & Kim (2003); Bartol & Srivastava (2002)
	Centralisation (-)	Graham & Pizzo (1996); Lee & Choi (2003); Delmonte & Aronson (2002); Bennet & Gabriel (1999); Stonehouse & Pemberton (1999); Teece (2000)
	Formalisation (-)	Lee & Choi (2003); Delmonte & Aronson (2002); Bennet & Gabriel (1999); Anthes (2000)
	T-shaped skills (+)	Leonard-Barton (1995); Johannenssen, Olsen & Olaisen (1999); Lee & Choi (2003); Madhavan & Grover (1998)
	Information technology infrastructure (+)	Hishamuddin Md Som et al (2004); Ko (2003); Okunoye & Karsten (2002); Tan (2004); Badruddin A Rahman (2004b); Hishamuddin Md Som, Low & Zaleha (2002), Yu, Kim & Kim (2004)
Knowledge creation process	Socialisation	Takeuchi & Nonaka (2004); Tan (2004); Seufert, von Krogh & Bach (1999); Poh (2001); Nonaka & Takeuchi (1995); Choo 1998
	Externalisation	
	Combination	
	Internalisation	
Knowledge management outcomes	Organisational efficiency	Suliman Al-Hawamdeh (2002); Nonaka & Takeuchi (1995); North, Reinhart & Schmidt (2004); Rumesh Kumar (2003)
	Competitive advantage	Probst, Raub & Romhardt (2000); Stewart et al. (2000); Martensson (2000); Suliman Al-Hawamdeh (2002); Kok (2004); Williams (2003); Ash (1998); Davenport, De Long & Beers (1998)
	Maximising organisational potential	Suliman Al-Hawamdeh (2002); Cortada & Woods (1999); Davenport & Prusak (2000); Di Mattia & Oder (1997); Martensson (2000)
	Managing knowledge assets	Mitchell (2005); Newman (1997); Gray & Densten (2005); Suliman Al-Hawamdeh (2002); North, Reinhardt & Schmidt (2004)

(Source: developed for this study)

2.8   Proposed research model

Based on the factors affecting knowledge management discovered through a review of literature on knowledge management in Malaysia and in other countries, an initial research model is presented in Figure 2.5. The initial research model provides the basis for investigation of the research problem identified in this study.

Figure 2.6   Initial research model on knowledge management practices
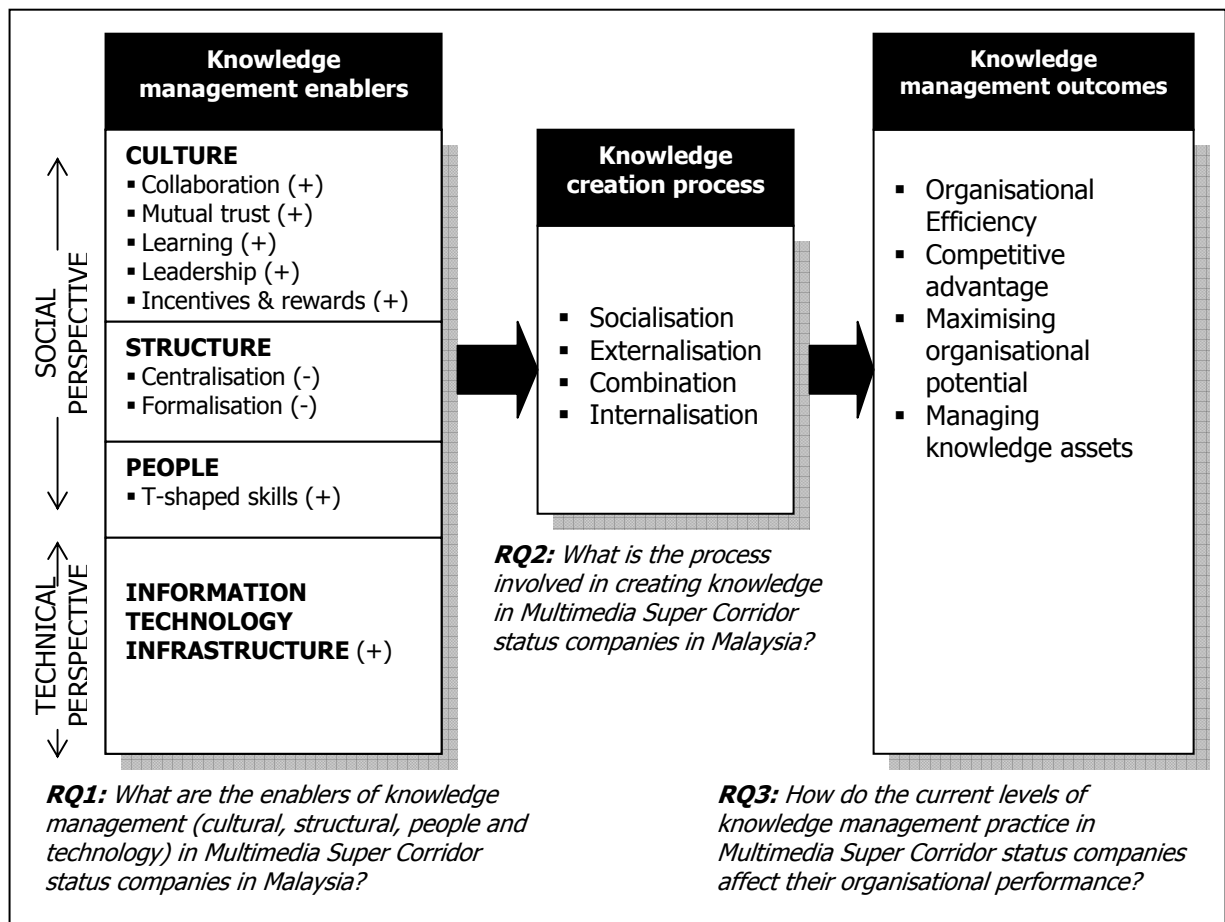
(Source: developed for this study)

The initial research model shows the relationship between the various factors identified in the literature and the three research questions developed based on the research problem identified for this study. The methodology used to collect data to answer each of these three research questions and to test this model is discussed in the next chapter.

2.9   Summary

This chapter has reviewed the literature relevant to the study of knowledge management practices in Multimedia Super Corridor status companies in Malaysia. It provided a brief overview on knowledge and its importance to organisations. It then provided a detailed working definition on knowledge management and traced its developments in recent times. A survey of knowledge management practices in Malaysia is also provided which included an overview of the Multimedia Super Corridor initiative undertaken by the Malaysian Government to develop a knowledge-based economy for national development. An examination of studies conducted in Malaysia reveal that a lot is still not known about knowledge management in MSC status companies which brings rise to the research problem - *'How and why do Multimedia Super Corridor status companies in Malaysia practise knowledge management?'* This chapter then analysed the three key factors that affect knowledge management – enablers, processes and outcomes. Based on the literature, an initial research model of knowledge management practice in Malaysia was developed for this study which incorporated the three research questions that were formulated. The next chapter discuss the methodology used to investigate the research questions.

3   RESEARCH METHODOLOGY

A set of research questions relevant to the study of knowledge management practices in Multimedia Super Corridor status companies in Malaysia was identified in the previous chapter. An initial research model on knowledge management practices was also formulated based on the literature review. This chapter identifies and describes the appropriate research methodology to investigate the research problem and answer the research questions being advanced in this study. It provides justification for the research paradigm and the selection of the case study method as well as explains the case study method research process which is made up of four key stages and the data analysis procedures. Issues pertaining to the reliability and validity in research design are also discussed. This is subsequently followed by a discussion of the limitations of the methodology and relevant ethical issues.

3.1   Justification for the research paradigm

A research paradigm is an overall conceptual framework within which a researcher may work or the 'basic belief system or worldview that guides the investigator [researcher]' (Guba & Lincoln 1994, p. 105). There are four different types of research paradigms which can be broadly classified as either dominant – positivism or alternative paradigms – critical realism, critical theory and constructivism (Guba & Lincoln 1994, p. 108; McPhail 2003, p. 2.20).

A summary of these research paradigms is provided in Table 3.1 which looks at these paradigms from three key aspects – ontology, epistemology and methodology (Guba & Lincoln 1994). Among these four paradigms, two of these – positivism and critical realism appear to be the most relevant to this study on knowledge management practices and are discussed further (Guba & Lincoln 1994; McPhail 2003; Perry, Riege & Brown 1999; Trochim 2005; Yin 1994). Critical realism is argued as being the most suitable

paradigm for the inquirer to operate within when investigating a research problem as complex and dynamic as this (Guba & Lincoln 1994; McPhail 2003; Perry 2001a; Perry, Riege & Brown 1999; Trochim 2005; Yin 1994).

Table 3.1   Scientific research paradigms

Item	Dominant Paradigm	Alternative Paradigms		
	Positivism	Critical realism	Critical theory	Constructivism
Ontology *What is the form and nature of reality and, therefore what is there that can be known about it?*	Naïve realism – 'real' reality but apprehensible. An apprehensible reality exists driven by immutable natural mechanism, and the investigator and reality are independent. Single reality or absolute truth that the researcher can discover.	'Real' reality but only imperfectly and probabilistically apprehensible. Reality is imperfectly apprehensible because of human mental limitations and the complexity of the world, with claims about reality subjected to others. Scrutinise to facilitate apprehending reality as close as possible.	Virtual reality shaped by social, political, cultural, economic, ethnic and gender values; crystallised over time. Work towards a single apprehensible reality but believe that it is shaped by social values and other forces. Research should emancipate the perceptions of co-researchers and participants.	Relativism – local and specific constructed realities. 'Reality' is constructed by people and (researchers), so there is no 'truth'. Multiple realities exist.
Epistemology *What is the nature of the relationship between the knower and the inquirer and what can be known?*	'Disinterested scientist' or 'one-way view mirror' inquirer. Can predict and control the phenomenon as objective researchers.	Inquirer with some level of participation as dualism is not possible to maintain but some objectivity is sought. Not truly objective.	Transformational/ subjective inquirer. Interested in transformation and critique.	Transactional/ subjectivist. Passionate participant/ inquirer who creates rather than discovers.
Methodology *How can the inquirer go about finding out whatever s/he believes can be known?*	Surveys and experiments	Case studies, in-depth interviews, convergent interviewing, focus groups	Action research	Hermeneutical, phenomenological and structuralist methodologies

(Adapted from: Guba & Lincoln 1994, pp. 108-9; McPhail 2003, p. 2.20)

Positivism is the default paradigm for most scientific research which assumes an ontological position that there is one true reality that can be discovered by means of rigorous, mostly quantitative and empirical study (Babbie 2000; Carson et al. 2001; Guba & Lincoln 1994; Trochim 2005). According to Guba and Lincoln (1994), the natural sciences, also known as 'hard science' operates within this paradigm. The natural scientist, experimenting and observing phenomena in a controlled laboratory environment embodies the classic positivist research paradigm (Lee 1989; Trochim 2005).

Positivism assumes that researchers are neutral observers and that their values, beliefs and biases will not influence the outcomes of the research (Babbie 1999; Flick 1999; Guba & Lincoln 1994; Trochim 2005). This assumption leads to the postulate of perfect repeatability of most experimental and natural scientific research (Lee 1989; Stehle 2004; Trochim 2005). In positivism, theories are first established and then tested by conducting experiments designed to confirm or disconfirm the theory (Babbie 1999; Blaikie 2003; Trochim 2005). Hence, positivism utilises a deductive rather than an inductive approach as hypotheses are first deduced from the literature and theories before they are tested in an empirical and statistical manner (Babbie 1999; Blaikie 2000; Stehle 2004).

The positivist paradigm is not well suited to this study for three key reasons. First, a search of sources conducted in Chapter 2 found insufficient testable theory in the field of knowledge management practice in MSC status companies in Malaysia. While there exist research and findings on knowledge management, these are mainly conducted in Western countries and not within the Malaysian context (Ramanathan Narayanan, Richardson & Abdul Latif Salleh 2003; Rumesh Kumar 2003; Syed Omar Sharifuddin Syed-Ikhsan & Rowland 2004a, 2004b; Tan 2004; Tan, Mohammad Yusof & Hamdan 2005).

The limited number of Malaysian studies on knowledge management on the other hand cannot be used conclusively as they merely replicated the instruments used in the Western studies without prior adjustment to suit the local culture and context (Raja Suzana Raja Kasim 2005; Ramanathan Narayanan, Richardson & Abdul Latif Salleh 2003; Rumesh Kumar 2003; Syed Omar Sharifuddin Syed-Ikhsan & Rowland 2004a, 2004b; Tan 2004; Tan, Mohammad Yusof & Hamdan 2005). As such, the theory and constructs on knowledge management practice in MSC status companies in Malaysia are yet to be established and thus cannot be tested in this study (Perry 1998; Stehle 2004).

Second, positivist researchers detach themselves from the research problem and are therefore not able to interact with all the stakeholders as deeply and subjectively which is a key requirement in this study to fully understand the complex issues being investigated (Perry, Riege & Brown 1999; Stehle 2004; Yin 1994). Most of the organisations and respondents in this study agree to participate as a result of personally knowing the

researcher to be both trustworthy and knowledgeable in the field of knowledge management, information systems and business. In other words, the respondents are able to relate to the researcher and view him as a colleague, which in turn means that the researcher involves himself in the research process.

Third, the research problem requires an investigation into knowledge management practice in MSC status companies in Malaysia which are undergoing a lot of changes due to the dynamic economic and technological climate in Malaysia (MDC 2004). The organisations, technologies and people involved are undergoing constant changes, thus making it impossible to repeat the study under exactly the same circumstances (Lee 1989). Positivism on the other hand requires repeatability of studies which is not possible in this instance (Lee 1989). In view of these factors, positivism is deemed to be not a suitable scientific research paradigm for this study. Next, the appropriateness of critical realism to this study is evaluated.

Critical realism which is also referred to as realism or post-positivism assumes that there is one reality which a researcher can only observe in certain parts and aspects due to its vast complexity (Babbie 1999; Perry, Riege & Brown 1999; Trochim 2005). In critical realism, especially where the organisational and social reality is complex and can be observed partially or comprehended imperfectly, there is a need for investigation of the different aspects and viewpoints of one reality (Perry, Riege & Brown 1999; Trochim 2005). This process to investigate the different aspects and viewpoints is known as triangulation (Perry, Riege & Brown 1999; Trochim 2005). Triangulation is achieved in this study by interviewing multiple managers and executives for each researched MSC status company in Malaysia, and by comparing interview results with publicly available documents such as brochures, company websites and reports (Perry, Riege & Brown 1999).

The critical realism paradigm is applicable to this study because the ontological assumption that reality is imperfectly apprehensible is suited to the situation of these MSC status companies in Malaysia which operate in a complex and dynamic business environment with limited existing literature and lack of well-established constructs (Benbasat, Goldstein & Mead 1987; Lake 2004; Lake & Erwee 2005; McPhail 2003). Organisations need information to enable better-informed decisions to be made and the

critical realism paradigm offers information and knowledge that is comprehensible within the mental capacity of participants without the false assumption that the sole 'real' reality or 'correct' answer has been found (Lake 2004; McPhail 2003).

The attempt at objectivity by the researcher allows observation whilst limiting the inference that participants in the study are influenced towards the researcher's preferred outcomes (McPhail 2003; Perry 2001a). To ensure that a certain level of objectivity remains the core aim of the study, a well-documented methodology is employed (Stehle 2004).

In critical realism, the researcher takes a more active and subjective role in the study than the positivist researcher who deliberately distances oneself from the question at hand (Perry, Riege & Brown 1999; Trochim 2005). In this study, the researcher investigates three large world-class MSC status organisations and has personal contacts with most of the respondents through work-related activities in information systems, business and communication. This professional involvement helps in building trust which results in open answers being obtained that might not have been possible to obtain in a more anonymous interview situation (McPhail 2003; Stehle 2004).

Another case for the selection of the critical realism paradigm is that knowledge management practices cannot be separated from the overall business situation and management philosophy of the researched MSC status companies (Yin 1994). This means that the study needs to grasp and appreciate as much as possible of the cultural, economic and political context in which these companies operate in (Stehle 2004; Yin 1994). Instead of attempting to control the external influences such as culture and organisational politics in the study, as the positivist researcher would attempt to achieve, this study seeks to understand the impact of these influences on knowledge management practice in MSC status companies (Benbasat, Goldstein & Mead 1987; Lee 1989; Yin 1994).

Furthermore, researchers operating within the critical realism paradigm often use an inductive approach and qualitative methods such as interviews and case studies, which allows the researcher to study 'real-world' issues that affect knowledge management practice in the organisations being investigated (Darke, Shanks & Broadbent 1998;

Trochim 2005; Zikmund 2000). Understanding these 'real-world' issues is not possible in the positivist paradigm (Darke, Shanks & Broadbent 1998; Trochim 2005). As such, this study will follow a process of discovery using inductive theory building as its fundamental approach in determining the level of knowledge management practice in MSC status companies.

Finally, information systems research requires an understanding of behavioural and organisational considerations within their natural setting and cultural context (Benbasat, Goldstein & Mead 1987; Darke, Shanks & Broadbent 1998; Silverman 1998). Most information systems research attempts to understand and further improve the effectiveness of information systems implementation within organisations and to assess that impact on individuals and organisations (Benbasat, Goldstein & Mead 1987; Darke, Shanks & Broadbent 1998; Silverman 1998). This understanding can only be achieved if the researcher operates within the critical realism paradigm (Benbasat, Goldstein & Mead 1987; Darke, Shanks & Broadbent 1998).

Based on the nature of the study, the research problem formulated for it and the suitability of the critical realism paradigm, critical realism is therefore selected as the research paradigm within which this study operates. The case study method employed for this study will be justified in the following section.

3.2   Justification for the case study method

The previous section established the case for critical realism as the most appropriate paradigm to operate within for this study. This section briefly discusses and justifies the use of a qualitative study, then more specifically the use of the case study method for this study.

A great debate exists regarding the scholarly nature, contributions, merits and limitations between quantitative and qualitative research (Denzin & Lincoln 1994; Yin 1994). Quantitative research methods are often thought to be synonymous with the natural sciences or the 'hard sciences', whilst qualitative research methods have been more often than not been reserved for the 'soft sciences' or the social sciences domain (Denzin & Lincoln 1994). Many traditional scientists argue that a quantitative approach to research is more superior to a qualitative one as it is backed with the use of statistics, experiments and surveys which are perceived to provide more scientific rigour and objectivity, and hence provide greater theoretical contributions (Guba & Lincoln 1994).

On the other hand, qualitative research is an umbrella term that covers a variety of methods which is used in many disciplines (Guba & Lincoln 1994). It is multi-method in focus and is used to study phenomena in their natural setting with the use of interviews, archival analysis, observations and surveys and by attempting to interpret phenomena in terms of the meaning people bring to them (Denzin & Lincoln 1994; Guba & Lincoln 1994). It describes and explains patterns of relationships and data in the form of words and not necessarily numbers which lends it to be more subjective if compared to quantitative studies (Miles & Huberman 1994). It allows the researcher to establish themes, patterns and categories from the data based on the researcher's understanding and interpretation (Miles & Huberman 1994).

The use of multiple methods, empirical materials, perspectives and participants in a single study enables the researcher to develop rigour, richness and triangulation to any inquiry (Denzin & Lincoln 1994). Therefore, qualitative research provides a more comprehensive and holistic view leading to the understanding of phenomena and is more aptly applied in situations involving inductive theory building (Perry 1998).

Based on the literature review in Chapter 2, it can be concluded that the existing theory development for the exploratory study of knowledge management practice in Multimedia Super Corridor status companies in Malaysia is underdeveloped. In view of this, it is therefore relevant for this study to attempt to build theory using qualitative research which could then be verified using quantitative research (Benbasat, Goldstein & Mead 1987; Darke, Shanks & Broadbent 1998; Lee 1989; McPhail 2003; Perry 1998, 2001a, 2001b; Rao & Perry 2003).

When theory development is low with the phenomena and constructs not being well-established, a quantitative approach is not recommended as it may lead to a false impression of accuracy that does not reflect the issues at hand (Varadarjan 1996). Instead an inductive and qualitative approach such as the case study method should be employed to identify the constructs to be used in the study and better comprehend the phenomena (Benbasat, Goldstein & Mead 1987; Darke, Shanks & Broadbent 1998; Lee 1989; McPhail 2003; Perry 2001a, 2001b; Silverman 1998; Varadarjan 1996).

According to Yin (1994), the case study method is an empirical enquiry that investigates a contemporary phenomenon within its real-life context that relies on multiple sources of evidence and prior development of theoretical propositions with data needing to converge in triangulation. Case study is one of the five research strategies (refer to Table 3.2) in social science and has been selected for this study (Yin 1994). Whilst each research strategy has its distinct characteristics, large overlaps exist between them and elements of one strategy may be found in research employing predominantly another strategy (Stehle 2004; Yin 1993).

In order to determine the most suitable strategy to be employed for a study, the researcher needs to examine the form of the research problem, the need for control of behavioural events and its focus on contemporary events (Yin 1981, 1993, 1994). These

strategies are discussed in Table 3.2 to justify the appropriateness of the case study method selected for this study.

Table 3.2   Selection of appropriate research strategy

Strategy	Characteristics of study			Relevance to this study?
	Form of research problem?	*Requires control over behavioural events?*	*Focus on contemporary events?*	
Experiment	How, why	Yes	Yes	Not applicable
Survey	Who, what, where, how many, how much	No	Yes	Partially (when obtaining facts during structured interviews)
Archival analysis	Who, what, where, how many, how much	No	Yes/No	Partially (when determining background and profile of cases)
History	How, why	No	No	Not applicable
Case study	How, why	No	Yes	Yes (overall strategy of this study, focus on in-depth interviews)

(Adapted from: Stehle 2004, p. 61; Yin 1994, p. 6)

The ***form of research problem*** can ask either 'who, what, where, how many, how much', requiring a more explanatory approach which can be addressed using a survey or archival analysis, or 'how' and 'why', requiring a more exploratory approach (Yin 1994). The aim of a case study is to answer 'how' and 'why' questions rather than seeking to test or verify a theory (Perry 1998). The research problem for this study is '*How and why do Multimedia Super Corridor status companies in Malaysia practise knowledge management?*' which is more of a 'how' type of question, seeking to explore the broad issue of knowledge management practice within the Malaysian context.

Control over behavioural events describes the degree to which the researcher can manipulate the behaviour of the subjects, for example by giving or withholding motivators (Yin 1994). In this study, the researcher has virtually no control over behavioural events, neither directly over the respondents, nor indirectly by being able to influence the overall strategy of the researched MSC status companies (Yin 1981). Case study research are best suited when the researcher attempts to understand the complex contemporary events in situations over which the researcher has little or no control (Yin 1981, 1994).

Contemporary events are events that take place at the time of the research and can be observed by the researcher, as opposed to past events where a researcher has to rely solely on records or recollections of other individuals (Yin 1994). Apart from establishing the historic context of the researched MSC status companies, this study is purely contemporary, resulting in the case study strategy being a suitable approach to be employed as they focus on one specific contemporary part of the organisation being investigated (Perry 1998; Yin 1981, 1994).

In short, case study method is the most suitable research strategy for this study based on the need to investigate contemporary events, the form of the research problem, lack of prior theory development, need for results that possess richness and depth, and the absence of the need for control over behavioural events (Yin 1994). Next, the number of cases used and reasons for their selection are discussed.

3.3   Case selection and number of cases

When using the case study method, two possibilities exist with regard to the number of cases being used, which are either conducting a single case study, or combining more than one case to form a multiple case study (Perry 1998; Yin 1994). It is argued here that a multiple case study offers a more robust research design appropriate to this study. Next, single and multiple case study designs are discussed.

A ***single case study*** approach can be appropriate if the single case study is a critical case, a unique or an extreme case or a revelatory case, in which it is possible to observe phenomena previously inaccessible to scientific investigation (Yin 1994). A single case study might be appropriate if the case was a general or typical case of the phenomenal (Yin 1994). The main aim of this study is to understand how Multimedia Super Corridor status companies practice knowledge management and with the form of the research problem developed, it would be difficult to draw conclusions from a single case study (Yin 1994). Furthermore, a single case was unlikely to provide the cross-case analysis needed for this study (Perry 1998). In view of this, a multiple case study would be more appropriate to this study as it would allow for replication and triangulation (McPhail 2003; Perry 1998; Yin 1994).

A *multiple case study* rather than a single case design approach was adopted for this study due to its inherent advantages which include rigour, ability for triangulation, theory generalization and testing (McPhail 2003; Miles & Huberman 1994; Mingers 2001; Yin 1994). First, multiple cases involves a methodologically more rigorous approach based on replication logic, allowing for both literal and theoretical replication (Miles & Huberman 1994; Yin 1994). Second, multiple case design provides triangulation of evidence, data sources and research methods for more rigorous research (Yin 1994). Third, a multiple case study can be used for theory generalization and for theory testing (Eisenhardt 1989; Maimbo & Pervan 2005; McPhail 2003; Mingers 2001; Perry 1998; Yin 1994). Multiple cases also allow the researcher to verify findings that are not merely the result of idiosyncrasies of the research setting (Cavaye 1996).

In brief, a multiple case study approach is better suited than a single case study design to address the research problem for this study. Specifically, studying MSC status companies in different areas/fields makes the results more robust and allows for generalization (Eisenhardt 1989; Maimbo & Pervan 2005; Yin 1994). Next, two forms of replication - literal and theoretical replication are discussed.

3.3.1   Replication logic for multiple case studies

Cases used for this study are selected for their specific relevance to the research problem under investigation to achieve both theoretical and literal replication (Perry 1998; Yin 1994). Literal replication produces similar results for predictable reasons, while theoretical replication produces contrary results for predictable reasons (Perry 1998).

In this study, both literal and theoretical replication were considered by selecting more than one respondent from each of the cases (literal replication) and by selecting cases from more than one field/industry sector (theoretical replication) (Carson et al. 2001; Perry 1998; Yin 1994). Details of how replication was achieved are discussed in the subsequent sections. Next, the number of cases and the processes used to select these cases are discussed.

3.3.2   Number of cases, interviews and sources of cases

A total of four case studies involving eleven interviews were selected for this study. Since no scientific agreement on the issue of what constitutes a case and the number of cases to be used for case study research exist, this section discusses what forms a case in this study and justifies the number of selected cases as well as the number of conducted interviews (Chew 2001; Darke, Shanks & Broadbent 1998; Perry 1998, 2001a; Stake 1995; Stehle 2004; Yin 1994).

Case definition. Qualitative researchers often struggle with the question of what a case is and where its boundaries are (Miles & Huberman 1994). According to Stake (1995), a case could be one person, a program or a subset of organisations being investigated. Miles and Huberman (1994) define a case as the unit of analysis, while Stake (1995) claims that precise definitions of cases or case studies cannot be made. As such, a case can be loosely defined as 'a specific, complex, functioning thing' (Stake 1995, p. 2). One method often applied in complex, multi-location, multi-organisation studies is to define a unit of analysis at large as a main case and define sub-units as embedded cases that can be used for data comparison (Scholz & Tietje 2002; Yin 1994). As no sub-units within organizations are analysed in this study, only main cases are used. Therefore, the Multimedia Super Corridor status company forms the unit of analysis employed for this study.

Number of case studies. Two notions exist on the number of cases that a rigourous case study research should employ (Chew 2001; Ng 2002; Perry 2001a; Stehle 2004; Van Akkeren 1999). The first notion refrains from suggesting a number or limit and recommends that the decision be left to the researcher. Cavaye (1996) and Eisenhardt (1989) recommend that cases should be added until theoretical saturation is reached while Lincoln and Guba (1985) propose sampling selection to the point of redundancy. Eisenhardt (1989) suggests that the appropriate number of cases depends on how much is known about the phenomenon after studying a case, and how much new information is likely to emerge studying further cases. In short, this notion posits that there are no explicit rule on the number of cases to be used in qualitative research (Cavaye 1996; Chew 2001; Darke, Shanks & Broadbent 1998; Eisenhardt 1989; Lake 2004; Patton 1990; Stehle 2004; Van Akkeren 1999).

The second notion is more specific on the number of cases to be used. For example, Hedges (1985) sets an upper limit of 12 cases because of the high costs involved in qualitative interviews and the quantity of qualitative data that can be effectively assimilated. Others suggest that more than 15 cases make a study 'unwieldy' (McPhail 2003; Miles & Huberman 1994; Perry 2001a). In brief, 'the widest acceptable range seems to fall between 2 to 4 as the minimum and 10, 12 or 15 as the maximum (Perry 2001a, p. 313). However, researchers agree that other practical issues such as time, budget and purpose of the research (student research for an awarded degree) that impact upon the design and scope of a case study research needs adequate consideration (Darke, Shanks & Broadbent 1998).

In view of these considerations, a design with four case studies and twelve interviews is selected as it is considered sufficient and practical as they are within the range suggested by researchers. These four cases can be divided into two distinct phases – one conducted in the pilot case study involving three interviews, and three main cases for the main data collection stage with three interviews conducted per case, giving a total of nine interviews in this stage. The rationale for the selection of the cases is discussed next

Selecting cases. As discussed in Section 3.3.1, the selection of cases is based on the specific purpose of literal replication. In general, random selection of cases is neither necessary nor even preferable (Eisenhardt 1989). Patton (1990) outlines strategies of purposeful sampling, as opposed to random sampling, which are used to select cases. The key objective of using purposeful sampling in case study research is to select information-rich cases that can be studied in-depth (Patton 1990; Perry 2001a). In other words, purposeful sampling helps in selecting cases that allow the researcher to gather in-depth information, by drawing on the strong personal experiences of the respondents about the phenomena under study.

In light of these, the three main cases for this study were selected from the population of all Multimedia Super Corridor status companies in Malaysia. These three cases were selected from among the more established companies as they would provide for literal replication and have implemented some level of knowledge management initiatives (Raja Suzana Raja Kasim 2005; Ramanathan Narayanan, Richardson & Abdul Latif Salleh 2003; Rumesh Kumar 2003; Tan 2004). If the recently established or new

companies were used, they would yield information that is not rich and would therefore not add value to this study (Darke, Shanks & Broadbent 1998; Perry 2001a; Raja Suzana Raja Kasim 2005; Tan 2004; Yin 1994). Apart from this, cases were selected based on similar organizational maturity for literal replication (Perry 2001a; Yin 1994). To achieve theoretical replication, these three cases were selected from different industry categories (Yin 1994).

Among the various potential large Multimedia Super Corridor status companies in Malaysia that are possible choices, the researcher approached those with whom he has a professional rapport and some established personal contacts, a practice often employed in case study research (Yin 1994). In brief, a purposeful sampling strategy, as opposed to random sampling, results in the selection of three information-rich main cases for this study, thus fulfilling the requirements of literal and theoretical replication (Perry 1998; Yin 1994).

Number of interviews. A total of nine main case study interviews, that is, three interviews for each of the three main cases were conducted for this study. When added to the two in-depth convergent interviews and the three pilot interviews (for one pilot case) conducted during the exploratory stage (Stage One) of this study, a total of fourteen interviews were conducted.

In each main case, interviews were conducted with the CIO/CKO/IT Section Head, one executive level information technology personnel, and one executive-level business personnel. These respondents were selected to allow for information richness and theoretical replication apart from allowing the researcher to better understand the phenomena being investigated (Darke, Shanks & Broadbent 1998; Lee 1989; Perry 2001a; Yin 1994). According to McPhail (2003, p. 5.31), an Honours dissertation would require at least four interviews, while a PhD dissertation would require about thirty-five to fifty interviews and a Masters research somewhere between four to thirty-five interviews. Hence, the nine main case interviews plus five convergent and pilot interviews conducted for in this study is considered adequate (McPhail 2003). Having justified the case selection criteria and the number of interviews in this section, the case study research procedures used in this study is discussed next.

3.4   Case study research procedures

Having selected the number of cases and interviews to be used, this section addresses the procedures to be used in case study research adopted for this study. Earlier parts of this study highlight the lack of established theory within the literature about knowledge management practices in Multimedia Super Corridor status companies in Malaysia. Whether taking a purely inductive approach, or a deductive approach, theory development is essential as part of the design phase for case studies, regardless of whether the case study's purpose is to develop or test theory (Yin 1994). While inductive theory building is important, it is unlikely that any researcher could genuinely separate the two processes of induction and deduction (Miles & Huberman 1994; Perry 1998).

Stages of theory building. This study is divided into four phases which spans over three stages as illustrated in Figure 3.1. Figure 3.1 gives an overview of the process of establishing prior theory through a largely inductive and convergent stage, followed by a confirmatory or disconfirmatory stage encompassing the main cases before developing a final theory in the third stage of the research (Chew 2001; McPhail 2003; Stehle 2004).

Figure 3.1   Stages of the case study research process
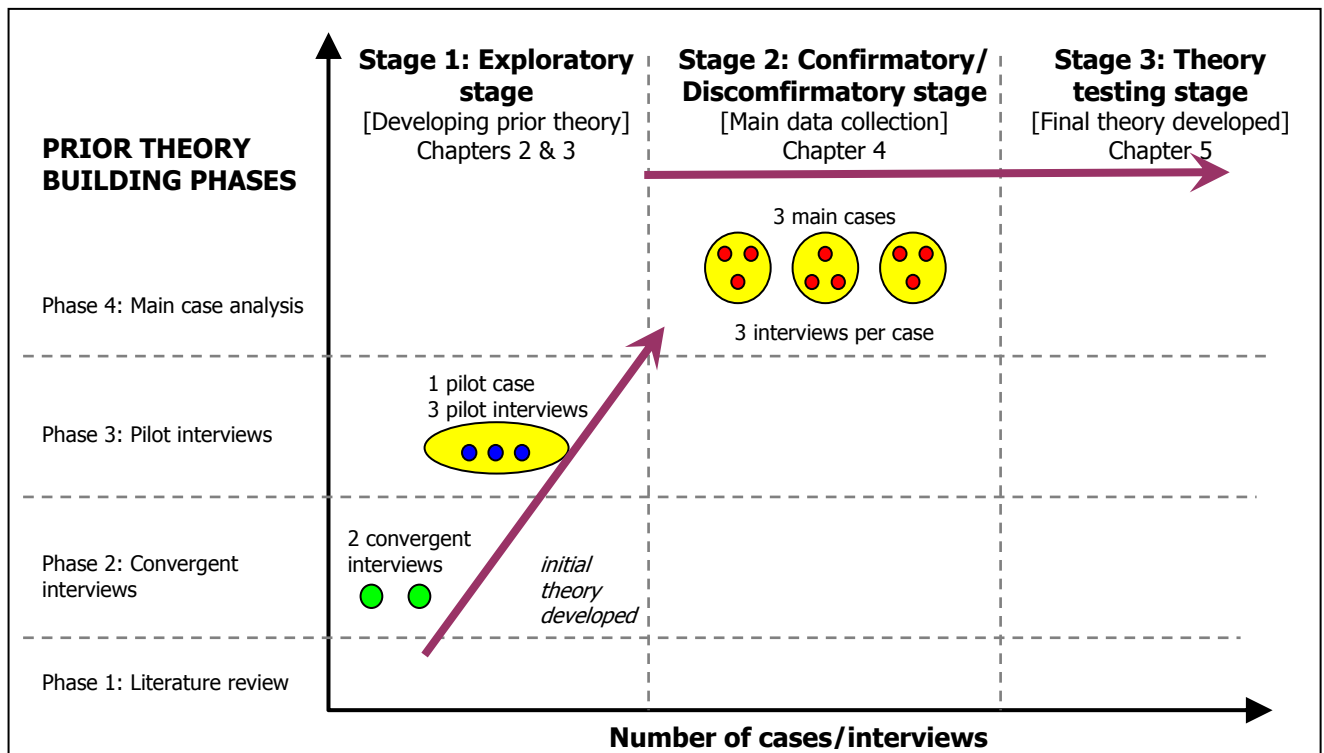
(Adapted from: Perry & Coote 1996, p. 14; Stehle 2004, p. 64; Teale 1999, p. 140)

The exploratory stage of this research covers three phases and the confirmatory or disconfirmatory stage covers one phase (McPhail 2003). The exploratory stage begins with a thorough literature review, followed by phase two, convergent interviews (McPhail 2003). After having concluded the convergent interviews, pilot cases were conducted before the administration of the main case study research (McPhail 2003). Based on the results of the main data collection, final theory regarding knowledge management practices in Multimedia Super Corridor status companies in Malaysia were developed in the final stage of this research (McPhail 2003). Details of these phases are provided in the following sections.

3.4.1   Phase 1: Literature review and the role of prior theory

A well-defined research problem is required before the researcher can commence the process of research design and subsequent data collection (Yin 1994).The level of prior theory is of pivotal importance in the design and analysis of case study research (Perry 1998; Yin 1994). Prior theory used for this study was derived from the review of the existing literature in academic journals, books, conference proceedings, dissertations and practitioner magazines (Darke, Shanks & Broadbent 1998; McPhail 2003; Perry 2001a).

Based on the review, existing constructs and theory were elicited and forms the foundation upon which the research problem was formulated (Darke, Shanks & Broadbent 1998; Perry 1998, 2001a; Yin 1994). Using this prior theory, two convergent interviews with experts in the field is then used to develop the research questions and the interview questions that form the core of the interview protocol which is tested and refined during three pilot interviews in one pilot case study (Perry 2001a; Yin 1994).

3.4.2   Phase 2: Convergent interviews

In this stage, not much is known about issues in the topic area that are worth investigating (Carson et al. 2001). As such, exploratory convergent interviews should be conducted to identify what needs to be done (Carson et al. 2001; Perry 2001a; Rao & Perry 2003). Carson, Gilmore, Perry and Gronhaug (2001, p. 85), explain that a convergent interview allows for:

> collecting, analysing and interpreting qualitative information about people's attitudes, beliefs, knowledge and opinions through the use of a limited number of interviews with experts that converge on the most important issues in a topic area.

In this study, two experts on knowledge management practices in Malaysia were interviewed. One is an academic researching in the field of knowledge management in Malaysia, and the other is the IT Manager of a large multinational company in Penang. These largely unstructured, conversational interviews were geared towards building on and contrasting them to the literature findings, to better structure the confirmatory stages of the main cases (Carson et al. 2001; Perry 2001a; Van Akkeren 1999). The main objective of these exploratory convergent interviews were to establish that the identified research issues are considered relevant by others in the field, and to identify questions best suited for exploring the research issues (Carson et al. 2001; Yin 1994).

Another result of the convergent interviews, integrated in the literature review, is the inclusion of leadership and the provision of incentives in the knowledge management program which were deemed important by these experts. The respondents also provide invaluable insights to the issues that face the practice of knowledge management in Malaysia which resulted in only established companies being selected for this study. This was because these respondents cautioned the researcher against newly-established companies for analysis as they would not be in the position to provide information that is required for the study as their systems are still in the early stages of development, confirming the researcher's notion as highlighted in an earlier statement.

A *case study protocol* was developed in this study to control the contextual environment of the case study (Yin 1994).The case study protocol consists mainly of the interview protocol and also addresses the procedures and general rules that should be followed during data collection (Yin 1994).

The *interview protocol* is a core element of the case study protocol, serving two major functions in this study. First, it forces the researcher to think through the questions to be asked during the interviews, and it enables the interview questions to be grouped according to the five research issues and to facilitate subsequent data analysis (McPhail 2003; Miles & Huberman 1994; Yin 1994).

The convergent interviews conducted earlier led to the development of the interview protocol which was subsequently used in two pilot interviews prior to its use in the main data collection phase. The interview protocol included in Appendix D was developed to facilitate the interview process enabling the researcher to gather new insights into the research problem and to corroborate facts that had been previously established and described in the literature (McPhail 2003; Yin 1994). The interview protocol was designed so that respondents do not feel intimidated in any way during the interview. This was achieved by giving adequate detail and introduction to the questions being asked (Perry 1998).

The first section of the interview protocol collected basic non-identifying demographic data about the company and position of the respondent. It then asked the respondent to simply tell the story of their experience with knowledge management in the company as prescribed by McPhail (2003), Perry (2001a) and Carson et al. (2001). The starting question for the interview session is '*To begin with, can you please tell me about your experience with knowledge management in your company?*'. This starting question does not require the respondent to think, so it does not make them apprehensive about being on trial (Carson et al. 2001; Perry 2001a). Next, questions related to the specific research questions formulated for the study were asked. A summary of the research questions and related interview questions contained in the case study interview protocol is shown in Table 3.3.

Table 3.3   Summary of the research questions and related interview questions contained in the interview protocol

Research questions/Sections		Interview questions
Background questions and opening question.		(i) to (vii)
RQ1: What are the enablers of knowledge management (cultural, structural, people and technology) in Multimedia Super Corridor status companies in Malaysia?		
Culture	Collaboration	A.1.1.1 to A.1.1.7
	Mutual trust	A.1.2.1 to A.1.2.8
	Learning	A.1.3.1 to A.1.3.8
	Leadership	A.1.4.1 to A.1.4.5
	Incentives and rewards	A.1.5.1 to A.1.5.5
Structure	Centralisation	A.2.1.1 to A.2.1.5
	Formalisation	A.2.2.1 to A.2.2.5
People		A.3.1 to A.3.7
IT infrastructure		A.4.1 to A.4.8
RQ2: What is the process involved in creating knowledge in Multimedia Super Corridor status companies in Malaysia?		
Socialistion		B.1.1 to B.1.6
Externalisation		B.2.1 to B.2.7
Combination		B.3.1 to B.3.6
Internalisation		B.4.1 to B.4.5
RQ3: How do the current levels of knowledge management practice in Multimedia Super Corridor status companies affect their organisational performance?		C1 to C6
Additional information to help address the research problem.		A.5 and D1

(Source: developed for this study)

Some of the responses to the questions in the interview protocol are measured with the aid of scales, triangulated with discussions and modified as necessary to reflect an accurate assessment of importance. Some interview questions included the need for respondents to rate the relative importance or quality of the items being investigated after some broad questions have been asked for the respondent's own views of issues (Carson et al. 2001). Respondents were given five verbal choices, based on their experience or perception. The choices range from *1: very low* to *5: very high*.

These ratings were then triangulated with discussion results and other information obtained during the case study research. Perry (1998) and Yin (1994) support the use of scales and argue that they can be used as a relatively accurate assessment of the importance of data. However, it must be cautioned that these scales only indicate an approximation and a perceived relative, which therefore cannot be used for further quantitative analysis (Zikmund 2000).

3.4.3   Phase 3: Pilot interviews

Next, three pilot interviews were conducted in phase three of the exploratory stage, to improve the data collection processes before the main case studies commence (Yin 1994). This phase represents the final preparation for data collection which is used more formatively to assist the researcher to develop relevant lines of questioning as well as providing some conceptual clarification for the research design as well (Yin 1994). Yin (1994, p. 74) notes that the pilot case study should not be seen as a pre-test, instead it is a 'dress rehearsal', in which the intended data collection plan is used faithfully as possible as a final test run.

Pilot interviews are considered to be an effective tool to assess the usefulness, reliability and validity of the interview protocol for case study research (Eisenhardt 1989; Yin 1994). Furthermore, it is desirable, more so in the pilot interviews than in the main cases, that the respondents should be supportive of the study (Yin 1994). In the selection of the pilot case for this study, the criteria used were based on convenience, access and geographic proximity (Yin 1994). In addition, the pilot case studied was similar in size and field as one of the main cases selected for this study to ensure that an extreme or inappropriate case (in terms of replication) was selected (Eisenhardt 1989; Yin 1994).

For this study, three pilot interviews were conducted in the selected pilot case located in Selangor, Malaysia which is a large Multimedia Super Corridor status company in the field of computing technology. These two interviews were held with the Section Leader (IT), Business Analyst and IT Analyst of the company.

In addition to the content questions, the researcher also sought input on the interview duration and content from the interviewees (Carson et al. 2001). The interview protocol developed for this study (Appendix D) was refined after the completion of the pilot interviews. Finally, the pilot interviews give the researcher a sense of the time and the amount of prompting required, thus enhancing the confidence and experience of the researcher before the main case interviews (Yin 1994). It also assisted the researcher refine relevant lines of questioning and also to provide some feedback on the overall research design (Yin 1994). In brief, these two pilot interviews help refine the interview

procedures, add relevance to the questions and provide some interviewing practice for the researcher (Yin 1994).

3.4.4   Phase 4: Main case analysis

The confirmatory or disconfirmatory stage, phase four, involves the main data collection where the final version of the interview protocol (Appendix D) is used in three main cases for a total of nine interviews, with the protocol based on the prior theory from the literature review, in-depth exploratory convergent interviews and pilot interviews discussed earlier (McPhail 2003). The same interview protocol (Appendix D) is used in all three main case interviews, thereby not modifying the protocol during the main case data collection (Yin 1993, 1994). The data collected from the four phases of the research are then analysed in Chapter 4 and conclusions drawn in Chapter 5.

According to Darke, Shanks and Broadbent (1998), effective and efficient data collection for case study research requires careful planning and judicious use of both the researcher's and respondents' time. As such, before the interviews were conducted, the researcher prepared himself by gathering sufficient background information about the case study company with publicly available information on the World Wide Web, corporate literature and annual reports (Cavaye 1996; Darke, Shanks & Broadbent 1998).

After obtaining approval from the companies to conduct the research, they were contacted to prepare at least three case participants for the interviews. In general, each company was asked to identify an IT manager or CIO/CKO, an executive level IT personnel and an executive level business personnel. Obtaining the participation of the executive level participants was not a problem but it was difficult to gain access to the 'top' person in the IT function. In view of this, the companies suggested that the researcher interviewed this person's nominee or representative. Whenever a nominee or representative is being recommended by the company, they are first scrutinised to ensure that they posses the experience, seniority and knowledge to respond to the interviews.

The respondents were contacted via telephone to briefly explain the nature of this study, why they were selected by their companies for this study, what information was needed and what participation was required of them. Subsequently, they were emailed a copy of the consent form, interview protocol and study background to enable them to have a better general understanding of the issues related to the study and the interview in particular (McPhail 2003; Ng 2002).

The researcher used the structured interview protocol developed for this study which addresses the research questions formulated, following a particular sequence and fixed wording (Yin 1994). This was necessary to provide greater depth and probing, enable spontaneity, provide greater sensitivity to misunderstandings by respondents, and is appropriate for revealing information about feelings and emotions regarding different issues being raised during the interview (Neuman 2000).

The interviews were conducted on-site and consumed approximately 40 to 90 minutes to complete. Each interview begins with a general introduction to acquaint the respondent with the interview purpose and agenda as outlined in the interview protocol in Appendix D (Van Akkeren 1999). Respondents were also briefed on ethical issues such as assurance of confidentiality and the ability to withdraw from the research at any point in time. The respondents were allowed to illustrate, expand or digress from the questions in the interview protocol (Stehle 2004).

Throughout each interview, extensive hand-written notes were taken and checked soon after the interview was completed. Summaries of the interviews were then shown to the respondents to check for errors and to allow them to clarify issues where necessary.

Apart from these, the researcher was able to view some related internal documents during the interview process. These documents and manuals were useful as they supported the claims made by some of the respondents and aided in the triangulation process (Yin 1994). However, these documents could only be viewed on-site due to privacy and organisational policies.

To ensure the confidentiality of the companies and respondents, each case was assigned a case identifier. The main cases were coded as 'A', 'B' and 'C' representing the

Multimedia Super Corridor companies in the IT solutions industry, computing technology industry and chemicals industry. The interviews conducted in each main case were coded with numbers 1-3, with 1 representing the CIO/CKO/IT Head, 2 representing the executive level IT personnel and 3 representing the executive level business personnel. For example, case B2 would represent an executive level IT personnel in a Multimedia Super Corridor company in the field of computing technology.

In short, the systematic case study research process employed for this study ensures that data collection progresses effectively and efficiently. Having discussed the four phases of the case study research method employed for this study, the next section discusses the processes involved in analysing the case study data.

3.5   Case study data analysis

This section explains how the data were analysed. Yin (1994) states that data analysis consists of examining, categorising and tabulating evidence gathered from the case study research to address the research problem and its research questions. The sources of data used in this study consisted primarily of interviews with respondents which were backed with archival analysis of documents provided by the companies, information from corporate websites, newspaper and magazine clippings (McPhail 2003; Perry 2001a). These data were used to check facts and to obtain a 'correct' understanding of the cases (Yin 1994). Miles and Huberman (1994, p.12) contend that 'qualitative analysis is a continuous iterative enterprise' in which data reduction, data display and drawing conclusions are part of the analytical process. These components of data analysis are shown in Figure 3.2

Figure 3.2   Components of data analysis
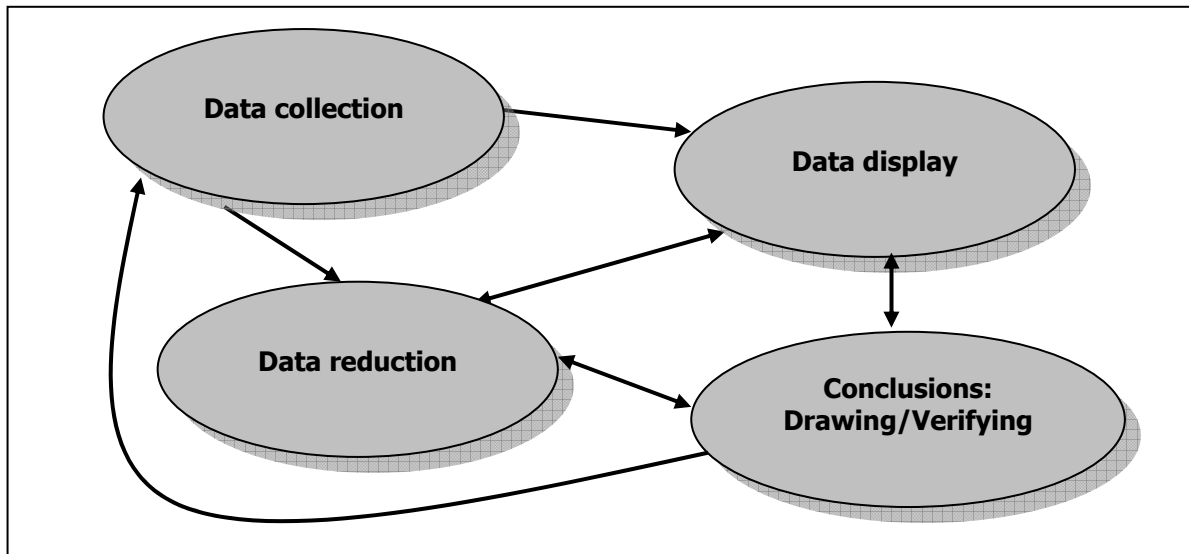
(Source: Miles & Huberman 1994, p. 12)

The initial steps in data analysis for each case took the form of immediately checking the data being gathered to ensure that they are correct and accurate (Yin 1994). Spurious data were identified and corrected before a summary of the interview was being verified by the respondent to clarify any missing or unclear detail (Miles & Huberman 1994).

Data reduction. Following the cleaning and editing of data and summarising each case, data reduction and coding were conducted in order to reduce and organise the data collected to a manageable level which could provide information rich detail to the study (Miles & Huberman 1994; Yin 1994). To reduce the data, they were classified into different arrays to facilitate search and retrieval and to identify any emerging themes and patterns (Miles & Huberman 1994; Neuman 2000; Yin 1994). Data were also summarised and paraphrased and where possible, were aggregated into larger patterns (Miles & Huberman 1994; Neuman 2000). Specific instances of the data were also quantified into numbers and ranks to facilitate further analyses (Miles & Huberman 1994; Zikmund 2000).

Data display. Data were also summarised using tables in order to combine, compare and contrast data apart from allowing the findings be reported in a visual and simplified manner (Miles & Huberman 1994). Furthermore, narrative text and quotations from case studies were used to enhance the credibility of data analysis and to add invaluable insights to the research questions (Miles & Huberman 1994; Patton 1990). This facilitated a clear display of the data and facilitated effective answering of the research questions formulated for this study (Miles & Huberman 1994).

Conclusions: drawing/verifying. The final step in data analysis is to draw meaning from displayed data which requires data to be in a condensed, clustered, sorted and linked (Patton 1990). Observing regularities and patterns, drawing explanations, propositions verifying data and reviewing findings formed a key part of this process (Miles & Huberman 1994; Yin 1994). However, it must be noted that drawing meaning does not only occur in this stage, in fact it occurs from the start of data collection itself whereby the researcher begins to decide what things mean (Miles & Huberman 1994). The same applies to conclusions which are also verified as the researcher proceeds from the start of the data collection stage (Miles & Huberman 1994). Cross-case analyses were conducted in this stage to detect any pattern that may emerge between different cases and to provide sufficient insights to the data analysis process (McPhail 2003; Perry 2001a). All of these will lead to the 'final' conclusion being made once the iterative process of data collection has been completed by the researcher (Miles & Huberman 1994). Table 3.4 provides a summary of the data collection activities conducted for this study. The next section details the validity and reliability issues of this study.

Table 3.4   Summary of data collection activities

STAGE 1 Exploratory stage	(i) Conduct literature review. (ii) Conduct two (2) convergent interviews. (iii) Develop case study interview protocol based on the findings of steps (i) and (ii). (iv) Case selection – single case or multiple case study approach. (v) Define what constitutes a 'case' – case definition (vi) Determine number of cases and interviews to be conducted for the study. (vii) Select cases for pilot study and main case analysis. (viii) Conduct pilot study (one pilot case with three pilot interviews). (ix) Refine case study interview protocol/procedures (if necessary).
STAGE 2 Confirmatory/disconfirmatory stage	(i) Conduct main case analysis (three main cases with three interviews per case): ▪ Obtain approval from cases. ▪ Provide case study interview protocol to participants. ▪ Confirm interview with participants. ▪ Brief participant and obtain written consent of their participation. ▪ Conduct interview (record responses with audio recorder/written notes). ▪ Collate and verify information with participant. ▪ Data reduction. ▪ Data display.
STAGE 3 Theory testing stage	(i) Analyse data from case study interviews (Chapter 4) (ii) Discuss data in relation to prior theory presented in Chapter 2 Literature Review (Chapter 5). (iii) Derive conclusions for each research question (Chapter 5). (iv) Derive conclusion for research problem (Chapter 5).

(Source: developed for this study)

3.6   Validity and reliability in research design

The final step in case study research that needs attention is the issue of validity and reliability (Cavaye 1996; Healy & Perry 2000a). In most qualitative research, it is difficult to achieve full validity and reliability due to the nature of the phenomena being studied and it is therefore exigent that the researcher attempts to establish some measures to increase the level of reliability and validity (Cavaye 1996; Healy & Perry 2000b).

For case study research, three approaches to ascertaining the quality of the study are available (Perry 2001a). Perry (2001) explains that these include the trustworthiness criteria by Guba and Lincoln (1995) for research conducted within the post-modern constructivist paradigm; the six criteria based on the critical realism paradigm by Healy and Perry (2000); and the most commonly used four tests of quality by Yin (1994). In view of the widespread acceptance and use of Yin's (1994) four tests of quality, this study employed validity and reliability based on construct validity, internal validity, external validity and reliability (Cavaye 1996; Lake 2004; McPhail 2003; Ng 2002; Perry 1998, 2001a; Perry & Coote 1996; Poh 2001; Stehle 2004; Van Akkeren 1999).

Construct validity refers to the formation of suitable operational measures for the concepts being investigated which forms the crux of case study research as researchers are always trying to establish agreement or disagreement about what a construct means (Carson et al. 2001; McPhail 2003; Perry 2001a; Yin 1994). This study adopts several measures to ensure construct validity. First, an extensive review of the literature in Chapter 2 helped to identify the constructs to be investigated (McPhail 2003; Yin 1994). Second, exploratory convergent interviews allowed the triangulation of constructs identified from the literature (McPhail 2003; Perry 2001a). Triangulation was also achieved with the use of multiple sources – interviews and archival analysis (Perry 2001a; Yin 1994).

Third, an interview protocol was developed which provided a structured approach in exploring the research questions and allowed for a logical flow of questioning (Perry 2001a). A chain of evidence was established in the data collection stage through carefully collected evidence (Van Akkeren 1999). Multiple case studies were conducted

to ensure that triangulation could be achieved to obtain a clear picture of the phenomenon (Perry 2001a; Yin 1994).

Internal validity refers to the soundness of cause and effect relationships that were discovered in the study (Perry 2001a; Yin 1994). Cause and effect relationships are difficult to establish in social science research (Carson et al. 2001). In this study, the use of prior theory, probe questions and in-depth listening techniques were used to determine these relationships (Carson et al. 2001; Perry 2001a). In the data analysis stage of this study, internal validity was achieved through pattern matching using matrices and explanation building (Perry 2001a; Van Akkeren 1999). In addition to that, within-case and cross-case analyses apart from theoretical and literal replication strategies were used to ensure that internal validity is achieved in this study (Carson et al. 2001; Perry 2001a).

External validity is refers to the generalisability of research findings beyond the scope of the cases being investigated (Perry 2001a; Yin 1994). It must be noted that case study research are not normally used for theory testing and theory generalisation, as in this study on knowledge management practices (Carson et al. 2001; Perry 2001a). However, a certain degree of external validity that is adequate for theory building was achieved through careful selection of cases and participants for this study (Perry 2001a). In addition, the multiple case study approach adopted and consideration for literal and theoretical replication when choosing these cases ensured that the findings are corroborated and provides for analytic generalisation (Perry 2001a; Van Akkeren 1999).

Reliability refers to how consistently a technique measures concepts so that other researchers will be able to obtain the same results (Perry 2001a; Yin 1994). To achieve reliability in this study, a comprehensive interview protocol was devised and the exact procedures involved in the entire research effort is clearly structured, documented and explained in Chapter 3 (Carson et al. 2001; Perry 2001a). This would allow other researchers to follow the steps taken in this study to obtain results. A case database was developed for this study. This database allows for systematic synthesising, organising and documenting the data collected, therefore making it easy for other researchers to review the evidence (Carson et al. 2001; Yin 1994). In addition, matrices were used in the analysis and presentation of data apart from the use of quotations to support claims

and conclusions made in this study (Perry 2001a). Next, the limitations of case study research are discussed.

3.7   Limitations of case study research

As with any research, some limitations do exist (Trochim 2005; Zikmund 2000). Although the researcher has ensured rigour, coherence and justified philosophical positions in the application of the case study method for the methodology for this study, it has several limitations which will be addressed in this section. According to Yin (1994), there are five common limitations of case study research. These limitations are that it results in overly complex theories, lack of external validity, difficult to conduct, insufficient for sound theory development, researcher bias and lack of rigour (Yin 1994). These limitations and appropriate strategic responses taken in this study to address them are shown in Table 3.4.

Table 3.5   Limitations of case study research and related strategic responses

Limitations	Strategic responses to overcome limitations	Sections where these limitations are addressed
1. Results in overly complex theories	Develop prior theory and specific research questions	Chapter 2
2. Lack of external validity	Use theoretical replication logic, compare evidence with existing literature	Section 3.3.1
3. Difficult to conduct	Use case study and interview protocols and systematic fieldwork process	Sections 3.4 and 3.5
4. Insufficient for sound theory development	Use multiple approaches	Section 3.4
5. Researcher bias and lack of rigour	Use of validity checks and discussion with other researchers and practitioners	Sections 3.4 and 3.5

(Adapted from: Stehle 2004, p. 84)

Results in overly complex theories. The first criticism of case study research relates to the potential of it generating overly complex theories as a result of the researcher not limiting the domain of research sufficiently (Eisenhardt 1989; Yin 1994). In addition, when overly complex theories develop from case study research, it sacrifices parsimony

(Eisenhardt 1989). To address this shortcoming, this study only utilised theories and research questions that have been developed and identified in Chapter 2 (Yin 1994).

Lack of external validity. There are concerns of case study research not achieving external validity (Carson et al. 2001; Yin 1994). To overcome this issue, this study adopted replication logic with the use of multiple case studies (Carson et al. 2001; Eisenhardt 1989; Yin 1994). In addition, careful selection of cases was made on the basis of achieving literal and theoretical replication (Carson et al. 2001; Perry 2001a).

Difficult to conduct. Eisenhardt (1989) posits that the case study method may have limitations in terms of logistical and operational problems which would make it difficult to conduct. With an appreciation of this limitation, this study employs a well-structured research plan, case and interview protocol and guidelines which will inherently reduce the complexities of conducting case study research (Carson et al. 2001; Healy & Perry 2000b; Perry 2001a; Yin 1994). Apart from this, Cavaye (1996) explains that the case study method may prove to be time consuming and that researchers may have difficulties analysing the large mass of information being collected. To overcome this issue, specific procedures and processing for data collection and display were employed in this research (Carson et al. 2001; Yin 1994).

Insufficient for sound theory development. The sufficiency of the methodology for sound theory development has been questioned by researchers (Carson et al. 2001; Yin 1994). The researcher acknowledges this limitation of the case study method and believes that there is no single research method that is sufficient for sound theory development (Carson et al. 2001; Yin 1994). Therefore, the findings of this study are not considered as a final theory but rather as an exploratory investigation to the theoretical development of knowledge management practices in Malaysia (Carson et al. 2001; Eisenhardt 1989). These findings will be a basis upon which subsequent studies on the research problem could be based on (Perry 2001a; Yin 1994).

Researcher bias and lack of rigour. The final criticism is directed at the impact of the researcher's bias resulting in the subjectivity of the researcher and respondents on whom the researcher relies on to obtain an understanding of the research problem (McPhail 2003; Van Akkeren 1999; Yin 1994). This limitation was addressed through discussion with supervisors and other researchers on research design, data analysis and findings to ensure that the interpretation is consistent and provides a dependable understanding of the phenomena being investigated (Van Akkeren 1999; Yin 1994).

3.8   Ethical considerations

The key purpose of research ethics is to ensure that participating individuals and organizations are protected from adverse consequences or harm that may result during and from the research process (Miles & Huberman 1994; Patton 1990; Zikmund 2000). In addition to that, the quality of the research results may be compromised and the research findings invalidated due to unethical research practices (Davis & Cosenza 1988; Neuman 2000). This section will address the ethical considerations for this research based on five often-cited principles of ethical standards which are intent of the study, voluntary participation, informed consent, avoidance of harm, confidentiality and anonymity (Miles & Huberman 1994; Trochim 2005).

The ***intent of this study*** was fully explained to the organisations in detail, from the initial contact to follow-up communication and case study interviews (Stake 1995). In addition, the purpose and details of the interview were also explained clearly in the letter to the participants before the study was conducted (see Appendix B).

Voluntary participation requires that people not be coerced into participating in research (Trochim 2005). All case study participants were contacted by telephone after their details were provided by the respective companies and were informed of their right in not taking part and that participation was voluntary.

Informed consent means that prospective research participants must be fully informed about the procedures and risks involved in research and agree to participate in it (Trochim 2005). The procedures of the research were detailed in the letter to the organizations. After the case study participants have been identified, they were informed

of the procedures involved and that their consent was required in writing prior to the commencement of the study. The consent form prepared for the participants is included in Appendix E. They were also explained of the measures taken to ensure that their confidentiality is assured by the researcher.

Avoidance of harm. Ethical standards require that researchers do not put participants in a situation where they might be at risk, or subjected to physical and psychological harm as a result of their participation in the research (Trochim 2005). In this study, physical harm is not considered a potential risk and psychological harm is eliminated with their voluntary participation. There are two standards that are applied in order to help protect the privacy of research participants and to ensure that they are not placed in any harm (Trochim 2005). These two standards are confidentiality and anonymity (Trochim 2005).

Confidentiality is required to protect the privacy of research participants (Miles & Huberman 1994; Trochim 2005; Yin 1994). Participants are assured that identifying information will not be made available to anyone who is not directly involved in the study (Zikmund 2000). Care and due diligence are exercised throughout all personal exchanges to respect and maintain the privacy and confidentiality of the interview partners (Miles & Huberman 1994).

Anonymity is agreed upon for all participating companies and individual participants. To ensure the anonymity of the companies, steps that were taken include not reporting very specifically on the precise product range, location or size of the company. In addition, it is crucial to the integrity of the researcher to ensure that the research is carried out responsibly and honourably.

In addition, this study has received ethics clearance from the University of Southern Queensland Human Ethics Committee with the reference number H05STU522 (see Appendix C for clearance document). In brief, the ethical concerns of the participating companies and case study participants were addressed in this study.

3.9   Summary

This chapter developed and justified the research methodology utilised in this study to answer the research problem formulated for this study introduced in Chapter 1: **'How and why do Multimedia Super Corridor status companies in Malaysia practise knowledge management?'.** Based on the nature of the research problem and the low level of theoretical development in the field of knowledge management practice in Multimedia Super Corridor status companies in Malaysia, this chapter explained and justified the need for this exploratory study to utilise a qualitative research methodology using the case study approach operating within the critical realism paradigm. After justifying the selection of the paradigm and research method to be employed, it detailed the procedures involved in the case study method to investigate the three research questions developed from the research problem. Method for collecting data and analysing them were also discussed. Next, the issue of validity and reliability for this study were analysed. Measures taken by the researcher to ensure that this study achieves construct validity, internal validity, external validity and reliability were explained. Limitations of the case study method and ethical considerations were also covered in the final section of this chapter. Having laid the framework for this study to be carried out with due consideration of its validity, reliability, limitations and ethical considerations, the next chapter will present the findings of the study and analyse them to address the three research questions of this study.

4   FINDINGS & ANALYSIS

The previous chapter discussed the research methodology employed in this qualitative multiple case study. In this chapter, the data collected from the cases are presented and analysed with regard to their relevance to the research questions. The objective of this chapter is to present, examine and interpret data and patterns obtained of the cases. The implications of the results and comparison to the literature are then discussed in the next and final chapter, Chapter 5. This chapter will first provide a background to the cases before going on to present the findings from the pilot study and then data for each of the three research questions. A summary of the findings which provides for an overall picture of the findings of this study will then be provided at the end of this chapter.

4.1   Details of cases and interview participants

Procedures and techniques for case study analysis were explained in the previous chapter. This section first defines data analysis and stresses on the need for an appropriate analysis strategy before analyzing data at an operational level. It then provides an overview of the cases and the details of the interview participants.

According to Yin (2003, p. 109), data analysis involves 'examining, categorizing, tabulating, testing or otherwise recombining both quantitative and qualitative evidence to address the initial propositions of a study'. In general, there are three general strategies that can be employed by the researcher to choose among the various techniques available and to complete the analytic phase of case study research successfully (Yin 2003). These three general strategies are relying on theoretical propositions, setting up a framework based on rival explanations, and developing case descriptions (Yin 2003). This study employs the first strategy which relies on theoretical propositions that led to the case study. It can be observed from the organization of this study that the interview protocol and data analysis are presented following and based on the research questions which in

turn were developed from propositions on knowledge management practice in the literature review (Yin 2003).

For this study, four case studies with three interviews each were conducted. These four cases can be divided into two distinct phases – one conducted in the pilot case study involving three interviews, and three main cases for the main data collection stage with three interviews conducted per case, giving a total of nine interviews in this stage. All these cases in the main data collection stage are established MSC status companies and are able to provide formal consent to their participation in this study as required by the USQ Human Research Ethics Committee (refer to Appendix C for clearance).

The structure of the cases allows for analysis along various patterns and clusters (Miles & Huberman 1994). Comparisons are made within each main case, between responses from each participant within each main case and cross case analyses which involves analysing clusters that emerged during data collection (Miles & Huberman 1994). As explained in Chapter 3, triangulation of data is obtained using interview data, document analysis, observation and use of published materials on the respective Multimedia Super Corridor status companies.

A key challenge in case study research is to address both data patterns and qualitative details that are presented in this chapter (Perry 2001b; Yin 1994). Patterns in the data explain how do Multimedia Super Corridor status companies in Malaysia practice knowledge management, with details being presented in this chapter to establish the foundation for these outlined patterns. To facilitate this, matrices are used for each type of finding as recommended by Miles and Huberman (1994).

In addition, the requirement for reliability and validity in qualitative research makes it necessary to provide detailed evidence for the patterns found in the data (Perry 2001b). In brief, it is necessary for patterns to be drawn from the data without losing focus on the qualitative details leading to the emergence of these patterns (Carson et al. 2001; Cavaye 1996; Perry 2001b). To this end, this chapter is structured around the three research questions developed for this study, and there are frequent summaries of the patterns of data with supporting quotations from the interview respondents (Perry 2001b).

To ensure the confidentiality of these cases and to facilitate data analysis, each case is assigned a case identifier. The pilot case was coded as 'P' while the main cases were coded as 'A', 'B' and 'C' representing the Multimedia Super Corridor companies in the IT solutions industry, computing technology industry and chemicals industry. The interviews conducted in each main case were coded with numbers 1-3, with 1 representing the CIO/CKO/IT Head, 2 representing the executive-level IT personnel and 3 representing the executive-level business personnel. For example, case B2 would represent an executive-level IT personnel in a Multimedia Super Corridor status company in the field of computing technology. Details of the interview participants are outlined in Table 4.1.

Table 4.1   Details of interview participants

Case	Identifier	Position Title	Sex	Years of work experience	Years in company
P	P1	Software Project Lead	Male	6	3
	P2	Software Engineer	Female	5	2
	P3	Business Analyst	Male	6	2
A	A1	CEO	Male	7	3
	A2	Programmer	Male	6	3
	A3	Customer Service Executive	Female	1	1
B	B1	IT Director	Male	16	6
	B2	IT Section Manager	Female	10	6
	B3	Service & Support Director	Male	28	2
C	C1	IT Manager	Male	15	6
	C2	Systems Programmer	Male	5	3
	C3	Manager, Demand Management	Male	3	3

(Source: developed for this study)

<u>Case P</u>

This is a *Fortune 100* multinational that specializes in communication solutions. It provides seamless mobility products and solutions across broadband, embedded systems and wireless networks. It has its operations in Malaysia for over 30 years and employs a very skilled and diverse workforce in its plants in Malaysia. It focuses on transforming innovative ideas into products that connect people the world over. It employs over 60,000 persons all over the world with approximately 2,000 employees in its Malaysian-based operations in several states.

<u>Case A</u>

This is a medium-sized company that has been in existence for less than 10 years. It specializes in web-based solutions and develops applications to suit the needs of its clients. It provides a comprehensive range of services ranging from consulting, planning, conceptualization, design, development, deployment and maintenance of web-based applications for organizations across the globe. With a highly-educated and skilled workforce, this company has a very informal structure and encourages maximum interaction amongst employees. Due to the nature of the work they do, knowledge management activities are crucial to its success and competitive advantage.

<u>Case B</u>

This multinational company is one of the world's leading providers of Internet, broadband network and enterprise business solutions dedicated to meeting the specialized needs a diverse and global base of customers. Constantly ranked as one of the world's top patent producing companies, this company delivers tailored solutions in the fields of computing, networking and electronic devices. It offers a complete range of notebook and desktop computers for personal and enterprise use. It is a global multinational company with approximately 300 employees in its Malaysian-based operations which spans over several states with customer service centres located in every major Malaysian city. It is ISO 9001:2000 certified and has a functional organization structure with clear reporting lines in place to ensure that the company operates effectively and efficiently.

<u>**Case C**</u>

This company is a large multinational that is deals with chemical products and operates in many countries across the globe. It has long been the leading supplier of outstanding products and services to a range of different industries and is often regarded as the first choice of organizations. Further, this company is also involved in trading, business and operational consultancy with a very strong research and development focus. Its main aim is to meet the needs of society in ways that are economically, socially and environmentally viable. It employs over 100,000 persons all over the world with approximately 2,000 employees in its Malaysian-based operations which spans across the entire country. It has a matrix reporting structure with its operations standardized across the globe.

In short, this section provides an overview of the cases being studied. The next section will discuss the data collected from the pilot case study conducted prior to the main data collection stage.

4.2   Data from pilot study

The interview protocol developed for this study was administered to a pilot case involving three interviews to ensure that the researcher is comfortable with the research instrument before collecting data from the three main cases. The data collected from this pilot study indicate that collaboration, mutual trust, learning, leadership, incentives and rewards, T-shaped skills and information technology infrastructure do play an important role in facilitating knowledge management in the organisation. The most popular information technology applications used are email, search engines, groupware and bulletin boards. Inhibitors of knowledge management are centralisation and formalisation.

Socialisation, externalisation, combination and internalisation are all practised in the pilot case. However, combination is found to be the most popular and common knowledge creating activity. With regard to knowledge management outcomes, this organisation believes that knowledge management has played a key role in maintaining its competitive advantage over the years and that more work needs to be done to its existing systems and culture to ensure continued success.

4.3   Data on research question 1: knowledge management enablers

This section analyses data collected with respect to research question 1 which examines the various knowledge management enablers in MSC status companies in Malaysia. The research question investigates:

RQ1:   What are the enablers of knowledge management (cultural, structural, people and technology) in Multimedia Super Corridor status companies in Malaysia?

The first part (Part A) of the interview protocol included in Appendix D documents the questions related to this research question. The respondents were asked to provide information on a range of cultural issues identified as affecting knowledge management practice. These factors include collaboration (part A.1.1), mutual trust (part A.1.2), learning (part A.1.3), leadership (part A.1.4), and incentives/rewards (part A.1.5). Apart from that, respondents were also required to comment on the degree to which structural issues such as centralisation (part A.2.1) and formalisation (part A.2.2) affect knowledge management practices in their companies. The third section in Part A of the interview protocol then canvasses the opinions of respondents on the importance of the people factors in knowledge management. The role of information technology infrastructure in facilitating knowledge management is then examined in section 4 (part A.4) of the interview protocol.

4.3.1   Collaboration

Case A is very satisfied with the degree of collaboration in its organisation. Due to the relatively small size of Case A, everyone in the organisation needs to collaborate on various projects to accomplish tasks. According to the executive-level IT personnel, *'there is sufficient opportunity to work both as individuals as well in larger groups to perform larger and more complex tasks collectively'* (A2). Team members are viewed to be very helpful and supportive in handling tasks with a culture for acceptance of responsibility when a failure occurs. This is possible as the organisation has an ethos whereby each member is viewed as an integral team player that works for the common

good of the organisation. Willingness to accept responsibility for failure is ingrained in the culture of this organisation as *'it is important that everyone do their best with the best of intentions'* (A2). All respondents believe that collaboration is an important enabler of knowledge management which needs to be nurtured in order to ensure that effective knowledge creation and sharing occurs.

Case B experiences rather high levels of collaboration but there is general consensus among the respondents that it could be further improved. B3 comments that *'collaboration is generally strong within sub-groups and among the more senior staff members - those who are thirty-somethings'*. For the IT personnel, staff members are generally supportive when there is some encouragement or directive from top management (B1, B2). Collaboration works in a more formalised manner in which employees collaborate on projects or work only when they are given the task by superiors (B1, B2, B3). Willingness to accept responsibility for failure is low as employees would view that as a sign of incompetence and weakness. *'Finger pointing may not necessarily occur when there is a failure but there is a common tendency for team members to shrug off the responsibility'* (B2). This trend is rather common in most Malaysian organisations as employees view failure as something negative and detrimental to their personal and professional growth, something that is closely related to the *kiasu* (afraid to lose) syndrome in East Asian societies (B1, B2). Respondents rate collaboration as having low to average impact on knowledge management practices in their organisation.

Case C experiences moderate to low levels of collaboration and respondents are satisfied with it. *'There is a degree of self-interest preservation, whereby sometimes [sic] information is withheld in order to promote self-interests'* (C3). *'Employees who visibly demonstrate support are rewarded'*. A reason for this is '… a degree of self-interest sustains the support the organisation receives from its employees (C1). C3 however warns that *'when it is viewed that supporting [an initiative] does not benefit them [employees] in any way, certain members withhold support'* (C3). Employees are also generally not helpful and do not go out of their way to help colleagues unless it is based on personal relationships (C3). Collaboration across organisational units is high and this can be attributed to the 'Enterprise First' thinking which is the 'in-thing' in the organisation (C1, C3). In light of this, *'... all departmental heads want to be seen as*

Enterprise-First champions in the organisation' (C3). As the organisation practices a matrix organisational structure, *'accountability is blurred hence there is less willingness to accept responsibility for failure'* (C2). Although collaboration levels are not satisfactory in the organisation, all respondents are of the opinion that it plays an important role in facilitating knowledge management. *'Collaboration, developed through a strong culture is in my view a critical component of KM. A strong collaborative culture would enable the right mindsets to set up the right structures and technologies to enable KM'* (C3). A summary of the ratings on collaboration provided by respondents in all three cases is presented in Table 4.2.

Table 4.2   Summary of ratings for collaboration

KM Enabler: Collaboration	Case A			Case B			Case C		
	A1	A2	A3	B1	B2	B3	C1	C2	C3
A.1.1.1 How would you describe the degree of collaboration in your department/organisation?	5	5	4	4	4	4	4	3	3
A.1.1.2 Are members of your department/organisation satisfied with current levels of collaboration?	5	5	4	3	3	3	4	4	4
A.1.1.3. Are members of your department/organisation supportive?	5	5	5	4	4	3	4	4	4
A.1.1.4 Are members of your department/organisation helpful?	5	5	5	4	4	3	3	2	3
A.1.1.5 Is there willingness to collaborate across organisational units within your organisation?	5	4	4	3	3	3	5	4	5
A.1.1.6 Is there willingness to accept responsibility for failure?	4	5	5	2	2	2	2	2	2
A.1.1.7 How would you rate the impact of collaboration as an enabler/facilitator in the implementation of KM in your organisation?	5	5	5	2	3	3	4	3	4
Scaling:1-very low; 5-very high									

(Source: developed for this study)

Cross case analysis indicates that while all cases generally describe collaboration to be on the high side in their organisations, observable variations exists with regard to helpfulness, collaboration across organisational units and willingness to accept failure. Of all organisations, Case A which is a relatively small organisation has a very helpful and supportive work culture in which collaboration is an essential feature in their operations. Cases B and C which are larger organisations have relatively lower

collaboration culture compared to Case A with visible unwillingness among employees to accept responsibility for failure.

4.3.2   Mutual trust

Case A has high levels of mutual trust and is of the opinion that staff members are generally trustworthy. Reasons for this include the size of the organisation and the fact that it is *'a close knit group that is accountable for their responsibilities'* (A2). In terms of ability, respondents indicate that they have no qualms as employees are recruited based on their ability and qualifications. Mutual trust is viewed as a key factor in the practise of knowledge management in Case A.

Case B experiences moderate levels of mutual trust. Respondents indicate that mutual trust amongst the more senior staff members is higher and that the newer or younger staff members are treated with a certain level of caution as their ability, skills and intentions are not yet known to others (B1, B2, B3). In view of this, *'there is no such thing as "blind faith" being placed on team members, and superiors would still need to make final checks as a precautionary measure'* (B1). Staff members generally work towards organisational goals but the management emphasises on the need to strike a balance between personal interests and organisational interests. *'Staff are encouraged to place equal emphasis on both individual and organisational interests as neglecting one over the other will lead to problems in the long term and would be unhealthy for both the employee and the organisation'* (B1).

Case C acknowledges that mutual trust is indeed important to its knowledge management initiative and experiences high levels of it. However, the issue of *kiasu*-ism crops up due to the fact that '*there are many smart people who look out for their own self-interests'* (C3). Generally, everyone can be trusted to do their work at the minimal level (C1, C2, C3). However, '*political creatures exist and these people would be able to get by doing little work, but still at an acceptable level'* (C3). The *kiasu* environment emerges due to HR practices which includes a force-ranking system in which superiors are required to allocate points to subordinates resulting in everyone looking out for themselves unless personal relationships are formed (C1, C3). *'Whenever self-interest*

conflicts with organisational interests, self-interest would take precedence' (C3). There is adequate faith that employees work towards organisational goals as they are rewarded for achieving them (C1, C2, C3). Mutual trust is important to Case C as it *'speeds up knowledge sharing and reduces costs of unnecessary re-checking work done by colleagues'* (C3).

Table 4.3   Summary of ratings for mutual trust

KM Enabler: Mutual trust	Case A			Case B			Case C		
	A1	A2	A3	B1	B2	B3	C1	C2	C3
A.1.2.1 How would you describe the degree of mutual trust in your department/organisation?	5	5	5	4	4	3	4	4	4
A.1.2.2 Are your members are generally trustworthy?	5	5	5	4	4	4	4	4	4
A.1.2.3 Do your members have reciprocal faith in other members' intentions and behaviours?	5	5	5	4	3	4	3	3	2
A.1.2.4 Do your members have reciprocal faith in others' ability?	4	5	5	3	3	4	4	4	4
A.1.2.5 Do your members have reciprocal faith in others' behaviours to work toward organisational goals?	5	5	5	4	4	4	4	4	4
A.1.2.6 Do your members have reciprocal faith in others' decision toward organisational interests rather than individual interests?	5	5	5	3	3	3	3	3	2
A.1.2.7 Do your members have relationships that are based on reciprocal faith?	5	5	5	4	4	3	4	3	3
A.1.2.8 How would you rate the impact of mutual trust as an enabler/facilitator in the implementation of KM in your organisation?	5	5	5	3	3	4	4	4	4
Scaling:1-very low; 5-very high									

(Source: developed for this study)

Cross case analysis of the data collected summarised in Table 4.3 indicate that mutual trust differs mainly due to organisational size and culture. Case A which is smaller in size compared to the other two cases have higher levels of trust and faith amongst employees as there is better opportunity for personal relationships to develop with closer interaction. The larger size of Cases B and C makes it more difficult for interaction to occur and inhibits the cultivation of mutual trust amongst employees. The organisational culture with regard to rewards and recognition also leads to the decline of mutual trust in Cases B and C. Case C has a very competitive work environment in which rewards are linked to performance and has a rigid force-ranking system that leads to the emergence of a self-preservation and *kiasu* work ethic.

4.3.3   Learning

In *Case A*, learning is found to be high. However, it must be noted that due to the small size of the organisation, it does not appear to be systematically planned or managed. Induction is provided to all new staff members where they are *'trained via our structured training sessions which include video and in-person training together with mock projects'* (A1). Apart from induction trainings, most of the other forms of training are *'basically on the job training with support and guidance provided by other colleagues when necessary'* (A2). Although job rotation is not practised, *'job tasks and roles are very fluid, allowing for ample learning opportunities and personal development'* (A2). There are plans for staff members to participate in seminars and conferences to keep them abreast with current developments in the field (A1, A2). Company-organised outings such as retreats to resort islands and team-building activities to foster teamwork and develop interpersonal skills (A1, A2, A3). Mistakes are tolerated to a certain extent (when it is a pioneering effort) and would be viewed as part of the learning curve. The organisation's library provides staff members with ample opportunity to upgrade their knowledge and skills (A1, A2).

Case B has formalised training programs to facilitate learning across the organisation. It recognises the importance of learning within the organisation and has made concerted effort to ensure that staff members are constantly upgrading their skills and knowledge. To this end, *'training programs are included in the company's annual budget with the key aim for each employee to undergo one training course per year'* (B1). There is a mix of both internal and external training programs made available to employees (B1, B3). However, job rotation or other informal training arrangements are not made available in the organisation (B1). Staff members are also generally encouraged to participate in seminars and conferences but timing and work commitments tend to be an obstacle at times (B1, B3). The management provides allocations and funding to its staff club which organises a variety of social and welfare programs throughout the year (B1). Mistakes are viewed as being part and parcel of work and integral part of learning. B1 stresses that *'...even bosses make mistakes!'*.

Case C has excellent training and learning programs which are said to be among the most comprehensive in the world. 'Many courses are designed to help learning with a

collegiate feel to it. Apart from that, learning occurs in a tacit manner with experience' (C3). These training programs are developed in-house and some are external programs. A wide range of training is provided which include *'...leadership courses, skills enhancement courses, self-motivation courses and even sponsorship for formal degree programs'* (C3). To ensure staff members are upgrading themselves all the time, *'employees are able to look for job rotation opportunities via an online open resourcing system where current staff members can look for placement in other job positions in all of its branches across the globe'* (C2). Executive-level staff members are required to attend a certain number of conferences annually (C2, C3). While social clubs exists, the level of participation varies from location to location, with the more obscure or rural locations having more activities and participation from employees (C1, C3). The organisation has a *'poor corporate memory'* and believes that *'it is better to ask for forgiveness than to ask for permission'* resulting in mistakes being tolerated in the organisation (C3). With extensive self-learning material available in the form of printed books and web-based self-paced learning portals, Case C strongly advocates learning and views it as being crucial for effective knowledge management to take place (C2, C3).

Table 4.4   Summary of ratings for learning

KM Enabler: Learning	Case A			Case B			Case C		
	A1	A2	A3	B1	B2	B3	C1	C2	C3
A.1.3.1 How would you describe the degree of learning in your department/organisation?	4	4	5	4	3	4	5	5	5
A.1.3.2 Does your organisation provide various formal training programmes to improve the performance of staff?	4	3	3	4	3	4	5	5	5
A.1.3.3 Are informal individual development opportunities such as work assignments and job rotation provided in your organisation?	3	5	4	2	2	2	5	5	5
A.1.3.4 Are staff members encouraged to attend seminars, conferences, symposia etc?	4	3	3	4	3	4	5	5	5
A.1.3.5 Does your organisation provides various programs such as clubs and community gatherings?	4	5	4	4	4	4	5	5	5
A.1.3.6 Are mistakes tolerated in your organisation? Are they viewed as a learning process?	5	4	4	4	4	4	5	5	5
A.1.3.7 In general, are staff members satisfied with the contents of training or self-development programs currently available at your organisation?	4	4	3	4	4	4	5	4	4
A.1.3.8 How would you rate the impact of learning as an enabler/facilitator in the implementation of KM in your organisation?	5	4	3	4	4	4	5	5	5
Scaling:1-very low; 5-very high									

(Source: developed for this study)

Cross case analysis reveals that all three organisations value the importance of learning. However, the level of learning that takes place in each organisation vary with Case A having very basic and informal learning opportunities. Cases B and C have more sophisticated learning and training programs managed by their respective HR departments. Case C is proactive in its approach to learning and has very advanced learning and development programs devised to ensure that the organisation's human capital is effectively managed to realise its maximum potential. A summary of the ratings provided by these organisations with regard to learning is detailed in Table 4.4.

4.3.4   Leadership

Case A has a CEO who is a technologically trained person as its management champion for its knowledge management activities. *'The CEO would guide and motivate staff members by clarifying strategies and goals frequently'* (A2). Although the CEO occasionally inspires staff with his leadership ability, he can be seen as a transactional leader (A2, A3).

Case B has its CEO as the key driver for its knowledge management initiative. The CEO *'pushes for a wide range of knowledge management efforts and encourages employees to practice it for [everyone's] common good'* (B1). Apart from the CEO acting as the knowledge management champion, all department heads champion knowledge management activities within their respective sub-units (B1, B2, B3). These knowledge management champions lead by focussing on task requirements and goals to be achieved with respect to the overall strategy (B1, B2). As such, they are more transactional than transformational. Respondents commented that these champions would need to possess more transformational leadership skills by providing more higher-order stimulation and exuding charisma that would motivate all levels of the organisation to practice knowledge management (B1, B3).

Although knowledge management leadership exists in *Case C*, its *'... impact is difficult to be observed at the middle and lower levels of the organisation'* (C3). The CIO is the sole organisation-wide knowledge management champion (C1, C2, C3). Although an

organisation-wide knowledge management champion exists, this person's leadership skills is hard to be observed at the middle and lower levels of the hierarchy as he reports directly to the CEO with minimal interaction with non-senior management staff. However, it seems that the CIO is very focussed on ensuring that task and role requirements are met and adhered to by employees with individualised consideration for employees not existent (C3). Despite this, respondents concur that the current leadership has brought a lot of development and benefit to the organisation with respect to its knowledge management initiatives but more could be done to improve conditions (C2, C3).

Table 4.5   Summary of ratings for leadership

KM Enabler: Leadership	Case A			Case B			Case C		
	A1	A2	A3	B1	B2	B3	C1	C2	C3
A.1.4.1 How would you describe the level of KM leadership in your department/organisation?	4	5	5	4	4	4	3	4	3
A.1.4.3 In the organisation, do these leaders guide and motivate staff members in the direction of established goals by clarifying role and task requirements?	3	4	5	4	4	4	3	3	3
A.1.4.4 In the organisation, do these leaders provide individualised consideration and intellectual stimulation and possesses charisma?	3	3	4	3	3	3	2	3	3
A.1.4.5 How would you rate the impact of leadership as an enabler/facilitator in the implementation of KM in your organisation?	3	5	4	4	4	4	4	4	5
Scaling:1-very low; 5-very high									

(Source: developed for this study)

All organisations recognise the importance of leadership in ensuring effective knowledge management with differing levels of knowledge management leadership in each organisation in the *cross case analysis* conducted. As observable in Table 4.5, these knowledge management champions are mainly transactional leaders rather than transformational leaders as they guide and motivate staff members in the direction of established goals by clarifying role and task requirements. In addition, these leaders are either the CEO (Cases A and B) or the CIO (in Case C). Case B has a rather broad-based leadership of knowledge management practised where department heads play a role in

providing knowledge management leadership. The other organisations have only a sole organisation-wide champion.

4.3.5   Incentives and rewards

Staff in *Case A* are rewarded for sharing knowledge as *'...sharing knowledge has a bearing on pay raises, bonus issues and the rate of promotion'* (A1). The practice of providing incentives and rewards for knowledge management activities is ingrained in the organisation's culture as observed from the intrinsic and extrinsic rewards provided (A1, A2, A3). The small size and close-knit family-like ethos of the organisation makes it easier to identify those who practice knowledge management. Staff members are given annual increments, bonuses and incentive trips when they reach certain goals with regard to knowledge creation and sharing (A2). Acknowledgement and recognition are also given to staff members to ensure that they remain motivated. Staff members derive more motivation from the intrinsic rewards as they are seen as contributing to the 'family' (A2).

Respondents in *Case B* indicate that whilst incentives and rewards are provided by the organisation, its implementation is difficult as it is confined to executive level employees with the lower level staff such as line operators not being able to enjoy this benefit (B1, B2). Another issue that further complicates matters is the fact that knowledge sharing activities are not visible and would be difficult to quantify (B2, B3). This results in difficulty in rewarding those who have practised knowledge management in the organisation (B3). Rewards are therefore more intrinsic with low levels of extrinsic rewards in the form of increments, bargain purchase of computer sets and flat rate bonuses (B1).

In *Case C*, staff members are rewarded for practising knowledge management through the 'Enterprise First' programme (C3). Employees who practise knowledge management are given bonuses through a forced-ranking system adopted by the organisation (C2, C3). Intrinsic rewards such as recognition, praise and better job prospects are also adopted by the organisation. However, it is the extrinsic rewards and the need for self-preservation that motivates staff to practise knowledge management (C1, C2, C3).

Table 4.6   Summary of ratings for incentives and rewards

KM Enabler: Incentives & Rewards	Case A			Case B			Case C		
	A1	A2	A3	B1	B2	B3	C1	C2	C3
A.1.5.1 Are staff members generally rewarded for practising KM (sharing knowledge etc) in your department/organisation?	5	5	4	3	2	2	4	4	4
A.1.5.3 What is the level of extrinsic rewards (pay, bonus, gift etc.) provided in your organisation for practising KM?	4	5	4	2	2	2	5	4	4
A.1.5.4 What is the level of intrinsic rewards (sense of achievement and accomplishment) provided in your organisation for practising KM?	5	5	5	3	3	3	3	3	3
A.1.5.5 How would you rate the impact of incentives and rewards as an enabler/facilitator in the implementation of KM in your organisation?	4	4	4	3	3	3	5	5	5
Scaling:1-very low; 5-very high									

(Source: developed for this study)

A summary of the ratings for incentives and rewards is presented in Table 4.6. ***Cross case analysis*** reveals that there is significant variation among all three cases with regard to incentives and rewards as an enabler of knowledge management. While all three organisations agree that it is an important enabler, the peculiarities of their respective organisational structure, size and culture results in varying degree of success in its implementation.

The personalised and close-knit family-like ethos of Case A makes practising knowledge management more of an intrinsic factor and allows for management to identify those to be rewarded easily (A2). Cases B and C which are larger and less personalised has lower levels of intrinsic rewards and experiences some level of difficulty in identifying those to be rewarded. However, due to the 'Enterprise First' program and forced-ranking system adopted at Case C, those who practise knowledge management are rewarded extrinsically as this would be a factor considered when superiors allocate points to each subordinate (C3).

4.3.6   Centralisation

Case A has no distinct compartmentalisation or subdivisions in its organisational structure but has a clear centralisation of decision making in the top management. Despite that '*each employee is entrusted with a high level of responsibility for his/her tasks' and are expected to make their own decisions within that scope*' (A2). As such, employees are allowed to make decisions and take action without their supervisor's approval. However, they must take responsibility for their actions (A1, A2).

Centralisation is high in *Case B* with decision making for non-routine tasks made by senior management. For operational decisions within the scope of an employee's job function, they are generally encouraged to make their own decisions even without their superior's approval (B1). However, '*they are rather reluctant to take risks and would normally run it through superiors just to be on the safe side*' (B1). It is viewed that too much centralisation can stifle creativity and hinder knowledge creation activities in the organisation, hence a perfect balance needs to be struck (B1, B3).

Case C is experiencing a shift towards a more centralised structure from its current matrix structure. As such, more decisions are being made at the top levels these days due to the shift in the organisation's decision making style (C2, C3). Staff members are given enough latitude to make their own decisions and take the necessary action but this would be largely influenced by the impact of the decision or action itself (C1, C2, C3). If the decision or action's impact has a large magnitude, then employees would revert to their superiors to ensure that they do not make a grave error (C1, C3).

Table 4.7   Summary of ratings for centralisation

KM Enabler: Centralisation	Case A			Case B			Case C		
	A1	A2	A3	B1	B2	B3	C1	C2	C3
A.2.1.1 How would you describe the degree of centralisation in your department/organisation?	4	5	4	4	4	2	4	4	4
A.2.1.2 Are staff members encouraged to make their own decisions?	4	5	4	3	3	4	2	3	2
A.2.1.3 Are staff members allowed to take action without a supervisor OR without their supervisor's permission?	3	4	3	4	4	4	3	3	3
A.2.1.4 Are staff members able to make decisions without their supervisor's approval?	3	4	3	4	4	4	3	3	3
A.2.1.5 How would you rate the impact of high levels of centralisation as an enabler/facilitator of KM in your organisation?	3	2	3	3	2	3	2	1	3
Scaling:1-very low; 5-very high									

(Source: developed for this study)

Cross case analysis shows that all three cases have rather high levels of centralisation despite encouraging staff members to make their own decisions and take actions without their superiors' approval. Although this is allowed and encouraged in all three cases, subordinates would rather seek confirmation from the superiors for their decisions and actions to ensure that they do not take the blame should a problem develop. There is consensus that too much centralisation would have adverse effects on knowledge management activities. A summary of the ratings for centralisation is presented in Table 4.7.

4.3.7   Formalisation

Formalisation is very low in *Case A* due to its organisational size and structure. Rules and procedures do exist but they are very limited and cover the key activities only (A1, A3). *'Some rules and procedures do exist but are not explicitly documented or formalised'* (A2). *'The organisational environment is very informal which encourages and stimulates creativity. Communication is also very informal and tends to be verbal or email-based when necessary'* (A2). Employees are given ample leeway to bend rules in exceptional situations (A1, A2).

Formalisation is high in certain departments or functions in **Case B**. For example, HR policies are clearly spelt out for all employees (B1, B3). In the functional areas, there is less formalisation. Even if there are formalised rules and procedures, they act as mere guidelines and are not in-depth (B1). Communication within the organisation is mixed and tends to be via telephone conversations, meetings and emails (B1, B2, B3). *'Where rules and procedures exist, they are either in print or published on the intranet'* (B2). Staff members would rarely break rules and even if they do break rules, these actions are not encouraged (B1, B3).

The degree of formalisation in **Case C** is becoming very extensive with the introduction of the *Sarbanes-Oxley Act* for listed companies to avoid fraudulent activities (C1, C3). The *Sarbanes-Oxley Act* mandates that organisations exercise strict adherence to formal procedures (Addison-Hewitt Associates 2006; Carney 2006; Jackson & Fogarty 2005; Moeller 2004; Pinder 2006; Ramos 2005; Romano 2005). Case C is working to this end to have these processes in place together with the advice of its external auditors (C3). Due to this, almost all activities are covered by some formal rules to mitigate risks (C3). Both formal and informal communication is equally important to ensure that work is done (C2, C3). *'Formal contact is normally through written communications that can be electronic and print-based'* (C3). 'SOX 404 [*Sarbanes-Oxley Act* Clause 404] mandates that documented procedures whereby the CEO would need to sign off all documents and ensure that all controls are in place' (C1). In light of the Enron fiasco, there is now increased emphasis on compliance of rules and procedures and it is not possible for staff members to reach informal agreements in any way (C1, C3). Too much formalisation restricts knowledge creation but there is a plus point to formalisation as it allows for the elicitation of tacit knowledge into explicit knowledge that are documented and easily disseminated as *'dry textbook knowledge'* (C3).

Table 4.8   Summary of ratings for formalisation

KM Enabler: Formalisation	Case A			Case B			Case C		
	A1	A2	A3	B1	B2	B3	C1	C2	C3
A.2.2.1 How would you describe the degree of formalisation in your department/organisation?	1	3	3	3	3	3	4	4	4
A.2.2.2 Are all activities covered by some formal rules in the organisation?	2	3	3	4	4	4	4	4	4
A.2.2.3 Are contacts and communication within the organisation on a formal or planned basis?	4	1	1	3	3	3	4	4	4
A.2.2.4 Are the rules and procedures in the organisation typically written/documented?	2	3	3	4	4	4	5	5	5
A.2.2.5 In certain situations, would it be possible for staff members to ignore the rules and reach informal agreements?	4	3	3	2	2	2	1	1	2
A.2.1.5 How would you rate the impact of high levels of formalisation as an enabler/facilitator of KM in your organisation?	1	1	2	3	3	3	1	3	2
Scaling:1-very low; 5-very high									

(Source: developed for this study)

Cross case analysis of the summary of ratings presented in Table 4.8 indicates that there are significant differences in the level of formalisation in all three organisations which could be attributable to its size and culture. Case A which is relatively small has very low levels of formalisation whilst Case C which is a multinational company with thousands of employees worldwide has very high levels of formalisation. However, communication tends to be mixed for all organisations, having to rely on both formal and informal communication channels.

4.3.8   T-shaped skills

Case A generally requires all staff members to have T-shaped skills due to its operations and key activities that are inter-disciplinary (A2). As such, '*each employee has his/her own primary area of responsibility apart from knowledge of broader areas that are relevant to the task at hand'* (A2). To ensure that staff members are aware of what happens in the organisation, '*everyone is trained to have adequate grounding in the overall fundamentals of our work'* (A1). Work processes are highly collaborative in nature with discussions that are both formal and informal held weekly with adequate feedback provided by team members (A2). Communication ability is good as it does not

experience any cultural or language barrier. This is partly due to the fact that only those with the correct skills and mindset are hired (A2). Staff members have a pro-change mindset and are open to changes. They are quick to adapt and learn new things (A1).

In *Case B*, the number of staff members with T-shaped skills is rather limited with more staff members having either broad knowledge or deep specialist knowledge (B1, B3). *'It is hard to find colleagues who are experts in their field and yet possess wide knowledge of related areas'* (B2). Those with T-shaped skills are normally pushed up the organisation hierarchy and would hold middle or top management positions (C1, C2). Employees may know what happens in other sections but may not have adequate knowledge and skills to take over these tasks (B2). Suggestions and feedback are given by colleagues and top management (B2, B3). The communication ability of staff members is satisfactory with inter-departmental communication taking on a more formalised approach (B1, B3). Changes do occur from time to time but there is generally resistance as staff members do not react well to changes (B1, B2, B3).

Executives recruited in *Case C* are required to have T-shaped skills as it part of the assessment criteria used in the selection of new hires (C3). In certain sections of the organisation, '*chief scientists are appointed to lead in research and development together with team members who have advanced degrees or training in their specialist areas'* (C3). Whilst most staff members understand their own tasks as well as that of others', they may tend to shy away from revealing that or from advancing broader-based knowledge or skills to avoid from being given more work (C1, C3). Staff members are encouraged to make suggestions to their peers using an intranet-based system called 360 degree feedback (C2, C3). All new hires '*... are judged on the same criteria at entry point before being assigned to any department. Hence, there is a standardised requirement of communication ability to ensure that effective communication takes place'* (C3). It must be stressed that only the best minds and talents are recruited into Case C (C1, C2, C3). In addition, the organisation is very dynamic with major changes occurring every 2 to 3 years (C1, C3). Employees are 'highly adaptable and are extremely fast learners' (C2).

Table 4.9   Summary of ratings for T-shaped skills

KM Enabler: T-shaped Skills	Case A			Case B			Case C		
	A1	A2	A3	B1	B2	B3	C1	C2	C3
A.3.1 In general, do staff members possess T-shaped skills (skills that are both highly specific and yet broad enough to allow them to 'see the whole picture' of their actions)?	4	5	4	3	3	4	5	4	5
A.3.2 Are staff members specialists in their own part/area?	4	4	4	4	4	4	5	5	5
A.3.3 Do staff members understand not only their own tasks but also others' tasks?	4	4	3	3	3	3	5	5	4
A.3.4 Are staff members capable of making suggestions about others' tasks?	5	5	4	3	3	3	5	5	4
A.3.5 How would you describe the communication ability of staff members of a particular department with those in other departments?	5	4	4	4	4	4	4	5	5
A.3.6 In the event of changes, are staff members still able to perform their own tasks effectively?	4	5	4	3	3	3	4	4	4
A.3.7 How would you rate the impact of T-shaped skills as an enabler/facilitator of KM in your organisation?	4	5	4	3	3	3	5	5	4
Scaling:1-very low; 5-very high									

(Source: developed for this study)

A summary of the ratings provided by responded for T-shaped skills is detailed in Table 4.9. ***Cross-case analysis*** reveals that the hiring process and culture of the organisation affects the presence of employees with T-shaped skills in the organisation. Case A which has a very informal and close-knit culture observes that most of its staff members have deep specialist knowledge that is complemented with broad general knowledge required to operate effectively. Case B which has rather isolated functional units that have little inter-departmental collaborative work has more employees with deep specialist knowledge or broad general knowledge depending on the nature of their work. Case C which operates in a very competitive environment coupled with its stringent hiring procedures sees staff member having T-shaped skills, 360 degree feedback and excellent communication ability. Due to the competitive nature within Case C and the need for self preservation, employees tend to keep a low profile with regard to their knowledge across domains to avoid being given more work to do. This is because they cannot reject work that is assigned and would only be assigned the task if superiors think that they knowledgeable in the area in addition to their own specialist set of skills or knowledge (C3). This is another example of the *kiasu* culture in Case C.

4.3.9   Information technology infrastructure

Case A has a very basic suite of IT applications used for its knowledge-related work. The key applications used are customer service applications, workflow management, helpdesk and email. These applications are the crux of the organisation as they are used to support the key operations of developing solutions and supporting users from across the globe (A1, A2). Due to the size and geographical location of its team members, the use of asynchronous and synchronous collaborative work within the organisation is not widely used (A2). Tools like email are used to support intra-organisation communication. Key information is stored on organisation-wide databases which allows for immediate and systematic retrieval of information (A3). Although the range of applications used are limited, Case A uses a few key applications to its fullest potential which are indispensable in ensuring that its operations run without a hitch (A1, A2, A3).

Case B has an advanced IT infrastructure with a wide range of applications available to cope with its business requirements. The key applications used to support knowledge management work include customer service applications, email, search engines, order-entry, bulletin boards, groupware, voice mail, document management, process modelling, library systems and service agent support tools. The key application used to support collaborative work is email and groupware (B1, B2, B3). Forecasting and prediction tools are not widely used as most of the organisation's activities do not require forecasting and prediction capabilities (B1, B3). Corporate information, product information and details on operations are readily available on the database servers that allow for searching and filtering by authorised users (B1, B2, B3). Authorised users can also connect from remote locations to these servers through secure channel connections (B2). IT applications available at Case B play a crucial role in supporting knowledge management work and collaboration both with its employees and key business partners (B1, B3).

Case C is a heavy user of IT applications for its knowledge management work. As observable in Table 4.10, it utilises a wide range of applications to support its work. The IT system in the organisation is very complex and sophisticated. However, it is viewed as being *'...too complicated and not so user friendly'* (C3). This is the key obstacle faced by employees when wanting to use the applications for knowledge work. Microsoft

Netmeeting is widely used within the organisation for different place collaborative work and emails used for asynchronous collaborative work. Although these applications are used by employees, respondents felt that *'... much more could be done to improve applications for collaborative work both within and outside the company'* (C1). Due to volume of information in the organisation, respondents find it difficult to find what they want. *'Sometimes, it all boils down to luck as the search strategy and experience with the system would affect the information obtained from corporate databases' (C2). This is attributable to the poor storage mechanisms in the organisation which is currently being revamped by the IT people* (C3). Outsourced forecasting and simulation activities are widely used and are indispensable in aiding decision making among executives in Case C (C2, C3). Generally, respondents are of the opinion that the IT applications in the organisation are great but some of these applications become cumbersome to use due to *'...lack of maintenance or refinement after the fanfare of the initial launch'* (C3).

Table 4.10   IT applications used to support knowledge management

IT applications	Case A			Case B			Case C		
	A1	A2	A3	B1	B2	B3	C1	C2	C3
Customer service applications	X	X	X	X	X	X	X	X	X
e-mail	X	X	X	X	X	X	X	X	X
Search engines		X	X	X	X	X	X	X	X
Helpdesk applications	X	X	X			X	X	X	X
Order entry applications	X			X	X	X	X	X	X
Bulletin boards				X	X	X	X	X	X
Groupware				X	X	X	X	X	X
Voice mail				X	X	X	X	X	X
Document management tools				X	X	X	X	X	X
Process modelling tools				X	X	X	X	X	X
Workflow management	X	X	X				X	X	X
Computer-based training	X				X		X	X	X
Online training	X						X	X	X
Service agent support applications				X	X	X		X	
Video conferencing				X			X	X	X
Chat rooms							X	X	X
Library systems				X	X	X			
Simulation technologies							X	X	X
Intelligent agents							X	X	
Push technologies	X							X	

(Source: developed for this study)

Cross case analysis of the results indicate that there is general consensus on the importance of IT applications in supporting knowledge management activities. However, differences exist on the importance of certain applications due to the nature of the work being performed and the key business activities of the organisation. For example, prediction and forecasting abilities are viewed as important for Case C but is irrelevant to Case A and B which do not perform such activities as detailed in Table 4.11. Email, customer service applications and search engines emerge as the most popular suite of IT applications in all three organisations as indicated in Table 4.10. A key concern among cases is the user-friendliness factor of these applications. Despite having excellent systems in Case C, most of the applications there are too complex and cumbersome for its staff to use. As such, adequate maintenance and emphasis on ease of use need to be considered by IT developers when designing new IT applications.

Table 4.11   Summary of ratings for IT infrastructure

KM Enabler: IT Infrastructure	Case A			Case B			Case C		
	A1	A2	A3	B1	B2	B3	C1	C2	C3
A.4.1 How would you describe the IT infrastructure available in your department/organisation?	4	4	4	3	3	3	4	3	3
A.4.2 How would you rate it in supporting collaborative work?	3	3	3	3	3	3	3	2	2
A.4.3 Does it support intra-organisation communication?	4	4	4	4	4	4	5	4	4
A.4.4 Does it support searching and accessing necessary data/information?	3	4	3	4	4	4	3	3	2
A.4.5 Does it support simulation, forecasting and prediction activities?	1	3	3	2	1	3	5	4	4
A.4.6 Does it allow for systematic storage of data/information?	3	4	3	4	4	4	3	2	2
A.4.8 How would you rate the impact of IT infrastructure as an enabler/facilitator of KM in your organisation?	3	3	3	4	4	4	4	5	4
Scaling:1-very low; 5-very high									

(Source: developed for this study)

In summary, the facilitators/enablers being investigated in this study do have an influence on knowledge management activities in all three cases. Responses indicate that there is generally a consensus on the importance and impact of the enablers being studied. However, differences in the magnitude of the influence of each enabler on a particular organisation do emerge due to organisational size, magnitude of operations,

culture and organisational structure with the smaller organisation (Case A) having high levels of enablers due to common values and understanding.

Larger organisations such as Cases B and C needs more organisational intervention in the form of rules, HR policies and controls to ensure that employees act in the desired manner to ensure that positive practices and behaviours are cultivated to facilitate knowledge management activities. Having outlined the findings on research question 1 – knowledge management enablers, the findings on research question 2 – knowledge management processes are presented next.

4.4 Data on research question 2: knowledge management processes

This section analyses data collected with respect to research question 2 which examines the process of knowledge creation in Multimedia Super Corridor status companies in Malaysia. The research issue investigates:

RQ2:   What is the process involved in creating knowledge in Multimedia Super Corridor status companies in Malaysia?

The second part (Part B) of the interview protocol included in Appendix D documents the questions related to this research question. The respondents were asked to provide information on a range processes known to used to create knowledge within their organisations. These include socialisation (part B.1), externalisation (part B.2), combination (part B.3) and internalisation (part B.4).

4.4.1 Socialisation

Socialisation proves to be an important knowledge creating activity in *Case A* with a great deal of tacit knowledge accumulation through information gathering from various sources within the organisation (sales and development teams) including key partners and customers (A1, A2, A3). Ideas for corporate strategy are derived from daily life and experiences in addition to informal interaction with experts and competitors outside the organisation (A2, A3). Discussions and sharing of experiences are the key method to

uncover new strategies and solutions (A2, A3). The organisational setting in Case A which is built on the common values of trust, teamwork and mutual respect fosters the correct environment for effective sharing of experiences and knowledge (A2). Management also gathers new ideas on solutions and markets through internal reflection within the organisation and looking at how employees operate internally (A1, A2). Mentoring and personalised training programs for new hires allow the transference of specific skills and knowledge which would otherwise be difficult to acquire via conventional learning such as books and online training (A1, A2).

Case B practices moderate levels of socialisation with employees getting feedback and complaints from customers and suppliers to work on (B3). Experience sharing occurs on a limited basis among team members within the department and with colleagues from other departments such as sales and production (B1, B2, B3). Sharing of experiences with external parties such as suppliers, customers and competitors is not practiced (B1, B3). New strategies and solutions are found through brainstorming sessions within the department, seminars and training from specialists (B1, B2, B3). Mentoring programs are available but its full impact cannot be observed due to the heavy workload of staff members and reluctance of trainees to seek clarification when they do not understand or face difficulties as they fear that it would make them look incompetent (B1, B3).

Case C practices a great deal of socialisation activities in the knowledge creation process with information and insights being constantly sourced from its customers, production sites, marketing intelligence, consultancy firms apart from periodicals and other printed literature (C3). Sharing of experiences with team members is a norm and is seen as an activity that leads to tacit knowledge creation within Case C (C1, C2). However, when communicating with external parties, employees tend to exercise caution with information being *'...screened first to ensure confidential and sensitive information is not divulged [to other parties]'* (C3). Active dialogue is engaged with competitors whenever employees attend corporate functions and trade dinners/events (C1, C3). This experience is then normally shared with fellow team members at informal meetings and sessions (C1, C3). Apart from formal and informal meetings at work and at work-related events, team members share experiences with each other at company retreats and with employees who are assigned as their apprentices (C1, C2). Mentoring occurs at the

administrative sections of the organisation whilst apprenticeship is more prevalent at the production and R&D sites (C1, C3).

Cross case analysis indicates that differences do occur in the level of socialisation practised in the three cases. Case A and C have high levels of socialisation but the reasons behind these are different. Case A's organisational culture and ethos promotes socialisation activities whilst Case C is driven mainly by organisational policy and procedures that mandate these activities and the need for self-preservation in a highly competitive environment.

4.4.2   Externalisation

Case A which prides itself with excellent staff knowledge and expertise acknowledges the importance of creative dialogues where staff members openly provide opinions and ideas to solve problems or come up with new strategies (A1, A2, A3). The management also practices an 'open-door' policy that allows staff members to put forward their creative ideas and subjective opinions for consideration by the entire team (A1, A2). *'Some wonderful and excellent solutions emerge through the staff members' creative brainstorming sessions and use of both induction/deduction of abstract ideas and metaphors'* (A2). Abduction is also an interesting inferencing method that can generate creative ideas which is used by team members in brainstorming sessions (A3).

Creative dialogues are encouraged in *Case B* with the application of both induction and deduction techniques. It recognises the importance of concept creation for its solutions and uses both analogies and metaphors in this process (B1, B3). Sharing and exchange of ideas occur all the time at all levels in the organisation (B1, B2, B3). However, there is less tolerance for subjective opinions by team members (B1, B3). The intensity of these activities is rather low as the organisation does not emphasise on the transformation of tacit knowledge to explicit knowledge and the organisational mechanisms do not support this (B1, B3). There is however a realisation of this limitation and this would be rectified in due course (B3).

Case C stresses on the importance of creative and essential dialogues in the organisation (C1, C3). This is clearly visible at the higher levels of the organisational hierarchy, particularly at the middle and senior manager levels (C1, C2, C3). Both inductive and deductive thinking are used to come up with concepts with the aid of metaphors and analogies (C1, C3). *'No formal rules exist on how this is implemented and would be based on the individual or group that is making the decision….generally, both induction and deduction are used to develop concepts for strategies and products'* (C3). As staff members are very skilled and knowledgeable, they would use a variety of methods to come up with new ideas and solutions (C1, C2). Metaphors and analogies are indispensable tools used to link up concepts that emerge in brainstorming sessions where ideas and dialogues are practised (C2, C3). *'Whilst subjective opinions [by team members] are accepted, there is a clearer appreciation for more objective opinions'* (C3).

The ability of staff members and the structure of the organisation have an influence on the externalisation process in the *cross-case analysis* conducted. It is clear that Cases A and C allow for more creative dialogues to take place and recognises the importance of concept creation for competitive advantage. Case B does not see externalisation as a key knowledge creation process as it focuses more on explicit knowledge dissemination rather than the transformation of tacit knowledge to its explicit form.

4.4.3   Combination

Combination is not the key knowledge creation process in *Case A* as the organisation does not focus on formalised activities and tends to take on a very informal approach to work. Whilst published literature such as marketing and sales figures and trade reports are used to a certain extent in the formulation of plans and strategies, they are not conducted in a systematic and planned manner (A1, A3). Manuals on the products and solutions provided are documented in manuals and online documentation accessible to customers (A2). Some information on the products is entered into databases but not at a comprehensive level. New ideas and concepts are transmitted to fellow team members through meetings and discussions, and with the use of handouts (A1, A2).

Case B uses published literature and to a certain extent some sensitivity analysis tools to assist top management in making decisions on their overall strategy (B1, B3). Comprehensive manuals and documentation on all of its products and services are developed by developers and made available on the intranet, in print form and on the Internet for customers to access (B1, B3). Information on products and services are kept in corporate databases but the implementation of this initiative is still at the early stages of development (B2). New ideas and concepts are transmitted to team members through meetings, presentations and newsletters. In general, combination is a popular activity in Case B.

Case C uses a wide variety of materials and sources such as trade and marketing statistics, company statistics, consultant reports, results of prediction and forecasting activities to guide management plans and strategies (C1, C3). These materials are often collected from various sources and integrated to aid decision making in the organisation (C2, C3). In addition to these materials and sources, another key reference used by employees are the manuals, guides and documents that provide information on work procedures and the organisations products and services (C1, C2, C3). *'The extensive documentation is in response to the requirements of the SOX 404 [Sarbanes-Oxley Act Clause 404] which the organisation is adhering to strictly'* (C3). A comprehensive SAP Enterprise Resource Planning (ERP) tool allows information on products and services stored and accessed from corporate databases (C1, C3). Newly created concepts and ideas are disseminated to team members through meetings, email, bulletin boards, internal newsletters, instant messaging systems and voice/video conference sessions (C1, C2, C3). Combination is the most obvious and widely practiced form of knowledge creating activity in Case C.

Cases B and C uses combination as one of its key knowledge creating activities whilst Case A has very few of such activities. This is mainly due to the structure and set-up of the organisations with Cases B and C having more explicit knowledge stored in its databases and manuals to ensure that it is disseminated to all relevant employees. Case A does not need too much explicit material stored as they are relatively small and are able to embody new knowledge tacitly though experience and sharing. In addition to that, Case A has very little formalisation, resulting in few manuals and guides being developed for staff members.

4.4.4   Internalisation

Case A has high levels of internalisation with the formation of teams as a model to conduct experiments is a norm (A1). Results that are obtained are disseminated to the entire organisation (A2). Cross functional teams is common as most projects undertaken by teams require staff members from several domain areas i.e. programming, analysis, marketing, accounting etc. (A1, A3). Part of the training activity requires staff members to learn by doing (A2, A3). This is achieved with the use of training video and books available to staff members where they internalise new concepts and practices by following instructions that are explicitly documented (A1, A2). Meetings and informal sessions allow members to search and share new values and thoughts that emerge (A2). Management visions and goals are clearly understood by all employees as it is part of training and is shared with all members at meetings and organisational activities (A1, A2).

The level of internalisation in *Case B* is low with the use of teams as a model to conduct experiments and with its results shared to others almost non-existent (B1, B3). However, the practice of cross functional teams is common in the organisation (B1, B2). Search and dissemination of new values and thoughts occurs frequently within the organisation but the management is of the opinion that management values and goals should be known by all employees (B1, B3).

Case C views the formation of teams as a model and conducting experiments with its results shared with others as a *'highly recognised process'* within the organisation (C3). Prototyping and benchmarking are common activities performed by staff members (C2). To ensure that cross-fertilisation of ideas do take place, cross functional teams are formed for its projects (C1, C2, C3). For example, 'finance staff members are embedded into business functions and projects' (C3). Learning by doing is also emphasised in certain organisational units to ensure that employees 're-experience' what is documented in the manuals and guides (C1, C2, C3). *'Employees try to understand management visions and goals through communication with each other in the form of informal communications over morning coffee or tea'* (C3). The importance of internalisation as a knowledge creating mode is low if compared with combination and socialisation for this organisation.

Cross case analysis indicates that internalisation is not widely practised in Cases B and C but seems to be a key activity in Case A. Case A relies heavily in the converting explicit knowledge contained in books and manuals to tacit knowledge as it does not have the ability to provide comprehensive staff development programmes like the other organisations. A summary of the ratings given by the respondents on the importance of each of the four knowledge creating activities is provided in Table 4.12. It can be observed that socialisation and combination are the two most common forms of knowledge creation activities adopted. However, each organisation has a different approach in its knowledge creation process which can be observed from the variation in the results presented in Table 4.12.

Table 4.12   Summary of ratings for knowledge creation activities

Knowledge Creation Activities	Case A			Case B			Case C		
	A1	A2	A3	B1	B2	B3	C1	C2	C3
B.1.6 How would you rate the level of socialisation as a knowledge creating activity in your organisation?	5	5	5	3	3	4	5	4	4
B.2.7 How would you rate the level of externalisation as a knowledge creating activity in your organisation?	4	4	4	3	3	3	4	4	3
B.3.6 How would you rate the level of combination as a knowledge creating activity in your organisation?	3	3	3	4	4	4	5	5	4
B.4.5 How would you rate the level of internalisation as a knowledge creating activity in your organisation?	5	5	4	3	3	3	3	3	3
Scaling:1-very low; 5-very high									

(Source: developed for this study)

Having outlined the findings on research question 2 – knowledge management processes, the findings on research question 3 – knowledge management outcomes are presented next.

4.5   Data on research question 3: knowledge management outcomes

This section analyses data collected with respect to research question 3 which examines the impact of knowledge management practice on the organisational performance of Multimedia Super Corridor status companies in Malaysia. The research issue investigates:

RQ3:   How do the current levels of knowledge management practice in Multimedia Super Corridor status companies affect their organisational performance?

The third part (Part C) of the interview protocol included in Appendix D documents the questions related to this research question. The respondents were asked to comment on the perceived impact of knowledge management practices towards their organisation's performance.

Case A experiences moderate levels of success with knowledge management with regard to its organisational results as detailed in Table 4.13. Respondents agree that knowledge management is indeed beneficial to the organisation and that it has allowed for the organisation to achieve a lot in a short span of time (A1, A2, A3). More importantly, it has provided the organisation with the competitive advantage it needed to stay in the market and ensure its profitability (A1, A2). However, there is still room for improvement with regard to knowledge asset management within Case A as not much is being done to manage its knowledge assets (tacit and explicit) well. 'As the organisation grows in size and matures in the next few years, it is anticipated that effective KM will be a key thrust in ensuring that it remains competitive in the market' (A1). To this end, there is a slow but steady move to develop more applications and systems to capture knowledge in the organisation (A1, A2).

Case B views knowledge management as being a crucial component to its success (B1, B3). Areas in which knowledge management has shown visible marked improvement is in the supply chain area and data management which has allowed the organisation to leverage on better supply chain management and better data storage and access (B1, B2). It has also allowed the organisation to be more effective and efficient in its daily operations and has certainly provided it with the competitive advantage it requires (B1, B2, B3). However, a major concern that it has is that it is not able to capture the tacit knowledge of employees which is often lost when they leave the organisation (B3). The IT department is finding ways in which it could stem this problem as it shares the view voiced by most departmental heads regarding the loss of invaluable knowledge when employees leave the organisation (B1). In summary, knowledge management has a high impact on the organisational performance of this case.

Case C believes that knowledge management has a high impact on its competitive advantage and lists knowledge sharing as having had contributed most to its performance worldwide (C1, C3). Its operations in Australia experienced a tremendous boost in terms of performance and profit when certain knowledge was shared in the organisation which eventually led to a strategy which addressed its declining sales and boosted its competitive advantage (C3). The knowledge management culture at Case C has been able to sustain the organisation for over a century with management placing continued emphasis on effective knowledge management practices (C2, C3). It is constantly finding new ways with new technologies to manage its knowledge apart from systemising procedures to ensure effective knowledge practices are ingrained in its organisational culture (C2, C3). Collaboration and idea sharing has allowed the organisation to reach new frontiers and enhanced its competitive position in Malaysia and globally (C1, C3). However, respondents felt that more could be done to facilitate the attainment of the organisation's full potential as they believe that the organisation is destined for greater heights and that knowledge management is the key to this goal (C1, C3). In addition, more work needs to be done to maintain its knowledge assets. Case C believes that knowledge management has been a key factor in sustaining its competitive advantage over the years and will continue to do so in coming years.

Table 4.13   Summary of ratings for knowledge management outcomes

Knowledge Management Outcomes	Case A			Case B			Case C		
	A1	A2	A3	B1	B2	B3	C1	C2	C3
C.2 How did KM impact on your organisation's organisational efficiency?	3	3	4	4	3	4	5	5	4
C.3 How did KM impact on your organisation's competitive advantage?	3	4	4	5	4	4	5	5	5
C.4 How did KM impact on the maximisation of your organisation's potential?	3	3	4	4	4	4	4	3	3
C.5 How did KM impact on the management of knowledge assets in your organisation?	3	3	3	4	4	4	2	3	3
C.6 How would you rate the impact of KM towards your organisation's performance?	3	3	3	4	4	4	5	4	4
Scaling:1-very low; 5-very high									

(Source: developed for this study)

4.6   Summary

Having discussed the data analysis and findings on each of the three research questions in sections 4.3– 4.5, this section summarises the main findings in condensed form.

The ***enablers of knowledge management*** investigated in this research reveal that collaboration, mutual trust, learning, leadership, incentives and rewards, T-shaped skills and information technology infrastructure are facilitators of knowledge management. In particular, it is found that strong leadership is crucial for effective knowledge management. Based on the interviews conducted, the knowledge management champions in these organisations tend to be transactional leaders who guide and motivate staff members in the direction of established goals by clarifying role and task requirements. The most popular information technology applications used by these organisations are email, customer service applications and search engines with a recognition for a need to simplify systems to ensure that they are user-friendly. Centralisation and formalisation are generally found to be inhibitors of knowledge management. However, in certain instances where high levels of formalisation is now a requirement, it is 'a blessing in disguise' as it allows for the elicitation of tacit knowledge into an explicit form that can be stored and easily disseminated to other employees.

The four modes of *knowledge processes* as outlined in the SECI model takes place in all cases investigated. *Socialisation* is an important knowledge creation activity in all three cases but results from the interviews indicate that differences do occur in the level of socialisation practised. Cases A and C have high levels of socialisation if compared to Case B. Case A's organisational culture and ethos promotes socialisation activities whilst Case C is driven mainly by organisational policy and procedures that mandate these activities and the need for self-preservation in a highly competitive environment. Sharing of experiences, mentoring and dialogues with external parties are key socialisation activities in these cases.

Externalisation is practised at the moderate level in all cases. The ability of staff members and the structure of the organisation have an influence on the externalisation process. It is clear that Cases A and C allow for more creative dialogues to take place and recognises the importance of concept creation for competitive advantage. Case B does not see externalisation as a key knowledge creation process as it focuses more on explicit knowledge dissemination rather than the transformation of tacit knowledge to its explicit form. In all organisations, there is less tolerance for subjective opinions and preference is given to more objective opinions. Creative dialogues, exchange of ideas and the use of induction, deduction, metaphors and analogies in problem solving are among the key externalisation activities identified in these cases.

Combination is another key knowledge process that occurs with Cases B and C using combination as one of its key knowledge creating activities whilst Case A has very few of such activities. This is mainly due to the structure and set-up of the organisations with Cases B and C having more explicit knowledge stored in its databases and manuals to ensure that it is disseminated to all relevant employees. Case A does not need too much explicit material stored as they are relatively small and are able to embody new knowledge tacitly though experience and sharing. The key combination activities are the use of manuals, extensive documentation, dissemination of ideas and news via email, bulletins and newsletters. Published literature and material are also used for prediction and forecasting by top management.

Internalisation is not widely practised in Cases B and C but seems to be a key activity in Case A. Case A relies heavily in the converting explicit knowledge contained in books and manuals to tacit knowledge as it does not have the ability to provide comprehensive staff development programmes like the other organisations. The use of teams to conduct experiments and the formation of cross-functional teams are some of the key internalisation activities conducted. Of the four modes of knowledge creation activities, socialisation and combination are the two modes that are widely practised in the cases analysed.

With regard to *knowledge management outcomes*, all cases agree that knowledge management has brought about positive impacts to their organisations. The key benefit of knowledge management as seen by these organisations is that it provides them with competitive advantage in their respective industries. However, all cases concur that much more work needs to be done to improve their knowledge capture processes especially with regard to tacit knowledge that is being lost when employees leave the organisation. Although the positive outcomes of knowledge management can be seen in all three cases, it is observed that the level or magnitude of these positive outcomes can be attributed to the size and maturity of the organisation itself. The smallest and youngest case – Case A has experiences less of the positive outcomes of knowledge management whilst the larger and more established Case C is basically driven by knowledge management and uses it effectively to remain as one of the key leaders in the field across the globe.

In summary, this chapter briefly outlined the data analysis strategy and procedures and then presented the findings obtained from the cases along the lines of the three identified research questions utilising both within-case and cross-case analyses. It is important to emphasise that up until this point, the analysis of the data is presented with no interpretation and implications presented. The data has yet to be compared and contrasted with the literature discussed in Chapter 2. Comparisons and contrasting of the findings with that of the literature will be addressed in the next and final chapter on conclusions and implications of the findings.

5 CONCLUSIONS & IMPLICATIONS

This research was undertaken to address the research problem as outlined in section 1.2: *'How and why do Multimedia Super Corridor status companies in Malaysia practise knowledge management?'*. The aim of this chapter is to discuss the key outcomes, implications and conclusions of the research undertaken.

In Chapter 1, the background and significance of this research was discussed. The research problem was defined and the research questions were outlined. The importance of this research was highlighted in terms of the lack of prior research in the area of knowledge management practice amongst Multimedia Super Corridor status companies in Malaysia, the growing importance of knowledge management and competitive advantage that can be obtained from effective knowledge management.

Next, Chapter 2 reviewed the literature relevant to the research problem and identified gaps in existing theory. This chapter began with an overview of knowledge and the different types of knowledge. It then went on to chronicle the developments of knowledge management and canvasses extant literature on knowledge management within the Malaysian context. Next, it looked that the various enablers of knowledge management – culture, structure, people and information technology infrastructure. The SECI model for knowledge creation is then presented together with the benefits of effective knowledge management. These provided a preliminary theoretical framework upon which this research was based on. Based on the gaps in the literature, the following research questions were advanced:

RQ1: What are the enablers of knowledge management (cultural, structural, people and technology) in Multimedia Super Corridor status companies in Malaysia?

RQ2: What is the process involved in creating knowledge in Multimedia Super Corridor status companies in Malaysia?

RQ3:   How do the current levels of knowledge management practice in Multimedia Super Corridor status companies affect their organisational performance?

Chapter 3 presented the methodology employed in this research. It provided justification for the critical realism research paradigm employed together with justification for the use of the multiple case study approach. It provided justification and support for the selection of cases in terms of replication logic. It also detailed the four main phases for case study research and the relevant data analysis strategies. Issues pertaining to the validity and reliability of the study are detailed together with limitations inherent with case study and qualitative research.

Chapter 4 presented the analysis of the data collected from the three case studies with a total of nine interviews. Each of the research questions was investigated using a set of interview questions included in the protocol. The data was first analysed and presented in relation to all three cases individually. This was then followed by cross-case analysis between these three cases. A summary of the key findings is then presented.

Chapter 5, the final chapter begins with a discussion of the findings in Chapter 4 in relation to the literature. It then provides conclusions for each research question before providing a conclusion to the research problem. The contributions of this research are identified through the comparison of findings in Chapter 4 with the literature reviewed in Chapter 2. This chapter concludes with implications for theory, practice and methodology, and a discussion of the limitations of the research. In addition, recommendations are also made for future research in the area of knowledge management practice in the Malaysian context.

5.1   Discussion and conclusions on research questions

This section will provide a discussion of the findings by comparing and contrasting it with the literature in Chapter 2 to highlight similarities and differences. It will also present the conclusions and contributions of this research to the literature. Each of these research questions will be discussed in turn.

5.1.1   Discussion and conclusions on research question 1: knowledge management enablers

This section discusses the findings of this study with respect to research question 1 and compares them to the existing literature. The research question investigates:

RQ1:   *What are the enablers of knowledge management (cultural, structural, people and technology) in Multimedia Super Corridor status companies in Malaysia?*

This research question can be subdivided into nine smaller components, each looking at a variable that is believed to affect knowledge management. These nine components are collaboration, mutual trust, learning, leadership, incentives and rewards, centralisation, formalisation, T-shaped skills and information technology infrastructure. Each of these will be discussed and concluded in turn.

Collaboration. The literature suggests that collaboration is an important enabler in knowledge management which leads to increased levels of knowledge exchange and knowledge creation (Hurley & Hult 1998; Lee & Choi 2003). The findings confirm this as all cases indicate that collaboration plays an important role in facilitating knowledge management. However, visible differences do exist among these cases with regard to helpfulness, collaboration across organisational units and willingness to accept failure. Case A which is smaller in size has high levels of collaboration as staff members need to work closely with each other to get projects completed on time. Apart from this, the management promotes a family-like work ethos which is based on mutual respect and

individual accountability which creates the correct environment for collaboration amongst staff members. In Cases B and C which are larger in size, there is a tendency to avoid taking responsibility for failure due to its organisational structure and the need for self-preservation by staff members which is closely aligned to the *kiasu* (afraid to lose) phenomenon that is common in certain East Asian cultures.

The findings also suggest that collaboration between team members can strengthen bonds and bridge individual differences which will help shape a shared understanding of the organisation and its goals (Fahey & Prusak 1998; Lee & Choi 2003). Organisational culture and size plays an important role in the determining the level of collaboration as observed from the findings. Smaller, less-formal and value-rich organisations like Case A have higher levels of collaboration compared to the larger and more competitive organisations of Cases B and C which demonstrate the need for individual self-preservation, hence the existence of the individualistic *kiasu* culture. *Kiasu*-ism effectively deters employees from sharing knowledge and leads to knowledge hoarding which hampers knowledge management.

Mutual trust. The findings from the study confirm that mutual trust is an enabler of knowledge management as suggested in the literature (Nahapiet & Ghoshal 1998; O'Dell & Grayson 1999; Robertson & Hammersley 2000; Shapiro 1987; Szulanski 1996; Takeuchi & Nonaka 2004). In all three cases, mutual trust can be seen as being the facilitator for open, substantive and influential knowledge exchange which leads to knowledge creation (Abrams et al. 2003; Lee & Choi 2003; Mayer, Davis & Schoorman 1995; Nahapiet & Ghoshal 1998; O'Dell & Grayson 1999; Robertson & Hammersley 2000; Shapiro 1987). Although mutual trust is acknowledged by all respondents as being a crucial component to effective knowledge management, some respondents find that mutual trust is difficult to cultivate and maintain as suggested by Robbins (1998).

Organisational size does affect the level of mutual trust experienced in an organisation. Case A which is relatively small with a close-knit organisational culture experiences a high level of mutual trust whilst the larger Cases B and C have lower levels of mutual trust. In the larger cases such as Case C, organisational policies such as the forced-ranking system results in employees looking out for themselves unless personal relationships are formed. Due to organisational policies and the highly competitive

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environment of the larger organisations, *kiasu*-ism emerges just like in the case of collaboration.

Based on the findings of this research, the *kiasu* culture which was not known to be an enabler in the literature on knowledge management practice in Malaysia, is found to be an important factor affecting knowledge management practice. The *kiasu* culture or afraid to lose mentality is a distinct character in some East Asian cultures, which is predominantly attributed to Singaporean society (Chaudry 2005; Ho 2006; Tong 2006). Whilst *kiasu*-ism is found to be a factor in some studies on knowledge management in Singapore (Chaudry 2005; Chu, Foo, Abdus Sattar Chaudhry & Suliman Al-Hawamdeh 2004; Ho 2006; Tong 2006), it has never known to be a factor in the Malaysian-based studies. One reason for this could be that most of the studies in Malaysia replicated the research instruments developed in Western contexts which were quantitative in nature, resulting in *kiasu*-ism not emerging as an inhibitor.

Kiasu-ism results from the mentality that 'knowledge is power' and job insecurities in addition to competition among peers which lead to the hoarding of knowledge by employees for self-preservation (Chaudry 2005). This results in employees being unwilling to share knowledge as they fear that they may lose their 'exclusiveness' in doing do (Chaudry 2005). *Kiasu*-ism has a wide ranging effect on organisational culture as it would impact on collaboration and mutual trust as seen from the findings of this study. As such, management would need to consider implementing measures such as providing incentives and promoting teamwork to encourage staff members to collaborate with each other more openly and to foster mutual trust (Chaudry 2005). In short, due attention to mutual trust is required to ensure that effective knowledge sharing occurs within the organisation.

Learning. The literature suggests that learning is a facilitator of knowledge management that allows an organisation to be infused with new knowledge and stimulate knowledge creation activities (Lee & Choi 2003; Nonaka & Takeuchi 1995; See 2002). In all three cases, learning is recognised as an enabler of knowledge management. All cases have some form of training programs in place for staff members as they value the importance of learning in enhancing the knowledge and performance of its employees. These training programs include in-house training and external training sessions. Job rotation is

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practised in Case C whereby the organisation has an online open resourcing system that allows current staff members to search for placements in other job positions in any of its branches worldwide. Case C believes that the exposure and opportunity to work in another country or in another position would motivate employees to work harder and would also enrich their experience and that of their home branch upon the completion of the job placement. This would in turn ensure that they remain competitive in the market as suggested by Simonin (1997).

Mistakes are regarded as part and parcel of learning in these organisations and are viewed constructively. This is in support of the literature that posits that a tolerance for mistakes is required and that mistakes should be viewed as an opportunity for learning and problem solving, often resulting in the creation of new knowledge (van Zolingen, Streumer & Stooker 2001).

Leadership. All cases recognised the importance of leadership in ensuring that the knowledge management effort is effectively managed in the organisation. This is in support of the literature which states that leadership is a key driver for effective knowledge management and the absence of adequate leadership appear to have resulted in the failure of many knowledge management initiatives (Ambrosio 2000; Crawford 2003; Hishamuddin Md Som et al. 2004; King, Marks & McCoy 2002; Mohamed Khalifa & Liu 2003; Peyman Akhavan, Mostafa Jafari & Mohammad Fathian 2005; Yu, Kim & Kim 2004). Although a knowledge management champion exists in each of the cases studied, their exact roles vary. In Case B, the CEO acts as the key champion with departmental heads playing an associate role in championing knowledge management in their respective departments. Case C has an enterprise-wide CIO who is the knowledge management champion but this person's leadership can hardly be seen at the middle and lower levels of the organisational hierarchy. This shows that the knowledge management leadership in these organisations is not systematically structured and executed, and is hardly visible at the middle and lower levels of the organisation.

With regard to the type of leadership style, all three cases have knowledge management champions who are transactional leaders who guide and motivate subordinates in the direction of established goals by clarifying role and task requirements (Robbins et al. 2001; Wood et al. 1998). This is contrast with the literature which states that

transformational leaders are strongly correlated with effective knowledge management and competitive advantage (Crawford 2003). Although the knowledge management champions in all these cases are transactional leaders, they are performing a good job as their knowledge management initiatives in their respective organisations are functioning well and these organisations are leaders in their respective industries.

Incentives and rewards. The findings from this study confirm the assertion made in the literature which states that incentives and rewards encourage knowledge management activities (Bartol & Srivastava 2002; Bock & Kim 2002, 2003; Ko 2003; Robertson & Hammersley 2000; Yu, Kim & Kim 2004). All three cases indicate that incentives and rewards have a positive effect on knowledge management activities in their respective organisations. In Cases A and B, the incentives and rewards that employees derive from practising knowledge management is mainly intrinsic in nature. Some form of extrinsic rewards such as bonuses, increments and discounts are still available to employees in Cases A and B. However, staff members in Cases A and B value the intrinsic rewards and satisfaction that they obtain from practising knowledge management and are of the opinion that the extrinsic rewards that are currently in place in their organisations are not attractive to employees and have not been adjusted to cater to knowledge management activities that occur these days. This supports the view by O'Dell and Grayson (1998) that artificial or extrinsic rewards that are not supported by the culture of the organisation are likely to be ineffective. As such, the extrinsic reward structures must be closely aligned to the knowledge management efforts of the organisation in order for it to be effective.

Tying in extrinsic rewards to knowledge management activities is effectively executed in Case C which has a forced-ranking system and 'Enterprise First' programme. In Case C, employees practise knowledge management as a means of self-preservation which eliminates the intrinsic factor of the rewards. The findings of this study suggest that incentives and rewards do play a crucial role in facilitating knowledge management. Hence, organisations would need to decide on the appropriate level of incentives or rewards based on their organisational setting and priorities to ensure that it yields the desired effect that is in line with their knowledge management plans.

Centralisation. There is consensus among the cases that excessive levels of centralisation hamper effective knowledge management practice. This is line with the literature which states that the key elements of knowledge creation such as spontaneity, experimentation, idea sharing and freedom of expression are greatly reduced with the centralisation of decision-making authority (Bennet & Gabriel 1999; Delmonte & Aronson 2002; Graham & Pizzo 1996; Lee & Choi 2003; Stonehouse & Pemberton 1999). In these cases, centralisation is high as it is clear that formal authority lies in the top management with some delegation of authority to the middle and lower management personnel. In some instances, employees are allowed to make decisions and take actions without obtaining prior approval provided that it is within their jurisdiction and scope. They would then need to be responsible for their actions. However, many employees are not willing to take on this extra responsibility and would rather run it by their superiors or top management to avoid being blamed should anything go wrong.

Formalisation. The findings of this study indicate that high levels of formalisation are expected to impede and limit knowledge management activities within the organisation. This is consistent with the literature which suggests that formalisation ensures that employees would have limited discretion over what is to be done, when it is to be done and how it should be done resulting in consistent and uniform outcomes which does not encourage knowledge creation activities (Anthes 2000; Bennet & Gabriel 1999; Delmonte & Aronson 2002; Robbins et al. 2001). Formalisation is relatively high for all organisations with Case C moving toward full formalisation in response to current financial reporting and management requirements in compliance with the *Sarbanes-Oxley Act* (Addison-Hewitt Associates 2006; Carney 2006; Jackson & Fogarty 2005; Moeller 2004; Ramos 2005). Most of the activities conducted in these organisations are covered by some formal rules which are typically in some documented form – either in print or electronic. Employees are however not allowed to ignore rules and reach informal agreements (Addison-Hewitt Associates 2006; Jackson & Fogarty 2005; Moeller 2004; Romano 2005).

One interesting finding with regard to formalisation is that it impedes creativity, creative dialogues, sharing and idea generation amongst employees which results in it being an inhibitor of the socialisation mode of knowledge creation. However, when high levels of formalisation occur like in Case C, where almost every process and action is

documented, this would involve the elicitation of tacit knowledge into a documented form which could then be disseminated throughout the organisation. At the initial stage of formalisation as experienced by Case C, it would involve a certain degree of externalisation in which staff members externalise their knowledge on work processes into an explicit form. Once this knowledge is embodied in an explicit form, it can then be used for both combination and internalisation knowledge creating activities. As such, the findings of this study confirm that high levels of formalisation do impede the socialisation mode of knowledge creation but also proves that high levels of formalisation do facilitate the other three modes of knowledge creation – externalisation, combination and internalisation.

T-shaped skills. There is general consensus on the positive impact of T-shaped skills on knowledge management activities in all cases. This is in support of the literature which posits that knowledge management activities benefit from the presence of employees with T-shaped skills who possess skills that are both deep and broad, coupled with the ability to effectively operate across the different areas that exist in organisations (Johannenssen, Olsen & Olaisen 1999; Lee & Choi 2003; Leonard-Barton 1995; Madhavan & Grover 1998; Rumesh Kumar 2003; Tan 2004; Tan, Mohammad Yusof & Hamdan 2005; Wiig 2004). All three cases have staff members who possess T-shaped skills, employees who are specialists in a particular field/area but are also able to appreciate tasks being performed in other areas. This is mainly due to the HR policy of these organisations that emphasises on hiring the most qualified and experienced persons for the job. Apart from that, training programs provided by the organisations allow for staff development and appreciation of the other aspects the organisation.

Having staff members with T-shaped skills is good for the organisation but having them do productive work for the organisation is another issue. The findings indicate that due to the *kiasu* phenomenon explained earlier, staff members with T-shaped skills may 'conceal' their knowledge across domains to avoid being given more work to do. This is because they cannot reject work in other areas that is being assigned to them by their superiors and they would only be assigned the work if their superiors think that they are knowledgeable in that area. Hence, organisations must ensure that their HR policy is focussed on hiring the correct person with T-shaped skills and that the *kiasu* culture does not hamper knowledge management activities as observed in Case C. In addition, these

employees with T-shaped skills need to be properly managed to ensure that they contribute positively to the knowledge management initiatives undertaken by the organisation.

Information technology infrastructure. Findings from the study confirm that information technology infrastructure is an enabler of knowledge management. This is congruent with the literature which suggests that information technology infrastructure allows for easy knowledge acquisition, facilitates timely communication and speeds up the pace of knowledge creation apart from building organisational memory (Holsapple 2005; Okunoye & Karsten 2002; van den Hoof & de Ridder 2004). As suggested in the literature, the findings indicate that there is a great need for applications to be more user-focussed and more user-friendly as most of the systems in place in organisations are rather cumbersome to use (Badruddin A Rahman 2004a; Hishamuddin Md Som, Low & Zaleha 2002; Hishamuddin Md Som et al. 2004; Tan 2004). The major deficiency of current applications that are available in the cases is that it is not able to capture the work-related knowledge of its employees into an explicit form. There are many instances where invaluable competitive knowledge is lost when an employee leaves the organisation and these organisations are currently finding ways to resolve this issue.

The literature suggests that the Internet, intranets and office automation systems are the most widely used information technology applications in Malaysia (Badruddin A Rahman 2004a; Hishamuddin Md Som, Low & Zaleha 2002; Hishamuddin Md Som et al. 2004; Tan 2004). However, the findings of this study reveal that the top ten IT applications used in the three cases investigated are customer service applications, email, search engines, helpdesk applications, order entry applications, bulletin boards, groupware, voice mail, document management tools and process modelling tools (refer to Table 4.10 for detailed information).

Conclusion on research question 1. The overall conclusion on the enablers of knowledge management in Multimedia Super Corridor status companies in Malaysia are:
- Collaboration, mutual trust, learning, leadership, incentives and rewards, T-shaped skills and information technology infrastructure are significant facilitators.
- Centralisation is a significant inhibitor.

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- Formalisation inhibits the socialisation phase of knowledge creation but acts as a facilitator for the externalisation, combination and internalisation phases.

- The knowledge management champions practise transactional leadership styles.

- The presence of T-shaped skills is important but what matters more is the effective management of employees with T-shaped skills to ensure that these skills are put to good use for the organisation's benefit.

- Information technology infrastructure needs to be user friendly and not cumbersome for employees to use in order for it to be effective.

- *Kiasu*-ism is a new variable discovered in this study and which is an inhibitor to knowledge management. This cultural issue needs to be adequately addressed by management to ensure that it does not impede on the creation and transfer of knowledge within the organisation.

5.1.2   Discussion and conclusions on research question 2: knowledge management processes

This section discusses the findings of this study with respect to research question 2 and compares them to the existing literature. The research question investigates:

RQ2:   What is the process involved in creating knowledge in Multimedia Super Corridor status companies in Malaysia?

This study adopts the SECI model of knowledge creation formulated by Nonaka and Takeuchi (1995) which has four modes of knowledge conversion. These four modes are socialisation, externalisation, combination and internalisation (Nonaka & Takeuchi 1995). The knowledge creation processes of the cases investigated in this study will be discussed based on the four knowledge creation processes of the SECI model.

Socialisation. Findings from this study indicate that all cases have high levels of socialisation activities and it is one of the key knowledge creating activity performed by the cases. A great deal of tacit knowledge is accumulated through information gathering from intra-organisational sources (sales and development teams) and external stakeholders such as partners and customers as indicated by Nonaka and Takeuchi

(1995). Some of this knowledge may come in the form of feedback from customers and partners. Depending on the structure and culture of the organisation, sharing of experiences occurs frequently and is the norm in Cases A and C. Experience sharing allows the organisation to uncover new knowledge, strategies and solutions to problems at hand. However, for experience sharing to occur, the organisation needs to have a correct environment that promotes such activities. Based on the study, it is found that common values of trust, mutual respect and teamwork in addition to management support are the preconditions for effective experience sharing to take place. If these preconditions are not met, sharing of experiences would be difficult to achieve as observed in Case B. This is in support of Nonaka, Toyama and Konno's (2002) assertion that the basis for knowledge conversion only emerges with the presence of care, love, trust and commitment.

New ideas on solutions and markets are also sourced through internal reflection within the organisation and through looking at how the organisation operates internally. As suggested by Nonaka and Takeuchi (1995), mentoring, apprenticeship and personalised training skills allow for the transference of tacit knowledge and skills from one employee to another through observation, imitation and practice. The use of active dialogue with competitors is conducted but with much caution as companies fear that they may leak out sensitive competitive information in that process.

In the socialisation process, it is evident that these organisations operate within a specific context known as '*ba*'. The prevalence of face-to-face interactions at this stage which allows for a full range of physical and psycho-emotional reactions to be captured is crucial in the sharing of tacit knowledge (Nonaka, Toyama & Konno 2002). Apart from this, it can be observed that in this stage the individual transcends the boundary between oneself and others by empathising with others (Nonaka, Toyama & Konno 2002). This confirms the theory that the 'originating *ba*' is indeed the context in which the socialisation knowledge creation process occurs.

In short, experience sharing, discussions, informal interactions, brainstorming sessions, mentoring and external gathering of intelligence are the key socialisation activities conducted by staff members. This study reveals that socialisation is the most popular mode of knowledge creating activity and also implies that these cases are quite similar in

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their knowledge creation processes with their Western counterparts which practice high levels of socialisation (Nonaka & Takeuchi 1995). This finding differs from that of Tan (2004) which found that socialisation is the least preferred mode of knowledge creating activity.

Externalisation. Findings from this study indicate that externalisation is practised at moderate levels in all cases. Externalisation is the process of articulating tacit knowledge into explicit forms, usually in the form of concepts, metaphors, analogies, hypotheses or models (Nonaka & Takeuchi 1995). In this study, it is found that all cases do come up with concepts, metaphors, analogies and models through the use of both induction and deduction in creative brainstorming sessions. Apart from that, abduction is also used to come out with creative ideas as seen in Case A (Nonaka, Toyama & Konno 2002). In short, the three different inferencing strategies – induction, deduction and abduction are used to come up with new models, analogies, metaphors and concepts for these cases. Whilst subjective opinions are accepted, there is greater appreciation for more objective opinions to be put forth.

The ability of staff members and the structure of the organisation have an influence on the externalisation process. An organisation that values and recognises that the creation of new creative ideas is of paramount importance to its sustained competitiveness and well-being will undoubtedly emphasis on the importance of creative dialogues in its meetings and have a certain level of tolerance for ambiguity when metaphors are first generated by staff members that are later linked together with analogies, later forming what is known as models which are explicit and that could further developed (Nonaka & Takeuchi 1995). Cases A and B recognises this and allows ample creativity to generate new ideas resulting in successful models being developed from time to time. Apart from that, the ability of staff members (such as the possession of T-shaped skills) is crucial in ensuring that they have the tenacity and capacity to share ideas whilst at the same time appreciate the mental models and skills that are articulated during brainstorming sessions.

The context of transference of shared mental models from one member to another which is then further articulated and reflected requires the presence of the 'interacting *ba*'. To ensure that this context exists, it is exigent that the organisation selects members who

possess the right mix of specific knowledge and capabilities (Nonaka, Toyama & Konno 2002). As such, it is observable that Cases A and C have higher levels of externalisation as their staff members are more capable and possess higher levels of T-shaped skills, apart from the strong support of the management on creative problem solving.

Combination. The findings of this study suggest that combination is another popular knowledge creating process practised by these organisations. This is in contrast with the literature that states that combination is one of the least popular methods of knowledge creation in Malaysian companies (Tan 2004). It is observed that combination is more prevalent in Cases B and C due to its large size and wealth of knowledge stored within the organisation. From this study, it is observed that employees are actively involved in acquiring and integrating knowledge by collating internal and external data using published data, simulation, prediction and forecasting to aid in their planning strategies as suggested by Nonaka and Takeuchi (1995).

In addition, employees develop comprehensive manuals and documentation which are either in electronic form available through corporate intranets, the Internet or databases to authorised users within and outside the organisation. To develop these materials, extensive information on the organisation such as technical and management figures are acquired. Another key activity involved at this stage is the dissemination of this compiled knowledge at meetings, presentations, email, newsletters and bulletin boards. However, there is a need for more user friendly applications to be developed to ensure that they are fully utilised by staff members.

Nonaka, Toyama and Konno (2002) suggested that there is a need for the presence of the 'cyber *ba'* which is also known as the 'systemising *ba'* which is defined by collective and virtual interactions. It can be seen from this study that this cyber *ba* plays a key role in the combination stage of knowledge creation as it allows for the timely and easy transmission of explicit knowledge to a large pool of recipients. This is made possible with the use of information technology applications such as emails, bulletin boards and databases that allow for prompt and easy access to the wealth of explicit material compiled by these organisations.

Internalisation. The findings suggest that internalisation is one of the least popular modes of knowledge creation in these MSC status companies. This is in contrast with the literature which suggests that internalisation is the most preferred mode of knowledge creations amongst Malaysian companies (Tan 2004). Although this study finds that internalisation is among the least preferred method of knowledge creation, its levels are still rather high within these organisations.

Among the activities conducted by these organisations to internalise knowledge is the formation of teams as a model to conduct experiments with the results of these experiments shared with others in the organisation. Apart from this, the formation of cross functional teams where team members are specialists in several different domain areas are a common practice. Learning by doing and on the job training are quite popular and are practised to ensure that employees 're-experience' what is documented in manuals and guides that are available. This is in line with the literature which suggests that on the job training is one of the most popular training activities in Malaysian organisations (Tan 2004).

It is clear that the exercising *ba* which provides a context for individual and virtual interactions for employees occur at this stage of knowledge creation (Nonaka, Toyama & Konno 2002). The exercising *ba* allows employees to embody explicit knowledge that is communicated through electronic media and printed media as observed from the cases being investigated (Nonaka, Toyama & Konno 2002).

Conclusion on research question 2. The overall conclusion on the process involved in creating knowledge in Multimedia Super Corridor status companies in Malaysia are:

- The most popular modes of knowledge creation are socialisation and combination which differs from that of prior literature.
- All four modes of knowledge creation are being practised at relatively high levels.
- The common values of trust, mutual respect and teamwork in addition to management support are the preconditions for effective socialisation to take place.
- The skills and ability of staff members like the presence of T-shaped skills are important to enable effective externalisation to take place. The organisation must also

appreciate the value of creativity in idea generation and have systems in place to promote this throughout the organisation.

- Combination appears to be heavily practised in organisations that are larger and that have a huge amount of knowledge stored. There is a need to ensure that information technology applications employed are user-friendly and not cumbersome to use.

5.1.3   Discussion and conclusions on research question 3: knowledge management outcomes

This section discusses the findings of this study with respect to research question 3 and compares them to the existing literature. The research question investigates:

RQ3:   How do the current levels of knowledge management practice in Multimedia Super Corridor status companies affect their organisational performance?

All the cases investigated reveal that they are experiencing positive outcomes with regard to their knowledge management initiatives. Knowledge management is regarded as being highly beneficial by staff members and has been linked as the source for these organisations' good performance in recent years. Knowledge management has undoubtedly allowed these organisations to be more efficient in the way they go about with their operational, tactical and strategic operations. This is in line with the assertions made by prior literature on knowledge management outcomes (Davenport & Prusak 2000; Dixon 2000; North, Reinhardt & Schmidt 2004; Rumesh Kumar 2003; Suliman Al-Hawamdeh 2002; Yelden & Albers 2004).

Apart from increased organisational efficiency, these organisations' competitive advantage in the market is secured with effective knowledge management. This is consistent with the views made in the prior literature (Ash 1998; Carson et al. 2001; Cortada & Woods 1999; Davenport, De Long & Beers 1998; Kok 2004; Lee & Choi 2003; Millet, Mattsson & Johnston 2005; Probst, Raub & Romhardt 2000; Suliman Al-Hawamdeh 2002; Williams 2003). With effective knowledge management, these organisations are able to come up with new products and services apart from effective strategies to ensure that they are ahead of competition. This is because these

organisations are able to generate new ideas in a timely manner and launch it to market within a reasonable time span ahead of its competitors. This would not be possible if it was not for the extensive knowledge management systems which include both social and technical mechanisms that are currently in place in these organisations.

These organisations' potential has been maximised to a certain extent with the use of knowledge management. However, respondents felt that if current practises are fine-tuned, more could be achieved for the organisation as there are some minor deficiencies that hamper these organisations from realising their full potential. Areas in which some improvement would be necessary are to ensure that the information technology infrastructure is more user friendly in order to allow easier and prompt access to knowledge. In addition, it is important that the system be able to capture tacit knowledge into the organisation's computer system so that this knowledge will never be lost when a staff member leaves the organisation. Some organisations are currently looking at ways to resolve these issues. In short, all organisations agree that knowledge management has improved the way they work and placed them ahead of competitors in their respective industries.

Conclusion on research question 3. The overall conclusion on the knowledge management outcomes in Multimedia Super Corridor status companies in Malaysia are:

- Knowledge management has brought about positive impacts on these organisations' organisational efficiency, competitive advantage, organisational potential and management of knowledge assets.

5.2   Conclusions on research problem

Based on the discussions and conclusions made for each of the three research questions formulated for this study, this section shall provide a conclusion to the research problem:

'How and why do Multimedia Super Corridor status companies in Malaysia practise knowledge management?'

The literature review in Chapter 2 concluded that there were gaps in the existing literature on how knowledge management is practised in Multimedia Super Corridor status companies in Malaysia. More precisely, there is limited knowledge within prior literature on the enablers of knowledge management, processes involved in creating knowledge and the outcomes of knowledge management in Multimedia Super Corridor status companies in Malaysia. Based on the prior literature, an initial research model was formulated in Figure 2.6. After completing this research, it is found that the cases investigated do practise knowledge management and that they are effective in ensuring that the key objectives of these companies are attained.

To appreciate how knowledge management is practised in the Multimedia Super Corridor status companies in Malaysia, it is important that an awareness of the enablers of knowledge management is created. As the extant literature does not provide a comprehensive view of these enablers, this research attempted to identify the enablers of knowledge management affecting these companies.

Based on the findings of this research, ten (10) factors are known to affect knowledge management which can be broadly classified into cultural, structural, people and information technology infrastructure. It is found that collaboration, mutual trust, learning, leadership, incentives and rewards, T-shaped skills and information technology infrastructure are significant facilitators of knowledge management. Interestingly a new cultural factor known as *'kiasu-ism'* emerges as one of the key inhibitors to knowledge management that has a strong influence on individual and organisational culture. In addition, centralisation is found to be a significant inhibitor. On the other hand, formalisation is found to have a dual effect on knowledge management as it acts as an

inhibitor to the socialisation process but acts as a facilitator to the externalisation, combination and internalisation processes.

This study also found that these companies are actively employing all four modes of knowledge creation as suggested by Nonaka and Takeuchi (1995) in their SECI model of knowledge conversion. Although all four modes of knowledge creation are being utilised, this study reveals that the two most popular modes used by these companies are socialisation and combination. Apart from this, there is evidence that the concept of 'ba' as put forth by Nonaka, Konno and Toyama (2001, 2002) has practical application within the Malaysian context as observed from the case studies conducted. Finally, organisations that practise knowledge management do experience positive outcomes in the form of organisational efficiency, competitive advantage, maximisation of organisational potential and effective management of knowledge assets.

The final research model of the factors affecting knowledge management based on the literature reviewed in Chapter 2 updated with the findings of this study presented in Chapter 4 shown in Figure 5.1. Changes made to the initial model are shown in italics in the final model. The final research model shows the relationship between the various factors identified in the literature and the three research questions developed based on the research problem identified for this study together with data presented in Chapter 4.

In brief, this study answers the research problem by providing a comprehensive description of how knowledge management is practised in the Multimedia Super Corridor status companies in Malaysia. Next, the implications of this study are discussed in the following section.

Figure 5.1   Final research model on knowledge management practices
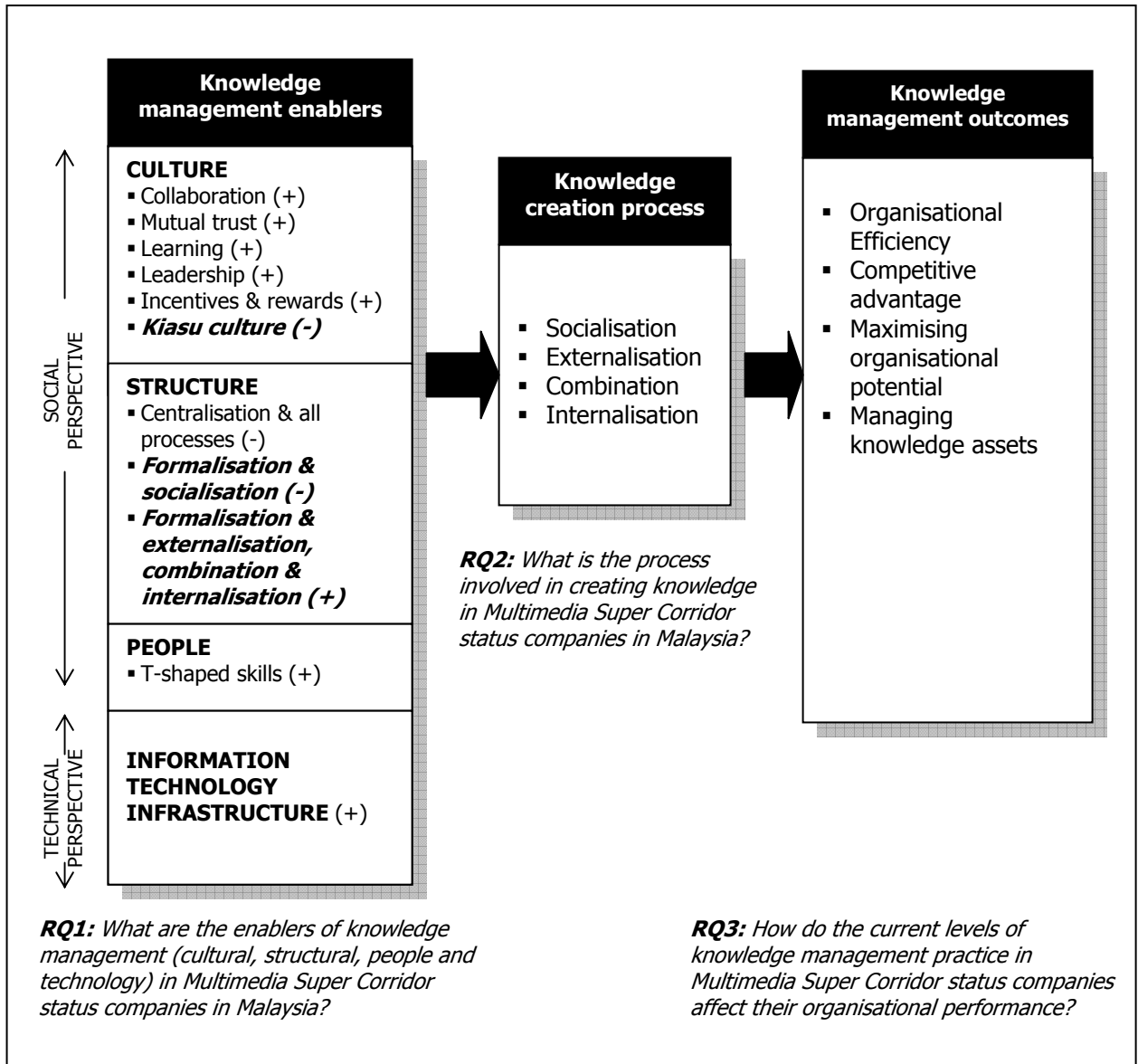
(Source: developed for this study based on the initial model in Figure 2.6 and results in Chapter 4)

5.3   Implications

The research findings and contributions have several implications for theory and practice. These implications will be addressed in turn.

Implications for theory. Through the development and confirmation of a conceptual model to investigate the current levels of knowledge management practice in Multimedia Super Corridor status companies, this research makes several contributions to theory. This research:

- is the first in-depth study to investigate the current levels of knowledge management practice in Multimedia Super Corridor status companies in Malaysia using a systems approach.

- is one of the few studies that looks at knowledge management practice from both social and technical perspectives.

- confirms the appropriateness of case study research to understand information systems research problems.

First in-depth study on knowledge management in MSC status companies using a systems approach. This research provides the first in-depth investigation into the practice of knowledge management in MSC status companies in Malaysia. Although past studies have looked at knowledge management in Malaysia, none of these specifically investigated the MSC status companies (Badruddin A Rahman 2004a; Ko 2003; Mohamad Hisyam Selamat & Choudrie 2004; Niza Adila Hamzah & Woods 2004; Nor Hazana Abdullah & Ahmad Othman 2005; Norizah Supar et al. 2005; Raja Suzana Raja Kasim 2005; Ramanathan Narayanan, Richardson & Abdul Latif Salleh 2003; Tan 2004).

In addition, previous studies tend to look at a particular aspect of knowledge management in Malaysia. They tend to look at the enablers or the processes in isolation of each other, hence providing a compartmentalised view of knowledge management practice (Badruddin A Rahman 2004a; Ko 2003; Mohamad Hisyam Selamat & Choudrie 2004; Niza Adila Hamzah & Woods 2004; Nor Hazana Abdullah & Ahmad Othman 2005; Norizah Supar et al. 2005; Raja Suzana Raja Kasim 2005; Ramanathan

Narayanan, Richardson & Abdul Latif Salleh 2003; Tan 2004). This study takes on a systems approach by looking at the three key phases of knowledge management practice i.e. enablers, process and outcomes. In this way, a more comprehensive view of the factors affecting knowledge management practice in these organisations can be obtained.

Combination of social and technical perspectives. Most previous research in this field will take on either a social or technical focus resulting in the findings lacking practical application as it does not provide a 'real' and 'complete' picture of the situation in Malaysia (Badruddin A Rahman 2004a; Ko 2003; Mohamad Hisyam Selamat & Choudrie 2004; Niza Adila Hamzah & Woods 2004; Nor Hazana Abdullah & Ahmad Othman 2005; Norizah Supar et al. 2005; Raja Suzana Raja Kasim 2005; Ramanathan Narayanan, Richardson & Abdul Latif Salleh 2003; Tan 2004). This research addresses this gap by bringing together the social and technical perspectives of knowledge management practice by utilising and combining literature from both the social sciences (organisational behaviour in particular) and information systems theories. Through this approach, this research is able to demonstrate the impact of these social and technical factors on knowledge management practice in Malaysia. In addition, the intertwined nature of these two perspectives can be further appreciated and understood by others.

Appropriateness of case study research. The successful application of a qualitative multiple case study research design to examine the current levels of knowledge management practice confirms the appropriateness of case study research to the discipline of information systems. Although the appropriateness of the applicability of case study research have been questioned, the rich and informative findings of this research suggest that case study research is indeed an important and useful methodology in the information systems discipline which is worth consideration when conducting exploratory research (Benbasat, Goldstein & Mead 1987; Cavaye 1996; Darke, Shanks & Broadbent 1998; Lee 1989; Perry 1998; Perry & Coote 1996; Perry, Riege & Brown 1999).

Implications for practice. Based on the findings of this research, four key implications of this research for practice and managerial decision making are advanced. These implications for practice include:

- appreciation of the socio-technical organisation-wide nature of knowledge management.
- understanding the social factors that affect knowledge management practice.
- the need for user-friendly information technology applications.
- the role of the relevant government bodies.

Socio-technical organisation-wide nature of knowledge management. To many IT practitioners, the mere mention of knowledge management will bring images of IT systems and applications to their minds. This is especially within the Malaysian context whereby knowledge management is perceived by many as being a technical application being deployed in an organisation. As seen from this research, knowledge management is not only a technical facet, it is a comprehensive system which spans across technical, cultural, structural and people categories. In view of this, it is hoped that this research will educate IT practitioners on the need to consider the entire knowledge management system ranging from the social issues to the technical issues as more often than not, the non-technical issues are among the most difficult to address when implementing knowledge management systems. In addition to this, IT practitioners need to appreciate that knowledge management systems involve the entire organisation and cannot be compartmentalised into the specialised IT department or section. In other words, the entire organisation would need to practice and implement knowledge management activities for the initiative to see positive results.

Social factors that affect knowledge management practice. A wide range of social factors such as *kiasu*-ism, collaboration, mutual trust, leadership, learning, incentives and rewards, centralisation, formalisation and T-shaped skills are found to affect knowledge management initiatives in these organisations. CKOs, CIOs or IT Heads would need to consider the impact of these social factors on their knowledge management programs and finetune organisational policies to ensure that the correct responses are being obtained from its employees to ensure the effectiveness of the knowledge management program in place. If these social factors are not addressed adequately, it is almost certain

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that the organisation would not be able to realise the full potential of knowledge management in the short term.

The need for user-friendly systems.   Despite being a simple tenet in systems development, the development of user-friendly and easy to use IT applications have always been a problem for many organisations especially in the case of knowledge management systems. As observed from the findings of this study, many respondents were provided with extremely complex IT applications which were cumbersome and difficult to use. IT practitioners need to reflect on the need to understand user requirements and develop applications that are simple to use and yet are able to provide users with all the knowledge they require to get on with their work effectively.

Role of government bodies. Government bodies such as the Ministry for Multimedia and Communications, Multimedia Development Corporation and other related agencies would need to formulate comprehensive guidelines on effective knowledge management practice for the benefit of local companies, in particular the MSC status companies in Malaysia. This is because not much is known on knowledge management in Malaysian companies and these guidelines would be a useful tool to disseminate information on knowledge management to them. These guidelines would need to include considerations for the enablers and processes of knowledge management to ensure that these companies fully understand the factors influencing knowledge management, the importance of knowledge management and the best way to deploy it to achieve organisational growth and success. Apart from these guidelines, it would be helpful if MDC is able to conduct workshops and consultation services to MSC status companies intending to implement or improve their knowledge management initiatives. This would ensure that these knowledge-intensive companies benefit from knowledge management and allow them to be able to compete in the regional and global marketplace.

5.4   Limitations

The previous section discussed the implications of this research to theory and practice. This section will address the limitations of this research. It must be stressed that limitations do exist in any study and these limitations may be addressed in further research efforts. First, this research was exploratory in nature and therefore the findings cannot be generalised. Although the data obtained from this research can be used to assist in theory building, further empirical and quantitative research need to be conducted to build upon the findings of this research to be able to generalise the research findings.

Second, this research employed the use of multiple case studies and was based on the data from three case studies with a total of nine interviews. As such, the causal relationships between the knowledge management enablers and the processes or outcomes could neither be explicitly nor implicitly inferred from the findings. In addition, Yin (1994) states that case study findings are only generalisable to theoretical propositions and not to populations at large. As such, it cannot be assumed that other Multimedia Super Corridor status companies in Malaysia face the same suite of knowledge management enablers, processes knowledge in the same manner or has the same knowledge management outcomes. Further research would be required to further generalise the research findings.

Third, the richness of the information gathered or the ability to triangulate evidence may be limited by the fact that respondents might not have been willing to share certain information with the researcher due to the confidentiality of the information to their respective organisations. Respondents may also be biased in that they may tend to create a positive image or even a negative image (in the event of frustration) of their company. These are beyond the control of the researcher and are inherent in qualitative research (McPhail 2003; Miles & Huberman 1994; Perry 1998; Yin 1994).

In brief, this research has identified certain limitations and the relevant measures were taken to address and overcome these limitations where possible to maximise the overall value of this research and its findings. The next section will provide suggestions for future research.

5.5   Suggestions for further research

This section provides suggestions for further research that originate from the findings of this study. This research employed the multiple case study methodology that relied primarily on qualitative data for analytical generalisation rather than statistical generalisation. This was mainly because the focus of this research was on theory building and not theory confirmation. Hence, it is recommended that further research could test the theory obtained from this research using a quantitative approach on a larger sample for the purpose of statistical generalisation.

In this research, only one type of company – MSC status companies were analysed. Future research could extend beyond this scope to include small and medium-sized businesses (SMBs), certain industry sectors (manufacturing, services) or multinational corporations to investigate their levels of knowledge management practice.

As a new variable, *kiasu*-ism emerged as an important inhibitor of knowledge management in this research, it would be beneficial if further research is conducted to comprehend the magnitude of this enabler's impact on knowledge management practices in Malaysia.

This research also focussed on an organisation-centric view of knowledge management. It would be beneficial if future research were to examine knowledge management from the perspective of the individual – the one who possesses knowledge, uses knowledge, creates knowledge and transfers knowledge.

The knowledge creation process could be further investigated to be refined and redeveloped to incorporate more elements of the organisation. Also, the concept of *ba* which was not fully analysed in this research could be researched further to appreciate the contexts in with the various knowledge creation processes occur.

5.6   Summary

In summary, this chapter has compared the extant literature to the findings of the three research questions developed for this study. The conclusions were drawn for each of the three research questions and that of the research problem. Based on the findings of this research, the final research model for knowledge management practice was presented in Figure 5.1.

In conclusion, this research has provided an understanding of the various factors that affect knowledge management practice in Multimedia Super Corridor status companies in Malaysia. It has identified ten different enablers of knowledge management, elaborated on the knowledge management process which was based on Nonaka and Takeuchi's SECI model. Apart from this, this research has documented the outcomes of knowledge management practice in these organisations. The findings of this exploratory research can provide a theoretical foundation for further research in the area of knowledge management practice in Malaysia.

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Appendix A   Letter to MSC status companies

University of Southern Queensland

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www.usq.edu.au

FACULTY OF BUSINESS
DEPARTMENT OF INFORMATION SYSTEMS
Gerald Goh Guan Gan
Master of Business Information Technology Candidate
PHONE 012 585 6593
EMAIL gohgg@hju.edu.my

[Date]
[Correspondent]
[Position]
[Address1]
[Address2]
[Address3]

Dear Sir/Madam

Re: Research on knowledge management practices in MSC status companies

I am a Master of Business Information Technology candidate at the Department of Information Systems, Faculty of Business, University of Southern Queensland undertaking research on knowledge management practices in MSC status companies in Malaysia.

The perspectives of your organization on knowledge management practices and issues affecting its implementation in Malaysia will not only benefit the industry but would also provide an opportunity for stakeholders to benefit from understanding the issues that come into play when managing knowledge.

I am particularly interested in studying the facilitators or enablers of knowledge management, knowledge creation processes and perceived knowledge management outcomes in your organization. This study is interested in the general details of knowledge management practices and will not require any confidential or organization-specific information i.e. exact functionality of systems employed, reporting structures etc. This study will employ the use of structured interviews with three participants per organization.

I would appreciate it if your organization could kindly consent to participate in this study and nominate three (3) participants - an executive level business personnel, an executive level IT personnel and a Head of IT/Chief Information Officer/Chief Knowledge Officer to participate in the interviews which will take approximately 40 minutes to complete each.

The data collected from this study will be presented in aggregate form together with results gathered from other organisations whereby the confidentiality of all organizations and participants will be assured at all times. No identifying information will be presented in the dissertation and publications emanating from it. Hence, no one apart from my supervisors and I will have access to any confidential information gathered. This is to ensure that the competitiveness of your organization is not affected in any way by this research. A copy of the proposed interview questions is attached for your perusal. To further ensure that confidentiality is not compromised and that this study is conducted ethically, this study will be monitored by the USQ Human Research Ethics Committee (Reference no: H05STU522).

If you have any queries, please do not hesitate to contact me or either one of my supervisors (Ms Charmaine Ryan – ryan@usq.edu.au / Assoc Prof Dr Raj Gururajan – gururaja@usq.edu.au) for clarification. I look forward to receiving a positive response from you soon.

Thank you and best regards.

Yours faithfully

Gerald Goh
MBIT Candidate

Cc: Ms Charmaine Ryan, Principal Supervisor
        Assoc Prof Dr Raj Gururajan, Co-supervisor
Encl: interview protocol

GOOD UNIVERSITIES GUIDES **Australia's University of the Year** JOINT WINNER **2000 - 2001** DEVELOPING THE e-UNIVERSITY

INAUGURAL WINNER **ICDE Prize for Institutional Excellence**
INTERNATIONAL COUNCIL FOR OPEN AND DISTANCE EDUCATION

Appendix B   Letter to interview participants

University of Southern Queensland

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FACULTY OF BUSINESS
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Gerald Goh Guan Gan
Master of Business Information Technology Candidate
PHONE 012 585 6593
EMAIL gohgg@hju.edu.my

[Date]

[Correspondent]
[Position]
[Address1]
[Address2]
[Address3]

Dear Sir/Madam

Re: Research on knowledge management practices in MSC status companies

With regard to the above matter, I would like to convey my sincere thanks for your time and effort in responding to the interview I conducted on knowledge management practice in your organisation. I anticipate that the final analysis of the results would be available in March 2006, after which I will be providing you with a copy of my findings in your organisation.

Please be reassured that the data collected from this study will be presented in aggregate form together with results gathered from other organisations whereby the confidentiality of all organizations and participants will be assured at all times. No identifying information will be presented in the dissertation and publications emanating from it. Hence, no one apart from my supervisors and I will have access to any confidential information gathered. This is to ensure that the competitiveness of your organization is not affected in any way by this research. To further ensure that confidentiality is not compromised and that this study is conducted ethically, this study will be monitored by the USQ Human Research Ethics Committee (Reference no: H05STU522).

If you have any queries, please do not hesitate to contact me or either one of my supervisors (Ms Charmaine Ryan – ryan@usq.edu.au / Assoc Prof Dr Raj Gururajan – gururaja@usq.edu.au) for clarification. Once again, thank you for your kind cooperation with this research.

Yours faithfully

Gerald Goh
MBIT Candidate

Cc: Ms Charmaine Ryan, Principal Supervisor
         Assoc Prof Dr Raj Gururajan, Co-supervisor

GOOD UNIVERSITIES GUIDES **Australia's University of the Year**
JOINT WINNER **2000 - 2001** DEVELOPING THE e-UNIVERSITY

INAUGURAL WINNER **ICDE Prize for Institutional Excellence**
INTERNATIONAL COUNCIL FOR OPEN AND DISTANCE EDUCATION

Appendix C   Ethics clearance

The University of Southern Queensland

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Office of Research and Higher Degrees

Postgraduate and Ethics Officer
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Email: bartlett@usq.edu.au

22 December 2005

Mr Gerald Goh
School of Multimedia & Information Technologies
Han Chiang College
Lim Learn Teng Road
1160 Penang MALAYSIA

Dear Mr Goh

Re: **Ethics Clearance for Research Project,** *Knowledge management practices in Multimedia Super Corridor status companies in Malaysia*

The USQ Human Research Ethics Committee recently reviewed your application for ethics clearance. Your project has been endorsed and full ethics approval is confirmed conditional upon obtaining written permission to recruit participants from the companies identified in your application. Reference number **H05STU522** is assigned to this approval that remains valid to 21 December 2006.

The Committee is required to monitor research projects that have received ethics clearance to ensure their conduct is not jeopardising the rights and interests of those who agreed to participate. Accordingly, you are asked to forward a **written report** to this office after twelve months from the date of this approval or upon completion of the project.

A questionnaire will be sent to you requesting details that will include: the status of the project; a statement from you as principal investigator, that the project is in compliance with any special conditions stated as a condition of ethical approval; and confirming the security of the data collected and the conditions governing access to the data. The questionnaire, available on the web, can be forwarded with your written report.

Please note that you are responsible for notifying the Committee immediately of any matter that might affect the continued ethical acceptability of the proposed procedure.

Yours sincerely

C. Bartlett

Christine Bartlett
Postgraduate and Ethics Officer
Office of Research and Higher Degrees

GOOD UNIVERSITIES GUIDES
Australia Copy: Ms C Ryan
University of the Year Associate Professor R Gururajan
2000 - 2001
DEVELOPING THE E-UNIVERSITY

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Appendix D   Interview protocol

**Knowledge Management Practices
in MSC Status Companies in Malaysia**

CASE STUDY INTERVIEW PROTOCOL

Researcher:
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INTRODUCTORY SECTION	
i. Name of the organisation	186
ii. Date & time conducted	
iii. Respondent position title	
iv. No of years in the organisation	
v. How many years of working experience do you have?	
vi. Briefly describe your current job responsibilities	
vii. To begin with, can you please tell me about your experience with knowledge management in your company?' Would you consider the current knowledge management practices to be successful? Why do you say so?	

RESEARCH QUESTION 1:

What are the enablers of knowledge management (cultural, structural, people and technology) in Multimedia Super Corridor status companies in Malaysia?

(i) Cultural issues

Collaboration – degree to which people in a group assist one another in their task

A.1.1.1 How would you describe the degree of collaboration in your department/organisation?	Very Low -------------- [PLEASE RATE] --------------- Very High				
	1	2	3	4	5

A.1.1.2 Are members of your department/organisation satisfied with current levels of collaboration? Why/Why not?	Very Low -------------- [PLEASE RATE] --------------- Very High				
	1	2	3	4	5

A.1.1.3. Are members of your department/organisation supportive? Provide examples (if possible).	Very Low -------------- [PLEASE RATE] --------------- Very High				
	1	2	3	4	5

A.1.1.4 Are members of your department/organisation helpful? Provide examples (if possible).	Very Low -------------- [PLEASE RATE] --------------- Very High				
	1	2	3	4	5

A.1.1.5 Is there willingness to collaborate across organisational units within your organisation? Provide examples (if possible).	Very Low -------------- [PLEASE RATE] -------------- Very High				
	1	2	3	4	5

A.1.1.6 Is there willingness to accept responsibility for failure? Provide examples (if possible).	Very Low -------------- [PLEASE RATE] -------------- Very High				
	1	2	3	4	5

A.1.1.7 How would you rate the impact of *collaboration* as an enabler/facilitator in the implementation of KM in your organisation?	Very Low -------------- [PLEASE RATE] --------------- Very High				
	1	2	3	4	5

Mutual trust– *where members believe in the integrity, character and ability of each other.*					
A.1.2.1 How would you describe the degree of mutual trust in your department/organisation?	Very Low -------------- [PLEASE RATE] --------------- Very High				
	1	2	3	4	5
A.1.2.2 Are your members are generally trustworthy? Provide examples (if possible).	Very Low -------------- [PLEASE RATE] --------------- Very High				
	1	2	3	4	5
A.1.2.3 Do your members have reciprocal faith in other members' intentions and behaviours? Provide examples (if possible).	Very Low -------------- [PLEASE RATE] --------------- Very High				
	1	2	3	4	5
A.1.2.4 Do your members have reciprocal faith in others' ability? Provide examples (if possible).	Very Low -------------- [PLEASE RATE] --------------- Very High				
	1	2	3	4	5
A.1.2.5 Do your members have reciprocal faith in others' behaviours to work toward organisational goals? Provide examples (if possible).	Very Low -------------- [PLEASE RATE] --------------- Very High				
	1	2	3	4	5
A.1.2.6 Do your members have reciprocal faith in others' decision toward organisational interests rather than individual interests? Provide examples (if possible).	Very Low -------------- [PLEASE RATE] --------------- Very High				
	1	2	3	4	5
A.1.2.7 Do your members have relationships that are based on reciprocal faith? Provide examples (if possible).	Very Low -------------- [PLEASE RATE] --------------- Very High				
	1	2	3	4	5
A.1.2.8 How would you rate the impact of **mutual trust** as an enabler/facilitator in the implementation of KM in your organisation?	Very Low -------------- [PLEASE RATE] --------------- Very High				
	1	2	3	4	5

Learning– any relatively permanent change in behaviour that occurs as a result of experience.		
A.1.3.1 How would you describe the degree of learning in your department/organisation? Can you briefly describe how learning takes place?	Very Low -------------- [PLEASE RATE] --------------- Very High 1 2 3 4 5	
A.1.3.2 Does your organisation provide various formal training programmes to improve the performance of staff? Provide examples (if possible).	Very Low -------------- [PLEASE RATE] --------------- Very High 1 2 3 4 5	
A.1.3.3 Are informal individual development opportunities such as work assignments and job rotation provided in your organisation? Provide examples (if possible).	Very Low -------------- [PLEASE RATE] --------------- Very High 1 2 3 4 5	
A.1.3.4 Are staff members encouraged to attend seminars, conferences, symposia etc? Provide examples (if possible).	Very Low -------------- [PLEASE RATE] --------------- Very High 1 2 3 4 5	
A.1.3.5 Does your organisation provides various programs such as clubs and community gatherings? Provide examples (if possible).	Very Low -------------- [PLEASE RATE] --------------- Very High 1 2 3 4 5	
A.1.3.6 Are mistakes tolerated in your organisation? Are they viewed as a learning process?	Very Low -------------- [PLEASE RATE] --------------- Very High 1 2 3 4 5	
A.1.3.7 In general, are staff members satisfied with the contents of training or self-development programs currently available at your organisation? Provide examples (if possible).	Very Low -------------- [PLEASE RATE] --------------- Very High 1 2 3 4 5	
A.1.3.8 How would you rate the impact of **learning** as an enabler/facilitator in the implementation of KM in your organisation?	Very Low -------------- [PLEASE RATE] --------------- Very High 1 2 3 4 5	

Leadership– ability to influence and develop individuals and teams to achieve goals that have been set by the organisation.					
A.1.4.1 How would you describe the level of KM leadership in your department/organisation?	Very Low -------------- [PLEASE RATE] -------------- - Very High				
	1	2	3	4	5
A.1.4.2 Is there anyone who acts as a management champion for your organisation's KM initiative? If there is, what is the position title of this person? Apart from this organisation-wide KM champion, do other leaders (such as section/department heads) champion KM initiatives? If there are, what are their position titles?	Yes / No				
A.1.4.3 In the organisation, do these leaders guide and motivate staff members in the direction of established goals by clarifying role and task requirements? Provide examples (if possible).	Very Low -------------- [PLEASE RATE] --------------- Very High				
	1	2	3	4	5
A.1.4.4 In the organisation, do these leaders provide individualised consideration and intellectual stimulation and possesses charisma? Provide examples (if possible).	Very Low -------------- [PLEASE RATE] --------------- Very High				
	1	2	3	4	5
A.1.4.5 How would you rate the impact of **leadership** as an enabler/facilitator in the implementation of KM in your organisation?	Very Low -------------- [PLEASE RATE] --------------- Very High				
	1	2	3	4	5

Incentives & Rewards– *systems to provide some form of tangible or intangible benefit to members who achieve goals that have been set by the organisation.*	
A.1.5.1 Are staff members generally rewarded for practising KM (sharing knowledge etc) in your department/organisation? Is this practice of rewarding staff members ingrained in your organisation's culture?	Very Low -------------- [PLEASE RATE] --------------- Very High 1 2 3 4 5
A.1.5.2 How are staff members rewarded for practising KM? **Extrinsic:** pay, bonus, gifts **Intrinsic:** sense of achievement, sense of contributing to the organisation's goals.	
A.1.5.3 What is the level of extrinsic rewards (pay, bonus, gift etc.) provided in your organisation for practising KM?	Very Low -------------- [PLEASE RATE] --------------- Very High 1 2 3 4 5
A.1.5.4 What is the level of intrinsic rewards (sense of achievement and accomplishment) provided in your organisation for practising KM?	Very Low -------------- [PLEASE RATE] --------------- Very High 1 2 3 4 5
A.1.5.5 How would you rate the impact of ***incentives and rewards*** as an enabler/facilitator in the implementation of KM in your organisation?	Very Low -------------- [PLEASE RATE] --------------- Very High 1 2 3 4 5

(ii) Structural issues					
***Centralisation**– degree to which decision making is concentrated at a single point.*					
A.2.1.1 How would you describe the degree of centralisation in your department/organisation?	Very Low -------------- [PLEASE RATE] --------------- Very High				
	1	2	3	4	5
A.2.1.2 Are staff members encouraged to make their own decisions? Provide examples (if possible). [REVERSE]	Very Low -------------- [PLEASE RATE] --------------- Very High				
	1	2	3	4	5
A.2.1.3 Are staff members allowed to take action without a supervisor OR without their supervisor's permission? Provide examples (if possible). [REVERSE]	Very Low -------------- [PLEASE RATE] --------------- Very High				
	1	2	3	4	5
A.2.1.4 Are staff members able to make decisions without their supervisor's approval? Provide examples (if possible). [REVERSE]	Very Low -------------- [PLEASE RATE] --------------- Very High				
	1	2	3	4	5
A.2.1.5 How would you rate the impact of high levels of ***centralisation*** as an enabler/facilitator of KM in your organisation?	Very Low -------------- [PLEASE RATE] --------------- Very High				
	1	2	3	4	5

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Formalisation - *the amount of written documentation of rules, procedures and policies to guide decision making and behaviour in organisations.*	
A.2.2.1 How would you describe the degree of formalisation in your department/organisation?	Very Low -------------- [PLEASE RATE] --------------- Very High 1 | 2 | 3 | 4 | 5
A.2.2.2 Are all activities covered by some formal rules in the organisation? Provide examples (if possible).	Very Low -------------- [PLEASE RATE] --------------- Very High 1 | 2 | 3 | 4 | 5
A.2.2.3 Are contacts and communication within the organisation on a formal or planned basis? Provide examples (if possible).	Very Low -------------- [PLEASE RATE] --------------- Very High 1 | 2 | 3 | 4 | 5
A.2.2.4 Are the rules and procedures in the organisation typically written/documented? Provide examples (if possible).	Very Low -------------- [PLEASE RATE] --------------- Very High 1 | 2 | 3 | 4 | 5
A.2.2.5 In certain situations, would it be possible for staff members to ignore the rules and reach informal agreements? Provide examples (if possible). [REVERSE]	Very Low -------------- [PLEASE RATE] --------------- Very High 1 | 2 | 3 | 4 | 5
A.2.1.5 How would you rate the impact of high levels of **formalisation** as an enabler/facilitator of KM in your organisation?	Very Low -------------- [PLEASE RATE] --------------- Very High 1 | 2 | 3 | 4 | 5

(iii) People

T-Shaped Skills– *possession of skills which allow members to be experts in their specific technical areas and intimately acquainted with the potential systemic impact of their particular tasks.*

A.3.1 In general, do staff members possess T-shaped skills (skills that are both highly specific and yet broad enough to allow them to 'see the whole picture' of their actions)?	Very Low -------------- [PLEASE RATE] -------------- Very High
	1 / 2 / 3 / 4 / 5

A.3.2 Are staff members specialists in their own part/area? Provide examples (if possible).	Very Low -------------- [PLEASE RATE] -------------- Very High
	1 / 2 / 3 / 4 / 5

A.3.3 Do staff members understand not only their own tasks but also others' tasks? Provide examples (if possible).	Very Low -------------- [PLEASE RATE] -------------- Very High
	1 / 2 / 3 / 4 / 5

A.3.4 Are staff members capable of making suggestions about others' tasks? Provide examples (if possible).	Very Low -------------- [PLEASE RATE] -------------- Very High
	1 / 2 / 3 / 4 / 5

A.3.5 How would you describe the communication ability of staff members of a particular department with those in other departments? Provide examples (if possible).	Very Low -------------- [PLEASE RATE] -------------- Very High
	1 / 2 / 3 / 4 / 5

A.3.6 In the event of changes, are staff members still able to perform their own tasks effectively? Provide examples (if possible).	Very Low -------------- [PLEASE RATE] -------------- Very High
	1 / 2 / 3 / 4 / 5

A.3.7 How would you rate the impact of *T-shaped skills* as an enabler/facilitator of KM in your organisation?	Very Low -------------- [PLEASE RATE] -------------- Very High
	1 / 2 / 3 / 4 / 5

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(iv) Information Technology Infrastructure

A.4.1 How would you describe the IT infrastructure available in your department/organisation?	Very Low -------------- [PLEASE RATE] -------------- Very High
	1 / 2 / 3 / 4 / 5

A.4.2 How would you rate it in supporting collaborative work? What about asynchronous collaborative work? What about different place collaborative work?	Very Low -------------- [PLEASE RATE] -------------- Very High
	1 / 2 / 3 / 4 / 5

A.4.3 Does it support intra-organisation communication?	Very Low -------------- [PLEASE RATE] -------------- Very High
	1 / 2 / 3 / 4 / 5

A.4.4 Does it support searching and accessing necessary data/information?	Very Low -------------- [PLEASE RATE] -------------- Very High
	1 / 2 / 3 / 4 / 5

A.4.5 Does it support simulation, forecasting and prediction activities?	Very Low -------------- [PLEASE RATE] -------------- Very High
	1 / 2 / 3 / 4 / 5

A.4.6 Does it allow for systematic storage of data/information?	Very Low -------------- [PLEASE RATE] -------------- Very High
	1 / 2 / 3 / 4 / 5

A.4.7 Please identify the different IT applications available in your organisation used to support KM. Some generic examples are listed in this section.	☐ Groupware ☐ e-mail ☐ Chat rooms ☐ Video conferencing ☐ Search engines ☐ Voice mail ☐ Bulletin boards ☐ Push technologies ☐ Simulation technologies ☐ Computer-based training ☐ Online training ☐ Workflow management ☐ Process modelling tools	☐ Document management tools ☐ Knowledge maps ☐ Library systems ☐ Intelligent agents ☐ Web crawlers ☐ Case based reasoning ☐ Helpdesk applications ☐ Customer service applications ☐ Order entry applications ☐ Service agent support applications ☐ Others:_____

A.4.8 How would you rate the impact of **IT infrastructure** as an enabler/facilitator of KM in your organisation?	Very Low -------------- [PLEASE RATE] -------------- Very High
	1 / 2 / 3 / 4 / 5

A.5 Apart from the factors discussed (culture, structure, people & IT infrastructure), are there any other issues that play a role in the effectiveness of your organisations KM program?	

RESEARCH QUESTION 2:
What is the process involved in creating knowledge in Multimedia Super Corridor status companies in Malaysia?

(i) Socialisation

B.1.1 Do your team members gather information from various sources and production sites?	
B.1.2 Do your team members share their experiences with each other and external parties (suppliers, customers etc.)?	
B.1.3 Do your team members engage in dialogue with competitors?	
B.1.4 How do your team members find new strategies, solutions, ideas and opportunities?	
B.1.5 Does your organisation work towards creating a work environment that allows peers to understand the craftsmanship, skills and expertise involved in its tasks?	

B.1.6 How would you rate the level of **socialisation** as a knowledge creating activity in your organisation?	Very Low -------------- [PLEASE RATE] -------------- Very High
	1 | 2 | 3 | 4 | 5

(ii) Externalisation	
B.2.1 Does your organisation stress on the importance of creative and essential dialogues? Is it practised?	
B.2.2 Is the use of inductive thinking (inference of a generalised conclusion from particular instances) practised?	
B.2.3 Is the use of deductive thinking (inference in which the conclusion about a particular case follows from general or universal premises/rules) practised?	
B.2.4 Is the use of metaphors/analogies in dialogue for concept creation practised?	
B.2.5 Is exchange of various ideas and dialogues practised?	
B.2.6 Are subjective opinions by team members appreciated?	
B.2.7 How would you rate the level of **externalisation** as a knowledge creating activity in your organisation?	Very Low -------------- [PLEASE RATE] --------------- Very High 1 · 2 · 3 · 4 · 5

(iii) Combination	
B.3.1 Are published literature, computer simulation and forecasting used in devising plans and strategies in your organisation?	
B.3.2 Are manuals, guides and documents on products and services created?	
B.3.3 Are information on products and services entered into databases?	

B.3.4 Are management figures and technical information gathered to develop materials?	
B.3.5 How are newly created concepts and ideas transmitted/disseminated to team members?	
B.3.6 How would you rate the level of **combination** as a knowledge creating activity in your organisation?	Very Low -------------- [PLEASE RATE] --------------- Very High 1 | 2 | 3 | 4 | 5

(iv) Internalisation	
B.4.1 Does your organisation encourage staff members to form teams as a model and conduct experiments, with the results shared with other staff members?	
B.4.2 Are cross-functional (across several departments/fields) development teams practised?	
B.4.3 Do team members search for new values and thoughts, and share them with fellow staff?	
B.4.4 Do team members try to understand management visions and goals through communication with fellow staff?	
B.4.5 How would you rate the level of **internalisation** as a knowledge creating activity in your organisation?	Very Low -------------- [PLEASE RATE] --------------- Very High 1 | 2 | 3 | 4 | 5

RESEARCH QUESTION 3:

How do the current levels of knowledge management practice in Multimedia Super Corridor status companies affect their organisational performance?

C.1 How do the current KM practices in your organisation affect its organisational performance? List the areas/activities in which KM has affected its performance.	

C.2 How did KM impact on your organisation's organisational efficiency?	Very Low -------------- [PLEASE RATE] --------------- Very High
	1 | 2 | 3 | 4 | 5

C.3 How did KM impact on your organisation's competitive advantage?	Very Low -------------- [PLEASE RATE] --------------- Very High
	1 | 2 | 3 | 4 | 5

C.4 How did KM impact on the maximisation of your organisation's potential?	Very Low -------------- [PLEASE RATE] --------------- Very High
	1 | 2 | 3 | 4 | 5

C.5 How did KM impact on the management of knowledge assets in your organisation?	Very Low -------------- [PLEASE RATE] --------------- Very High
	1 | 2 | 3 | 4 | 5

C.6 How would you rate the impact of KM towards your organisation's performance?	Very Low -------------- [PLEASE RATE] --------------- Very High
	1 | 2 | 3 | 4 | 5

OPEN QUESTION:

D.1 Is there any additional information that you would like to provide about for this study on knowledge management practice that we have not covered? [Pause for at least 10 seconds for the interviewee to reflect on the session]	

THANK YOU FOR YOUR PARTICIPATION IN THIS RESEARCH PROJECT. PLEASE BE REASSURED THAT ALL PERSONAL INFORMATION WILL BE KEPT CONFIDENTIAL AT ALL TIMES. ONCE AGAIN, THANK YOU.

Appendix E   Consent form

Information and Consent Form for Interview Participants
Study on Knowledge Management Practices in
MSC Status Companies in Malaysia

This study is being conducted by Gerald Goh Guan Gan, Master of Business Information Technology Candidate in the Department of Information Systems, Faculty of Business, University of Southern Queensland, Australia. The purpose of this study is to investigate the current levels of knowledge management practice in MSC status companies in Malaysia as part of the requirements for the Master of Business Information Technology award.

You can help in this study by consenting to participate in a case study interview. It is anticipated that the time to complete the interview will be no more than 90 minutes. Contained in the interview are questions about your perceived opinions on the issues that affect knowledge management practices in your company.

With your permission, the interview shall be recorded to assist with transcription of your responses. No questions of a personal nature will be asked, and no inconvenience or discomfort is expected. No personal identifying data of yourself as the participant or identifying data of the organisation to which you are affiliated to will be made in the research report and publications emanating from it. You are free to withdraw consent and to discontinue participation in the interview at any time. The data collected from this interview will be stored in a locked filing cabinet in the researcher's office, and will be destroyed after five years.

It is anticipated that the full study will be completed by the end of February 2006 and access to a summary of the study should be available in March 2006. You will be contacted and provided with this summary as soon as it is available.

This study has been approved by the University of Southern Queensland's Human Research Ethics Committee for ethics clearance for investigations involving human research (Ref. no: H05STU522). Any questions relating to this study can be directed to Gerald Goh on (012) 585 65 93 (M) or (604) 283 1088 ext 121 (W) or gohgg@hju.edu.my. Should you require further information, you may contact the supervisors of the study – Ms Charmaine Ryan (ryan@usq.edu.au) OR Assoc Prof Dr Raj Gururajan (gururaja@usq.edu.au). If you are unable to gain a satisfactory response to any questions you may have about this study after contacting either the researcher or the supervisors, please feel free to contact: The Secretary, USQ Human Research Ethics Committee, University of Southern Queensland, PO Box Darling Heights, Toowoomba QLD4350. Phone: +617 4631 28956.

Your cooperation and generosity in participating in this study is highly valued and appreciated.

Thank you,

Gerald Goh Guan Gan

Consent form for interview participants

[Participants are to retain a copy of this consent form]

I, the participant have read and understood the information contained in this 'Information and Consent Form' and have had all questions pertaining to this study answered to my satisfaction. I hereby agree to participate in this study, realising that I may withdraw at any time. I also agree that information and research data gathered for this study will be used in the analysis of knowledge management practices in Multimedia Super Corridor companies in Malaysia, and will be used in aggregate statistics. No personal identifying data of myself as the participant or identifying data of the organisation to which I am affiliated to will be made in the research report.

_____   *Date: _____*
Participant or authorised representative

_____   *Date: _____*
Researcher: Gerald Goh Guan Gan

Appendix F   Sarbanes-Oxley Act 2002

The Sarbanes-Oxley Act of 2002 is mandatory whereby all organizations, large and small, must comply (Addison-Hewitt Associates 2006).. The legislation came into force in 2002 and introduced major changes to the regulation of financial practice and corporate governance (Addison-Hewitt Associates 2006). Named after US Senator Paul Sarbanes and Representative Michael Oxley, who were its main architects, it also set a number of deadlines for compliance (Addison-Hewitt Associates 2006; Moeller 2004).

The Sarbanes-Oxley Act of 2002 is a United States federal law passed in response to a number of major corporate and accounting scandals involving prominent companies in the United States (Addison-Hewitt Associates 2006). These scandals resulted in a decline of public trust in accounting and reporting practices. The Act came in the wake of a series of corporate financial scandals, including those affecting Enron, Tyco International and WorldCom (now MCI) (Addison-Hewitt Associates 2006).

The legislation is wide ranging and establishes new or enhanced standards for all US public company Boards, Management, and public accounting firms. The Sarbanes-Oxley Act is arranged into eleven titles (Addison-Hewitt Associates 2006). As far as compliance is concerned, the most important sections within these are often considered to be 302, 401, 404, 409, 802 and 906 (Addison-Hewitt Associates 2006)..

Sarbanes-Oxley Act Section 302

This section is listed under Title III of the act, and pertains to 'Corporate Responsibility for Financial Reports'. Summary of Section 302:

- Periodic statutory financial reports are to include certifications that:
- The signing officers have reviewed the report.
- The report does not contain any material untrue statements or material omission or be considered misleading.
- The financial statements and related information fairly present the financial condition and the results in all material respects.
- The signing officers are responsible for internal controls and have evaluated these internal controls within the previous ninety days and have reported on their findings.
- A list of all deficiencies in the internal controls and information on any fraud that involves employees who are involved with internal activities.
- Any significant changes in internal controls or related factors that could have a negative impact on the internal controls.
- Organizations may not attempt to avoid these requirements by reincorporating their activities or transferring their activities outside of the United States.

Sarbanes-Oxley Act Section 401

This section is listed under Title IV of the act (Enhanced Financial Disclosures), and pertains to 'Disclosures in Periodic Reports' (Addison-Hewitt Associates 2006). Financial statements published by issuers are required to be accurate and presented in a manner that does not contain incorrect statements or admit to state material information. These financial statements shall also include all material off-balance sheet liabilities, obligations or transactions. The Commission is required to study and report on the extent of off-balance transactions resulting transparent reporting. The Commission is also required to determine whether generally accepted accounting principals or other regulations result in open and meaningful reporting by issuers (Addison-Hewitt Associates 2006; Carney 2006; Jackson & Fogarty 2005; Moeller 2004; Pinder 2006; Romano 2005)..

Sarbanes-Oxley Act Section 404

This section is listed under Title IV of the act (Enhanced Financial Disclosures), and pertains to 'Management Assessment of Internal Controls' (Addison-Hewitt Associates 2006). Issuers are required to publish information in their annual reports concerning the scope and adequacy of the internal control structure and procedures for financial reporting. This statement shall also assess the effectiveness of such internal controls and procedures. The registered accounting firm shall, in the same report, attest to and report on the assessment on the effectiveness of the internal control structure and procedures for financial reporting (Addison-Hewitt Associates 2006; Carney 2006; Jackson & Fogarty 2005; Moeller 2004; Pinder 2006; Romano 2005).

Sarbanes-Oxley Act Section 409

This section is listed within Title IV of the act (Enhanced Financial Disclosures), and pertains to 'Real Time Issuer Disclosures'. Issuers are required to disclose to the public, on an urgent basis, information on material changes in their financial condition or operations. These disclosures are to be presented in terms that are easy to understand supported by trend and qualitative information of graphic presentations as appropriate (Addison-Hewitt Associates 2006; Carney 2006; Jackson & Fogarty 2005; Moeller 2004; Pinder 2006; Ramos 2005; Romano 2005).

Sarbanes-Oxley Act Section 802

This section is listed within Title VIII of the act (Corporate and Criminal Fraud Accountability), and pertains to 'Criminal Penalties for Altering Documents' (Addison-Hewitt Associates 2006; Carney 2006; Jackson & Fogarty 2005; Moeller 2004; Pinder 2006; Romano 2005). This section imposes penalties of fines and/or up to 20 years imprisonment for altering, destroying, mutilating, concealing, falsifying records, documents or tangible objects with the intent to obstruct, impede or influence a legal investigation (Addison-Hewitt Associates 2006).. This section also imposes penalties of fines and/or imprisonment up to 10 years on any accountant who knowingly and willfully violates the requirements of maintenance of all audit or review papers for a period of 5 years (Addison-Hewitt Associates 2006; Carney 2006; Jackson & Fogarty 2005; Moeller 2004; Pinder 2006; Romano 2005).

Sarbanes-Oxley Act and information technology controls

Sarbanes-Oxley is strictly focused on financial reporting and does not specifically address IT (Carney 2006; Jackson & Fogarty 2005; Pinder 2006; Romano 2005). However, IT does affect the reliability and security of systems in which companies keep their financial records (Carney 2006; Jackson & Fogarty 2005; Pinder 2006; Romano 2005). There are several titles and sections in the Sarbanes-Oxley Act that has a direct impact on internal controls (including IT controls).

These four major sections are:

Section	Title	Description
302	**Corporate Responsibility for Financial Reports**	Certifies that financial statement accuracy and operational activities have been documented and provided to the CEO and CFO for certification
404	**Management Assessment of Internal Controls**	Operational processes are documented and practiced demonstrating the origins of data within the balance sheet
409	**Real-time Issuer Disclosures**	Public companies must disclose changes in their financial condition or operations in real time to protect investors from delayed reporting of material events
802	**Criminal Penalties for Altering Documents**	Requires public companies and their public accounting firms to retain records, including electronic records that impact the company's assets or performance. Fines and imprisonment for those who knowingly and willfully violate this section with respect to (1) destruction, alteration, or falsification of records in federal investigations and bankruptcy and (2) destruction of corporate audit records.

(Source: Addison-Hewitt Associates 2006)