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THE RELATIONSHIP BETWEEN KNOWLEDGE MANAGEMENT FACTORS AND THE ADOPTION OF KNOWLEDGE SHARING: A STUDY OF SINGAPORE ORGANISATIONS

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STATEMENT OF ORIGINALITY

This dissertation contains no material which has been accepted for the award of any other degree or diploma in any university or other tertiary institution and, to the best of my knowledge and belief, contains no material previously published or written by another person, except where due reference has been made in the text. I give consent to this copy of my dissertation, when deposited in the University Library, being made available for loan and photocopying subject to the provisions of the Copyright Act 1968.

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I hereby certify that the work embodied in this dissertation is the result of original research and has not been submitted for a higher degree to any other university or institution.

Ming Yen Tan
5 April 2012
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THE RELATIONSHIP BETWEEN KNOWLEDGE MANAGEMENT FACTORS AND THE ADOPTION OF KNOWLEDGE SHARING: A STUDY OF SINGAPORE ORGANISATIONS

ABSTRACT

This dissertation aims to explore and give an adequate view of knowledge sharing adoption in Singapore organisations by answering the following research questions:

RQ1: What is the relationship between knowledge sharing techniques/tools and knowledge sharing adoption within the organisation in Singapore?

RQ2: What impacts do these key knowledge management dimensions (people, leadership, information systems, processes, organisational structure and reward system) have on knowledge sharing adoption in Singapore organisations?

RQ3: Among these key knowledge management dimensions (people, leadership, information systems, processes, organisational structure and reward system), which are the better predictors of good knowledge sharing practices in Singapore organisations?

From October to December 2009, 900 sets of survey information sheet and questionnaire were given to Singapore educational agents namely University of Newcastle (Singapore Campus), TMC Educational Group and Singapore Human Resources Institute for distribution to potential respondents. A total of 234 questionnaires were returned.
For the first research question, research findings reveals that these frequently used knowledge sharing techniques and tools: discussions, trainings, collaboration/teamwork and brainstorming session are associated with the level of knowledge sharing. Less frequently used knowledge sharing techniques and tools: workshops, conferences, seminars and focus groups are also associated with the level of knowledge sharing.

For the second research question, data analysis confirms that knowledge management dimensions such as leadership, information systems, processes, organisational structure, reward system and people characteristic (such as: trust and communication among staff) are positively associated with the adoption of knowledge sharing in Singapore organisations.

For the third research question, data analysis results show that knowledge management dimensions such as leadership, people and knowledge sharing processes are better predictors of adoption of knowledge sharing in Singapore organisations than other knowledge management dimensions such as information system, organisational structure and reward system.
CHAPTER ONE: INTRODUCTION

1.1 Introduction

This chapter starts with a brief summary of the background behind the research, justification for the research, research questions and hypotheses, research methodology, and major findings. This chapter ends with an outline of the structure of the dissertation.

1.2 Background behind the Research

Knowledge is more than just the resources of an organisation, but an important foundation in achieving competitive advantage (Drucker, 1999; Stewart, 1997) and it is essential for long-term success of the organisation (Nonaka and Takeuchi, 1995). In this dissertation, knowledge is defined as “information combined with experience, context, interpretation, and reflection” (Davenport, De Long and Beers, 1998, p. 43). Organisations have a plethora of knowledge, but often underutilised (Argote, 1999). Many knowledge management techniques/tools have been adopted to increase usage, capture and share knowledge. Knowledge management in a business organisation means “managing the activities of knowledge workers, achieved through facilitating, motivating, leading, and supporting knowledge workers and providing or nurturing a suitable working environment.” (Gao, Li and Clarke, 2008, p.11).
Because the organisation capacity of knowledge is in the mind of the staff, it is important for organisations to appreciate what motivates employees to share knowledge and what is stopping them to share (Paroutis and Saleh, 2009). Knowledge sharing has become an important factor to achieve organisational goals (Davenport and Prusak, 1998) and to increase organisational innovation (Fukugawa, 2006; Haas and Hansen, 2007). In this dissertation, knowledge sharing is defined as “activities of transferring or disseminating knowledge from one person, group or organisation to another” (Lee, 2001, page 324).

In a changing and turbulent business environment, organisations need to improve knowledge sharing activities widely to influence and maintain competitive market advantage (Drucker, 1999). Knowledge sharing offers a relationship between individuals and organisations in mobilising the knowledge of individual at all levels of the organisations so that knowledge can give a significant change to the competition and financial of organisation (Hendriks, 1999). Knowledge sharing practices helps organisations reduce costs, meet the needs of clients, provide better services and products, improve business processes, and achieve the expansion of market share (Law and Ngai, 2008).
In an effort to facilitate the knowledge sharing within the organisation, organisations located in different countries use different knowledge sharing techniques/tools. Email, internet and intranet are the most frequently used tools (Chase, 1997); document management systems, intranet, databases, internet and email are used frequently in Australia (Xu and Quaddus, 2005); email, leadership involvement and internet in Indian engineering industries (Singh, Shankar, Narain and Kumar, 2006); and informal personal network and face to face in Hong Kong government (Yao, Kam and Chan, 2007). However, internet, video conference, telephone, email, intranet, groupware, knowledge management software and web conference are not significant predictors of knowledge sharing in two large information technology organisations in the United States of America (Han and Anantatmula, 2007).

A deliberate and systematic understanding of the critical success factors for adoption of knowledge sharing is very important because of ignorance or a failure to notice the important driving forces may hamper the efforts of organisation to realise the full benefits (Ichijo, Krough and Nonaka, 1998). Key success factors to organisational success in knowledge sharing adoption are identified in various countries. The commonly identified critical success factors of knowledge sharing adoption by various empirical studies include organisational culture (Han and Anantatmula, 2007; Lin, Lee, and Wang, 2009; Sohail and Daud, 2009), organisational leadership (Hsu and Wang, 2008; Chen and Barnes, 2006), information systems (Lin et al., 2009; Han and
Anantatmula, 2007), knowledge management processes (Hsu and Wang, 2008; Batra, 2010), organisational structure (Al-Alawi, Al-Marzooqi and Mohammed, 2007; Willem and Buelens, 2009), reward system (Al-Alawi et al., 2007; Kang, Kim and Chang, 2008), and people such as trust (Quigley, Tesluk, Locke and Bartol, 2007; Ma, Qi, and Wang, 2008), communication (Cheng, Yeh, and Tu, 2008; Kang et al., 2008) and motivation (Siemsen, Roth and Balasubramanian, 2008).

Based on empirical studies by many researchers, many critical success factors of knowledge sharing adoption have been identified as associated with the adoption of knowledge sharing within organisations in many countries. In Singapore organisations, previous studies show that different critical factors for knowledge sharing practice are identified using qualitative or case studies approach. For example, in a construction project involving three joint venture between Japan and Singapore and one joint venture between Germany and Singapore, Dulaimi (2007) shows that top management leadership and commitment have a positive influence on the culture, processes and structures to share knowledge. Dulaimi (2007) adds that the effort to share knowledge can be enhanced when the Singapore management has a high cultural awareness of their foreign counterparts. Also, in another qualitative case study using in-depth interviews, Retna and Ng (2011) maintain that individual motivation, organisational culture and leadership are critical factors in nurturing knowledge sharing within the community of practice in a Singapore-based multinational company. Community of practice comprises
of individuals who have common passion, concerns and problems to interact regularly with the aim to improve the skills and knowledge (Wenger, McDermott and Snyder, 2002). A case study by Teo (2005) in the Singapore Housing and Development Board shows that top management support and commitment, process, reward systems, content management and information technology are challenges to successful knowledge management.

Previous research findings from other countries may not result in parallel and congruent factors for adoption of knowledge sharing in the context of Singapore. This present study aims to investigate frequently used knowledge sharing techniques/tools within organisations and to provide a deeper understanding of the critical knowledge management factors that may influence knowledge sharing adoption in Singapore organisations using a quantitative study. The findings from this study can give managers a better understanding on the application of knowledge management practices to enhance the knowledge sharing adoption within the organisation.

1.3 Justification for dissertation project

As a different set of knowledge management techniques and tools have been used by organisations in various countries, there is an ambiguity for researchers and business practitioners on knowledge management techniques/tools that are effective in the adoption of knowledge sharing. This dissertation continues the investigation on
knowledge management techniques/tools that have been used by organisations in Singapore and which knowledge management techniques/tools that are effective in shaping the adoption of knowledge sharing in Singapore organisations.

Many empirical findings are sufficient to support that particular knowledge management factors, such as organisational culture characteristics (Park, Ribiere and Schulte, 2004), system and procedures (Karlsen and Gottschalk, 2004), communication, reward system and organisation structure (Al-Alawi et al., 2007), motivation (Quigley et al., 2007) and leadership (Alavi, Kayworth and Leidner, 2005), have positive correlations with successful knowledge sharing. Different authors proposed different critical success factors of knowledge management that can influence the adoption of knowledge sharing. Identifying critical success factors of knowledge sharing adoption in accordance with the relevant Singapore context can assist organisations in designing, implementing and evaluating initiatives to share knowledge.

Furthermore, national culture can be an important factor that can influence organisational culture (Hofstede, 1994), the type of knowledge management techniques and tools used, and the knowledge sharing adoption within the organisation. Thus, the results obtained from different countries or using a different research methodology may not generate the congruent and parallel knowledge management techniques/tools used and the critical success factors for knowledge sharing adoption in Singapore.
organisations. In addition, previous empirical studies do not indicate which critical success factors that are better predictors for knowledge sharing adoption.

Therefore, this study aims to fill that gap by conducting a survey research on organisations in Singapore to examine knowledge sharing adoption. After an extensive review of relevant knowledge management literature, this study plans to update and expand the work of Gupta and Govindarajan’s (2000) on the dimensions of knowledge management as well as to continue and develop Al-Alawi et al.’s (2007) work. In keeping with this background, this dissertation aims to explore knowledge sharing practices in Singapore organisations.

1.4 Research Questions and Hypotheses

The gap in the literature as discussed above leads to the formulation of the following research questions:

RQ1: What is the relationship between knowledge sharing techniques/tools and knowledge sharing adoption within the organisation in Singapore?

RQ2: What impacts do these key knowledge management dimensions (people, leadership, information systems, processes, organisational structure and reward system) have on knowledge sharing adoption in Singapore organisations?
RQ3: Among these key knowledge management dimensions (people, leadership, information systems, processes, organisational structure and reward system), which are the better predictors of good knowledge sharing practices in Singapore organisations?

From the above research questions, the following hypotheses are identified:

H1: The frequently used knowledge sharing techniques/tools are associated with the level of knowledge sharing adoption in Singapore organisations.

This hypothesis attempts to examine the relationship between knowledge sharing techniques/tools used and the perceived level of respondents on knowledge sharing within their organisation.

H2a: Organisational leadership is positively associated with knowledge sharing adoption in Singapore organisations.

This hypothesis focuses on investigating the existence of leadership, organisational leadership effectiveness, and willingness of managers to engage in knowledge sharing activities.

H2b: Knowledge sharing information system is positively associated with the adoption of knowledge sharing in Singapore organisations.

This hypothesis focuses on the effectiveness and investigates the information systems in addition to staff’s comfort in applying the information system while engaged in knowledge sharing activities.
**H2c:** Knowledge sharing process is positively associated with knowledge sharing adoption in Singapore organisations.

The aim of this hypothesis is to examine organisational abilities and efficiency in the creation, application and transfer of knowledge.

**H2d:** Organisational structure is positively associated with knowledge sharing adoption in Singapore organisations.

This hypothesis is designed to examine the participative decision making process, the use of functional team and ease of information flow.

**H2e:** Knowledge sharing reward system is positively associated with knowledge sharing adoption in Singapore organisations.

This hypothesis aims to test the effectiveness and the existence of rewards (team and individual) in motivating staff engagement in knowledge sharing activities.

**H2f:** People characteristics (such as: communication among staff, trust among staff, motivation to share) are positively associated with knowledge sharing adoption in Singapore organisations.

This hypothesis aims to test the existence of trust, communication channels and the motivation effort of the organisation towards encouraging staff involvement in knowledge sharing activities.
H3: People, leadership, information systems, processes, organisational structure and reward system are the better predictors of knowledge sharing adoption in Singapore organisations.

This hypothesis attempts to identify some of the six dimensions of knowledge management are a better predictors of good knowledge sharing adoption in Singapore organisations.

1.5 Research Methodology

This research uses mixed methods (Teddlie and Tashakkori, 2009) as the main research design. The mixed methods include a combination of qualitative and quantitative methods. This dissertation use survey method to collect data (qualitative approach) and then applies regression analysis techniques to analyse these data (quantitative approach). This dissertation identifies and adopts constructs from previous studies to create a self-administered anonymous questionnaire. Because of limited cost and time, this research used a convenient sampling method.

Data collected are analysed and tested using Statistical Package for the Social Sciences (SPSS) Student version 15 for windows software. Additional analyses are carried out after examining the adequacy and reliability of data. In hypothesis testing, relationships between variables are examined using cross tabulation and linear or multiple regression methods.
Although the findings from this study offer an adequate view of knowledge sharing adoption in organisations in Singapore, this study has limitations. These include: the limitations of the structure of the questionnaire; self-reporting bias (Han and Anantatmula, 2007); exclusion of other organisational culture and knowledge management critical success factors that can influence knowledge sharing adoption; and the weakness of the application of convenient sampling method for this study.

1.6 Research Findings

Research findings from this study may add valuable contributions and provide implications for both academic researchers and business practitioners. Firstly, this study offers Singapore organisations involved in knowledge sharing adoption, strategies and guidelines needed to manage the influence of the factors of knowledge management on knowledge sharing adoption. Secondly, the findings of this study offer evidence that attempts to link the use of knowledge sharing techniques/tools with the adoption level of knowledge sharing in organisations in Singapore. Thirdly, the results of this study may identify the factors of knowledge management, namely the people, leadership, information systems, process, organisation structure and reward system associated with knowledge sharing adoption in Singapore organisations. Finally, this study contributes to current literature on knowledge sharing adoption, especially in the context of Singapore, in which researchers and business practitioners can reproduce, extend and enhance the research findings.
1.7 Structure of the Dissertation

This dissertation consists of five chapters. Chapter one provides an overview of this study. Chapter two reviews current and previous literature that is appropriate to the research questions. Chapter three discusses the research methodology and analysis tools used to answer each research question and to test the hypotheses. Chapter four tests the hypotheses, analyses the data and presents the results of this study. Finally, Chapter five reviews and summarises the results presented in chapter four before discussing the implications and limitations of the study and suggestions for future research.
CHAPTER TWO: LITERATURE REVIEW

2.1 Introduction

This chapter examines previous studies relevant to the research questions stated in chapter one. This dissertation examines techniques/tools used in shaping knowledge sharing practices; and studies the relationship between knowledge management success factors and knowledge sharing adoption in one of Asia’s leading economies: Singapore.

Section 2.2 discusses the different definitions and views of knowledge and examines the hierarchy of knowledge. This section also introduces the transformation model of contemporary data to show the relationship between tacit and explicit knowledge, and how this knowledge is used in creating a competitive advantage.

Section 2.3 discusses the concepts of knowledge management and sets up a basic understanding of these principles. While this literature review cannot fully assess all previous studies, this dissertation discusses the basic theories and concepts of the early researchers and leaders in knowledge management. Critical success factors of knowledge management are also discussed. This section then explores the influences of Hofstede’s (1980) dimensions of national culture on knowledge management.
Section 2.4 provides an overview of knowledge sharing by defining and exploring the adoption of knowledge sharing behaviour. This section discusses the individual and organisation motivational factors for knowledge sharing adoption, in which the individual dimensions are identified as self-efficacy, job satisfaction and trust, and organisational dimensions are identified as management leadership and support, organisational culture, organisational structure, information technology infrastructure, and incentives and rewards. Common techniques/tools used by organisations to share knowledge are also identified.

The first part of Section 2.5 discusses different knowledge sharing adoption framework. Critical success factors of knowledge sharing adoption proposed by different researchers are discussed before this section explores in detail the common critical success factors of knowledge sharing adoption, such as organisational culture, leadership, information systems, knowledge management processes, organisational structure, reward system, and people (trust, communication and motivation). The last part of this section presents findings from empirical studies on knowledge sharing adoption success in different countries.

Lastly, Section 2.6 summarises research questions and hypotheses for this study. The research model used to answer research questions is also shown.
2.2 Overview of Knowledge

This section discusses the different definitions and views of knowledge, presents the strengths and weaknesses of the knowledge hierarchy model, and introduces a contemporary data transformation model.

2.2.1 Definitions and Views of Knowledge

Knowledge has become an important factor in the competitiveness and success of an organisation (Syed-Ikhsan and Rowland, 2004a; Pinelli, Barclay, Kennedy and Bishop, 1997). Unlike the conventional economy that depends on physical assets such as capital and land, contemporary economy regards knowledge as an important production factor that creates competitive advantage (Han and Anantatmula, 2007; Beijerse, 1999). Although most researchers and practitioners agree that the sharing of knowledge can form the core competencies (Widén-Wulff and Suomi, 2007; Davenport and Prusak, 1997) and creates a distinctive competitive advantage (Hickins, 1999; Gold, Malhotra and Segars, 2001), most researchers and practitioners find little agreement about the definition of knowledge.

Based on the situation in which ‘knowledge’ is applied, different terms, such as insight, intuition, ideas, ability, experience, skill, intelligence, information or data, may be associated with knowledge (Gao et al. 2008). Different theorists, academics and practitioners define knowledge differently. Knowledge is defined as: process, object,
state of mind, rules for gaining access to information (Nonaka, 1994); information that
drive people’s actions (Bourdreau and Couillard, 1999); power for acting and making
decisions (Kantner, 1999); as a thing that stores, manipulates, processes and applies
ability (Zack, 1999); specialised know-how (Bourdreau and Couillard, 1999); and
information that merged with creativity, intuition (Karlsen and Gottschalk, 2004;

Further problems occur when knowledge is defined as property in the human minds
(Tuomi, 1999; Fahey and Prusak, 1998) or as something that can be reused (Ruggles,
1997), transferred (Davenport and Prusak, 1998) and distributed (Probst, Raub and
Romhardt, 2000). Knowledge is also a complex system involving continuous creation,
adaptation, enhancement and use (Alle, 1997). However, knowledge can be classified
into two: tacit knowledge and explicit knowledge (De Long and Fahey, 2000; Nonaka,

Tacit knowledge has many definitions: intangible information, such as the values,
perspectives and personal beliefs of individuals (Nonaka and Takeuchi, 1995); more
individualised, unable to be expressed or seen, complicated to share and manage
(Nonaka, 1994; Polanyi, 1966); entrenched in activities, skill and actions (Nonaka,
1994); difficult to clarify (Teece, 1998); functional abilities (Koskinen, 2003); and
passed on only by watching and doing (Harigopal and Satyadas, 2001). Tacit knowledge
is residing in a person’s subconscious that includes technical skill, perspectives, beliefs, mental models and cognitive learning (Nonaka, 1994). Tacit knowledge, being context specific and personal, is not easy to communicate and formalise (Nonaka, Takeuchi and Umemoto, 1996). Tacit knowledge is invisible and regularly comes to mind when needed for problem solving and decision making (McDermott, 1999).

Explicit knowledge allows the transformation into words and numbers (Nonaka, 1994; Polanyi, 1966). Explicit knowledge is the tangible information (Shin, Holden and Schmidt, 2001), external to a person (Nonaka, 1994), and allows encoding, clarification, and clear illustration (Zack, 1999) into the formal operating procedures, electronic files or paper documents (Koskinen, 2003). Explicit knowledge is the formalised knowledge sent into a systematic and formal language (Nonaka et al., 1996; Alavi and Leidner, 2001), and delivered in a format, such as data, textbooks, manuals, specifications and scientific formulas (Polanyi, 1966).

Tacit and explicit knowledge are inter-related, reciprocally dependent (Alavi and Leidner, 2001) and holistically show assets and resources of the organisation (Fahey and Prusak, 1998). Tacit knowledge forms the basis for the identification, acquisition, interpretation and distribution of explicit knowledge (Fahey and Prusak, 1998; Polanyi, 1975). Explicit knowledge is easy to get and can be deployed quickly to the dissemination of knowledge (Polanyi, 1966).
2.2.2 Hierarchy of Knowledge

Although there are different approaches to defining knowledge, there seems to be general agreement that knowledge is beyond data and information (Alavi and Leidner, 2001). Although some researchers consider knowledge as a parallel to the information (Beckman, 1997; Turban, 1992; Woolf, 1990), others show a more centralised approach to information (Alavi and Leidner, 2001; Morey, Marbury and Thuraisingham, 2000). Knowledge differs from data and information (Davenport and Prusak, 1998). Data are raw facts (Freeman, 2001) that serve as the basis for the development of information and knowledge (Willke, 1998). Unless the relevance and importance are added, data are facts that lack of meaning (Davenport and Prusak, 1998). Information is characterised as: contextual data (Galup, Dattero and Hicks, 2002); important data (King, 1993); explanation and study that have the value (Bourdreau and Couillard, 1999). Information has distinctive intentions (Drucker, 1995) and data interpretation based on predetermined perspective (Freeman, 2001).

Many studies used a knowledge hierarchy to argue that the data are first transformed into information then into knowledge (Machlup, 1983; Mason, Mason and Culnan, 1995; Nissen, Kamel and Sengupta, 2000; Quinn, Anderson and Finkelstein, 1996; Davenport and Prusak, 1997). Figure 2.1 shows the Hierarchy of Knowledge model.
However, Tuomi (1999) proposes an inverted hierarchy whereby knowledge forms the base for information to be transformed into data. Nissen (2002) expands knowledge hierarchy idea and propose two hierarchies. The first hierarchy shows the view of knowledge seeker where data are needed for the creation of information and knowledge then transforms this information into action. The other hierarchy shows the view of knowledge creator that knowledge is important to transform information and consecutively becomes important for data creation.

2.2.3 Data Transformation Model

Important elements are absent in the knowledge hierarchy model because this model only shows the relationship between different factors (knowledge, information and data). This model ignores behavioural aspects (Earl, 2001) of sharing tacit and explicit knowledge (Hicks et al., 2007). This model ignores how knowledge and accelerated organisational learning (Senge, 1990) can enhance ability of the organisation to achieve
competitive advantages (McElroy, 2003). This model also omits the acknowledgment of knowledge as a main resource for leveraging competitive advantages (Grant, 1996; Davenport and Prusak, 1997).

Based on a metaphor ‘Explicit Islands in a Tacit Sea’ (EITS), Hicks et al. (2007) created another approach of data evolution into knowledge. As shown in Figure 2.2 ‘Explicit Islands in a Tacit Sea’ (EITS), Hicks et al. (2007) use three islands to represent data, explicit knowledge and information. Explicit knowledge, being the most dynamic and demonstrable, is the apex, information is put the next level down and data are positioned at the bottom level.

**Figure 2.2  ‘Explicit Islands in a Tacit Sea’ (EITS)**

Source: Adapted from Hicks et al. (2007).
EITS model supports studies of knowledge hierarchy concepts such as Tuomi’s inverted hierarchy (1999) and Nissen’s two hierarchy (2002), and proposes that tacit knowledge is a ‘sea’ important for creating, executing and maintaining the flows of information and data. Including in the ‘sea’ are three important factors that lack a hierarchical model of knowledge: behavioural aspects, strategic knowledge management and organisational learning (Hicks et al., 2007). Behavioural aspects focus on social interactions (Nahaplet and Ghoshal, 1998). Strategic knowledge management concerns on how knowledge is combined with a strategy to produce goods and services based on knowledge assets of the organisation (Earl, 2001). Organisational learning refers to the methods and techniques used to increase the productivity of the organisation (Senge, 1990). Thus, the EITS model illustrates a holistic and contemporary approach that shows data transformation within an organisation and how organisations use knowledge in creating competitive advantage (Hicks et al., 2007).

2.3 Overview of Knowledge Management

This section briefly discusses the development, different definitions and critical success factors of knowledge management. Then, this section explores the influence of Hofstede’s (1980) dimensions of national culture on knowledge management.
2.3.1 Knowledge Management Concepts

Peter Drucker first introduced the idea of workers and knowledge (Drucker, 1983). At a United Nation conference in 1986, Karl Wiig presented ‘knowledge management’ idea of the importance of knowledge related to the performance of the organisation (Wiig, 1995; Wiig, 1993). Karl-Erik Sveiby pioneered the ‘intellectual capital’, a term used to describe intangible assets contributed to organisational value (as cited in Holsapple, 2003). Nonaka and Takeuchi (1995) later introduced the knowledge developed in conjunction with innovations in organisations in Japan in 1991. Karl Wiig continues to learn the basic of knowledge management; how organisations and individuals create, symbolise and use knowledge, and technical and practical approaches to knowledge management (as cited in Holsapple, 2003).

Pioneers of knowledge management held first conference in 1994. At the same time, Leonard-Barton’s study linked knowledge management to innovation success that includes the use of software programs that store, organise and facilitate access to information (as cited in Bennet, 2005).

In the late 1990s, growing interest in knowledge management reached its peak in 1998 (Hislop, 2010). Since then, the attention of academics in knowledge management has been extensive and ongoing (Ma and Yu, 2010) and continued at a moderately high level rather than just a temporary (Hislop, 2010). Sarvary (1999) suggests that knowledge
management involves the process whereby organisations innovate, use, spread and accumulate organisational knowledge. Wenger (1999) adds that the communities of practice and social interaction are effective knowledge management techniques. In 2002, Holsapple compiled findings from 91 international distinguished knowledge management authors and presented them in a book titled ‘Handbook on Knowledge Management’ (as cited in Bennet, 2005).

Knowledge is more than just the resources of an organisation’s resource, but an important foundation in achieving competitive advantage (Drucker, 1999; Stewart, 1997) and it is essential for long-term success of the organisation (Nonaka and Takeuchi, 1995). Having better financial and physical assets are not sufficient for organisations to achieve sustainable competitive advantage. It is important for organisations to learn how to channel intellectual capital more effectively than ever before (Mundra, Gulati and Vashisth, 2011). The increasing amount of research and studies in the field of knowledge management has facilitated the organisation to recognise and learn how to manage those knowledge assets in order to achieve better organisational competitive advantage (Alavi and Leidner, 2001; Szulanski, 2003).

Although the above paragraphs provide an overview of the concepts of knowledge management, knowledge management development is not only associated with these studies. The diversity of individuals, organisations and institutions around the world
contribute to a new thought and understanding. The following section discusses the definitions and basic dimensions of knowledge management.

### 2.3.2 Definitions of Knowledge Management

Similar to definition of knowledge, there are different definitions of knowledge management (Gloet, 2002). Most knowledge management studies, books and articles propose various explanations and definitions of knowledge management (Choi, 2000). Different authors have defined knowledge management in a different perspective and focus. Beckman (1999) describes as formalisation and use of knowledge, ability and experience to compete, promote innovation, support improved performance, and create value for customers. Coleman (1999) states that knowledge management includes a large variety of interlocking and interdependent activities that involve creating, valuating, mapping, transporting, storing, distributing and sharing of knowledge. Hibbard (1997) shows that knowledge management involves the capture of the collective experience of an organisation from documents, databases and staff’s mind, before knowledge is shared to achieve the greatest results. Knowledge management manages and gets information to the appropriate individuals at the right time, and assists individuals in the creation, acquisition, organisation, use, storage and sharing explicit and tacit knowledge with the aim to improve organisational performance and value (Alavi and Leidner, 2001; Davenport and Prusak, 1998). **Table 2.1 Definitions of Knowledge Management** lists knowledge management definitions defined by many
researchers.

Table 2.1  Definitions of Knowledge Management

<table>
<thead>
<tr>
<th>Definitions</th>
<th>Authors</th>
<th>Source</th>
</tr>
</thead>
<tbody>
<tr>
<td>“Systematic, explicit, and deliberate building, renewal, and application of knowledge to maximise an enterprise's knowledge-related effectiveness and returns from its knowledge assets.”</td>
<td>Wiig</td>
<td>Schroeder and Pauleen (2007; p.415)</td>
</tr>
<tr>
<td>“Amalgamation of concepts from the applied artificial intelligence, software engineering, business process reengineering, organisational behaviour, and information technology fields.”</td>
<td>Liebowitz and Wilcox</td>
<td>Liebowitz (1999; p.37)</td>
</tr>
<tr>
<td>“Generation, representation, storage, transfer, transformation, application, embedding, and protecting of organisational knowledge.”</td>
<td>Hedlund</td>
<td>Hedlund (1994; p.218)</td>
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<tr>
<td>“Capability of a company as a whole to create new knowledge, disseminates it throughout the organisation, and embodies it in products, services, and systems.”</td>
<td>Nonaka and Takeuchi</td>
<td>Nonaka and Takeuchi (1995; p.3)</td>
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<tr>
<td>“Systematic process for creating, acquiring, disseminating, leveraging and using knowledge to retain competitive advantages and to achieve organisational objectives.”</td>
<td>Nicolas</td>
<td>Nicolas (2004; p.20)</td>
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</tbody>
</table>
Table 2.1   Definitions of Knowledge Management (Continued)

<table>
<thead>
<tr>
<th>Definitions</th>
<th>Authors</th>
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<tbody>
<tr>
<td>“Systematic, goal-oriented application of measures to steer and control the tangible and intangible knowledge assets of organisations, with the aim of using existing knowledge inside and outside of these organisations to enable the creation of new knowledge, and generate value, innovation and improvement.”</td>
<td>Wunram</td>
<td>Wunram (2000; p.2)</td>
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<tr>
<td>“Integrated, systematic approach to identify, manage, and share all department's information assets, including databases, documents, policies and procedures, as well as previously unarticulated expertise and experience resident in individual officers.”</td>
<td>Qones</td>
<td>Akhavan, Jafari and Fathian, (2006; p.97)</td>
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</tbody>
</table>

As shown above in Table 2.1, the authors share similarities that an organisation should have procedures, processes or methods to find, get, analyse, store, distribute, share and apply tacit and explicit knowledge. However, as a term, knowledge management can be defined differently from different perspectives in different contexts.

Gao et al. (2008) categorise knowledge management approaches, methodologies, theories and tools in two clusters: soft track and hard track. Knowledge management approaches, methodologies, theories and tools in hard track assumes that the event
makes the data, the data are transformed into information, and then the information is transformed into knowledge. Knowledge management in hard track involves the use of technology, management information system, information technologies (IT), IT infrastructures, decision-support systems, expert systems or supporting software, for research and development, data mining, knowledge discovery and knowledge warehousing (Stewart, 1997; Davenport and Prusak, 1998; Davenport, 1993; Boisot, 1995). Thus, knowledge management approaches, methodologies, theories and tools in hard track focus on the management of explicit knowledge and use of information technologies (IT) to accelerate the flow of knowledge and offer a contemporary IT-based management systems to support the sharing of personal knowledge and formal knowledge accumulation (Gao et al., 2008).

Knowledge management approaches, methodologies, theories and tools in soft track focus on tacit knowledge and knowledge as different from the information. Knowledge is considered embedded in the personal of an individual. Knowledge creation is the result of social interaction (Gao et al., 2008). Knowledge management in soft track that involves the focus on people and community of practice, provides environment to create knowledge and promotes knowledge sharing culture (Nonaka et al., 1996; Wenger, 1999; Sveiby, 1997). Thus, knowledge management approaches, methodologies, theories, and tools in soft track focus on soft management issues, such as organisational learning, culture, values and vision (Edmondson and Sole, 2002; Von Krogh and Roos, 1995;

While there can be many contributions to the definitions of knowledge management, knowledge management can be defined differently from different perspectives in different contexts (Gao et al., 2008). This dissertation uses knowledge management characteristics as defined by Gao et al. (2008, p.11): “Knowledge management in a business organisation means managing the activities of knowledge workers, achieved through facilitating, motivating, leading, and supporting knowledge workers and providing or nurturing a suitable working environment.”

2.3.3 Knowledge Management Critical Success Factors

Knowledge management critical success factors are important areas performed by organisations to gain competitive knowledge management advantage (Alazmi and Zairim, 2003). For knowledge management, critical success factors are measures and focused activities that are nurtured and created to achieve better implementation. These factors create a knowledge management environment that allows organisations to support the growth and survival of knowledge management, and achieve sustainable competitive advantage through constant knowledge creation and knowledge resources maintenance (Alazmi and Zairim, 2003).
Chourides, Longbottom and Murphy (2003) suggest six critical success factors of knowledge management consisting of marketing, quality, IT, human resource management, and strategy. Steyn and Kahn (2008) propose six factors that include training, collaborative organisational structures, leadership, information and communication technologies, organisational transparency and dimensions of knowledge sharing culture. Conley and Zheng (2009) also put forward nine other factors consists of the leadership and top management support, knowledge management strategy, technology infrastructure, organisational culture, incentives, education and training, knowledge management processes, knowledge management practices, and the use of knowledge management team. Wong (2005) proposes another 11 factors that include human resources management, training and education, resources, motivational aids, processes and activities, organisational infrastructure, measurement, strategy and purpose, IT, management leadership and support, and culture.

In a multi case analysis based on data collected from several companies, like Siemens, Teltech, Microsoft, BusinessEdge Solutions, Hewlett-Packard and Ernst & Young, Akhavan et al. (2006) suggest 16 knowledge management critical success factors such as: CEO’s commitment and support, organisational culture, pilot projects, knowledge identification, knowledge storage, knowledge review, knowledge capturing, business process engineering, organisational structure, trust, knowledge management strategy, organisational transparency, knowledge sharing, experts networking, knowledge
architecture, and training.

Table 2.2 Knowledge Management Critical Success Factors highlights the many knowledge management critical success factors identified by different researchers. Based on Table 2.2, the top three knowledge management critical success factors identified are technology infrastructure, leadership or top management support, and culture.
<table>
<thead>
<tr>
<th>Authors</th>
<th>Training</th>
<th>Culture</th>
<th>Leadership/Top Management Support</th>
<th>Technology Infrastructure</th>
<th>Knowledge Strategy</th>
<th>Knowledge Infrastructure</th>
<th>Processes</th>
<th>Reward and recognition</th>
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<td>Syed-Ikhsan and Rowland (2004a)</td>
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<td>Steyn and Kahn (2008)</td>
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<td>Akhavan, Hosnavi and Sanjaghi (2009)</td>
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</table>

**Total** | 11 | 12 | 16 | 16 | 10 | 9 | 5 | 1

Source: Holsapple and Joshi (2000); Alazmi and Zairim (2003); Syed-Ikhsan and Rowland (2004a); Wong (2005); Akhavan *et al.* (2006); Steyn and Kahn (2008); Conley and Zheng (2009); Akhavan *et al.* (2009).
As discussed above, although the proposed critical success factors of knowledge management are similar, however, many discrepancies and differences are identified. As other researchers who proposed the knowledge management critical success factors, Gupta and Govindarajan (2000) create a comprehensive social dimension framework to bridge the gap between knowledge management and how to handle organisational knowledge in reality. Gupta and Govindarajan’s (2000) organisational culture framework is discussed in later Section 2.5 Knowledge Sharing Adoption Critical Success Factors.

2.3.4 Knowledge Management and National Culture

Individuals’ behaviours are influenced by cultural values and national culture held by individuals (Srite and Karahanna, 2006; Hofstede, 1993; Wei, Stankosky, Calabrese and Lu, 2008). Empirical studies show that differences in national culture may affect knowledge management (Finestone and Snyman, 2005; Voel and Han, 2005). Voel and Han (2005) show that Chinese employees showed greater willingness to participate in knowledge transfer than the employees from the United States. Finestone and Snyman (2005) also suggest that cultural diversities in South African organisations have been identified as a barrier in knowledge management. The above studies show that Hofstede’s (1994) national cultural individualism and collectivism dimensions influence knowledge management.
Hofstede (1994) shows that the national culture forms five bipolar dimensions as follows: individualism versus collectivism, power distance, uncertainty avoidance, masculinity versus femininity, and long-term versus short-term oriented. Except for the long-term versus short-term oriented dimension, the other four dimensions of national culture measure the discussions, citation and replications, discussions (Triandis, 1995; Sondergaard, 1994; Smith, 2002) and criticism (Yeh and Lawrence, 1995; Lowe, 2001). For comparison, long-term versus short-term oriented dimension is less popular (Fang, 2003). Individuals in long-term oriented cultures focus on the future and value thriftiness, persistence and postpone gratifications. In short-term oriented culture, individuals focus on the present and the past, respect for tradition, fulfill social obligations and seek instant gratifications (Hofstede, 1994). While Hofstede’s first four dimensions are based on empirical data obtained from the IBM staff in 53 countries, long-term oriented versus short-term oriented dimension data was obtained from college students in 23 countries. Both studies did not have the same empirical position because the empirical data in one study were collected from college students who have no business experiences (Fang, 2003).

**Individualism versus Collectivism:** Individualism and collectivism show individuals’ concerns about their personal interest and the interest of others (Hofstede, 1994). The issue of knowledge management based on individualism versus collectivism dimension needs the individual to choose between the individual interest
and the interest of the team (Triandis, 1995; Hofstede, 2001). Connections between individuals in individualistic cultures are less stringent because of personal interest, rather than the interest of the team, drives this culture (Lucas, 2006). The focus of individual knowledge management effort is on personal benefit than organisation (Kedia and Bhagat, 1988; Gargiulo and Benassi, 2000). While individualistic cultures view knowledge as individual assets (Kedia and Bhagat, 1988), research in Korea and Japan show knowledge management goals are achieved due to the alignment of collectivist cultures (Pak and Park, 2004; Inkpen, 1996).

**Power distance:** Power distance refers to the individual's perception of inequality between individuals in adjacent ranks (Hofstede, 2001). When the power distance is small, the decision is based on a participative approach and individuals are more willing to ask colleagues to exchange ideas rather than imposing it on the willingness of colleagues (Lucas, 2006). However, when power distance is large, there is autocratic approach to decision making and individual views of peers as subordinate and uses power to gain knowledge (Lucas, 2006). Thus, in large power distance cultures, customs and norms include bureaucratic organisational structure (Hofstede, 2001), a high respect for the superior (Srite and Karahanna, 2006) and centralised decision making (Furner, Mason, Mehta, Munyon and Zinko, 2009).
Uncertainty avoidance: Uncertainty avoidance refers to individual’s willingness towards ambiguity handling and change embracement (Hofstede, 2001). A high uncertainty avoidance culture perceives views as a risk (Hofstede, 1997; Dox, Bartlett, Christopher and Prahalad, 1981) and prefers standardised rules, exact and meticulous directions, and formalised structures (Furner et al., 2009). However, a low uncertainty avoidance culture values uncertainty and favours change. Individuals are flexible, open minded, rely on social contacts rather than strict rules (Furner et al., 2009) and have continuous wish towards experimenting new things. Thus, low uncertainty avoidance cultures may be less likely to show resistance to the process of knowledge management because individuals may be enthusiastic in the pursuit of knowledge management opportunities and are always looking for new and superior way to perform their tasks (Furner et al., 2009).

Masculinity versus Femininity: Masculinity and femininity, also known as an achievement versus nurturing, refers to individuals’ eagerness to promote social values. Masculine culture appreciates results and rewards based on competitiveness and ambition. In feminine cultures, assertiveness is less preferred and problem solving is through negotiation and cooperation (Hofstede, 2001). In knowledge management activities, norms in masculine culture are characterised by ego, power and wealth (Zander and Solvell, 2000; Kedia and Bhagat, 1988). Norms in feminine culture are characterised by supporting others and building relationships (Hofstede,
Therefore, individuals in masculine culture may only take part in activities related to knowledge if the advantages can be added to them (Lucas, 2006).

**Table 2.3 Hofstede's National Cultural Dimensions** shows the national cultural dimensions of different countries.

### Table 2.3  Hofstede’s National Cultural Dimensions

<table>
<thead>
<tr>
<th>Country</th>
<th>Individualism/Collectivism</th>
<th>Power Distance</th>
<th>Uncertainty Avoidance</th>
<th>Achievement/Nurturing*</th>
</tr>
</thead>
<tbody>
<tr>
<td>Australia</td>
<td>Individual</td>
<td>Small</td>
<td>Moderate</td>
<td>Strong</td>
</tr>
<tr>
<td>Canada</td>
<td>Individual</td>
<td>Moderate</td>
<td>Low</td>
<td>Moderate</td>
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<tr>
<td>England</td>
<td>Individual</td>
<td>Small</td>
<td>Moderate</td>
<td>Strong</td>
</tr>
<tr>
<td>France</td>
<td>Individual</td>
<td>Large</td>
<td>High</td>
<td>Weak</td>
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<tr>
<td>Greece</td>
<td>Collective</td>
<td>Large</td>
<td>High</td>
<td>Moderate</td>
</tr>
<tr>
<td>Italy</td>
<td>Individual</td>
<td>Moderate</td>
<td>High</td>
<td>Strong</td>
</tr>
<tr>
<td>Japan</td>
<td>Collective</td>
<td>Moderate</td>
<td>High</td>
<td>Strong</td>
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<tr>
<td>Mexico</td>
<td>Collective</td>
<td>Large</td>
<td>High</td>
<td>Strong</td>
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<tr>
<td>Singapore</td>
<td>Collective</td>
<td>Large</td>
<td>Low</td>
<td>Moderate</td>
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<tr>
<td>Sweden</td>
<td>Individual</td>
<td>Small</td>
<td>Low</td>
<td>Weak</td>
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<tr>
<td>United States</td>
<td>Individual</td>
<td>Small</td>
<td>Low</td>
<td>Strong</td>
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<tr>
<td>Venezuela</td>
<td>Collective</td>
<td>Large</td>
<td>High</td>
<td>Strong</td>
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</table>

* A weak achievement score is equivalent to high nurturing.

Source: Based on Hofstede (1980).

The above discussion and **Table 2.3** suggests that national culture influences knowledge management success factors and knowledge sharing adoption in many countries.
2.4 Overview of Knowledge Sharing

This section defines knowledge sharing and explores knowledge sharing behaviour and the individual factor and motivation to share knowledge. This section discusses knowledge sharing techniques/tools commonly used by organisations.

2.4.1 Definition of Knowledge Sharing

Although previous studies are using the term knowledge management and knowledge sharing in turn, many studies have shown that knowledge sharing is part of the process of knowledge management (Sohail and Daud, 2009; Kim and King, 2004; Tiwana, 2002).

Knowledge sharing is the process whereby individuals’ explicit and tacit knowledge are reciprocally exchanged for constructing innovative knowledge (Van Den Hooff and De Ridder, 2004). Knowledge sharing is the extent to which members of the organisations shows information related to the organisation capabilities, suggestions and ideas (Bartol and Srivastava, 2002), which can support the actions of others (Heide and Miner, 1992). McDermott (1999) adds that knowledge sharing involves directing the mind of individuals or applying their own knowledge to help others’ perceptions that promote problem solving. Knowledge sharing occurs when the recipient has successfully internalised the knowledge (Cummings and Teng, 2006).
Measure of knowledge sharing also depends on the recreation of knowledge of the recipient (Kostova, 1999; Cummings and Teng, 2006). In this dissertation, knowledge sharing is defined as “activities of transferring or disseminating knowledge from one person, group or organisation to another” (Lee, 2001, page 324).

2.4.2 Knowledge Sharing Behaviour

Knowledge sharing is an important element of knowledge management because it supports the repository codification of ready knowledge in an organisation (Liebowitz, 1999). Knowledge sharing is an important process because when knowledge is not shared, cognitive resources in an organisation remain underused (Argote, 1999).

However, knowledge sharing goes beyond the sharing of information because knowledge sharing involves a process of social interaction (Nonaka and Takeuchi, 1995) that stimulate the exchange of thoughts, experiences and ideas among the staff (Ismail, Nor and Marjani, 2009). Knowledge sharing behaviour gives and receives knowledge (Ardichvili, Page and Wentling, 2003). Vries, Hooff and Ridder (2006) identify two basic knowledge sharing behaviour: knowledge donation in which the individual’s personal intellectual capital is communicated to the recipient; and the collection of knowledge in which the individual asking colleagues to share their
intellectual capital. Vries et al. (2006) suggest that engaging in knowledge sharing is on a temporary basis, because these individuals expect their colleagues to share their knowledge to achieve a balance between knowledge donation and knowledge collection (Putnam, 1993; Nahaplet and Ghoshal, 1998; Adler and Kwon, 2002). For eager individuals, the behaviour of peers is less important. Behaviour of individuals with a willingness to share knowledge may not take the first step to sharing knowledge unless their colleagues are willing to contribute their knowledge. However, individuals with passion of knowledge sharing are immediately contributing knowledge based on their personal views rather than their knowledge collection (Chen, Chen and Meindl, 1998). However, the willingness and eagerness are only related to knowledge donation and knowledge collection behaviour (Vries, et al., 2006).

Regardless of whether knowledge sharing behaviour is the willingness or eagerness, every individual has two choices, the choice to engage or not engage in knowledge sharing. The choice depends on individual intentions, needs, attitudes and motivation to share knowledge (Castelfranchi, 2004). When individuals do not wish to share, they may not share even if the best technology is ready for use. Individuals may not share if they do not see what’s in it for them (Garvin, 1997).
Therefore, organisations need to acquire competencies and skills to promote and encourage the sharing of knowledge among staff, that enables organisations to utilise their richest resources – knowledge (Michailova and Husted, 2003).

2.4.3 Motivational Factors for Knowledge Sharing – Individual Dimensions

Davenport and Prusak (1998) argue that knowledge sharing is usually not natural and individuals do not share their knowledge if they believe that knowledge is valuable and important. However, individuals may be motivated to share knowledge for the individual character, behaviour, roles duties, shared goals and values or individual goals (Castelfranchi, 2004). An explanation that recognises individual attitudes and behaviour in organisation is found in the Maslow's hierarchy of needs (Maslow, 1987). Maslow (1987) classifies human basic needs into five levels, with self actualisation at the top, followed by esteem, belongingness, security, and physiological at the bottom level. Unsatisfied need drives behaviour; higher needs triggered the next level once lower level needs are satisfied. Jacobson (2007) identifies that individuals work on their knowledge sharing behaviours because knowledge sharing can meet different needs, such as supporting mutual relationship, increase power and status, strengthen personal abilities and knowledge, enhance reputation, and ensure job security.
Although the literature reviews show many motivational factor for knowledge sharing behaviours, motivational factors are classified into individual and organisational dimensions (Connelly and Kelloway, 2003). Most commonly discussed factors in individual dimensions are: self-efficacy (Lin, 2007a; Bandura, 1986; Luthans, 2003; Wasko and Faraj, 2005), job satisfaction (Salancik and Pfeffer, 1977; Engstrom, 2003; Vries et al., 2006), and trust (Bijlsma and Koopman, 2003; Zand, 1972; Ma et al., 2008; Davenport and Prusak, 1998; Dirks and Ferrin, 2001; Ridings, Gefen and Arinze, 2002; Volery and Menisk, 1998; Nahapiet and Ghoshal, 1998; Fukuyama, 1995). Most commonly discussed factors in organisational dimensions are discussed in Section 2.4.4 Motivational Factors for Knowledge Sharing – Organisational Dimensions.

**Self-efficacy:** Self-efficacy is individual’s judgments of his or her ability to organise, execute and achieve thriving performance in everyday tasks rules (Lin, 2007; Bandura, 1986). The tendency of individuals to take actions such as level of problems, expressed interest, persistence and task effort is subjected by the individual sense of self-efficacy (Gist and Mitchell, 1992; Gist, 1987; Bandura, 1997).
Knowledge self-efficacy strengthen individuals trust who know that by contributing knowledge, they can help organisation to solve problems, improve work efficiency (Luthans, 2003) and individuals becomes more inclined and motivated to share knowledge with colleagues (Wasko and Faraj, 2005). Lin’s (2007) study of 50 large Taiwan organisations consisting of 172 respondents shows that the staff may increase their willingness to donate and collect knowledge when they think that their knowledge sharing contributions improve organisational performance.

**Job satisfaction**: Salancik and Pfeffer (1977) show that job satisfaction positively influences individual behaviour, motivation and attitudes. Job satisfaction of individual brings about greater willingness and eagerness to contribute its experience, skill and knowledge to others (Engstrom, 2003; Vries *et al*., 2006). In a study consisting of 424 individuals belonging to different work-related teams, job satisfaction and self rated performance are associated to eagerness and willingness to work on knowledge sharing (Vries *et al*., 2006).

**Trust**: Nelson and Cooprider (1996) states that the trust has a precursor relationship to share knowledge and to work with shared knowledge to influence the outcome of a team effort. Other studies further showed that trust among members of the organisation can encourage voluntary collaboration (Bijlsma and Koopman, 2003) and individuals are more inclined towards providing useful knowledge when there is
trust (Zand, 1972). Without trust, individuals may become less willing to pay attention to take up other’s knowledge (Mayer, Davis and Schoorman, 1995) and to share knowledge with others (Ma et al., 2008; Davenport and Prusak, 1998). With perceptions of high level of trust in the workplace, staff is more likely to show an extra role behaviour and tends to hold the knowledge and skills (Dirks and Ferrin, 2001). Trust increases individual’s willingness to engage in knowledge sharing activity (Ridings et al., 2002; Volery and Menisk, 1998; Nahapiet and Ghoshal, 1998; Fukuyama, 1995).

2.4.4 Motivational Factors for Knowledge Sharing – Organisational Dimensions

Motivational factors in organisational dimensions such as: management leadership and support (Wong, 2005; Riege, 2005; Artail, 2006; Song, 2009), organisational culture (McDermott and O'Del, 2001; Lucas and Ogilvie, 2006; Wallace, Hunt and Richards, 1999; Conley and Zheng, 2009; Kaweevisultrakul and Chan, 2007), organisational structure (Myers, 1996; Davenport et al., 1998; Bennett and Gabriel, 1999), information technology infrastructure (Hsu, 2008; Alavi and Leidner, 2001; Ardichvili et al., 2003; Vries et al., 2006), and incentives and rewards (Bartol and Srivastava, 2002; Wong, 2005; Davenport et al., 1998) would be discussed in this section.
**Management leadership and support:** Effective use of knowledge involves the intervention of leadership associated with the vision and direction changes (Anantatmula, 2008). Management involvement is important in nurturing the trust and in promoting knowledge sharing culture (Riege, 2005; Artail, 2006). The leader is a role model for exemplifying the preferred knowledge sharing behaviour in organisations (Wong, 2005). In addition to affecting the present of knowledge resources in organisation, leadership influences knowledge sharing behaviour because managers need to coordinate, encourage, motivate, guide and inspire staff participation in knowledge sharing activities (Vries *et al.*, 2006; Song, 2009).

**Organisational culture:** As an organisational culture is a set of assumptions, values, attitude, beliefs, shared understandings, norms and practices (McDermott and O'Del, 2001), it sets up individual and collective behaviour towards adaptation of innovation and change (Kaweevisultrakul and Chan, 2007; Lucas and Ogilvie, 2006). Organisational culture affects the manners on how the knowledge is ranked and influences the attitude of staff towards using, managing and creating knowledge (Wallace *et al.*, 1999; Conley and Zheng, 2009). When there is ‘transparency’, one facet of organisational culture, organisation may share and perceive failures, mistakes and errors as learning opportunities (Marchand, Kettinger and Rollins, 2002). Therefore, the successful knowledge sharing depends on whether organisations can create a culture that encourages and rewards knowledge sharing.
(Broady-Preston and Williams, 2004).

**Organisational structure:** Organisational structure influences and determines the accessibility of resources, allocation of decision making rights, the definition of the division boundaries, and labour assignment in a separate department (Myers, 1996). An appropriate organisational structure sets up the suitable roles and team composition to execute knowledge related tasks (Davenport *et al.*, 1998).

Organic organisations are superior to the mechanistic organisations in innovation and creativity (Damanpour, 1991) because the organic structure grows and advances individuals (Kennedy, 1983). Informal and flexible structure help internal communications, increase the willingness to change, drive more activities for gathering information, cultivate vital attitude in information analysis and promote individual initiatives (Bennett and Gabriel, 1999).

In mechanistic organisations, because of bureaucratic and inflexible regulations, the individual may be allowed limited autonomy (Ahmed, 1998). Thus, the formalisation of communication led to difficulties in the sharing and flow of knowledge (Wang and Ahmed, 2003). Hierarchical functional structure hinders information flow across departments and hierarchical borders. Extreme specialisation of work processes hinder the incorporation of expert knowledge and prompt reactions to the aggressive
business situations (Cross, 2000).

**Information technology (IT) infrastructure:** IT infrastructure is important in improving internal communication and knowledge flows that enhance the facilitation of creating, storing, and sharing of knowledge (Hsu, 2008; Alavi and Leidner, 2001). IT infrastructure consists of software and hardware used to improve the timeliness and scope of knowledge sharing (Ardichvili et al., 2003); to complete personal tasks effectively; and to support colleagues in creating, sharing and transferring knowledge (Vries et al., 2006). Gupta and Govindarajan (2000) find that IT has an important role in knowledge management as a practical mechanism that helps the communication between individuals of the most geographically distributed. However, although the IT infrastructure improves the effectiveness and efficiency of staff, have access to advanced technologies does not indicate that staff may use them to share knowledge. Conversely, when the technology is not complicated to attract, with adequate training, staff are confidence and are encouraged to apply this technology in knowledge sharing (Han and Anantatmula, 2007).

**Incentives and rewards:** Based on Vroom’s (1964) expectancy theory, individual action depends on the expected consequences. Incentives and rewards in monetary and non monetary value (Bartol and Srivastava, 2002) are often recommended to motivate staff to participate in knowledge sharing adoption (Wong, 2005; Davenport
Combining knowledge sharing performance as a criterion in performance evaluation and a decision on the promotion and merit payment may be associated to knowledge sharing in formal communication (Bartol and Srivastava, 2002). In addition, when performance is rewarded at a team level, individuals who shared their knowledge with team members are likely to have a higher knowledge sharing motivation when they assume that the knowledge shared may improve team performance and consecutively increases personal rewards received (Bartol and Srivastava, 2002).

### 2.4.5 Knowledge Sharing Techniques/tools

Alavi and Leidner (1999) suggest that retrieval tools, electronic mail and intranet, are frequently used methods for distributing knowledge in organisations. Zhou and Fink (2003) show that email, internet and intranet are three most popular knowledge sharing tools used. Yao et al. (2007) show that informal personal network and face to face are the most common knowledge sharing tools used in Hong Kong government. Based on findings from a national survey among over 1500 Australian organisations, Xu and Quaddus (2005) show the rank to the knowledge sharing tools, from the lowest to the most often used, namely: search tools, data warehousing, workflow systems, online discussion forum, video conferencing, customer management systems, document management systems, intranet, databases, internet and email.
Singh et al.’s (2006) study of engineering companies in India show similar results with the Australian survey conducted by Xu and Quaddus (2005). Top three popular knowledge management tools are email, leadership involvement and internet. Moderate knowledge management tools used are the customer management systems, executive information support, reward system, recognition system, workflow, groupware, electronic document management, pride and professional ethics, cross functional team, organisation intranet. Less attractive knowledge sharing tools are video conferencing, yellow pages, extranet, data warehousing, data visualisation, and data analysis.

In a survey conducted in two large IT organisations in the U.S., Han and Anantatmula (2007) also show that organisations provide staff different knowledge sharing tools. Ranked from least popular to the most popular tools are telephone conference, video conference, facsimile, telephone, email, intranet. Groupware, knowledge management software and web conference are not ready for use. Internet, video conference, telephone, email, intranet, groupware, knowledge management software and web conference are not significant predictors of knowledge sharing.

In another survey conducted in 70 large United Kingdom construction organisations, Carrillo, Robinson, Al-Ghassani and Anumba (2004) classify knowledge management tools into IT related and non IT related tools. Electronic discussion
forums (15.1%), document management systems (37.7%), database systems (62.3%) and intranets (73.6%) are the top four rated IT related tools; but data warehousing and data mining are not common in UK organisations. For non IT related tools, job rotation and observation (8%), research collaboration (21%), brainstorming (25%), communities of practice (33%), as well as conferences and seminars (38%), are the main tools of knowledge management. Different non IT related tools used in organisations with different sizes are shown in **Figure 2.3 Non IT related tools by Organisation sizes**.

**Figure 2.3 Non IT related tools by Organisation sizes**

Source: Adapted from Carrillo et al. (2004).
2.5 Knowledge Sharing Adoption Critical Success Factors

The first part of this section discusses different framework of knowledge sharing adoption. Then, critical success factors of knowledge sharing adoption commonly identified are explored in detail. This section presents the findings of empirical studies on knowledge sharing adoption success in different countries.

Organisational knowledge sharing conceptual framework

Based on the literature review from various fields of study, such as organisational behaviour, communication, information and decision sciences, strategic management and management theory, Ipe (2003) creates a conceptual framework of organisational knowledge sharing. As shown in Figure 2.4 Organisational Knowledge Sharing conceptual framework below, this framework forms four main interrelated factors that influence each other in a non-linear manner.
Firstly, Ipe (2003) proposes that knowledge sharing within an organisation depends on the nature of knowledge in relation to knowledge tacitness and explicitness as well as the perceived value of shared knowledge. Secondly, opportunities for sharing knowledge in an organisation are formal and informal in nature. Formal opportunities, also known as purposive learning channels (Rulke and Zaheer, 2000), are a specially designed environment that explicitly help the knowledge sharing activities, for example, technological based systems, structured work team and training workshops. Informal opportunities, also known as relational learning channels, are the informal personal relationships created when individuals interact with each other (Truran, 1998; Pan and Scarbrough, 1999). Lastly, Ipe (2003) classifies internal and external factors of motivation for knowledge sharing. Internal
factors include the perception of power attached to knowledge and the reciprocity of knowledge sharing activities. External factors include the relationship between the sharer and the recipient, subjected to the current trust between parties, the status and power of the recipient, and the perceived and real incentives and rewards for the individuals involved in knowledge sharing activities.

Although the above mentioned factors are important in promoting the understanding on how knowledge sharing happens among individuals, these three factors are embedded in working environment culture that refers to organisational culture (Ipe, 2003).

**Contexts of knowledge sharing framework**

Cummings and Teng (2006) suggest five basic factors affecting the success of knowledge sharing. As shown in **Figure 2.5 Five contexts of Knowledge Sharing Framework**, the first factor is the relational context that includes various forms of distance between the parties (source and recipients). Relationship distance refers to quality of work experiences between the parties; knowledge distance refers to knowledge gaps between the parties; institutional distance refers to institutional environments alikeness between the parties; physical distance refers to geographical proximity between the parties; and organisational distance refers to governance manners that inter-organisation and internal transfer is carried out. The second factor
is knowledge context that includes two characteristics of knowledge: the knowledge explicitness and the knowledge embedded in people, tools and routines. The third factor is recipient context that includes learning culture and learning capabilities. Learning culture refers to foster learning through delegating responsibilities, tolerate creative mistakes and provide relaxed working time on innovative thinking. Learning capabilities refers to the ability of recipient to accept, keep and nurture new knowledge (Cummings and Teng, 2006). The fourth factor is the source of context that includes the credibility of source and motive to complete the transfer of knowledge (Arrow, 1971). Credibility of the source depends on the perceived value of recipients of the knowledge shared; and motive refers to the act in which the source or recipient stops or less actively takes part in knowledge sharing effort when one party has reached his or her goals from the sharing arrangements (Khanna, Gulati and Nohria, 1998). The fifth factor is the environmental context refers to the environmental variables, such as technological, national culture, political, and economic, that can affect the way individuals perform activities in knowledge sharing (Cummings and Teng, 2006).
In addition to the three different frameworks for knowledge sharing adoption discussed above, many previous studies proposed critical success factors of knowledge sharing adoption as shown in Table 2.4 Knowledge Sharing Adoption Critical Success Factors.
Table 2.4  Knowledge Sharing Adoption Critical Success Factors

<table>
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<tr>
<th>Source &amp; Authors</th>
<th>Culture</th>
<th>Leadership/ Management Support</th>
<th>Technology Infrastructure</th>
<th>Knowledge Network</th>
<th>Organisational Structure and incentives</th>
<th>Reciprocal benefits</th>
<th>Trust</th>
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Table 2.4 Knowledge Sharing Adoption Critical Success Factors (Continued)

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<th>Source &amp; Authors</th>
<th>Culture</th>
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<th>Organisational Rewards and incentives</th>
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As discussed above, although many authors show many differences on knowledge sharing adoption critical success factors, they also show similarities. The following section discusses in detail the critical success factors of knowledge sharing adoption based on Gupta and Govindarajan’s (2000) organisational culture framework, such as organisational culture, leadership, information systems, processes, organisational structure, reward system, and people (trust, communication and motivation).

Gupta and Govindarajan (2000) organisational culture framework

Gupta and Govindarajan’s (2000) framework of organisational culture seeks to show how the social dimension influence the identifying, creating, acquiring, sharing, and retaining of knowledge. Gupta and Govindarajan (2000) propose that effective knowledge management success is a result of greater reliance on technology infrastructure, not on the social ecology of organisation or organisational culture. Social ecology sets informal and formal expectations of members, sets the type of staff matched the organisation, outlines staff autonomy in pursuing the action, and influences staff communication with individuals in and outside the organisation (Gupta and Govindarajan, 2000).

As shown in Figure 2.6 Gupta and Govindarajan organisational culture framework, the social ecology makes up the six knowledge management success factors that encompass diverse social facets in which the individual functions and
this framework offers important condition for successful knowledge management. In addition, these six success factors of knowledge management are considered as a comprehensive whole that interact with each other, rather than a random collection of unrelated essentials.

Figure 2.6 Gupta and Govindarajan Organisational Culture Framework

Source: Gupta and Govindarajan (2000); Al-Alawi et al. (2007).

2.5.1 Organisational Culture

This section reviews the relationship between knowledge management and organisational culture. Important organisational culture attributes that support effective knowledge management will be identified and discussed.
Knowledge management and organisational culture

The need for effective knowledge management is to build an effective social ecology or organisational culture in which individual tasks are done effectively (Gupta and Govindarajan, 2000). Organisational culture refers to the shared beliefs, values, attitude, assumptions norms of behaviour and ways of doing things in an organisation (Wallace et al., 1999; McDermott and O'Del, 2001; Kaweevisultrakul and Chan, 2007). Organisational culture characterises a core set of values that govern employees’ attitudes towards adapting to change and their behaviour to the introduction of new things (Lucas and Ogilvie, 2006; Kaweevisultrakul and Chan, 2007).

As mentioned above, although organisational culture is illusive and intangible, it can be pragmatic at values, norms, and practices of organisations (Schein, 1999; Trice and Beyer, 1993). Values, embedded at the deepest level of the organisational culture, are hard to articulate and change (De Long and Fahey, 2000). Values are tacit inclinations about what organisations are trying to do and ways to executes it (De Long and Fahey, 2000). The influence of values on knowledge management is evident in the behaviour and should not be underestimated. For example, values that encourage staff to consider the client as a partner may lead to the increased motivation of staff behaviour that value the clients’ knowledge. Normally derived from values, norms are more obvious and simpler for staff to recognise. For example,
when the staff believes that knowledge sharing invites personal risks and cuts power, the social norms that guide the behaviour of staff may not support the exchange of knowledge. Being a symbol of the most observed in the display of organisational culture, the practice is repetitive behaviour understood by the staff. Practices offer the utmost straightforward levers behaviour change needed to sustain the creating, using and sharing of knowledge. Organisational culture shapes knowledge management behaviour in four ways. Organisational culture outlines assumptions about knowledge important to the organisation. Culture describes knowledge structure that the organisation needs to regulate the use of knowledge, forms of social interaction and communication environment using rules and practices, and determine how new knowledge is created and adopted (De Long and Fahey, 2000).

For not having the the right organisational culture, knowledge management will face a problem, and is unlikely to take place (Gold et al., 2001; Davenport and Prusak, 1998). Scholars, practitioner and academics agree that organisational culture to support knowledge management needs to be established within the organisation to achieve successful knowledge management initiatives (Lee and Choi, 2003; Park et al. 2004). Moffett, McAdam and Parkinson (2003) conduct a survey in three industry sectors that comprise more than 1000 organisations and suggest a strong association between organisational culture and knowledge management. Ruggles (1998) distribute questionnaires to more than 400 United States and European organisations
and recognise the organisational culture as a constraint that applies to knowledge management.

Syed-Ikhsan and Rowland (2004a) show that knowledge management success depends on organisational culture in determining the influence of management techniques and technologies for knowledge management. Davenport et al. (1998) stated that organisations have to ensure that knowledge management projects fit their organisational culture, or else, organisations need to be ready to change its culture. McDermott and O'Del (2001) also echo this perspective that successful knowledge management implementation happens when organisations construct their knowledge management approach to fit organisational culture rather than alter organisational culture to fit knowledge management approach. In the same way, Stoddart (2001) sustains that knowledge sharing only works when organisational culture promotes it and changes have to be formed in alignment with organisational culture.

Besides constituting a vital success factor in the knowledge management process, organisational culture influences other organisational aspects, such as human resources management, management style or structure (Donate and Guadamillas, 2010). Thus, successful knowledge management involves the balance of visible and invisible cultural dimensions (McDermott and O'Del, 2001).
Organisational culture attributes

As discussed in Section 2.3.3 Knowledge Management Critical Success Factors and Table 2.2 Knowledge Management Critical Success Factors, many researchers recognise organisational culture as knowledge management critical success factors (Steyn and Kahn, 2008; Conley and Zheng, 2009; Wong, 2005; Akhavan et al., 2006; Alazmi and Zairim, 2003). Schein (1999) asserts that although many survey instruments support identification of cultural relics and values, important tacit shared assumptions in an organisation have not been identified. The aim of literature review in this section is to get a comprehensive understanding of organisational culture attributes, by showing organisational culture attributes with its distinctive dimensions.

Organisational culture influences in knowledge management environment are often affirmed in different term. Using a case study analysis, Oltra (2005) identifies staff commitment, cultural change, cooperation and trust as organisational culture attributes for effective knowledge management. Benbya and Belbaly (2005) propose social relations person-organisation fit, social interaction culture, organisational climate, and trust level as organisational culture attributes. Besides, many studies done in the United States of America suggest that organisational culture attributes needed for successful knowledge management includes trust, cooperative involvement (DeTienne, Dyer, Hoopes and Harris, 2004), fairness, enthusiasm, team
oriented work, working closely with others, and sharing information freely (Park et al., 2004).


O'Reilly, Chatman and Caldwell (1991) create an organisational culture profile, an important acknowledged framework to show organisational culture attributes comprising 54 items that could be applied to describe an organisation. As shown in Table 2.5 Organisational culture profile attributes, Harper (2000) reduces the cultural attributes to 44 items.
Table 2.5  Organisational Culture Profile Attributes

<table>
<thead>
<tr>
<th>Source: Adapted from O'Reilly et al., (1991); Harper (2000).</th>
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<tr>
<td>Davenport and Prusak (1998) also offer another set of important organisational culture attributes, such as the need for support, open-mindedness for mistakes, willingness to share beyond own team, rewards and status, not only limited to knowledge holders, absorptive ability of knowledge recipients, meeting places and times, frames of reference, vocabularies, common sub cultures, and trust.</td>
</tr>
<tr>
<td>As discussed above, although important organisational culture attributes proposed by different authors are to some extent similar, yet many discrepancies and differences are identified. Such differences may be attributed to values, norms, and practices of organisations (Schein, 1999; Trice and Beyer, 1993).</td>
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2.5.2 Leadership

Leadership refers to the functions that leadership to create a knowledge management initiative efforts (Gupta and Govindarajan, 2000; DeTienne et al., 2004). When leaders perceive knowledge as a main resource and knowledge sharing as the basis for value creation, they may sustain varieties of knowledge management practices, aims for knowledge sharing facilitation in the organisation as their main aim (Davenport and Prusak, 1998). The manners on how leaders perceive knowledge creation, sharing, and usage in creating competitive advantage (Grover and Davenport, 2001; Bartlett and Ghoshal, 2002; Collins and Porras, 1996) may affect the formulation of knowledge sharing practices and policies (Hsu and Wang, 2008). Leaders therefore influence the nature, exploitation and use of knowledge resources in organisation (Steyn and Kahn, 2008).

Leaders’ roles are important in modelling the preferred knowledge management behaviour (Wong, 2005). Leaders who show willingness towards sharing knowledge and providing their knowledge generously to staff, model their actions and behaviour by influencing staff to imitate (Wong, 2005). Therefore, the organisation leaders set the social norm that sets staff’s knowledge sharing behaviour (Alavi et al. 2005).
As implementation of knowledge management initiatives involve changes in the ways things are done and therefore affects staff’ behaviour, leaders’ commitment and continual support in knowledge management programs are important in nurturing the trust needed to uphold a knowledge sharing culture (Riege, 2005; Artail, 2006). Management may create an environment that cultivates staff’s achievement and use of knowledge management skills, by providing handy access to the knowledge resources needed (Steyn and Kahn, 2008).

2.5.3 Information Systems

The most important role of information systems in knowledge management is that it expands the achievements and raises the level of knowledge management (Tiwana, 2000). Information systems that improve the flow of information are an integral part in the knowledge management system (Galandere-Zile and Vinogradova, 2005). Organisation-wide infrastructure to build knowledge management involves the incorporation of several different tools and technologies (Galandere-Zile and Vinogradova, 2005).

Information systems refer to knowledge sharing tools and technologies supporting communications among processes, people and the data in everyday decision making process and operations (Whitten, Bentley and Dittman, 2001). Information systems can be categorised as e-learning, data mining, collaboration, customer service
management, content and document management, collaboration, knowledge base, and business intelligence (Luan and Serban, 2002).

Information systems are vital elements needed to cut communication barriers and link information and communication systems (Teece, 1998; Duncan, 1972; Argyris and Schon, 1978) that enhance mobilisation of social capital towards creating innovative knowledge (Gold et al., 2001). Information systems enhance organisational capabilities to capture, define, store, categorise, index, transfer and store explicit knowledge (Zack, 1994). Marx and Smith (1994) said technology is the driver that sets up the revolutionised social system. From a strategic perspective, information systems accommodate because information systems can be customised to fit different users’ motives and purposes (Zuboff, 1988; Thomas, 1994; Barrett, Cappleman, Shoib and Walsham, 2004).

However, information systems used to support knowledge management must be adapted to organisational needs but not vice versa (Egbu, Hari and Renukappa, 2005). Although information systems enhance speed and effectiveness in distributing knowledge (Alavi and Leidner, 1999), information systems are unlikely to support knowledge management if there is no knowledge sharing practice (McDermott, 1999). As knowledge is inherently in the mind of the individual, the genuine challenge for organisations interacting relationship is multifaceted among context,
content, and knowledge workers (Massey, Montoya-Weiss and O'Driscoll, 2005). Organisations have to create and implement suitable structure and processes to encourage staff’s knowledge sharing efforts (Gold et al. 2001).

Thus, in creating information systems, organisations have to think about important issues, such as suitability to standardisation of knowledge structure, relevancy of knowledge content, the user’s needs, ease of use, and simplicity of technology (Wong, 2005). However, for organisational knowledge to flow, organisations may look for the equilibrium among people, structure, processes and technologies (Brown and Duguid, 2000).

2.5.4 Processes

Efficient knowledge management processes create important organisational intellectual capital and intangible resources, which produce values, improve performance and growth (Nold III, 2012). When the organisation is able to capture the tacit knowledge held by employees and transform it into explicit knowledge, the entire organisation will gain from it (Erickson, Rothberg and Carr, 2003). The result is that when organisations manage their knowledge assets better than their opponents, the organisation will have a greater chance for a better performance in the market (Erickson et al., 2003; Rahab, Sulistyandari and Sudjono, 2011).
Processes are an important aspect of knowledge management that includes creating, acquiring, retention, identifying, inflow, outflow, and transmit knowledge (Gupta and Govindarajan, 2000). The different important aspects of knowledge management processes identified are process, control (Ivers, 1998), use, transfer, create (Spender, 1996; Skyrme and Amidon, 1998), exploit, integrate, assemble, transfer, create (Teece, 1998), experiment, integrate, collaborate, and acquire (Leonard, 1995).

Nonaka and Takeuchi (1995) suggest that knowledge management is a constant accumulation, exploitation and discovery of new knowledge that form the four methods of transfer of explicit and tacit knowledge: socialisation, externalisation, combination and internalisation. Socialisation involves the transfer of tacit knowledge to other individuals, in which new tacit knowledge can be made by the recipient; externalisation involves the encoding of tacit knowledge into explicit format; combination involves changes in encoded form or add a new context that translates explicit knowledge into new explicit format; and internalisation of explicit knowledge accesses and understands where the new tacit knowledge is created.

Gold *et al.* (2001) also show that knowledge management processes can be classified into four broad groups: acquisition, conversion, application, and protection of knowledge. Knowledge acquisition involves seeking and acquiring new knowledge, creating knowledge from knowledge through cooperation with individuals and
corporate associates (Nonaka and Takeuchi, 1995; Leonard, 1995; Inkpen, 1996; Cole, 1998). Knowledge conversion involves organising, structuring and coordinating the tacit and explicit knowledge so that knowledge becomes easier to use and distribution within the organisation (O’Dell and Grayson, 1998; Nahaplet and Ghoshal, 1998). Knowledge application refers to the effective knowledge using and sharing (Johannessen, Olsen and Olaisen, 1999). Knowledge protection involves protecting knowledge from illegal uses and unsuitable usages or theft. Besides prevention measures in technology infrastructure, other protection measure includes governing staff’s manner and behaviour (Porter-Liebskind, 1996; Hansen, Nohria and Tierney, 1998; Caplan, Naidu and Tripathi, 1984).

Dixon (2000) concludes that the choice of processes depend on suitable classifications of explicit and tacit knowledge, regularities and frequencies of knowledge sharing processes, and knowledge receivers (whole organisation, group or individual). In a qualitative study conducted in India, Goel, Sharma and Rastogi (2010) highlight the relevance of knowledge management processes in retaining and leveraging knowledge in organisations. Furthermore, in a global survey conducted by Chase (1997) involving 73 respondents, 8% of respondents reported that their organisations are good in transferring knowledge to other parts of organisations; 6% of respondents suggest that their organisations are efficient at leveraging knowledge to improve performance; and 25% of respondents claim that their organisations are
good in generating new knowledge.

2.5.5 Organisational Structure

Organisational structure refers to the exploitation of communication mechanisms and systems that strengthen the competence of knowledge sharing (Gupta and Govindarajan, 2000). Suitable organisational structure sets up roles definition and points out a permanent arrangement of activities and tasks (Skivington and Daft, 1991) to execute responsibilities associated knowledge (Davenport et al., 1998). Organisational structure also offers directions in setting up individuals to work together in doing tasks (Rapert and Wren, 1998).

Besides leveraging technological architecture, organisational structure supports the exchange of tacit knowledge through interactions, sharing and collaboration with other knowledge workers across internal organisational boundaries (Walczak, 2005; Gold et al., 2001). Organisational structure, among them process, policy, incentives and reward systems, can decide the direction the knowledge flows (Leonard, 1995). Relevant organisational structures affect employees' behaviour and attitudes of knowledge management (Sabri, 2005).
However, Syed-Ikhsan and Rowland (2004a) notice that the flow of information depends on the level of the organisation because of the time needed for information to pass each level. Formal organisational structure can also limit the reporting of information on the division line, thus limiting the flow of information and any contact from each division to knowledge accumulated by other divisions (Syed-Ikhsan and Rowland, 2004a).

### 2.5.6 Reward System

Reward system refers to the presence and efficiency of team and individual incentives for knowledge sharing efforts (Gupta and Govindarajan, 2000; Goh, 2002; Syed-Ikhsan and Rowland, 2004a). Besides individual rewards, team rewards can be used to motivate team members to cooperate and coordinate efforts toward achieving group aims (Dulebohn and Martocchio, 1998).

Reward can be classified as outcome oriented or behaviour oriented (Lucas and Ogilvie, 2006). Results-oriented rewards are for staffs who have achieved specified and measurable targets. Oriented behaviour influences staff’s manners on doing their tasks (Lucas and Ogilvie, 2006). Structured incentive and reward systems motivate employees to take part in sharing, learning and generating knowledge with individuals from other departments (O’Dell and Grayson, 1998; Argote and Epple, 1990).
Characteristics of reward systems for motivating individuals’ behaviour include the perceived fairness of rewards, staff setting challenging goals to get rewards, and practices that allow staff’s high self-efficacy for completing the assignments (Lucas and Ogilvie, 2006; Bartol and Locke, 2000).

2.5.7 People (Trust, Communication and Motivation)

Although the organisation is using modern telecommunication and information technology to assist the management of knowledge across distance and time, such technologies often face challenges in persuading staff to use this system to share ideas (Cabrera and Cabrera, 2002). Even if the organisation succeeds in getting staff to use these technologies, the biggest hurdle is in motivating staff to communicate and share their knowledge (Desouza, 2003).

Innovative behaviour of organisations is significantly influenced by staff’s competencies (Tidd, Bessant and Pavitt, 1997) and the manners in which staff apply their abilities and skills to meet superior performance in using knowledge (Monavvarian and Khamda, 2010). Productive work applies concepts, knowledge and vision; not depend on hands but on the mind (Drucker, 1959). People are more responsible in creating, storing, sharing and applying knowledge in the organisation (Monavvarian and Khamda, 2010).
Trust: Trust is an important aspect in individual's choice to knowledge sharing (Dirks and Ferrin, 2001; Gardener, 2003). Trust is considered as necessary conditions to facilitate cooperative work behaviour and the efficient exploitation of resources (Dodgson and Rothwell, 1994). Trust among staff increases the willingness to swap and absorb other individual knowledge, allowing greater sharing of knowledge (Tsai and Ghoshal, 1998; Levin and Cross, 2004; Bouty, 2000). In high trust environments, individuals and teams may act cooperatively and engage in knowledge sharing activities (Levin and Cross, 2004; Goh, 2002). While the trust level is high, individuals are willing to share their ideas without fear that these be subjected to mockery (Lucas, 2005). Politis (2003) suggests that trust encourages team members to accumulate new knowledge needed to form decisions for problem solving.

Trust in interpersonal relationship entails that individual is willing to take risk and becomes vulnerable, and such act is subjected to the conditions that the counterpart is reliable and competent (Mayer et al., 1995). Politis (2003) discovers that interpersonal trust in individual’s peers enhances open communication, dissemination of knowledge, and understanding of task related issues.

Trust, associated to individuals’ perception, is affected by the manners in which other staff and management treat individuals. Trust is also affected by whether the individuals creating the impression that the other parties act reasonably, keep their
promises and meet obligations, and whether the other parties can be trusted to meet future obligations and promises (Fuchs, 2003; Guest and Conway, 2001). Knowledge sharing depends on how the staff perceive and see whether the recipients of knowledge can be a significant resource for knowledge sharing (Lucas and Ogilvie, 2006; Leat and El-Kot, 2009) and the proximity to the recipients of knowledge (Goh, 2002; Han and Anantatmula, 2007).

**Communication:** Organisational culture promoting transparent and open communication may lead to an increase of knowledge sharing and collaboration at hierarchical levels (Anantatmula, 2008). As knowledge at work is characterised by non-recurring, multidisciplinary and unconventional tasks, organisation needs to coordinate effort to get benefits (Tsai and Ghoshal, 1998). While knowledge may be explicitly in print or stored properly, knowledge is kept informally through individuals’ collective memories (Nahaplet and Ghoshal, 1998). Thus, organisational knowledge creation occurs when an organisation incorporates individual learning and communicates this learning between staff (Nahaplet and Ghoshal, 1998).

When rich communication interactions or wider communication channels is ready for use, the ability to transfer vital information and knowledge in the organisation may be possible, and individuals can reasonably use significant resources for knowledge acquisition, sharing and use (Hoegl, Parboteeah and Munson, 2003).
Motivation: Success of knowledge management practices depends on intentions, opportunities, abilities and capabilities of human resources department (Monavvarian and Khamda, 2010); and organisational abilities in managing employees and reducing probable loss of knowledge through resignations, retirements and retrenchments (Key, 2008). Besides recognising and rewarding staff’s knowledge management efforts (Key, Thompson and McCann, 2009), the organisation needs to drive and promote knowledge sharing in the organisations. Motivation has been recognised as an important aspect of successful knowledge flow (Wittenbaum, Hollinghead and Botero, 2004; Osterloh and Frey, 2000; Bunderson and Sutcliffe, 2002).

The nature of motivation can be classified as intrinsic and extrinsic (Deci, 1976). Intrinsic motivation offers immediate satisfaction of need (Deci, 1976). Intrinsic motivation exists when an individual achieves fulfilment with social and personal norms that may include meeting organisational values or strengthening personal values identified by the affiliated social groups (Kreps, 1997). Extrinsic motivation exists when individual needs are not directly satisfied by obtaining additional resources, such as promotion, money and other non financial resources. Extrinsic motivators employed by organisation include career progression (Morris and Empson, 1998), performance (Prendergast, 1999), and wage payment based on the number of pieces of job completed (Lazear, 1988).
2.5.8 Empirical Studies on Knowledge Sharing Adoption Success

Deliberate and systematic understanding of the critical success factors for adoption of knowledge sharing is very important. Ignorance or a failure to see the important driving forces are likely to hamper the efforts of organisation to realise the full benefits (Ichijo et al., 1998). Different authors, theorists, academics and practitioners have been conducting further study in different countries based on the critical success factors determining the success of knowledge sharing adoption.

From a survey of 172 respondents in Taiwan shipping industry, Lin et al. (2009) suggest that corporate culture, staff motivations, information technology and leadership are important dimensions affecting knowledge sharing. In another survey based on 130 respondents, Hsu and Wang (2008) propose that top management who value knowledge as well as knowledge sharing practices and policies is important in supporting knowledge sharing efforts. However, in another survey in Taiwan that collects a sample of 172 respondents, Lin (2007b) suggests that intrinsic motivational factors (enjoyment in helping others, knowledge self-efficacy and reciprocal benefits) are motivators that affects staff’s intentions and attitude towards sharing knowledge with others.
In Malaysia, based on a 161-respondent sample, Sohail and Daud (2009) concluded that opportunity for sharing, motivation to share, staff attitude, work culture and the nature of knowledge (explicit and tacit) are an important factor in the adoption of knowledge sharing in universities.

In China, Ma et al. (2008) collect 222 completed questionnaires in the construction sector. Research suggests that trust and the nature of knowledge (tacit and explicit) are significantly related. Empowerment, leadership style and justice are found not related to knowledge sharing adoption in organisations.

In Bahrain, using Gupta and Govindarajan’s (2000) organisational culture framework, Al-Alawi et al. (2007) study the influence of organisational culture on the achievement of knowledge sharing. In a study of 231 respondents, Al-Alawi et al. (2007) point out that information systems, organisational structure, communications among staff, reward system, and trust are positively related to knowledge sharing in organisations.

In another empirical study conducted in India, Batra (2010) showed that when the knowledge management process is established, it increases individual growth and generates new ideas and practice in problem solving.
Many authors, theorists, academics and practitioners do further study using different knowledge sharing adoption critical success factors. **Table 2.6 Empirical studies on Knowledge Sharing adoption success** shows empirical studies conducted in different countries based on knowledge sharing adoption critical success factors discussed in **Section 2.5.1** to **Section 2.5.7**.
Table 2.6  Empirical studies on Knowledge Sharing Adoption Success

<table>
<thead>
<tr>
<th>Source &amp; Authors</th>
<th>Country</th>
<th>Sample Size</th>
<th>Organisational Culture</th>
<th>Organisational Leadership</th>
<th>Information Systems</th>
<th>Knowledge Management Processes</th>
<th>Organisational Structure</th>
<th>Reward System</th>
<th>People (Trust)</th>
<th>People (Communication)</th>
<th>People (Motivation)</th>
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<tbody>
<tr>
<td>Chen and Barnes (2006)</td>
<td>USA &amp; Taiwan</td>
<td>165</td>
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<td>Al-Alawi et al. (2007)</td>
<td>Bahrain</td>
<td>231</td>
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<tr>
<td>Han and Anantatmula (2007)</td>
<td>USA</td>
<td>235</td>
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<td>Lin (2007b)</td>
<td>Taiwan</td>
<td>172</td>
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<td>Quigley et al. (2007)</td>
<td>USA</td>
<td>120</td>
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<td>Cheng et al. (2008)</td>
<td>Taiwan</td>
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<td>Hsu and Wang (2008)</td>
<td>Taiwan</td>
<td>130</td>
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<td>Kang et al. (2008)</td>
<td>South Korea</td>
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<td>Ma et al. (2008)</td>
<td>China</td>
<td>222</td>
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<td>Siemens et al. (2008)</td>
<td>USA</td>
<td>140</td>
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<td>Lin et al. (2009)</td>
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<td>Sohail and Daud (2009)</td>
<td>Malaysia</td>
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<td>Willem and Buelens (2009)</td>
<td>Belgium</td>
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<td>Batra (2010)</td>
<td>India</td>
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2.6 Proposed Research Model, Questions and Hypotheses

As stated by Davenport and Prusak (1998), knowledge sharing is usually not natural, and individuals do not share knowledge because they believe knowledge is a valuable personal asset. Organisations need to motivate staff willingness to share knowledge because staff’s behaviour is influenced by different and endless listings of organisational culture attributes. Even though knowledge sharing techniques/tools are applied by organisations to support knowledge sharing adoption, the research findings about frequently used knowledge sharing techniques/tools are applied differently by organisations.

Review of literature of knowledge management suggests many definitions and important knowledge management critical success factors. Earlier studies show limited quantitative studies about knowledge management critical success factors influences on knowledge sharing especially in the context of Singapore organisations.

National culture, as an expected significant aspect affecting organisational culture (Hofstede, 1994), also has a direct effect on knowledge management. While many studies on the success factors of knowledge management and knowledge sharing are conducted globally, the results may not be comparable on organisational culture attributes for knowledge sharing adoption in the context of Singapore.
This study adopts and expands the success of Al-Alawi et al.’s (2007) research. While Al-Alawi et al. (2007) assume that their findings allow for replication and that comparable results can be yielded on countries besides the Arab world, national culture may have influences on the individual. Individual’s behaviour is influenced by cultural values held by this individual, and is affected by national culture (Srite and Karahanna, 2006; Hofstede, 1993; Wei et al., 2008). Therefore, this study seeks to study if Singapore organisations may show different results from previous studies in other countries.

2.6.1 Research Model

While different authors find diverse knowledge management critical success factors, Gupta and Govindarajan’s (2000) organisational culture framework includes knowledge management success factors commonly identified, shown in Section 2.3.3 Knowledge Management Critical Success Factors and Table 2.2 Knowledge Management Critical Success Factors. This study aims to investigate the influence of knowledge management critical success factors to the adoption of knowledge sharing in Singapore organisations as stated in Gupta and Govindarajan’s (2000) organisational culture framework. The research model in Figure 2.7 Hypothesised Model is created to answer the following research questions proposed:
RQ1: What is the relationship between knowledge sharing techniques/tools and knowledge sharing adoption within the organisation in Singapore?

RQ2: What impacts do these key knowledge management dimensions (people, leadership, information systems, processes, organisational structure and reward system) have on knowledge sharing adoption in Singapore organisations?

RQ3: Among these key knowledge management dimensions (people, leadership, information systems, processes, organisational structure and reward system), which are the better predictors of good knowledge sharing practices in Singapore organisations?

Figure 2.7 Hypothesised Model
2.6.2 Research Question 1

As discussed in Section 2.4.5 Knowledge Sharing Techniques/tools, different studies have been conducted to find frequently used methods for knowledge management and knowledge sharing in organisations (Alavi and Leidner, 1999; Zhou and Fink, 2003; Yao et al., 2007). Earlier studies suggest that email, internet and intranet are among the top few most popular tools used for knowledge sharing. From surveys conducted in different countries, such as in Australia (Xu and Quaddus, 2005), India (Singh et al., 2006), United States of America (Han and Anantatmula, 2007), United Kingdom (Carrillo et al., 2004), and Bahrain (Al-Alawi, et al., 2007), findings show diverse sets of knowledge sharing techniques/tools frequently used by organisations to support knowledge sharing. Therefore, this study aims to identify which knowledge sharing techniques/tools that are frequently used by Singapore organisations. This leads to the first research question:

RQ1: What is the relationship between knowledge sharing techniques/tools and knowledge sharing adoption in Singapore organisations?

Besides showing the knowledge sharing techniques/tools used to help knowledge sharing in respondents’ organisations, this study seeks to test the relationships between knowledge sharing techniques/tools used and respondents’ perceived level of knowledge sharing in their organisations. This study focuses on investigating knowledge sharing techniques/tools used by organisations and the excellent, good or
poor knowledge sharing in these organisations. The first hypothesis in this dissertation is as follows:

\textit{H1:} The frequently used knowledge sharing techniques/tools are associated with the level of knowledge sharing adoption in Singapore organisations.

\textbf{2.6.3 Research Question 2}

Using Gupta and Govindarajan’s (2000) organisational culture framework, Al-Alawi \textit{et al.} (2007) study the influence of organisational culture knowledge management success factors on knowledge sharing practice. Al-Alawi \textit{et al.} (2007) point out that information systems, organisational structure, communications among staff, reward system and trust, are positively related with knowledge sharing practices in Bahrain organisations. However, this research lacks the examination of influences that leadership, processes and motivation dimensions of Gupta and Govindarajan’s (2000) organisational culture have on knowledge sharing.

This study seeks to adopt Al-Alawi \textit{et al.’s} (2007) study and expand their study for a research in Singapore organisations to include other knowledge management success factors, such as leadership, processes and motivation dimensions, not found in Al-Alawi \textit{et al.’s} (2007) work. Although Al-Alawi \textit{et al.} (2007) study Bahrain organisations, their findings could be generalised to other Gulf States, such as Oman, United Arab Emirates, Kuwait, Saudi Arabia, and Qatar, as well as the Arab world because these nations share
similar traditions, beliefs and culture. As suggested by Hofstede (1994), differences in national culture may influence the result of studies conducted in a different nation, therefore the aim of this study is to test if Singapore organisations have similar results as found in previous studies in other countries. This leads to the second research question:

**RQ2:** What impacts do these key knowledge management dimensions (people, leadership, information systems, processes, organisational structure and reward system) have on knowledge sharing adoption in Singapore organisations?

As leaders’ perceptions affects knowledge creation, sharing, and usage in creating competitive advantage (Grover and Davenport, 2001; Bartlett and Ghoshal, 2002; Collins and Porras, 1996), organisational leadership therefore influences efforts in knowledge management initiatives (Gupta and Govindarajan, 2000; DeTienne et al., 2004) and formulation of knowledge sharing practices and policies (Hsu and Wang, 2008). Leaders’ model of the preferred knowledge management behaviour (Wong, 2005) set the social norm for staff knowledge sharing behaviour (Alavi et al., 2005). This study focuses on examining the effectiveness of organisational leadership (Chen and Barnes, 2006), leadership (Han and Anantatmula, 2007), and managers’ willingness (Han and Anantatmula, 2007) to engage in knowledge sharing activities, and therefore proposes:
H2a: Organisational leadership is positively associated with knowledge sharing adoption in Singapore organisations.

Information systems are knowledge sharing tools and technologies that cut communication barriers (Teece, 1998; Duncan, 1972; Argyris and Schon, 1978) and support communications among processes, people and data in everyday decision making process and operations (Whitten et al. 2001). Organisations have to form and implement suitable structure and processes to encourage staff’s knowledge sharing efforts (Gold et al. 2001). For organisational knowledge to flow, organisations may look for the equilibrium among people, structure, processes and technologies (Brown and Duguid, 2000). This study focuses on examining the effectiveness of information systems as well as the comfort of staff in using these information systems (Al-Alawi et al., 2007) while engaging in knowledge sharing activities, and therefore proposes:

H2b: Knowledge sharing information system is positively associated with knowledge sharing adoption in Singapore organisations.

Knowledge management processes include creating, acquiring, retaining, identifying, out-flowing, transmitting and inflowing organisational knowledge (Gupta and Govindarajan, 2000). Explicit and tacit knowledge are transferred through socialisation, externalisation, combination and internalisation (Nonaka and Takeuchi, 1995). The choice of suitable processes of knowledge sharing depends on classifications of explicit
and tacit knowledge, regularities and frequencies of knowledge sharing processes, and knowledge receivers (Dixon, 2000). This study focuses on examining the organisational efficiency and abilities in creating, applying and transferring knowledge, and therefore proposes:

\[ H2c: \text{Knowledge sharing process is positively associated with knowledge sharing adoption in Singapore organisations.} \]

As discussed in Section 2.5.5 Organisational Structure, organisational structure exploit mechanisms and communication systems to strengthen knowledge sharing competence (Gupta and Govindarajan, 2000), set up definition of roles, and shows a permanent arrangement of activities and tasks (Skivington and Daft, 1991) to carry out the knowledge associated responsibilities (Davenport et al., 1998). Besides, organisational structure supports the exchange of tacit knowledge through interactions, sharing and collaboration with other knowledge workers across internal organisational boundaries (Walczak, 2005; Gold et al., 2001). This study focuses on examining the ease of information flow, functional team and participative decision making process, and therefore proposes:

\[ H2d: \text{Organisational structure is positively associated with knowledge sharing adoption in Singapore organisations.} \]
Organisations can use the rewards of individual and teams to motivate team members to work together and coordinate efforts to achieve group goals (Dulebohn and Martocchio, 1998). Structured incentive and reward systems motivate employees to take part in sharing, learning and generating knowledge with individuals from other departments (O’Dell and Grayson, 1998; Argote and Epple, 1990). This study focuses on examining the effectiveness of rewards (individual and team) in motivating staff to engage in knowledge sharing activities, and therefore proposes:

\[ H2e: \text{Knowledge sharing reward system is positively associated with knowledge sharing adoption in Singapore organisations.} \]

The biggest hurdle for knowledge sharing is in motivating staff to communicate and share their knowledge (Desouza, 2003). As staff are responsible in creating, storing, sharing and applying knowledge in the organisation (Monavvarian and Khamda, 2010), organisations need to address trust, communication and motivation issues to have knowledge sharing success.

Trust among staff increase the willingness to swap and absorb individual knowledge, therefore allowing greater knowledge sharing (Tsai and Ghoshal, 1998; Levin and Cross, 2004; Bouty, 2000). When rich communication interactions or wider communication channels is ready for use, the ability to transfer vital information and knowledge in organisations may be possible, and individuals can reasonably use significant resources.
for knowledge acquisition, sharing and use (Hoegl, et al. 2003). Motivation is acknowledged as an important aspect in successful organisational knowledge flow (Wittenbaum et al. 2004; Osterloh and Frey, 2000; Bunderson and Sutcliffe, 2002). A central barrier to facilitating knowledge sharing activities is individuals’ unwillingness to share and combine their knowledge (Lam and Lambermont-Ford, 2010). Thus, the success of knowledge management practices depends on the intention, opportunity and ability of the human resources department (Monavvarian and Khamda, 2010); and the ability in managing employees’ motivation towards sharing knowledge with co-workers (Wasko and Faraj, 2005).

Trust is an important attribute for knowledge sharing and teamwork. An environment of trust, affected by organisational culture, promotes openness in communication, transparency and team cooperation (Anantatmula, 2008). This study focuses on examining trust, communication channels and motivation effort of the organisation to encourage staff to engage in knowledge sharing activities, and therefore proposes:

\[ H2f: \quad \text{People characteristics (such as: communication among staff, trust among staff, motivation to share) are positively associated with knowledge sharing adoption in Singapore organisations.} \]
2.6.4 Research Question 3

As mentioned before, knowledge management critical success factors are important areas identified by organisations to gain competitive advantage (Alazmi and Zairim, 2003). As shown in Table 2.2 Knowledge Management Critical Success Factors, researchers highlight different sets of knowledge management critical success factors. However, these proposed knowledge management critical success factors show similarities and differences. In addition, previous studies mainly focused on identifying critical success factors and did not identify which knowledge management critical success factors are better predictors of knowledge sharing practices. Thus, this study seeks to fill this gap by examining which dimensions identified in Gupta and Govindarajan’s (2000) organisational culture framework that are the better predictors of good knowledge sharing practices. This leads to the third research question:

RQ3: Among these key knowledge management dimensions (people, leadership, information systems, processes, organisational structure and reward system), which are the better predictors of good knowledge sharing practices in Singapore organisations?

More studies regarding knowledge management critical factors for knowledge sharing adoption are highlighted in Table 2.4 Knowledge Sharing Adoption Critical Success Factors. Furthermore, Table 2.6 Empirical Studies on Knowledge Sharing Adoption Success shows empirical studies conducted on knowledge sharing adoption critical success factors in different countries. Different authors, theorists, academics and
practitioners have proposed a different perspective on the critical success factors of knowledge sharing adoption, but there is no agreement on the common critical success factors. This study aims to bring research to higher level by examining the critical dimensions of knowledge management that are a better predictor of good knowledge sharing practices in Singapore organisations, and therefore proposes:

\[ H3: \text{ People, leadership, information systems, processes, organisational structure and reward system are the better predictors of knowledge sharing adoption in Singapore organisations.} \]

The following Chapter 3 addresses the research methodology used to answer the above mentioned research questions and to test the hypotheses.
CHAPTER THREE: METHODOLOGY

3.1 Introduction

Chapter Two reviews various literatures on knowledge, knowledge management and knowledge sharing. As mentioned in Chapter Two, a gap identified from previous literature review results in the formation of research questions, designed to determine the techniques/tools used to shape knowledge sharing practice; and to examine the influences of knowledge management critical dimensions, as stated in Gupta and Govindarajan’s (2000) work that might affect knowledge sharing adoption in Singapore organisations. The research questions for this study are as follows:

RQ1: What is the relationship between knowledge sharing techniques/tools and knowledge sharing adoption within the organisation in Singapore?

RQ2: What impacts do these key knowledge management dimensions (people, leadership, information systems, processes, organisational structure and reward system) have on knowledge sharing adoption in Singapore organisations?

RQ3: Among these key knowledge management dimensions (people, leadership, information systems, processes, organisational structure and reward system), which are the better predictors of good knowledge sharing practices in Singapore organisations?
This chapter starts with evaluating research methodologies, sample for the research and data collection methods. Then, this chapter discusses the design and pre-testing of the questionnaire. Lastly, the analysis tools to test research questions and hypotheses used in this study are discussed.

### 3.2 Research Methodology and Design

As shown in Figure 3.1, Research Process Onion (Saunders, Lewis and Thornhill, 2009), the first outermost layer is the research philosophy of positivism, realism, interpretivism and pragmatism. The second layer is a research approach, such as inductive and deductive. The next layer is a research strategy that includes archival research, ethnography, action research, grounded theory, experiment, survey and case study. The fourth layer is the choice of research method, including mono, mixed methods and multi-methods. The fifth layer is the time horizon such as the longitudinal and cross-sectional. The last layer is the techniques and procedures that include the use of data collection methods such as observation, sampling, secondary data, questionnaires and interviews and analysis method.
Research Process Onion (Saunders et al., 2009) was used to guide the research approach. The research process onion is directing this study in identifying alternatives and concerns related to data collection methods. This study uses positivism philosophy as the appropriate research philosophy because the study will be conducted based on the willingness of the potential respondents to participate and using a highly structured method, while a sample with sufficient size to be collected using qualitative and quantitative methods. A deduction research approach will be adopted because many previous studies and literature on knowledge sharing will be used to support the development of research questions and hypotheses. Further, the deduction research approach is faster to complete because it used a structured study method and time table that are set before data collection. For this study, the strategy is the correct method and is adopted because the survey strategy allows a large quantity of data collected from a significant population in a very low cost, and the data collected can be applied to support the explanation of relationships between variables (Sanders et al., 2009).
methods research is the primary research design for this study in which a qualitative approach and quantitative approach are applied in sequential order. Qualitative approach is first conducted before a quantitative approach is carried out. Because of cost and time constraint, this study prefers a cross-sectional rather than longitudinal study. Mail survey method is the preferred choice for data collection technique.

### 3.2.1 Research Philosophy

Philosophical commitment directs the selection of research strategy that affects what to do and investigate (Johnson and Clark, 2006). Research philosophy can further be explored through research paradigms (Sanders et al., 2009). Research paradigm, a way of examining social phenomena, provides principles and guidelines about the approach, methods and techniques on how the research is performed (Sanders et al., 2009; Carson, Gilmore, Perry, and Gronhang, 2002; Ticehurst and Veal, 1999). The essential concern is not about whether the research should be philosophically informed, but how well the research reflects upon the philosophical alternatives and defends them for alternatives that could have been accepted (Johnson and Clark, 2006).

Sanders et al.’s (2009) Research Process Onion is discussed to determine the research philosophy for this study. **Table 3.1 Comparison of Research Philosophies** below illustrates the comparison of these research philosophies.
<table>
<thead>
<tr>
<th>Features</th>
<th>Positivism</th>
<th>Realism</th>
<th>Interpretivism</th>
<th>Pragmatism</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Ontology</strong></td>
<td>- External</td>
<td>- Objective</td>
<td>- Subjective</td>
<td>- External</td>
</tr>
<tr>
<td></td>
<td>- Objective</td>
<td>- Independent</td>
<td>- Multiple</td>
<td>- Multiple</td>
</tr>
<tr>
<td>Epistemology</td>
<td>Focus on causality and law</td>
<td>Focus on explaining within context</td>
<td>Focus on reality behind details</td>
<td>Focus on practical applied research</td>
</tr>
<tr>
<td>Axiology</td>
<td>- Value-free</td>
<td>- Value-laden</td>
<td>- Value-bound</td>
<td>- Objective</td>
</tr>
<tr>
<td></td>
<td>- Objective</td>
<td>- Biased</td>
<td>- Subjective</td>
<td>- Subjective</td>
</tr>
<tr>
<td>Data Collection</td>
<td>- Highly structured</td>
<td>- Fit subject matter</td>
<td>- Small samples</td>
<td>- Mixed and multiple method</td>
</tr>
<tr>
<td>Method</td>
<td>- Large sample</td>
<td>- Quantitative and qualitative</td>
<td>- In-depth investigations</td>
<td>- Quantitative and qualitative</td>
</tr>
<tr>
<td></td>
<td>- Measurement</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>- Quantitative</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>- Can use qualitative</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Source: Sanders et al. (2009; p.119).

The positivism philosophy puts forward that reality is objective and that the researcher’s role is to test theories and offer substances for enhancement of laws (Remenyi, Williams, Money and Swartz, 1998; Bryman, 2004). Research is carried out in a value free manner; and researchers are independent and external to the data collection process (Sanders et al., 2009). With the emphasis on scientific observations that allow for statistical studies, positivist researchers employ extremely structured methodology to achieve reproduction of findings (Gill and Johnson, 2002).

Similar to positivism philosophy, realism philosophy positions that a systematic and scientific attempt is necessary to explain the development of knowledge within the context (Sanders et al., 2009; Bryman, 2004). Researchers’ conceptualisation of reality
reflects the reality (Bhasker, 1975). Research is value-laden and the researchers are biased by upbringing, cultural experiences and world views (Sanders et al., 2009). The realism philosophy is typically associated with quantitative or qualitative research methods fit subject matter (Sanders et al., 2009).

Conversely, interpretivism philosophy views reality as being subjective and may change due to multiple perspectives of the researchers (Sanders et al., 2009). The research is value-bound and subjective interpretation of the reality is behind the details (Bryman, 2004). Interpretivism philosophy, a continual process of interpreting the social world, is suitable for management and business research, particularly in the fields such as human resource management, marketing and organisational behaviour (Sanders et al., 2009). Interpretivism philosophy, typically applied to qualitative data collection methods, does not attempt to generalise the findings, but tries to interpret the relationships between events, problems or issues (Hackley, 2003).

Next, pragmatism philosophy argues that it is possible to function within interpretivist and positivist positions (Sanders et al., 2009). Pragmatism focuses on practical research questions and thus uses a practical method of integrating different ways (quantitative and qualitative) data collection and interpretation of data (Sanders et al., 2009). Pragmatism philosophy is naturally appealing as it avoids researchers engaging in what they view as pointless debates about what is truth and reality (Tashakkori and Teddlie,
Researchers may study whatever that is interesting; use whatever methods and use the results in the manner that brings about positive consequence (Tashakkori and Teddlie, 1998).

Hence, positivism research is the appropriate philosophy for this study. Based on the researcher’s knowledge, experience, skills and experiences, the researcher strives to maintain objective, independent and unbiased throughout the research process. All investigations are performed in a free and open way. The researcher focuses on collecting quantitative data and explains the cause and effects using empirical testing.

3.2.2 Research Approaches

Literature review shows the most common research approaches used for data collection are deductive and inductive (Sanders et al., 2009). When using inductive approach, data collection is conducted and then a theory and hypothesis are created as an outcome of the data analysis. When using deductive approach, a theory and hypothesis are formulated before strategies are developed to test hypothesis (Sanders et al., 2009).

Table 3.2 Comparison of deductive and inductive approach below illustrates a comparison of deductive and inductive approach.
Table 3.2  Comparison of deductive and inductive approach

<table>
<thead>
<tr>
<th>Deductive</th>
<th>Inductive</th>
</tr>
</thead>
<tbody>
<tr>
<td>- Researchers independent of research subjects</td>
<td>- Researchers is part of research procedure</td>
</tr>
<tr>
<td>- Require explanation of fundamental relationships among variables</td>
<td>- Seek to understand meanings between human and events</td>
</tr>
<tr>
<td>- Gather quantitative data</td>
<td>- Gather qualitative data</td>
</tr>
<tr>
<td>- Structural approach based on scientific principles</td>
<td>- Flexible structure to allow for research changes as research develops</td>
</tr>
<tr>
<td>- Generalisation of conclusions require collection of adequate sample size</td>
<td>- Generalization of conclusions of less importance</td>
</tr>
<tr>
<td>- Shift from theory to data</td>
<td>- Close understanding of research context</td>
</tr>
<tr>
<td>- Use controls to conserve data validity</td>
<td></td>
</tr>
<tr>
<td>- Clarification of definition through concepts operationalisation</td>
<td></td>
</tr>
</tbody>
</table>

Source: Based on Sanders et al. (2009) p.127.

When a research topic is new or when minimal research is available for review, inductive approach is relevant (Creswell, 1994). Hence, the deductive approach is applied because many previous research and literature on knowledge sharing supported the development of research questions and hypotheses. Moreover, this study seeks to select a sample of sufficient size, enough to generalise statistically about the social behaviour being researched. Furthermore, research deduction approach is quicker to complete because the method is structured and time schedule is set before data collection (Sanders et al., 2009).
3.2.3 Research Strategies

As mentioned earlier, research strategies consist of archival research, ethnography, action research, grounded theory, experiment, survey and case study (Sanders et al., 2009). Although no research strategy is fundamentally better or poorer than others, the choice of research strategy is guided by research philosophical underpinnings, research questions and objectives, the application of knowledge, amount of time and resources (Sanders et al., 2009). When selecting appropriate research strategies, three conditions are to be considered: formulated type of research question; amount of control over behavioural events; and extent of focus on contemporary events (Yin, 2003).

Survey strategy permits gathering of huge quantity data from a significant population in a very cost-effective manner, and the data collected can be applied to advocate possible relationships among variables (Sanders et al., 2009). Survey strategy is also usually associated with deductive approach (Hussey and Hussey, 1997). Hence, survey strategy is the appropriate method adopted for this study.

3.2.4 Research Methods

In choosing the research method to answer the research questions, mono method is used when researchers use a single data collection method and the appropriate analysis procedure (Sanders et al., 2009); multi-method is used when the researchers used two or
more methods of data collection (techniques are limited within either qualitative or quantitative technique) and the associated analysis procedure (Tashakkori and Teddlie, 2003); and mixed method is used when the researchers use both qualitative and quantitative methods of data collection and the appropriate analysis procedure (Sanders et al., 2009).

As a mixed method research consists of deductive and inductive research logic, it gives the advantage of advanced research design that allows the collection of a wider variety of data sources, and variations in the analytical approach that generates a different perspective and result (Tashakkori and Teddlie, 1998; Creswell, 2003). Jogulu and Pansiri (2011) conduct an investigation on the various types of mixed research methods proposed by different researchers (Tashakkori and Teddlie, 2003; Pansiri, 2005) and concluded that a quantitative approach or qualitative approach is applied as either one of the dominant or in equal status. Both approaches can be carried out in a sequential order or simultaneously. When a quantitative approach or qualitative approach is conducted in sequence, the research starts with a quantitative approach before starts a qualitative approach, or vice versa. However, when a quantitative approach and qualitative approach are conducted simultaneously, the data analyses are carried out at the same time as the quantitative and qualitative methods of data collection are performed (Tashakkori and Teddlie, 1998).
This study will be empirically tested the techniques and tools used to share knowledge; the effectiveness of knowledge sharing techniques and tools in shaping the practice of knowledge sharing; and the impact of the critical dimensions of knowledge management on knowledge sharing. Hence, this study uses mixed method research as a primary research design. Qualitative and quantitative approaches are applied with equal share in a sequential order in which qualitative approach is first conducted before quantitative approach.

### 3.2.5 Time Horizons

Cross-sectional studies are studies conducted just once at a single point of time, whereas longitudinal studies are conducted to study changes of more than one point of time (Bryman, 2004; Cavana, Delahaye and Sekaran, 2001). Although longitudinal studies allow insights into time order of variables and permit causal interferences, longitudinal studies are costly and involve more time and effort than cross-sectional studies (Bryman, 2004). In costs and time constraint situations, researchers may prefer cross-sectional studies rather than longitudinal studies and conduct a less than ‘ideal’ research design (Cavana et al., 2001). As long as the scope and reasons of the research are satisfied, researchers may prefer to employ a lower level of scientific rigour and sub-optimise research design decision whereby the cross-sectional studies rather than longitudinal studies are conducted with smaller sample size rather than large sample size (Cavana et al., 2001).
3.2.6 Techniques and procedure - Data Collection Methods

The following data collection methods were evaluated for appropriateness:

**Observational Studies Method:** Observational studies method uses direct observation to clarify complex matters and obtains information as it occurs because all actions are being observed in real time (Cavana *et al.*, 2001). Although this method provides a respondent bias free, more reliable data and a broad range of information, it has disadvantages such as issues of observer bias, validity and reliability (Boyd, 1985). During observation, it may be hard for researchers to notice and document respondents’ cognitive thought process, non-verbal and facial expressions behaviours (Cavana *et al.*, 2001). Furthermore, the involvement for observers’ physically present is time consuming; and data collection can be tedious, slow in progress and expensive (Cavana *et al.*, 2001).

**Experimental Method:** Another method for data collection is an experimental method, commonly employed in social psychology and organisation studies, whereby all variables are controlled and then the impact are investigated when a variable changes (Bryman, 2004; Baker, 2001). As experimental method may have strong internal validity (Bryman, 2004), this method is considered suitable for measuring organisational behaviour and product testing (Ticehurst and Veal, 1999). However, significant drawbacks of this method are independent variables need to be manipulated.
to establish whether it influences the dependent variables; and that huge majority of independent variables cannot be manipulated (Bryman, 2004).

**Survey Method:** Another alternative is the survey method normally used in a causal and descriptive research (Lukus, Hair, Bush and Orinaiu, 2004). With this approach, statistical problems, random sampling error and systematic error are unavoidable without increasing sample size (Zikmund, 2003; Assael and Keon, 1982). Nevertheless, this method provides a fast and precise way to assess information about a population (Zikmund, 2003) and permits for accommodation of large sample size at moderately lower cost (Lukus et al., 2004). For this study, the survey method would be most suitable method for data collection, because responses from a sample of Singapore organisations can be economically collected within a short time frame.

Basically, five types of typical survey methods are identified: personal interview (door-to-door), personal interview (mall intercept), telephone interview, internet survey and mail survey (Zikmund, 2003). Aaker, Kumar and Day (2001) specify these options are not better than the other survey methods and that the selection of methods depends on the research objectives, time, cost and response rates. Some strengths and weaknesses of survey methods are presented in **Table 3.3 Comparing Survey Methods** (Zikmund, 2003).
Table 3.3 Comparing Survey Methods

<table>
<thead>
<tr>
<th>Characteristics</th>
<th>Personal Interview (Door-to-Door)</th>
<th>Personal Interview (Mall Intercept)</th>
<th>Telephone Interview</th>
<th>Internet Survey</th>
<th>Mail Survey</th>
</tr>
</thead>
<tbody>
<tr>
<td>Cost</td>
<td>High</td>
<td>Moderate to high</td>
<td>Low to moderate</td>
<td>Low</td>
<td>Lowest</td>
</tr>
<tr>
<td>Speed of data collection</td>
<td>Moderate to fast</td>
<td>Fast</td>
<td>Very fast</td>
<td>Instantaneous</td>
<td>Slow</td>
</tr>
<tr>
<td>Geographic flexibility</td>
<td>Limited to moderate</td>
<td>Confined</td>
<td>High</td>
<td>High</td>
<td>High</td>
</tr>
<tr>
<td>Respondent cooperation</td>
<td>Excellent</td>
<td>Moderate to low</td>
<td>Good</td>
<td>Varies</td>
<td>Moderate</td>
</tr>
<tr>
<td>Follow up</td>
<td>Difficult</td>
<td>Difficult</td>
<td>Easy</td>
<td>Difficult</td>
<td>Easy</td>
</tr>
</tbody>
</table>


Personal interview survey methods, including door-to-door and mall intercept, have the strengths of face to face communication and opportunity for feedback (Zikmund, 2003), researchers are able to secure greater depth of information and details through asking follow-up questions (Cooper and Schindler, 2001). Additionally, personal interview survey methods are effective when respondents require clarifications (Aaker et al., 2001). Nevertheless, when compared to other methods of data collection, personal interview methods can be costly, time consuming and administratively difficult (Cooper and Schindler, 2001; Aaker et al., 2001).

The cost of telephone interview method is 45% to 64% lower yet faster in speed than comparable personal interview survey methods (Groves and Kahn, 1979). However, it is not possible to ask complex questions and use measurement techniques, sorting techniques, complex scale, visual aids and maps in telephone interview (Cooper and
Schindler, 2001; Aaker et al., 2001). Additionally, some target groups are not reachable by phone (Cooper and Schindler, 2001), and respondent can unilaterally terminate the interview without explanation or warning by ending the phone call (Cavana et al., 2001). Furthermore, respondents may be less keen to provide more time to complete the telephone interview (Sanders et al., 2009).

Another method is an internet survey that allows to break geographical barriers and reach large sample population; to capture accurate instantaneous data collection; and to achieve cost effectively through eliminating the cost of postage, paper, data entry and other administrative cost (Zikmund, 2003). However, internet survey may obtain a poorer response rate when compared with hard copy questionnaire data collection method (Granello and Wheaton, 2004). Respondents may be frustrated with blurred instructions and the online survey may end without completing the entire questionnaire (Ray and Tabor, 2003). Moreover, online survey could be filtered into spam mail by mail server (Evans and Mathur, 2005). Even if the online survey was sent through the mail server, 20 percent of emails are never read by the respondent (Andersen and Gansneder, 1995).

Mail survey has the lowest cost as compared to other methods (Zikmund, 2003). Additionally, mail survey allows for expanded geographic coverage at a lower cost and is considered as a more anonymous method of data collection (Cooper and Schindler,
2001). Moreover, respondents are given time to consider the questions asked (Fox, Robinson and Boardley, 1998) and surveys are completed at the respondents’ discretion (Aaker et al., 2001). The problems with mail survey include non-response error (Cooper and Schindler, 2001), the low response rate (Greer, Chuchinprakarn and Seshadri, 2000) and the greater risk of missing data due to lack of supervision (Bryman, 2004). Hence, it is vital to ensure that response rates are at an acceptable level. The following are ways to improve response rate: providing monetary incentives (Sanders et al., 2009); using single or multiple follow-up letters (Bryman, 2004; Aaker et al., 2001); providing return envelopes and postage (Cooper and Schindler, 2001); and a covering letter explaining the purpose of the survey (Dillman, 2007).

Self administered questionnaires are distributed by mail traditionally, but nowadays questionnaires may be distributed directly to individual respondents (Zikmund, 2003). Agreements have been established with Singapore educational agents to request for support in distributing Participants Information Statement and self administered questionnaires directly to students. In addition, subsequent follow-up could be conducted with the support from these educational agents. Hence, this study uses the mail survey method as the appropriate method.
3.3 Sample

Cavana *et al.* (2001) describe the target population as an entire collection of events, people or subjects of concern that the researcher desires examination. A sample is some part or a subset of a population consists of some elements chosen from the target population (Zikmund, 2003; Cavana *et al.*, 2001). Application of sampling could save time and cost when population size is massive (Aaker *et al.*, 2001).

Given that the Singapore business community is very big and there are cost and time constraints, conducting a survey on every Singapore organisation would not be feasible. Therefore, convenient sampling method is applied for this study. Convenient sampling method, a non-probability sampling design, is applied when the sample was chosen because of limitations in the accessibility and availability of samples (Bryman, 2004; Cavana *et al.*, 2001). Convenient sampling method allows researcher to attain a good response rate (Bryman, 2004).

Although this method may not generalise findings because the sample may not be representative (Bryman, 2004), a convenience sampling approach is still acceptable for this study. This study uses a convenient random sampling due to cost and time limitation. This limitation will be addressed in the discussion of the limitations of this research in the last chapter. However, the sample is still representative because questionnaires distributed and returned were collected from full-time professionals.
enrolled in the certificate, diploma and degree programs with different educational agents. As these potential respondents are non-gender specific and could belong to either operational or managerial levels without industrial restriction, an assortment of opinions and views could be obtained.

According to Roscoe (1975), the principle for establishing the sample size for most study needs to be between 30 and 500. The sample size should be at least 100 (Barlett, Kotrlik and Higgins, 2001). From previous studies in knowledge management areas, the most common sample size varies from 120 to 235 (Al-Alawi et al., 2007; Quigley et al., 2007; Syed-Ikhsan and Rowland, 2004a). Using these studies as yardstick, a comparable collection of data would be considered adequate. Therefore, this study targeted at achieving a sample size of 200 to 300 respondents.

3.4 Data Collection Methods - Questionnaire

In order to obtain suitable data, the researchers set up agreements with the following Singapore educational agents to request for their support in data collection:

- University of Newcastle (Singapore Campus)
- TMC Educational Group
- Singapore Human Resources Institute
With the approval from the Newcastle Human Research Ethics Committee (Reference no. H-2009-0241), these agents are given the Participants Information Statement and a self-administered questionnaire to be distributed to potential respondents. As in the Appendix 1, Participants Information Statement stated that research is entirely voluntary participation along with all responses kept confidential and anonymous. The respondents are given the autonomy of choice to decide their involvements in this study. No reason is required if the respondents chose to withdraw from the study at any time and their answers will not affect the assessments of their program in any manner. Respondents recognise that the primary purpose of this study are: first, to determine the critical factors affecting the adoption of knowledge sharing in Singapore organisations, and second, the research findings aim to provide management of the organisation in Singapore with a better understanding of how to effectively use the practice of knowledge management in their organisations.

The process includes a distribution of Participants Information Statement and self administered questionnaire to respondents either during commencement of the class or during class break. Potential participants were given a Participants Information Statement and the questionnaire and given the freedom and enough time to decide their involvement. If they wish to participate, the potential participants may either drop the completed questionnaire by hand in an envelope to the collection box at the institution or return completed questionnaire by mail to institution’s administrative staff before the
stated due date on the questionnaire. Educational agent staff gathers completed questionnaires from the administrative staff and then pass them to the researchers.

3.5 Questionnaire Design and Scope

As outlined previously, a self-administered questionnaire is used for data collection. As in Appendix 2, the questionnaire consisted of three parts that contain pre-coded and closed ended questions, asking respondents to choose the response that closely reflect their opinions and check the box that best matches. Depending on the respondent, each questionnaire takes approximately 20 to 30 minutes to complete. All respondents must be above 18 years of age, currently employed in Singapore and working in an organisation with no less than 5 staffs.

Part A assesses level of knowledge sharing; and techniques and tools used to facilitate knowledge sharing in respondent’s organisation. This part is designed to reveal knowledge sharing techniques and tools used to facilitate knowledge sharing in respondents’ organisations and their perceived level of knowledge sharing (excellent, good or poor) in their organisations. The common techniques and tools are knowledge sharing tools (emails, groupware and etc), brainstorming sessions, chatting during breaks time, collaboration and teamwork, discussions (formal and informal), communication networks (internet, intranet and extranet), conferences, focus group, seminars, quality circles, training and workshops (Al-Alawi et al., 2007).
Part B asks about the influence factors of knowledge management and the adoption of knowledge sharing activities within respondent’s organisation. This part examines the influences of critical dimensions of knowledge management such as people, leadership, information systems, process, organisational structure and reward system in Gupta and Govindarajan’s (2000) work that may affect knowledge sharing adoption in Singapore organisations. This study adopts and expands the success of Al-Alawi et al.’s (2007) study. Based on the study conducted in Bahrain organisations, Al-Alawi et al. (2007) point out that information systems, organisation structure, communication among staff, reward system and trust are positively related to knowledge sharing. However, this study lacks examination of the leadership, processes and motivation dimensions.

After reviewing a diversity of knowledge sharing studies, knowledge management dimensions such as organisational leadership (Chen and Barnes, 2006; Han and Anantatmula, 2007), processes (Chase, 1997), motivation (Siemsen et al., 2008; Burgess, 2005) are selected and applied to further develop this questionnaire. Respondents are invited to determine and rate the influences of these dimensions and the adoption of knowledge sharing activities within the organisation. Likert-style rating scale is used to measure respondents’ behaviours and attitudes (Cavana et al., 2001); and to collect their agreement or disagreement with each statement (Cooper and Schindler, 2001). Likert-style rating scale is usually a four, five, six or seven point rating scale to measure how strongly respondents agreed or disagreed with each
statement (Dillman, 2007). In this questionnaire, a five-point scale is used and respondents will select one of the five levels of agreements, namely 1 = Strongly Disagree (SD), 2 = Disagree (D), 3 = Neither Agree nor Disagree (NAD), 4 = Agree (A), and 5 = Strongly Agree (SA).

Finally, Part C collects general respondents’ demography information, such as gender, age, education level, type of industry or business, organisation size and position within the company. Although Part C collecting demographic and industry information, the anonymity of respondents is preserved because no company or personal information is collected.

### 3.6 Questionnaire Development

Prior to distribution of questionnaire, Cavana et al. (2001) suggest researchers need to conduct pre-tests to ensure that the instrument’s potential effectiveness in gathering useful data for decision making and recommendations. Pre-tests, such as content validity, face validity and pilot study should be carried out.

While a pilot study can be used to ascertain the proper functioning of the questionnaire (Aaker et al., 2001), conducting a pilot study can be time consuming (Mason and Zuercher, 1995). A successful pilot study may not assure the success of full-scale survey and that a pilot study may create problems, such as funding, considerable investment of
resources, and the difficulty for researchers to continue the study after an unsuccessful pilot study (Van Teijlingen and Hundley, 2001). Therefore, in consideration of time and financial limitations, a pilot study is not a practical option for this study.

Burns (1994) refers the questionnaire face validity as effectiveness in measuring the concepts being investigated, especially the clearness and understandability of the wordings in the questionnaire. Five full time Singapore working adults attending part time degree program were invited to pre-test the questionnaire with the purpose to collect constructive comments on the questionnaire about the font size, wordings, language, instructions, understandability, layout and structure. Based on these feedbacks, the questionnaire is modified accordingly.

Burns (1994) refers content validity as representativeness of the theoretical constructs on the content to be measured in the questionnaire. Unless current measures are unavailable or inadequate, Churchill (1979) suggests that adaptation of existing measures matches researchers’ requirements should be preferred to sustain content validity and preserve the accuracy of measurement.

This study seeks to expand the success of Al-Alawi et al.’s (2007) study. Based on 231 returned questionnaires, Al-Alawi et al. (2007) point out that some organisational characteristics, such as information systems, organisation structure, communication
among staff, reward system and trust, are positively related to knowledge sharing. As shown in Table 3.4 Indicators of variables, in designing the survey research, this study adopt knowledge management dimensions from previous studies. Wherever possible, these variables are measured using direct questions. The reliability and validity of these measures provide the basis for testing of hypotheses.
<table>
<thead>
<tr>
<th>Type of Variable</th>
<th>Variables</th>
<th>Question</th>
<th>Indicators</th>
<th>Value of Cronbach Alpha</th>
<th>Indicators of existence/Reference Paper</th>
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<td>A1</td>
<td>1 Direct assessment of the level of Knowledge Sharing</td>
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<td></td>
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<td>A2</td>
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<td></td>
<td></td>
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<td>3 Willingness to share knowledge freely</td>
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<td></td>
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<td>2 Leadership</td>
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<td>Han and Anantatmula (2007)</td>
</tr>
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<td></td>
<td></td>
<td>B 2c</td>
<td>3 Managers’ willingness</td>
<td>0.901</td>
<td>Han and Anantatmula (2007)</td>
</tr>
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<td>1 Technologies</td>
<td>-</td>
<td>Al-Alawi et al. (2007)</td>
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<td></td>
<td></td>
<td>B 3b</td>
<td>2 Effectiveness of technology</td>
<td>0.780</td>
<td>Han and Anantatmula (2007)</td>
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<td></td>
<td></td>
<td>B 3c</td>
<td>3 Comfort in using technologies</td>
<td>0.780</td>
<td>Han and Anantatmula (2007)</td>
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<td>Type of Variable</td>
<td>Variables</td>
<td>Question</td>
<td>Indicators</td>
<td>Value of Cronbach Alpha</td>
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<td></td>
<td>B 4b</td>
<td>2 Use of knowledge</td>
<td></td>
<td>Chase (1997)</td>
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<td></td>
<td>B 4c</td>
<td>3 Knowledge Transfer</td>
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<td>Chase (1997)</td>
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<td>1 Ease of information flow</td>
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<td></td>
<td></td>
<td>B 5b</td>
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<td>Syed-Ikhsan and Rowland (2004a)</td>
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<td></td>
<td>B 5c</td>
<td>3 Participative decision making</td>
<td>0.830</td>
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<td></td>
<td>B 6b</td>
<td>2 Effectiveness of reward</td>
<td></td>
<td>Goh (2002)</td>
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<td>3 Team rewards</td>
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<td>Al-Alawi et al. (2007)</td>
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<td></td>
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<td>Type of Variable</td>
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<td>Question</td>
<td>Indicators</td>
<td>Value of Cronbach Alpha</td>
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<td>------------------------------</td>
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<tr>
<td>Independent</td>
<td>People - Trust</td>
<td>B 7a</td>
<td>1 Trust</td>
<td>-</td>
<td>Al-Alawi et al. (2007)</td>
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<tr>
<td></td>
<td></td>
<td>B 7b</td>
<td>2 Share personal feelings</td>
<td>-</td>
<td>Mishra and Morrissey (1990)</td>
</tr>
<tr>
<td></td>
<td></td>
<td>B 7c</td>
<td>3 Knowledge of co-workers’ personality</td>
<td>0.690 Kang et al. (2008)</td>
<td>Al-Alawi et al. (2007)</td>
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<td>Independent</td>
<td>People – Communication</td>
<td>B 7d</td>
<td>1 Face to face</td>
<td>-</td>
<td>Al-Alawi et al. (2007)</td>
</tr>
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<td></td>
<td></td>
<td>B 7e</td>
<td>2 Teamwork discussions</td>
<td>-</td>
<td>Al-Alawi et al. (2007)</td>
</tr>
<tr>
<td></td>
<td></td>
<td>B 7g</td>
<td>2 Benefit of sharing</td>
<td>0.830 Siemsen et al., (2008)</td>
<td>Burgess (2005)</td>
</tr>
</tbody>
</table>
Knowledge sharing variable: From Al-Alawi et al.’s (2007) study, most of the 231 respondents evaluate the level of knowledge sharing within their organisations as excellent, good and poor. Most of these respondents indicate collaboration and teamwork, training, formal and informal discussion, knowledge sharing and communication network as techniques most frequently used by organisations in emphasising knowledge sharing whereas chatting during break time, brainstorming, workshops, seminars, conferences, focus groups and quality circles are less frequently used by organisations in emphasising knowledge sharing (Al-Alawi et al., 2007). Al-Alawi et al.’s (2007) study on knowledge sharing techniques was based on the success of Syed-Ikhsan and Rowland’s (2004a), Griffen’s (2002) and Davenport and Prusak’s (1998) studies. This study adopts indicators used by Al-Alawi et al. (2007) and seeks to investigate the knowledge sharing techniques/tools used to facilitate knowledge sharing and the level of knowledge sharing adoption in Singapore organisations.

Organisational leadership variable: Indicators are adopted from the works of Chen and Barnes (2006) and Han and Anantatmula (2007). Chen and Barnes (2006) use 72 samples collected from United States of America and 93 samples collected from Taiwan to study the impacts of leadership behaviours on knowledge sharing activities. Chen and Barnes’ (2006) questionnaire includes leadership variables extracted from studies conducted by Burns (1978), Bass and Avolio (1994) and Bycio, Hackett and
Alien (1995) and has obtained a significant result for leadership dimension. Han and Anantatmula’s (2007) study comprising of 235 responses adopts O’Dell and Grayson’s (1998) survey questions and shows leadership that promotes knowledge sharing among employees in the United States of America organisations. As shown in Table 3.4, Cronbach’s alpha reliability scale of all the constructs are above the minimum accepted level of 0.7 (Nunnally and Bernstein, 1994). Therefore, these indicators for organisational leadership provide the foundation for this study to test if organisational leadership influences knowledge sharing adoption in Singapore organisations.

**Information System variable:** Indicators are adopted from the works of Al-Alawi *et al.* (2007) and Han and Anantatmula (2007). Al-Alawi *et al.*’s (2007) questionnaire is based on variables extracted from Connelly and Kelloway’s (2003) study with a Cronbach’s alpha of 0.720. Al-Alawi *et al.* (2007) indicate that various tools and technologies (such as groupware, email and intranet) are provided by respondents’ organisations for knowledge sharing purposes and agree that these available technologies/tools are effective in facilitating knowledge sharing, and confirm that they feel comfortable in using these knowledge sharing technologies/tools. In addition, Han and Anantatmula’s (2007) study, with Cronbach’s alpha of 0.780, adds that information technology is used to promote knowledge sharing among employees. Therefore, the indicators for information systems are adopted from Al-Alawi *et al.* (2007). This study
uses questions from Al-Alawi et al.’s (2007) questionnaire to investigate if availability, effectiveness and comfort in using information system technologies influence knowledge sharing adoption in Singapore organisations.

Knowledge Sharing Processes variable: Indicators are adopted from an international research survey (Chase, 1997) that has been cited and applied in empirical studies conducted in United Kingdom (Chen, Duan, Edwards and Lehaney, 2006) and Malaysia (Syed-Ikhsan, and Rowland, 2004b). Chen et al. (2006) study adopts eight sub questions from Chase’s (1997) study to investigate inter organisational knowledge transfer needs in small to medium-sized organisation. Chase’s (1997) study is adopted in Syed-Ikhsan, and Rowland’s (2004b) study on knowledge management in public organisation. However Cronbach’s alpha for variables used in Chase’s (1997) study are not disclosed. Chase (1997) collects responses from both 431 individuals (132 respondents from Europe and 299 respondents from North America) and 143 organisations (Europe – 52%, United States of America – 41%, Australasia – 4% and Africa – 3%). Chase (1997) shows a quarter of respondents indicate that their organisations are good in generating new knowledge whereas only six percent of respondents concur that their organisations are efficient at leveraging knowledge to improve performance and merely eight percent of respondents agree that their organisations are good in transferring existing knowledge to other parts of their organisations. Thus, this study seeks to apply questions relating to knowledge sharing
processes used in Chase’s (1997) questionnaire to investigate the relationship between knowledge sharing processes and knowledge sharing adoption in Singapore organisations.

**Organisational Structure variable:** Indicators are adopted from the works of Al-Alawi et al. (2007) and Kang et al. (2008). Al-Alawi et al.’s. (2007) questionnaire adopts questions from the works of Goh (2002), Syed-Ikhsan and Rowland (2004a), Griffen and Moorhead (2001). Goh (2002) shows how an organisation is designed to encourage teamwork and the formation of cross-functional teams that ultimately allow the easy flow of information between group across boundaries without restrictions and hierarchical barriers. Syed-Ikhsan and Rowland (2004a) add that appropriate organisational structure eases the flow of information. Griffen and Moorhead (2001) suggest that organisational structure promotes participative decision making to support knowledge sharing. Based on 231 sample collected, Al-Alawi et al. (2007) indicate most respondents agree that teams formation is needed for certain tasks, that co-workers’ active involvement in decision making process is required and that information flows easily within their organisations regardless of staff roles or other boundaries. In an empirical study conducted in South Korea based on 323 samples, Kang et al. (2008) add that organisational structure secures staff participations in knowledge sharing (with Cronbach’s alpha of 0.830). Thus, in testing the relationship between knowledge sharing processes and knowledge sharing adoption in Singapore
organisations, this study uses the works of Al-Alawi et al. (2007) and Kang et al. (2008) and applies questions relating to organisational structure used by Al-Alawi et al. (2007).

**Reward System variable:** Indicators are adopted from the works of Al-Alawi et al. (2007) and Kang et al. (2008). Al-Alawi et al. (2007) adopt questions from the literature review of Syed-Ikhsan and Rowland’s (2004a) and Goh’s (2002) works. Existence of rewards for knowledge sharing promote knowledge sharing activities (Syed-Ikhsan and Rowland, 2004a; Goh, 2002). Based on 231 sample collected, Al-Alawi et al. (2007) indicate that most respondents agree that knowledge sharing rewards are effective in motivating co-workers to engage in knowledge sharing, that staff expect to receive rewards based on teamwork and collaboration rather than personal performance, but less respondents agree that employees are given rewards for experience and knowledge sharing with their co-workers. Kang et al. (2008) in an empirical study conducted in South Korea based on 323 samples, add that rewards positively influence knowledge sharing (Cronbach’s alpha of 0.890). Thus, in testing the relationship between rewards and knowledge sharing adoption in Singapore organisations, this study uses the indicators used by Al-Alawi et al. (2007) and Kang et al. (2008) and applies questions relating to reward systems used by Al-Alawi et al. (2007).
People - Trust variable: Indicators are adopted from the works of Al-Alawi et al. (2007) and Kang et al. (2008). Al-Alawi et al.’s (2007) questionnaire is based on trust variable extracted from Mishra and Morrissey’s (1990) study. Mishra and Morrissey (1990) study 143 organisations in Michigan, United States of America and suggest that trust exists when employees feel the freedom to share knowledge, disclose personal feelings, and work with others towards a common goal. Al-Alawi et al. (2007) show that most respondents are willing to share personal feelings and perceptions with their colleagues, that substantial trust is present between co-workers, and that co-workers can be trusted. In an empirical study conducted in South Korea based on 323 samples, Kang et al. (2008) add that most respondents believe that their co-workers are willing to advise and encourage them regarding their personal problems (with Cronbach’s alpha of 0.690). Thus, in testing the relationship between trust and knowledge sharing adoption in Singapore organisations, this study seeks to adopt the indicators used by Al-Alawi et al. (2007) and Kang et al. (2008); and applies questions relating to trust used by Al-Alawi et al. (2007).

People - Communication variable: Indicators are adopted from the works of Al-Alawi et al. (2007) and Kang et al. (2008). Al-Alawi et al.’s (2007) questionnaire is based on communication variable extracted from literature review conducted by Smith and Rupp (2002) and Goh (2002). Smith and Rupp (2002) suggest that high level of face to face interaction increases knowledge renewal and sharing within the
organisation. Goh (2002) indicates that development of teamwork, collaborations and
discussions allow and encourage staff to apply and share information regarding solving
problems and execute ground-breaking answers to solve problems. Al-Alawi et al.
(2007) indicate most respondents agree that communication has been enhanced
through teamwork, discussions and collaborations and report the existence of
considerable high level of face-to-face interactions between co-workers in their
organisations. In an empirical study conducted in Taiwan based on 288 samples, Cheng
et al. (2008) add that communication significantly influences inter-organisational
knowledge sharing (with Cronbach’s alpha of 0.880). Thus, in testing the relationship
between communication and knowledge sharing adoption in Singapore organisations,
this study seeks to use the indicators used by Al-Alawi et al. (2007) and Cheng et al.
(2008); and applies questions relating to communication used by Al-Alawi et al.
(2007).

**People - Motivation variable:** Indicators are adopted from the works of Siemsen et al.,
(2008) and Burgess (2005). In an empirical study conducted in United States of
America based on 140 samples, Siemsen et al. (2008) provide theoretical model and
empirical evidence indicate that ability, opportunity, and motivation drive knowledge
sharing behaviour. Siemsen et al. (2008) based their study on a famous
motivation–opportunity–ability (MOA) framework (Blumberg and Pringle, 1982) that
has been applied in diverse management areas (Boudreau, Hopp, McClain and Thomas,
2003; Adler and Kwon, 2002) and knowledge management practices (Argote, McEvily and Reagans, 2003). Based on a web based survey conducted in the United States of America that collects 480 responses, Burgess (2005), based on the Snyder and Cantor’s (1998) study, suggests that individual motives can influence workers’ willingness to share. Snyder and Cantor’s (1998) study has also been re-applied in various motivation areas, such as organisational citizenship behaviours (Rioux and Penner, 2001; Penner, Midili and Kegelmeyer, 1997), threat, authoritarianism, and voting (Lavine, Burgess, Snyder, Transue, Sullivan, Haney and Wagner, 1999) and volunteerism (Omoto and Snyder, 1995; Clary, Snyder, Ridge, Miene and Haugen, 1994). Thus, this study seeks to apply questions relating to motivation used by Siemsen et al. (2008) and Burgess (2005); and provides empirical analysis to tests the relationship between motivation and knowledge sharing adoption in Singapore organisations.

3.7 Research Question and Hypothesis Testing

Cavana et al. (2001) highlight the following procedures in quantitative data analysis, such as preparing data for analysis, obtaining feel for data, examining the goodness of the data, and testing hypotheses.

Firstly, in preparing the data for analysis, the data are checked, edited, coded and entered into computer through the use of Statistical Package for the Social Sciences (SPSS) software, student version 15 for windows. Secondly, dispersion and central
tendency are inspected to acquire a feel for the data. Then, data mean, range, variance and standard deviation are verified before studying the variables’ frequency distribution. Data biases and variability are to be detected and removed. Thirdly, correlation matrix between variables determines the goodness of the data for their validity and reliability. Lastly, hypotheses are tested using multiple regressions.

For the first research question or Hypothesis 1, various descriptive statistics are performed on the collected data to reveal the current techniques and tools used to facilitate knowledge sharing. In order to test hypothesis H1, the association between the two variables is investigated by cross tabulating ‘knowledge sharing techniques/tools’ and ‘organisation’s knowledge sharing level’. The results are established when causal relationships exist between the type of knowledge sharing techniques/tools used and the shaping of knowledge sharing practices.

H1: The frequently used knowledge sharing techniques/tools are associated with the level of knowledge sharing adoption in Singapore organisations.

For the second research question or Hypothesis 2, the following hypotheses (H2a to H2f) are to be tested simultaneously using linear and multiple regression methods. These results show the association between knowledge management factors and the adoption of knowledge sharing in Singapore organisations.
H2a: Organisational leadership is positively associated with knowledge sharing adoption in Singapore organisations.

H2b: Knowledge sharing information system is positively associated with knowledge sharing adoption in Singapore organisations.

H2c: Knowledge sharing process is positively associated with knowledge sharing adoption in Singapore organisations.

H2d: Organisational structure is positively associated with knowledge sharing adoption in Singapore organisations.

H2e: Knowledge sharing reward system is positively associated with knowledge sharing adoption in Singapore organisations.

H2f: People characteristics (such as: communication among staff, trust among staff, motivation to share) are positively associated with knowledge sharing adoption in Singapore organisations.

For the third research question or Hypothesis 3, the following hypothesis H3 is to be tested simultaneously using multiple regression method. The results indicate which of these key knowledge management dimensions (people, leadership, information systems, processes, organisational structure and reward system) are the better predictors of good knowledge sharing practices.
3.8 Conclusion

For this study, positivism philosophy and deduction research approach are appropriate. Due to financial and time constraints, this study is conducted just once at a single point of time. The researcher focuses on collecting quantitative data using self-administered questionnaire survey method. Although a pilot study was not conducted, content validity was supported as questions in the questionnaire based on previous published research, and face validity was tested before distributing the questionnaire as a pre-test of the questionnaire to ensure face validity of the questionnaire.

Convenience sampling approach was applied because the questionnaires were distributed and collected from full time working adults enrolled in various academic programs with different educational agents. Further, potential respondents were sourced from working adults who work at either operational or managerial level without the restrictions of the industry, so a variety of opinions and views could be obtained.
Data collected were analysed and tested using SPSS software. Data dispersion, central
tendency, mean, range, variance, standard deviation and frequency distribution are
studied before additional analysis can be performed. Correlation matrix between
variables is available to test the goodness of data for validity and reliability before
hypotheses are tested using multiple regressions. Detailed data analysis and results are
discussed in the following chapters.
CHAPTER FOUR: DATA ANALYSIS AND FINDINGS

4.1 Introduction

In this chapter, the data that were collected from the returned questionnaire are analysed and the results are presented. This chapter aims to investigate, analyse and present the results from analysing the data collected from questionnaires that were distributed to organisations in Singapore. The first section commences with discussion on the questionnaire responses. The following sections examine demographics of the respondents and descriptions of variables used in this study. Then, the next section focuses on analysing the research questions and hypotheses as discussed previously in Section 2.6 Proposed Research Model, Questions and Hypotheses.

4.2 Questionnaire response

From October to December 2009, questionnaires were given to Singapore educational agents for distribution to potential respondents. University of Newcastle (Singapore Campus), TMC Educational Group and Singapore Human Resources Institute, each equipped with 300 questionnaires that will be distributed to their students. Two waves of questionnaire distributions were conducted. The first distribution of questionnaires, that included an information sheet and questionnaire, produced 115 returned questionnaires. The second wave was done in the next three weeks and generated additional 119 returned questionnaires.
Respondents were selected from these Singapore-based leading educational institutions because these institutions offer a wide range of recognised programs at certificate, diploma and degree programs that meet the specific needs of individual in different fields. For example, the University of Newcastle (Singapore campus) offers undergraduate and postgraduate programs in business, commerce, communication, engineering (electrical/ mechanical/ mechatronics), environmental and occupational health and safety, and information technology. In addition, TMC Educational Group is a company listed on the Singapore Stock Exchange and a partner with renowned Australia and the United Kingdom universities to provide recognised courses from certificate, diploma, undergraduate and master programs in English, business and management, psychology and counseling, information technology, mass communications, law, hospitality and tourism management, and arts and humanities. Likewise, Singapore Human Resources Institutes (School of human capital management and School of financial services and risk management) provide certificate, diploma and degree programs in human resources management, financial services, banking and finance, organisational psychology, counselling, organisational development and change, hospitality and tourism services management. Therefore, the sample is representative as respondents are full time working professionals from various industries and companies with different organisation sizes.
A total of 900 questionnaires were distributed and 234 questionnaires were returned. With this sample size, this study has achieved a response rate of 26.0%, which is acceptable according to Neuman’s (2005) recommendation that acceptable response rate for postal questionnaire survey would be between 10 and 50 percent. Furthermore, according to Roscoe (1975), the principle for establishing sample size for most research needs to be between 30 and 500. From previous empirical research on knowledge sharing adoption success as shown in Table 2.6, the most common sample size varies from 161 to 323 (Sohail and Daud, 2009; Lin et al., 2009; Al-Alawi et al., 2007; Kang et al., 2008; Cheng et al., 2008). Using these researches as a measure, the number of returned questionnaire of 234 in this study is adequate.

4.3 Descriptive statistics

This section begins with a descriptive analysis to get the feel for the data to provide a basis for further analysis. Variables are created to convert the raw data collected from the questionnaire into data that can be used. For example, as in Appendix 2 Questionnaire, Statement A1, which asks respondents to indicate the level of knowledge sharing within their organisation, knowledge sharing variable is created with an assigned numeric code of 1 for poor, 2 for good and 3 for excellent. Similarly, for statements in Part B of the questionnaire, each variable is assigned a numeric code of 1 for strongly disagree, 2 for disagree, 3 for neither agree nor disagree, 4 for agree and 5 for strongly agree. The variables analysed include: industry type, organisation
size, demographics of respondents (gender, age, education level and position in the organisation), descriptive statistics of variables, and reliability statistic of variables.

4.3.1 Type of industry

As shown in Table 4.1, 50 respondents are working in the finance/insurance services industry. This group is the highest number of respondents at 21.4% of the total sample. Government organisations is the next highest with 39 respondents representing 16.7% of the total sample, professional services ranked third with 33 respondents representing 14.1% of the total sample, and construction in fourth with 26 respondents representing 11.1% of the total sample.

The lowest respondent groups are from aerospace, event management, gaming, graphic design, marine, semiconductor, and steel fabrication. These industries only have 1 respondent with each representing 0.4% of the total sample.

The majority of respondents are working in finance/insurance, professional services and government, which amount to 52% of the sample collected.
Table 4.1 Type of industry

<table>
<thead>
<tr>
<th>Type of Industry</th>
<th>Frequency</th>
<th>Percent (%)</th>
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<tbody>
<tr>
<td>Finance/ Insurance</td>
<td>50</td>
<td>21.4</td>
</tr>
<tr>
<td>Government</td>
<td>39</td>
<td>16.7</td>
</tr>
<tr>
<td>Professional Services</td>
<td>33</td>
<td>14.1</td>
</tr>
<tr>
<td>Construction</td>
<td>26</td>
<td>11.1</td>
</tr>
<tr>
<td>Technical Services</td>
<td>13</td>
<td>5.6</td>
</tr>
<tr>
<td>Education</td>
<td>12</td>
<td>5.1</td>
</tr>
<tr>
<td>Business Services</td>
<td>12</td>
<td>5.1</td>
</tr>
<tr>
<td>Information Technology</td>
<td>7</td>
<td>3.0</td>
</tr>
<tr>
<td>Wholesale/Retail Trade</td>
<td>5</td>
<td>2.1</td>
</tr>
<tr>
<td>Hotels/ Restaurants</td>
<td>5</td>
<td>2.1</td>
</tr>
<tr>
<td>Transport/ Storage</td>
<td>5</td>
<td>2.1</td>
</tr>
<tr>
<td>Manufacturing</td>
<td>4</td>
<td>1.8</td>
</tr>
<tr>
<td>Biological Pharmaceutical</td>
<td>3</td>
<td>1.3</td>
</tr>
<tr>
<td>Health Care</td>
<td>3</td>
<td>1.3</td>
</tr>
<tr>
<td>Petrol Chemical</td>
<td>3</td>
<td>1.3</td>
</tr>
<tr>
<td>Property</td>
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<tr>
<td>Marketing/ Advertising</td>
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<td>0.9</td>
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<tr>
<td>Telecommunication</td>
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<td>0.9</td>
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<td>Event Management</td>
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<td>Gaming</td>
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<td>Graphic Design</td>
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</tr>
<tr>
<td>Marine</td>
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<td>0.4</td>
</tr>
<tr>
<td>Semi Conductor</td>
<td>1</td>
<td>0.4</td>
</tr>
<tr>
<td>Steel Fabrication</td>
<td>1</td>
<td>0.4</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>234</strong></td>
<td><strong>100.0</strong></td>
</tr>
</tbody>
</table>

4.3.2 Organisation size

As in Table 4.2, 88 respondents (37.6%) are working in organisations that have more than 1,000 staff. Furthermore, a total of 115 respondents (49.1%) are working in organisations that have more than 500 staff.
### Table 4.2 Organisation size

<table>
<thead>
<tr>
<th>Number of Staff</th>
<th>Frequency</th>
<th>Percent (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Less than 50</td>
<td>51</td>
<td>21.8</td>
</tr>
<tr>
<td>50 to less than 100</td>
<td>22</td>
<td>9.4</td>
</tr>
<tr>
<td>100 to less than 500</td>
<td>46</td>
<td>19.7</td>
</tr>
<tr>
<td>500 to less than 1000</td>
<td>27</td>
<td>11.5</td>
</tr>
<tr>
<td>1000 or more</td>
<td>88</td>
<td>37.6</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>234</strong></td>
<td><strong>100.0</strong></td>
</tr>
</tbody>
</table>

### 4.3.3 Demographics of respondents

Table 4.3 shows demographics of the sample. Of the 234 total respondents, the majority of respondents (57.7%) are males. The majority of the respondents are between 25 years old to 35 years old (58.5%) and followed by the age group between 35 to 45 years old (17.5%).

With regards to the education level of the respondents, more than half of respondents (50.9%) have a diploma, 19.7% of respondents are high school graduates, and 20.5% of respondents have bachelor degree. Some respondents (9.0%) are master degree holders.

As for the position of respondents in organisations, the majority of respondents (58.5%) are operational staff, followed by middle level manager (19.7%) and senior manager (12.4%).
Table 4.3  Demographic characteristics of the sample

<table>
<thead>
<tr>
<th>Variables</th>
<th>Frequency</th>
<th>Percent (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Gender</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Female</td>
<td>99</td>
<td>42.3</td>
</tr>
<tr>
<td>Male</td>
<td>135</td>
<td>57.7</td>
</tr>
<tr>
<td>Age</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Less than 25 years old</td>
<td>41</td>
<td>17.5</td>
</tr>
<tr>
<td>25 to less than 35 years old</td>
<td>137</td>
<td>58.5</td>
</tr>
<tr>
<td>35 to less than 45 years old</td>
<td>41</td>
<td>17.5</td>
</tr>
<tr>
<td>45 to less than 55 years old</td>
<td>13</td>
<td>5.6</td>
</tr>
<tr>
<td>55 years old and older</td>
<td>2</td>
<td>0.9</td>
</tr>
<tr>
<td>Education level</td>
<td></td>
<td></td>
</tr>
<tr>
<td>High School</td>
<td>46</td>
<td>19.7</td>
</tr>
<tr>
<td>Diploma</td>
<td>119</td>
<td>50.9</td>
</tr>
<tr>
<td>Bachelor Degree</td>
<td>48</td>
<td>20.5</td>
</tr>
<tr>
<td>Master Degree</td>
<td>21</td>
<td>9.0</td>
</tr>
<tr>
<td>Organisation Position</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Senior Manager</td>
<td>29</td>
<td>12.4</td>
</tr>
<tr>
<td>Middle Level Manager</td>
<td>46</td>
<td>19.7</td>
</tr>
<tr>
<td>Operational Staff</td>
<td>137</td>
<td>58.5</td>
</tr>
<tr>
<td>Others</td>
<td>21</td>
<td>9.0</td>
</tr>
<tr>
<td>Missing record</td>
<td>1</td>
<td>0.4</td>
</tr>
</tbody>
</table>

4.3.4 Descriptive Statistics of Variables

Examination of the skewness and kurtosis of the sample may offer summary information regarding the sample distribution (Balanda and MacGillivray, 1988) and the normality of the distribution (D’Agostino, Balanger and D’Agostino Jr., 1990). When a variable skewness and kurtosis have values between $-1.0$ and $+1.0$, this
variable is considered to be normally distributed (Doric, Nikolic-Doric, Jevremovic and Malisic, 2009). Many researchers suggest that variables having skewness and kurtosis values between -2 to +2 are usually acceptable (Doric et al., 2009; DeCarlo, 1997; Hildebrand, 1971; Finucan, 1964).

With reference to Table 4.4, the skewness and kurtosis values of all the variables are in the range of -2 to +2. After considering both the skewness and kurtosis simultaneously, all the variables are reasonably normally distributed.
### Table 4.4 Descriptive Statistic of Variables

<table>
<thead>
<tr>
<th></th>
<th>Knowledge Sharing Level</th>
<th>Knowledge Sharing</th>
<th>Leadership</th>
<th>Information System</th>
<th>Knowledge Sharing Process</th>
<th>Organisational Structure</th>
<th>Reward System</th>
<th>People</th>
<th>People (Trust)</th>
<th>People (Communication)</th>
<th>People (Motivation)</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>N</strong> Valid</td>
<td>226</td>
<td>234</td>
<td>233</td>
<td>233</td>
<td>234</td>
<td>231</td>
<td>234</td>
<td>234</td>
<td>234</td>
<td>234</td>
<td>234</td>
</tr>
<tr>
<td><strong>Missing</strong></td>
<td>8</td>
<td>0</td>
<td>1</td>
<td>1</td>
<td>0</td>
<td>3</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td><strong>Median</strong></td>
<td>2</td>
<td>4</td>
<td>4</td>
<td>4</td>
<td>4</td>
<td>3</td>
<td>4</td>
<td>4</td>
<td>4</td>
<td>4</td>
<td></td>
</tr>
<tr>
<td><strong>Mode</strong></td>
<td>2</td>
<td>4</td>
<td>4</td>
<td>4</td>
<td>4</td>
<td>4</td>
<td>4</td>
<td>4</td>
<td>4</td>
<td>4</td>
<td></td>
</tr>
<tr>
<td><strong>Std. Deviation</strong></td>
<td>0.456</td>
<td>0.744</td>
<td>0.697</td>
<td>0.765</td>
<td>0.733</td>
<td>0.698</td>
<td>0.920</td>
<td>0.574</td>
<td>0.670</td>
<td>0.643</td>
<td></td>
</tr>
<tr>
<td><strong>Variance</strong></td>
<td>0.208</td>
<td>1.107</td>
<td>1.459</td>
<td>1.754</td>
<td>1.613</td>
<td>1.460</td>
<td>2.537</td>
<td>2.306</td>
<td>1.347</td>
<td>0.826</td>
<td></td>
</tr>
<tr>
<td><strong>Skewness</strong></td>
<td>0.281</td>
<td>-0.221</td>
<td>-0.339</td>
<td>-0.346</td>
<td>-0.233</td>
<td>-0.282</td>
<td>-0.175</td>
<td>-0.104</td>
<td>-0.253</td>
<td>-0.539</td>
<td></td>
</tr>
<tr>
<td><strong>Kurtosis</strong></td>
<td>1.683</td>
<td>0.249</td>
<td>1.019</td>
<td>0.600</td>
<td>0.397</td>
<td>0.441</td>
<td>-0.027</td>
<td>0.366</td>
<td>0.593</td>
<td>1.700</td>
<td></td>
</tr>
<tr>
<td><strong>Minimum</strong></td>
<td>1</td>
<td>1</td>
<td>1</td>
<td>1</td>
<td>1</td>
<td>1</td>
<td>1</td>
<td>1</td>
<td>1</td>
<td>1</td>
<td></td>
</tr>
<tr>
<td><strong>Maximum</strong></td>
<td>3</td>
<td>5</td>
<td>5</td>
<td>5</td>
<td>5</td>
<td>5</td>
<td>5</td>
<td>5</td>
<td>5</td>
<td>5</td>
<td></td>
</tr>
</tbody>
</table>


4.3.5 Reliability Statistic of Variables

Each variable is treated as a discrete variable and is created from adding values obtained from the items used to measure a specific variable. For example, seven variables were created to represent the people dimension and knowledge sharing adoption. Each variable has a value which is calculated by adding the values of all items that make up a variable. Each item has an assigned numeric code (1 for strongly disagree, 2 for disagree, 3 for neither agree nor disagree, 4 for agree and 5 for strongly agree). Then, a new variable is created by adding the value of all items measuring the same variable.

Table 4.5 below shows the Cronbach alpha coefficient for all variables used in this study. Cronbach alpha coefficients of all variables are greater than 0.7 (ranged from 0.709 to 0.906). As a Cronbach’s Alpha of 0.7 or more is considered as acceptable (Nunnally and Bernstein, 1994), thus, the constructs used in this study are considered as reliable to apply statistical analysis to answer Research Question 1, Research Question 2 and Research Question 3.
Table 4.5  Reliability statistics of variables

<table>
<thead>
<tr>
<th>Constructs</th>
<th>No of Items</th>
<th>Statement</th>
<th>Indicators</th>
<th>Cronbach's Alpha</th>
</tr>
</thead>
<tbody>
<tr>
<td>Knowledge Sharing Techniques and Tools</td>
<td>12</td>
<td>A2a Brainstorming sessions</td>
<td></td>
<td>0.752</td>
</tr>
<tr>
<td></td>
<td></td>
<td>A2b Chatting during breaks time</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>A2c Collaboration and Teamwork</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>A2d Communication networks</td>
<td>(Internet, Intranet &amp; Extranet)</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>A2e Conferences</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>A2f Discussions</td>
<td>(Formal and informal)</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>A2g Focus groups</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>A2h Knowledge sharing tools</td>
<td>(Emails, groupware and etc)</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>A2i Seminars</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>A2j Quality Circles</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>A2k Training</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>A2l Workshops</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Knowledge Sharing</td>
<td>2</td>
<td>B1a Willingness to share knowledge freely</td>
<td></td>
<td>0.709</td>
</tr>
<tr>
<td>Organisational Leadership</td>
<td>3</td>
<td>B2a Effectiveness of leadership on Knowledge Sharing</td>
<td></td>
<td>0.882</td>
</tr>
<tr>
<td></td>
<td></td>
<td>B2b Leadership</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>B2c Managers’ willingness</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Information System</td>
<td>3</td>
<td>B3a Technologies</td>
<td></td>
<td>0.908</td>
</tr>
<tr>
<td></td>
<td></td>
<td>B3b Effectiveness of technology</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>B3c Comfort in using technologies</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Knowledge Sharing Processes</td>
<td>3</td>
<td>B4a Knowledge creation</td>
<td></td>
<td>0.907</td>
</tr>
<tr>
<td></td>
<td></td>
<td>B4b Use of knowledge</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>B4c Knowledge Transfer</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Organisational Structure</td>
<td>3</td>
<td>B5a Ease of information flow</td>
<td></td>
<td>0.715</td>
</tr>
<tr>
<td></td>
<td></td>
<td>B5b Cross functional teams</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>B5c Participative decision making</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Reward System</td>
<td>3</td>
<td>B6a Reward</td>
<td></td>
<td>0.885</td>
</tr>
<tr>
<td></td>
<td></td>
<td>B6b Effectiveness of reward</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>B6c Team rewards</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Constructs</td>
<td>No of Items</td>
<td>Statement</td>
<td>Indicators</td>
<td>Cronbach's Alpha</td>
</tr>
<tr>
<td>--------------------------------</td>
<td>-------------</td>
<td>--------------------</td>
<td>-----------------------------------</td>
<td>------------------</td>
</tr>
<tr>
<td>People</td>
<td>7</td>
<td>B7a to B7g</td>
<td>People Characteristics</td>
<td>0.881</td>
</tr>
<tr>
<td>People (Trust)</td>
<td>3</td>
<td>B7a</td>
<td>Trust</td>
<td>0.765</td>
</tr>
<tr>
<td></td>
<td></td>
<td>B7b</td>
<td>Share personal feelings</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>B7c</td>
<td>Knowledge of co-workers personality</td>
<td></td>
</tr>
<tr>
<td>People (Communication)</td>
<td>2</td>
<td>B7d</td>
<td>Face to face</td>
<td>0.786</td>
</tr>
<tr>
<td></td>
<td></td>
<td>B7e</td>
<td>Teamwork discussions</td>
<td></td>
</tr>
<tr>
<td>People (Motivation)</td>
<td>2</td>
<td>B7f</td>
<td>Personal motivation</td>
<td>0.858</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Benefit of sharing</td>
<td></td>
</tr>
</tbody>
</table>

### 4.4 Research questions and hypothesis testing

**Figure 2.7 Hypothesised Model** illustrates the hypotheses that are formulated from the research questions.

**Figure 2.7 Hypothesised Model**
RQ1: What is the relationship between knowledge sharing techniques/tools and knowledge sharing adoption within the organisation in Singapore?

RQ2: What impacts do these key knowledge management dimensions (people, leadership, information systems, processes, organisational structure and reward system) have on the adoption of knowledge sharing in Singapore organisations?

RQ3: Among these key knowledge management dimensions (people, leadership, information systems, processes, organisational structure and reward system), which are the better predictors of good knowledge sharing practices in Singapore organisations?

Data collected are analysed using Statistical Package for the Social Sciences (SPSS) Student version 15 for windows software.
4.5 Research Question 1

RQ1: What is the relationship between knowledge sharing techniques/tools and knowledge sharing adoption within the organisation in Singapore?

In investigating the relationship between the frequently used ‘knowledge sharing techniques and tools’ and ‘knowledge sharing adoption’, this section shows the frequency tables for ‘knowledge sharing techniques and tools’ and ‘organisation’s knowledge sharing level’ (excellent, good, or poor). The association between the two variables is investigated by cross tabulating ‘knowledge sharing techniques and tools’ and ‘organisation’s knowledge sharing level’. The statistically tested findings are then used to answer the following hypothesis:

\[ H1: \text{The frequently used knowledge sharing techniques and tools are associated with the level of knowledge sharing adoption in Singapore organisations.} \]

Knowledge Sharing techniques and tools

Table 4.6 provides a summary to the knowledge sharing techniques and tools that Singapore organisations used. The majority of respondents use discussions - formal and informal (76.0%), training (68.7%) and communication networks - internet, intranet and extranet (64.4%) as knowledge sharing techniques and tools. The three least popular knowledge sharing techniques and tools are quality circles (10.7%), focus groups (23.2%) and seminars (254.9%).
Table 4.6  The usage of Knowledge Sharing techniques and tools

<table>
<thead>
<tr>
<th>Knowledge Sharing Techniques and Tools</th>
<th>Yes</th>
<th>Percent (%)</th>
<th>No</th>
<th>Percent (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Discussions (Formal and informal)</td>
<td>177</td>
<td>76.0%</td>
<td>56</td>
<td>24.0%</td>
</tr>
<tr>
<td>Training</td>
<td>160</td>
<td>68.7%</td>
<td>73</td>
<td>31.3%</td>
</tr>
<tr>
<td>Communication networks (Internet, Intranet &amp; Extranet)</td>
<td>150</td>
<td>64.4%</td>
<td>83</td>
<td>35.6%</td>
</tr>
<tr>
<td>Knowledge sharing tools (Emails, groupware and etc)</td>
<td>146</td>
<td>62.7%</td>
<td>87</td>
<td>37.3%</td>
</tr>
<tr>
<td>Collaboration and Teamwork</td>
<td>135</td>
<td>57.9%</td>
<td>98</td>
<td>42.1%</td>
</tr>
<tr>
<td>Chatting during breaks time</td>
<td>127</td>
<td>54.5%</td>
<td>106</td>
<td>45.5%</td>
</tr>
<tr>
<td>Brainstorming sessions</td>
<td>120</td>
<td>51.5%</td>
<td>113</td>
<td>48.5%</td>
</tr>
<tr>
<td>Workshops</td>
<td>115</td>
<td>49.4%</td>
<td>118</td>
<td>50.6%</td>
</tr>
<tr>
<td>Conferences</td>
<td>73</td>
<td>31.3%</td>
<td>160</td>
<td>68.7%</td>
</tr>
<tr>
<td>Seminars</td>
<td>58</td>
<td>24.9%</td>
<td>175</td>
<td>75.1%</td>
</tr>
<tr>
<td>Focus groups</td>
<td>54</td>
<td>23.2%</td>
<td>179</td>
<td>76.8%</td>
</tr>
<tr>
<td>Quality Circles</td>
<td>25</td>
<td>10.7%</td>
<td>208</td>
<td>89.3%</td>
</tr>
</tbody>
</table>

Based on 226 responses, as shown in Table 4.7, more than 50% of the respondents indicate that the knowledge sharing techniques and tools used to facilitate knowledge sharing in their organisations include discussions – formal and informal (76.5%), training (69.0%), communication networks - internet, intranet and extranet (64.2%), knowledge sharing tools - emails, groupware and etc (62.8%), brainstorming sessions (52.2%), collaboration and teamwork (57.5%), and chatting during breaks time (55.3.0%). Conversely, less popular knowledge sharing techniques and tools used include workshops (49.6%), conferences (31.9%), seminars (25.2%), focus group (23.4%), and quality circle (11.1%).
<table>
<thead>
<tr>
<th>Knowledge Sharing Techniques and Tools</th>
<th>Response</th>
<th>Excellent</th>
<th>Good</th>
<th>Poor</th>
<th>Total Percent (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>N</td>
<td>%</td>
<td>N</td>
<td>%</td>
</tr>
<tr>
<td>Discussions ( Formal and informal )</td>
<td>Yes</td>
<td>29</td>
<td>12.8</td>
<td>136</td>
<td>60.2</td>
</tr>
<tr>
<td></td>
<td>No</td>
<td>3</td>
<td>1.3</td>
<td>42</td>
<td>18.7</td>
</tr>
<tr>
<td>Training</td>
<td>Yes</td>
<td>29</td>
<td>12.8</td>
<td>118</td>
<td>52.2</td>
</tr>
<tr>
<td></td>
<td>No</td>
<td>3</td>
<td>1.3</td>
<td>60</td>
<td>26.6</td>
</tr>
<tr>
<td>Communication networks (Internet, Intranet &amp; Extranet)</td>
<td>Yes</td>
<td>22</td>
<td>9.7</td>
<td>116</td>
<td>51.4</td>
</tr>
<tr>
<td></td>
<td>No</td>
<td>10</td>
<td>4.4</td>
<td>62</td>
<td>27.4</td>
</tr>
<tr>
<td>Knowledge sharing tools (Emails, groupware and etc)</td>
<td>Yes</td>
<td>23</td>
<td>10.2</td>
<td>112</td>
<td>49.5</td>
</tr>
<tr>
<td></td>
<td>No</td>
<td>9</td>
<td>4.0</td>
<td>66</td>
<td>29.2</td>
</tr>
<tr>
<td>Collaboration and Teamwork</td>
<td>Yes</td>
<td>23</td>
<td>10.2</td>
<td>102</td>
<td>45.1</td>
</tr>
<tr>
<td></td>
<td>No</td>
<td>9</td>
<td>4.0</td>
<td>76</td>
<td>33.6</td>
</tr>
<tr>
<td>Chatting during breaks time</td>
<td>Yes</td>
<td>20</td>
<td>8.8</td>
<td>98</td>
<td>43.4</td>
</tr>
<tr>
<td></td>
<td>No</td>
<td>12</td>
<td>5.3</td>
<td>80</td>
<td>35.4</td>
</tr>
<tr>
<td>Brainstorming sessions</td>
<td>Yes</td>
<td>23</td>
<td>10.2</td>
<td>90</td>
<td>39.8</td>
</tr>
<tr>
<td></td>
<td>No</td>
<td>9</td>
<td>4.0</td>
<td>88</td>
<td>38.9</td>
</tr>
<tr>
<td>Workshops</td>
<td>Yes</td>
<td>20</td>
<td>8.9</td>
<td>89</td>
<td>39.4</td>
</tr>
<tr>
<td></td>
<td>No</td>
<td>12</td>
<td>5.3</td>
<td>89</td>
<td>39.4</td>
</tr>
<tr>
<td>Conferences</td>
<td>Yes</td>
<td>20</td>
<td>8.9</td>
<td>50</td>
<td>22.1</td>
</tr>
<tr>
<td></td>
<td>No</td>
<td>12</td>
<td>5.3</td>
<td>128</td>
<td>56.6</td>
</tr>
<tr>
<td>Seminars</td>
<td>Yes</td>
<td>17</td>
<td>7.5</td>
<td>38</td>
<td>16.8</td>
</tr>
<tr>
<td></td>
<td>No</td>
<td>15</td>
<td>6.6</td>
<td>140</td>
<td>62.0</td>
</tr>
<tr>
<td>Focus groups</td>
<td>Yes</td>
<td>17</td>
<td>7.5</td>
<td>34</td>
<td>15.0</td>
</tr>
<tr>
<td></td>
<td>No</td>
<td>15</td>
<td>6.6</td>
<td>144</td>
<td>63.8</td>
</tr>
<tr>
<td>Quality Circles</td>
<td>Yes</td>
<td>11</td>
<td>4.9</td>
<td>14</td>
<td>6.2</td>
</tr>
<tr>
<td></td>
<td>No</td>
<td>16</td>
<td>7.0</td>
<td>164</td>
<td>72.6</td>
</tr>
</tbody>
</table>
Pearson Chi Square Test

In understanding the relationship between knowledge sharing techniques and tools and organisation’s knowledge sharing level, the data are statistically tested. As shown in Table 4.8, the association or nature of the relationship between these variables is determined by applying the Chi square test to obtain the P values.

Table 4.8 Cross tabulation: ‘Organisation’s Knowledge Sharing level’ and ‘Knowledge Sharing techniques and tools’

<table>
<thead>
<tr>
<th>Knowledge Sharing Techniques and Tools</th>
<th>Organisation’s Knowledge Sharing level</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Degree of Freedom</td>
</tr>
<tr>
<td>Discussions (Formal and informal)</td>
<td>2</td>
</tr>
<tr>
<td>Training</td>
<td>2</td>
</tr>
<tr>
<td>Communication networks (Internet, Intranet &amp; Extranet)</td>
<td>2</td>
</tr>
<tr>
<td>Knowledge sharing tools (Emails, groupware etc.)</td>
<td>2</td>
</tr>
<tr>
<td>Collaboration and Teamwork</td>
<td>2</td>
</tr>
<tr>
<td>Chatting during breaks time</td>
<td>2</td>
</tr>
<tr>
<td>Brainstorming sessions</td>
<td>2</td>
</tr>
<tr>
<td>Workshops</td>
<td>2</td>
</tr>
<tr>
<td>Conferences</td>
<td>2</td>
</tr>
<tr>
<td>Seminars</td>
<td>2</td>
</tr>
<tr>
<td>Focus groups</td>
<td>2</td>
</tr>
<tr>
<td>Quality Circles</td>
<td>2</td>
</tr>
</tbody>
</table>

\(^{(a)}\) 2 cells (33.3%) have expected count less than 5. The minimum expected count is 1.77.

When the P value exceeds the significance level (0.05), no significant relationship exists between two variables. Hence, the result indicates that nine out of twelve knowledge sharing techniques and tools are significantly associated with the level of
knowledge sharing in the organisation. However, one of the nine knowledge sharing
techniques and tools (quality circles) has 33.3% cells with expected count less than 5
(see footnote on Table 4.8), which indicates that not enough data to test for the
significant association. Thus, this tool is excluded from our data analysis.

Combining information from two tables (Table 4.7 and Table 4.8), the results show
that the knowledge sharing techniques and tools: discussions, trainings,
collaboration/teamwork and brainstorming session that are used frequently in
Singapore organisations (more than 50% of use) are associated with level of
knowledge sharing adoption.

The results showed that there was contrary to initial expectation as per the Hypothesis
1, which states that the frequently used knowledge sharing techniques and tools are
associated with the level of knowledge sharing with the organisation in Singapore.
Other knowledge sharing techniques and tools: workshops, conferences, seminars and
focus groups are associated with the level of knowledge sharing. However, these tools
are not frequently used in Singapore organisations. Furthermore, the results also
indicate that, although they are frequently used tools with the use of more than 50%,
communication networks (internet, intranet and extranet), knowledge sharing tools
(emails, groupware etc.) and chatting during breaks time are not associated with the
level of knowledge sharing within Singapore organisations.
4.6 Research Question 2

RQ2: What impacts do these key knowledge management dimensions (people, leadership, information systems, processes, organisational structure and reward system) have on the adoption of knowledge sharing in Singapore organisations?

In investigating the impacts these key knowledge management dimensions (people, leadership, information systems, processes, organisational structure and reward system) have on knowledge sharing adoption, the correlation analysis between variables is performed first to know the nature of the relationship between each variable. Subsequently, in testing hypotheses H2a to H2f, linear and multiple regression methods are used.

Regression method is used in this study, despite the limitations of ordinary least squares technique. The first limitation is that ordinary least squares cannot be used when the relationships between dependent variables and independent variable are non-linear (De Veaux, Velleman and Back, 2008). Next, unusual or extreme data values in both the dependent and independent variables can lead to misrepresentation of the linear model (De Veaux et al., 2008). Lastly, the missing values can lead to the non-optimal variance components computation (Ugrinowitsch, Fellingham and Ricard, 2004). However, ordinary least squares technique is useful when an error in the
equation includes a constant variance and that there was no correlation exists between errors in the equation (Morley, 1997). Furthermore, when each of the dependent variable values follows a normal distribution, an ideal regression model can be obtained (De Veaux et al., 2008).

In this study, the skewness and kurtosis of the samples on the sample distribution are examined prior to regression analysis performed. Many researchers suggest that the variables have skewness and kurtosis values between -2 to +2 are usually accepted (Doric et al., 2009; DeCarlo, 1997; Hildebrand, 1971; Finucan, 1964). With reference to Table 4.4, all the variables are normally distributed after considering both skewness and kurtosis simultaneously. The skewness and kurtosis values of all the variables are in the range of -2 to +2. Therefore, the regression analysis is appropriate to examine the data of this study.

Table 4.9 below shows that all key knowledge management dimensions variables are positively correlated with knowledge sharing adoption variable at 1 percent significance level.
Table 4.9 Correlations between ‘Knowledge Sharing’ variable and key knowledge management dimensions variables

<table>
<thead>
<tr>
<th>Correlations between Knowledge Sharing and Variables</th>
<th>Pearson Correlation</th>
<th>Sig. (1 tailed)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Organisational Leadership</td>
<td>0.643 (**)</td>
<td>.000</td>
</tr>
<tr>
<td>Information System</td>
<td>0.507 (**)</td>
<td>.000</td>
</tr>
<tr>
<td>Knowledge Sharing Processes</td>
<td>0.599 (**)</td>
<td>.000</td>
</tr>
<tr>
<td>Organisational Structure</td>
<td>0.472 (**)</td>
<td>.000</td>
</tr>
<tr>
<td>Reward System</td>
<td>0.356 (**)</td>
<td>.000</td>
</tr>
<tr>
<td>People</td>
<td>0.606 (**)</td>
<td>.000</td>
</tr>
<tr>
<td>People - Trust</td>
<td>0.588 (**)</td>
<td>.000</td>
</tr>
<tr>
<td>People – Communication</td>
<td>0.502 (**)</td>
<td>.000</td>
</tr>
<tr>
<td>People – Motivation</td>
<td>0.465 (**)</td>
<td>.000</td>
</tr>
</tbody>
</table>

** Correlation is significant at the 0.01 level (1-tailed).

4.6.1 H2a Hypothesis

The following statistically tested findings are used to answer the hypotheses:

\[ H2a: \text{Organisational leadership is positively associated with the adoption of knowledge sharing in Singapore organisations.} \]

Table 4.9 Pearson correlation results show that the organisational leadership correlation is 0.643, which indicate a positive correlation between organisational leadership and adoption of knowledge sharing at 1 percent significance level. In further testing, linear regression methods are used to test the hypothesis. Based on the model summary in Table 4.10, the adjusted R-square of 0.411 indicates that 41.1 percent of the variation in knowledge sharing adoption is explained by the variation in organisational leadership variable. An ANOVA value of F = 162.593 at p < 0.05
shows an overall significance of the model. The analysis showed that the organisational leadership variable with beta 0.643 and p = 0.000 is positively associated with the adoption of knowledge sharing in Singapore organisations.

Table 4.10  Organisational leadership variable – Linear Regression Results

<table>
<thead>
<tr>
<th>Model Summary (b)</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>R</strong></td>
</tr>
<tr>
<td>1</td>
</tr>
</tbody>
</table>

a  Predictors: (Constant), Leadership  
b  Dependent Variable: Knowledge Sharing

<table>
<thead>
<tr>
<th>ANOVA(b)</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Model</strong></td>
</tr>
<tr>
<td>1 Regression</td>
</tr>
<tr>
<td>Residual</td>
</tr>
<tr>
<td>Total</td>
</tr>
</tbody>
</table>

a  Predictors: (Constant), Leadership  
b  Dependent Variable: Knowledge Sharing

<table>
<thead>
<tr>
<th>Coefficients(a)</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Model</strong></td>
</tr>
<tr>
<td>1 (Constant)</td>
</tr>
<tr>
<td>Leadership</td>
</tr>
</tbody>
</table>

a  Dependent Variable: Knowledge Sharing
4.6.2 H2b Hypothesis

The following statistical analyses are used to answer the hypotheses:

\[ H2b: \text{ Knowledge sharing information system is positively associated with the adoption of knowledge sharing in Singapore organisations.} \]

Table 4.9 Pearson correlation results show that the correlation is 0.507, which indicates a positive relationship between knowledge sharing information system and the adoption of knowledge sharing at 1 percent significance level. Based on the model summary in Table 4.11, the adjusted R-square value of 0.254 indicates that 25.4 percent of the variation in knowledge sharing adoption is explained by the variation in information system variable. An ANOVA value of F = 79.953 at p < 0.05 shows an overall significance of the model. The analysis showed that the knowledge sharing information system variable with beta 0.507 and p = 0.000 is positively associated with the adoption of knowledge sharing in Singapore organisations.

Table 4.11 Information system variable – Linear Regression Results

<table>
<thead>
<tr>
<th>Model</th>
<th>R</th>
<th>R Square</th>
<th>Adjusted R Square</th>
<th>Std. Error of the Estimate</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>.507(a)</td>
<td>.257</td>
<td>.254</td>
<td>1.28727</td>
</tr>
</tbody>
</table>

a Predictors: (Constant), Information System
b Dependent Variable: Knowledge Sharing
### ANOVA(b)

<table>
<thead>
<tr>
<th>Model</th>
<th>Sum of Squares</th>
<th>df</th>
<th>Mean Square</th>
<th>F</th>
<th>Sig.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Regression</td>
<td>132.487</td>
<td>1</td>
<td>132.487</td>
<td>79.953</td>
<td>.000(a)</td>
</tr>
<tr>
<td>Residual</td>
<td>382.783</td>
<td>231</td>
<td>1.657</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Total</td>
<td>515.270</td>
<td>232</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

- a Predictors: (Constant), Information System
- b Dependent Variable: Knowledge Sharing

### Coefficients(a)

<table>
<thead>
<tr>
<th>Model</th>
<th>Unstandardised Coefficients</th>
<th>Standardised Coefficients</th>
<th>t</th>
<th>Sig.</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>B</td>
<td>Std. Error</td>
<td>Beta</td>
<td></td>
</tr>
<tr>
<td>1 (Constant)</td>
<td>3.486</td>
<td>.425</td>
<td></td>
<td>8.193</td>
</tr>
<tr>
<td>Information System</td>
<td>.329</td>
<td>.037</td>
<td>.507</td>
<td>8.942</td>
</tr>
</tbody>
</table>

- a Dependent Variable: Knowledge Sharing

#### 4.6.3 H2c Hypothesis

The following statistical analyses are used to answer the hypotheses:

**H2c:** Knowledge sharing process is positively associated with the adoption of knowledge sharing in Singapore organisations.

**Table 4.9** Pearson correlation results show that the correlation is 0.599, which indicates a positive relationship between knowledge sharing information system and the adoption of knowledge sharing at 1 percent significance level. Based on the model summary in **Table 4.12**, the adjusted R-square value of 0.356 indicates that 35.6 percent of the variation in knowledge sharing adoption is explained by the variation in knowledge sharing process variable. An ANOVA value of $F = 129.853$ at
p < 0.05 shows an overall significance of the model. The analysis showed that the knowledge sharing process variable with beta 0.599 and p = 0.000 is positively associated with the adoption of knowledge sharing in Singapore organisations.

Table 4.12  Knowledge sharing process variable – Linear Regression Results

Model Summary (b)

<table>
<thead>
<tr>
<th>Model</th>
<th>R</th>
<th>R Square</th>
<th>Adjusted R Square</th>
<th>Std. Error of the Estimate</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>.599(a)</td>
<td>.359</td>
<td>.356</td>
<td>1.19402</td>
</tr>
</tbody>
</table>

a  Predictors: (Constant), Knowledge Sharing Process
b  Dependent Variable: Knowledge Sharing

ANOVA(b)

<table>
<thead>
<tr>
<th>Model</th>
<th>Sum of Squares</th>
<th>df</th>
<th>Mean Square</th>
<th>F</th>
<th>Sig.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Regression</td>
<td>185.128</td>
<td>1</td>
<td>185.128</td>
<td>129.853</td>
<td>.000(a)</td>
</tr>
<tr>
<td>Residual</td>
<td>330.757</td>
<td>232</td>
<td>1.426</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Total</td>
<td>515.885</td>
<td>233</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

a  Predictors: (Constant), Knowledge Sharing Process
b  Dependent Variable: Knowledge Sharing

Coefficients(a)

<table>
<thead>
<tr>
<th>Model</th>
<th>Unstandardised Coefficients</th>
<th>Standardised Coefficients</th>
<th>t</th>
<th>Sig.</th>
</tr>
</thead>
<tbody>
<tr>
<td>(Constant) Knowledge Sharing Process</td>
<td>2.832</td>
<td>.393</td>
<td>7.212</td>
<td>.000</td>
</tr>
<tr>
<td>(Constant) Knowledge Sharing Process</td>
<td>.405</td>
<td>.036</td>
<td>11.395</td>
<td>.000</td>
</tr>
</tbody>
</table>

a  Dependent Variable: Knowledge Sharing
4.6.4 H2d Hypothesis

The following statistical analyses are used to answer the hypotheses:

\[
H2d: \quad \text{Organisational structure is positively associated with the adoption of knowledge sharing in Singapore organisations.}
\]

Table 4.9 Pearson correlation results show that the correlation is 0.472, which indicates a positive relationship between organisational structure and the adoption of knowledge sharing at 1 percent significance level. Based on the model summary in Table 4.13, the adjusted R-square value of 0.219 indicates that 21.9 percent of the variation in knowledge sharing adoption is explained by the variation in organisational structure variable. An ANOVA value of $F = 65.520$ at $p < 0.05$ shows an overall significance of the model. The analysis showed that the organisational structure variable with beta 0.472 and $p = 0.000$ is positively associated with the adoption of knowledge sharing in Singapore organisations.

Table 4.13 Organisational structure variable – Linear Regression Results

<table>
<thead>
<tr>
<th>Model Summary (b)</th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Model</td>
<td>R</td>
<td>R Square</td>
</tr>
<tr>
<td>1</td>
<td>.472(a)</td>
<td>.222</td>
</tr>
</tbody>
</table>

a Predictors: (Constant), Organisational Structure
b Dependent Variable: Knowledge Sharing
# ANOVA(b)

<table>
<thead>
<tr>
<th>Model</th>
<th>Sum of Squares</th>
<th>df</th>
<th>Mean Square</th>
<th>F</th>
<th>Sig.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Regression</td>
<td>113.522</td>
<td>1</td>
<td>113.522</td>
<td>65.520</td>
<td>.000(a)</td>
</tr>
<tr>
<td>Residual</td>
<td>396.772</td>
<td>229</td>
<td>1.733</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Total</td>
<td>510.294</td>
<td>230</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

a  Predictors: (Constant), Organisational Structure  
b  Dependent Variable: Knowledge Sharing

# Coefficients(a)

<table>
<thead>
<tr>
<th>Model</th>
<th>Unstandardised Coefficients</th>
<th>Standardised Coefficients</th>
<th>t</th>
<th>Sig.</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>B</td>
<td>Std. Error</td>
<td>Beta</td>
<td></td>
</tr>
<tr>
<td>1</td>
<td>(Constant)</td>
<td>3.593</td>
<td>.457</td>
<td>7.861</td>
</tr>
<tr>
<td></td>
<td>Organisational Structure</td>
<td>.336</td>
<td>.041</td>
<td>.472</td>
</tr>
</tbody>
</table>

a  Dependent Variable: Knowledge Sharing

## 4.6.5 H2e Hypothesis

The following statistical analyses are used to answer the hypotheses:

**H2e:** Knowledge sharing reward system is positively associated with the adoption of knowledge sharing in Singapore organisations.

Table 4.9 Pearson correlation results show that the correlation is 0.356, which indicates a positive relationship between knowledge sharing reward system and the adoption of knowledge sharing at 1 percent significance level. Based on the model summary in Table 4.14, the adjusted R-square value of 0.123 indicates that 12.3 percent of the variation in knowledge sharing adoption is explained by the variation in knowledge sharing reward system variable. An ANOVA value of $F = 33.604$ at
\[ p < 0.05 \] shows an overall significance of the model. The analysis showed that the knowledge sharing reward system variable with beta 0.356 and \[ p = 0.000 \] is positively associated with the adoption of knowledge sharing in Singapore organisations.

Table 4.14  Reward system variable – Linear Regression Results

Model Summary (b)

<table>
<thead>
<tr>
<th>Model</th>
<th>R</th>
<th>R Square</th>
<th>Adjusted R Square</th>
<th>Std. Error of the Estimate</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>.356(a)</td>
<td>.127</td>
<td>.123</td>
<td>1.39367</td>
</tr>
</tbody>
</table>

(a) Predictors: (Constant), Knowledge Sharing Reward System  
(b) Dependent Variable: Knowledge Sharing

ANOVA(b)

<table>
<thead>
<tr>
<th>Model</th>
<th>Sum of Squares</th>
<th>df</th>
<th>Mean Square</th>
<th>F</th>
<th>Sig.</th>
</tr>
</thead>
<tbody>
<tr>
<td>1 Regression</td>
<td>65.269</td>
<td>1</td>
<td>65.269</td>
<td>33.604</td>
<td>.000(a)</td>
</tr>
<tr>
<td>Residual</td>
<td>450.615</td>
<td>232</td>
<td>1.942</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Total</td>
<td>515.885</td>
<td>233</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

(a) Predictors: (Constant), Knowledge Sharing Reward System  
(b) Dependent Variable: Knowledge Sharing

Coefficients(a)

<table>
<thead>
<tr>
<th>Model</th>
<th>Unstandardised Coefficients</th>
<th>Standardised Coefficients</th>
<th>t</th>
<th>Sig.</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>B</td>
<td>Std. Error</td>
<td>Beta</td>
<td></td>
</tr>
<tr>
<td>1 (Constant) Knowledge Sharing Reward System</td>
<td>5.409</td>
<td>.325</td>
<td>16.642</td>
<td>.000</td>
</tr>
<tr>
<td></td>
<td>.192</td>
<td>.033</td>
<td>.356</td>
<td>5.797</td>
</tr>
</tbody>
</table>

(a) Dependent Variable: Knowledge Sharing
### 4.6.6 H2f Hypothesis

The following statistical analyses are used to answer the hypotheses:

\[ H2f: \quad \text{People characteristics (such as: communication among staff, trust among staff, motivation to share) are positively associated with the adoption of knowledge sharing in Singapore organisations.} \]

**Table 4.9** Pearson correlation results show that the correlation is 0.606, which indicates a positive relationship between people characteristics (such as: communication among staff, trust among staff, and motivation to share) and the adoption of knowledge sharing at 1 percent significance level. Based on the model summary in **Table 4.15**, the adjusted R-square value of 0.364 indicates that 36.4 percent of the variation in knowledge sharing adoption is explained by the variation in people characteristic variable. An ANOVA value of \( F = 134.602 \) at \( p < 0.05 \) shows an overall significance of the model. The analysis showed that the people characteristics variable with beta 0.606 and \( p = 0.000 \) is positively associated with the adoption of knowledge sharing in Singapore organisations.

**Table 4.15  People characteristics variable – Linear Regression Results**

<table>
<thead>
<tr>
<th>Model</th>
<th>R</th>
<th>R Square</th>
<th>Adjusted R Square</th>
<th>Std. Error of the Estimate</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>0.606(a)</td>
<td>0.367</td>
<td>0.364</td>
<td>1.18626</td>
</tr>
</tbody>
</table>

*a  Predictors: (Constant), People Characteristics  
b  Dependent Variable: Knowledge Sharing*
**ANOVA(b)**

<table>
<thead>
<tr>
<th>Model</th>
<th>Sum of Squares</th>
<th>Df</th>
<th>Mean Square</th>
<th>F</th>
<th>Sig.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Regression</td>
<td>189.413</td>
<td>1</td>
<td>189.413</td>
<td>134.602</td>
<td>.000(a)</td>
</tr>
<tr>
<td>Residual</td>
<td>326.472</td>
<td>232</td>
<td>1.407</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Total</td>
<td>515.885</td>
<td>233</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

a  Predictors: (Constant), People Characteristics
b  Dependent Variable: Knowledge Sharing

**Coefficients(a)**

<table>
<thead>
<tr>
<th>Model</th>
<th>Unstandardised Coefficients</th>
<th>Standardised Coefficients</th>
<th>t</th>
<th>Sig.</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>B</td>
<td>Std. Error</td>
<td>Beta</td>
<td></td>
</tr>
<tr>
<td>(Constant)</td>
<td>1.239</td>
<td>.521</td>
<td></td>
<td>2.377</td>
</tr>
<tr>
<td>People Characteristics</td>
<td>.224</td>
<td>.019</td>
<td>.606</td>
<td>11.602</td>
</tr>
</tbody>
</table>

a  Dependent Variable: Knowledge Sharing

Furthermore, **Table 4.9** Pearson correlation results show that the correlation for People - Trust is 0.588, the correlation for People – Communication is 0.502, and the correlation for People – Motivation is 0.465, which indicate positive relationships between these variables and the adoption of knowledge sharing at 1 percent significance level. Based on the model summary in **Table 4.16**, the adjusted R-square value of 0.372 indicates that 37.2 percent of the variation in knowledge sharing adoption is explained by the variation in people characteristic variable. An ANOVA value of F = 46.953 at p < 0.05 shows an overall significance of the model. The analysis showed that both the People - Trust variable (beta 0.427 and p = 0.000) and the People - Communication variable (beta 0.215 and p = 0.002) are positively associated with the adoption of knowledge sharing in Singapore organisations.
because p value is less than 0.05. However, the analysis showed that the People -
Motivation variable (beta 0.045 and p = 0.550) is not a significant predictor of the
adoption of knowledge sharing in Singapore organisations.

Table 4.16 People characteristics (Trust, Communication and Motivation)
variables – Multiple Regression Results

Model Summary (b)

<table>
<thead>
<tr>
<th>Model</th>
<th>R</th>
<th>R Square</th>
<th>Adjusted R Square</th>
<th>Std. Error of the Estimate</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>.616(a)</td>
<td>.380</td>
<td>.372</td>
<td>1.17943</td>
</tr>
</tbody>
</table>

a  Predictors: (Constant), People (Motivation), People (Communication), People (Trust)
b  Dependent Variable: Knowledge Sharing

ANOVA(b)

<table>
<thead>
<tr>
<th>Model</th>
<th>Sum of Squares</th>
<th>df</th>
<th>Mean Square</th>
<th>F</th>
<th>Sig.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Regression</td>
<td>195.942</td>
<td>3</td>
<td>65.314</td>
<td>46.953</td>
<td>.000(a)</td>
</tr>
<tr>
<td>Residual</td>
<td>319.942</td>
<td>230</td>
<td>1.391</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Total</td>
<td>515.885</td>
<td>233</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

a  Predictors:(Constant), People (Motivation), People (Communication), People (Trust)
b  Dependent Variable: Knowledge Sharing

Coefficients(a)

<table>
<thead>
<tr>
<th>Model</th>
<th>Unstandardised Coefficients</th>
<th>Standardised Coefficients</th>
<th>t</th>
<th>Sig.</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Std. Error</td>
<td>Beta</td>
<td></td>
<td></td>
</tr>
<tr>
<td>(Constant)</td>
<td>1.385</td>
<td>.532</td>
<td></td>
<td>2.605</td>
</tr>
<tr>
<td>People (Trust)</td>
<td>.316</td>
<td>.055</td>
<td>.427</td>
<td>5.711</td>
</tr>
<tr>
<td>People (Communication)</td>
<td>.249</td>
<td>.080</td>
<td>.215</td>
<td>3.095</td>
</tr>
<tr>
<td>People (Motivation)</td>
<td>.051</td>
<td>.086</td>
<td>.045</td>
<td>.598</td>
</tr>
</tbody>
</table>

a  Dependent Variable: Knowledge Sharing
4.7 Research Question 3

**RQ3:** Among these key knowledge management dimensions (people, leadership, information systems, processes, organisational structure and reward system), which are the better predictors of good knowledge sharing practices in Singapore organisations?

In investigating which of the main dimensions of knowledge management (people, leadership, information systems, processes, organisational structure and reward system) are better predictors of good knowledge sharing practices, multiple regression method is used.

**H3:** People, leadership, information systems, processes, organisational structure and reward system are the better predictors of knowledge sharing adoption in Singapore organisations.

*Table 4.17* shows the adjusted R-square value of 0.514 which indicates that 51.4 percent of the variation in knowledge sharing adoption is explained by the variation in these predictor variables. An ANOVA value of $F = 41.140$ at $p < 0.05$ shows an overall significance of the model. The analysis showed that the leadership variable (beta 0.331 and $p = 0.000$), the knowledge sharing processes variable (beta 0.267 and $p = 0.000$) and the people variable (beta 0.269 and $p = 0.000$) are better predictors of the adoption of knowledge sharing in Singapore organisations because p value is less
than 0.05. Furthermore, the analysis showed that the information system variable (beta 0.037 and p = 0.591), the organisational structure variable (beta -0.049 and p = 0.493), and the reward system variable (beta -0.022 and p = 0.710) were not better predictors of the adoption of knowledge sharing in Singapore organisations because the analysis did not show significant relationships.

The value of unstandardised beta coefficient represents a mean and standard deviation of the relationship between independent and dependent variables in an equation (Schroeder, Sjoquist and Stephan, 1986). In multiple regression analysis, the magnitude of the coefficients is the relative effect of independent variable on the dependent variable (Schroeder, et al., 1986). Beta coefficient of 0.236 for leadership means that changing the leadership variable by one standard deviation while keeping both knowledge sharing process and people variables constant will change the dependent variable (knowledge sharing) by 0.236 standard deviations. Similarly, the beta coefficient of 0.182 for knowledge sharing process variable means that by changing knowledge sharing process variable with one standard deviation while keeping both leadership and people variables constant will change knowledge sharing variable by 0.182 standard deviation. Likewise, the beta coefficient of 0.100 for people variable means that by changing the people variable by one standard deviation while keeping both leadership variable and knowledge sharing process variables constant will change knowledge sharing variable by 0.100 standard
deviation. Therefore, among these three significant independent variables, leadership variable has a more significant effect on knowledge sharing variable than knowledge sharing process and people variables.

Table 4.17 Predictors of knowledge sharing adoption variables – Multiple Regression Results

<table>
<thead>
<tr>
<th>Model Summary (b)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Model</td>
</tr>
<tr>
<td>1</td>
</tr>
</tbody>
</table>

a Predictors: (Constant), People, Reward System, Information System, Leadership, Organisational Structure, KS Processes

b Dependent Variable: Knowledge Sharing

<table>
<thead>
<tr>
<th>ANOVA(b)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Model</td>
</tr>
<tr>
<td>1 Regression</td>
</tr>
<tr>
<td>Residual</td>
</tr>
<tr>
<td>Total</td>
</tr>
</tbody>
</table>

a Predictors: (Constant), People, Reward System, Information System, Leadership, Organisational Structure, KS Processes

b Dependent Variable: Knowledge Sharing

<table>
<thead>
<tr>
<th>Coefficients(a)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Model</td>
</tr>
<tr>
<td></td>
</tr>
<tr>
<td>1 (Constant)</td>
</tr>
<tr>
<td>Leadership</td>
</tr>
<tr>
<td>Information System</td>
</tr>
<tr>
<td>KS Processes</td>
</tr>
<tr>
<td>Organisational Structure</td>
</tr>
<tr>
<td>Reward System</td>
</tr>
<tr>
<td>People</td>
</tr>
</tbody>
</table>

a Dependent Variable: Knowledge Sharing
4.8 Conclusion

In summary, this chapter discusses the statistical results for the three research questions identified. For the first research question, the findings support these frequently used knowledge sharing techniques and tools: discussions, trainings, collaboration/teamwork and brainstorming session are associated with the level of knowledge sharing. The less frequently used knowledge sharing techniques and tools: workshops, conferences, seminars and focus groups are also associated with the level of knowledge sharing.

The results also show that, although they are frequently used tools, communication networks (internet, intranet and extranet), knowledge sharing tools (emails, groupware etc.) and chatting during breaks time are not associated with the level of knowledge sharing in Singapore organisations.

For the second research question, the data analysis confirms that such knowledge management dimensions as leadership, information systems, processes, organisational structure, reward system and people characteristic (such as: trust and communication among staff) are positively associated with the adoption of knowledge sharing in Singapore organisations. Furthermore, the data analysis shows that people characteristic (i.e. motivation) is not associated with the adoption of knowledge sharing in Singapore organisations.
For the third research question, the data analysis results show that such knowledge management dimensions as leadership, people and knowledge sharing processes are better predictors of adoption of knowledge sharing in Singapore organisations than other knowledge management dimensions such as information system, organisational structure and reward system.
CHAPTER FIVE: DISCUSSION AND SUMMARY

5.1 Introduction

The objectives of this research are to investigate the relationship between knowledge sharing techniques/tools and knowledge sharing adoption in Singapore organisations; and the effects of important knowledge management dimensions (people, leadership, information systems, processes, organisational structure and reward system) have on knowledge sharing adoption in Singapore organisations. This chapter aims to further review, discuss and summarise the results in Chapter four. Furthermore, the implications and limitations of the study are discussed prior to suggestions for future research are presented.

5.2 Review and summary of results

First, this section begins with a discussion of descriptive statistics of the respondents in relation to the type of industry, organisation size, and respondent demographics (gender, age, education level and position within the organisation). Then, the next section examines the statistical testing results for research questions and hypotheses discussed in Section 2.6.
5.2.1 Respondent's descriptive statistics

Demographics of the sample show that from a total of 234 respondents, 57.7% are male and 42.5% are female. As for education level, data are collected from respondents ranging from high school graduates to master degree holders. These collected data are represented by workforces in the age groups between 25-45 years old that make up 76% of the total respondents. Data collected from four industries make up 63.3% of the sample that comprises finance/insurance (21.4%), government (16.7%), professional services (14.1%) and construction (11.1%) industries. These results are comparable with Singapore economy and business environment. A survey conducted by Ministry of Trade and Industry of Singapore (MTI, 2010) states that the structure of Singapore economy comprises of financial/insurance services (11.9%), professional services (14.0%), construction (4.5%) and other services industries (10.7%). Respondents were also evenly distributed across organisations of various sizes, which employ staff ranging from less than 50 to 1,000 employees or more. Furthermore, the makeup of respondents is from different levels in the hierarchy of the organisation, from operational staff to senior managers.

Data obtained in this study are suitable for further research because it encompasses a considerably extensive cross section in relation to basis of responses, type of industry, size of organisation and positions in organisation.
5.2.2 Knowledge sharing techniques/tools and knowledge sharing adoption

The first research question and the accompanying hypothesis try to investigate the relationship between the frequently used knowledge sharing techniques/tools and knowledge sharing adoption in Singapore organisations. The results suggest that these knowledge sharing techniques/tools: discussions, trainings, collaboration/teamwork and brainstorming session used frequently in Singapore organisations (of more than 50% usage) are positively associated with the level of knowledge sharing adoption. These research findings confirm and are consistent with previous study conducted in India by Singh et al. (2006) that identifies email and internet as popular knowledge management tools; and in the United Kingdom construction organisations by Carrillo et al. (2004) that shows intranets as top rated IT-related knowledge management tools. Many research findings have identified communication networks (internet, intranet and extranet) and knowledge sharing tools (e.g. emails, groupware) as popular and frequent knowledge sharing tools used in organisations (Alavi and Leidner, 1999; Zhou and Fink, 2003; Xu and Quaddus, 2005).

The results also suggest that other knowledge sharing techniques/tools: workshops, conferences, seminars and focus groups are positively associated with the level of knowledge sharing adoption, but these tools are not frequently used in Singapore organisations. The result aligns with a study conducted by Han and Anantatmula
(2007) in the United States that web conference is not commonly used as a knowledge sharing tool. However, the results contradict Carrillo et al.’s (2004) research findings that suggest communities of practice, conferences and seminars as the main tools of knowledge management in the United Kingdom companies.

The results also show that, although they are frequently used tools with more than 50% usage, communication networks (internet, intranet and extranet), knowledge sharing tools (e.g. emails, groupware) and chatting during breaks time are not associated with level of knowledge sharing adoption in Singapore organisations. The results are in accordance with Han and Anantatmula’s (2007) findings in the United States that the video conference, facsimile, telephone, email and intranet are the most popular tools to share knowledge, but these tools are not significant predictor of good knowledge sharing adoption. However, these findings are in contrast to the results of research conducted in Australia that the most frequently used knowledge sharing technologies are document management systems, intranet, databases, internet and email (Xu and Quaddus, 2005).
5.2.3 Knowledge Management Dimensions and knowledge sharing adoption

The second research question and hypotheses pertain to the effects of these important knowledge management dimensions (people, leadership, information systems, processes, organisational structure and reward system) have on knowledge sharing adoption in Singapore organisations.

Organisational Leadership

The present study shows that organisational leadership is positively associated with knowledge sharing adoption in Singapore organisations. This result demonstrates the significance of leadership in knowledge sharing adoption in Singapore organisations. This result is also in alignment with previous findings that leadership and management supports are important to knowledge sharing adoption (Wong, 2005; Alavi et al., 2005; Riege, 2005; Artail, 2006; Steyn and Kahn, 2008). These results are also the findings of many empirical studies in other geographical areas, such as in the United States of America (Chen and Barnes, 2006; Han and Anantatmula, 2007), Taiwan (Chen and Barnes, 2006; Hsu and Wang, 2008; Lin et al., 2009), and South Korea (Kang et al., 2008) that show organisational leadership as a knowledge sharing adoption critical success factor.

Organisational leadership that supports knowledge sharing activities (Arnold, Arad, Rhoades and Drasgow, 2000), management’s encouragement (Chen and Barnes,
and willingness (Han and Anantatmula, 2007) may enhance the exchange of information and knowledge sharing between work group members. Leadership has significant effects on knowledge sharing behaviour because managers coordinate, encourage, motivate, guide, and inspire staff’s participations in knowledge sharing activities (Vries et al., 2006; Song, 2009).

**Knowledge Sharing Information System**

The present study shows that knowledge sharing information system is positively associated with knowledge sharing adoption in Singapore organisations. This result is consistent with previous study that information systems enhance the speed and effectiveness of organisation in distributing knowledge in an organisation (Alavi and Leidner, 1999).

Furthermore, the results support the Al-Alawi et al.’s (2007) study that identified the availability of technology tools within the organisation to facilitate knowledge sharing adoption and that employee needs to feel comfortable applying these technologies. However, Al-Alawi et al. (2007) suggest that knowledge sharing information system is not enough to insure knowledge sharing adoption, top management’s reinforcement and supports are also vital to create successful knowledge sharing adoption. Similarly, empirical studies conducted in the United States of America (Han and Anantatmula, 2007) and Taiwan (Lin et al., 2009) also
recognised knowledge sharing information system as a knowledge sharing adoption critical success factor.

**Knowledge Sharing Process**

The present study shows that knowledge sharing process is positively associated with knowledge sharing adoption in Singapore organisations. These results support a study in India by Goel *et al.* (2010) that highlights the relevance of knowledge management processes in retaining and leveraging knowledge in organisations. Batra’s (2010) empirical study conducted also in India produces the same results, which shows that the knowledge management process generates new ideas and practices for problem solving.

The present study employs a similar approach used by Chase (1997) in an effort to study respondents’ perception on how knowledge sharing processes influence knowledge creation, transfer and use. The study results support the Chase’s (1997) finding that the knowledge sharing process helps in generating new knowledge, using knowledge to improve performance, and transferring knowledge to other parts of the organisation. A study by Hsu and Wang (2008) also shows the knowledge sharing process as a critical success factor of knowledge sharing adoption.
**Organisational Structure**

The present study shows that organisational structure is positively associated with knowledge sharing adoption in Singapore organisations. These results are consistent with previous findings that organisational structure is important to knowledge sharing adoption (Walczak, 2005; Gold *et al*., 2001; Leonard, 1995).

Furthermore, the present study supports Al-Alawi *et al*.’s (2007) study that organisational structure improves information flow, supports cross functional teams knowledge sharing activities and enhances workers’ participation in decision making process. An empirical study conducted in Belgium (Willem and Buelens, 2009) also shows organisational structure as a knowledge sharing adoption critical success factor.

**Knowledge Sharing Reward System**

The present study shows that knowledge sharing reward system is positively associated with knowledge sharing adoption in Singapore organisations. These results are consistent with previous findings that knowledge sharing reward system is important in motivating staff to participate in knowledge sharing (Wong, 2005; Davenport *et al*., 1998) and that structured incentive and reward systems motivate employees to take part in sharing, learning and generating knowledge with individuals from other departments (O’Dell and Grayson, 1998; Argote and Epple,
The results support Al-Alawi et al.’s (2007) study in Bahrain that identifies knowledge sharing reward system (individual reward and team reward) as a tool to motivate staff toward sharing their knowledge and experience. The findings of this study are consistent with empirical studies conducted in South Korea (Kang et al., 2008) that knowledge sharing reward system is one of the critical success factors for knowledge sharing adoption.

**People Characteristics**

The present study shows that people characteristics are positively associated with knowledge sharing adoption in Singapore organisations. The present study also shows that trust and communication are positively associated with knowledge sharing adoption in Singapore organisations. However, this study does not demonstrate that motivation is one of the critical success factors for knowledge sharing adoption in Singapore organisations.

**Trust:** The results of this study are consistent with earlier findings that trust is one of the critical success factors for knowledge sharing adoption (MacNeil, 2003; Zarraga and Bonache, 2003; Lu et al., 2006; Kelly, 2007; Barachini, 2009; Paroutis and Saleh, 2009; McNeish and Mann, 2010). This result also supports Al-Alawi et al.’s (2007)
study that trust is an important factor in promoting knowledge sharing adoption. The finding of this study is consistent with empirical studies conducted in the United States (Quigley et al., 2007), Taiwan (Cheng et al., 2008; Lin et al., 2009), China (Ma et al., 2008) that trust is one of the critical success factors for knowledge sharing adoption.

Communication: Results of this study are consistent with earlier findings that communication is one of the critical success factors for knowledge sharing adoption (Nahaplet and Ghoshal, 1998; Hoegl et al., 2003). The results also support Al-Alawi et al.’s (2007) study that identifies communication, involving intensity face-to-face interaction among colleagues as important for promoting knowledge sharing adoption; and that teamwork discussion and collaboration does enhance communication among colleagues. Once again, these research findings are consistent with empirical studies conducted in Taiwan (Cheng et al., 2008) and South Korea (Kang et al., 2008) that communication is one of the critical success factors for knowledge sharing adoption.

Motivation: The present study shows that motivation is not a significant predictor of knowledge sharing adoption in Singapore organisations. This result contradicts previous empirical studies conducted in the United States (Han and Anantatmula, 2007; Quigley et al., 2007; Siemsen et al., 2008), Taiwan (Lin, 2007; Lin et al., 2009).
2009), and Malaysia (Sohail and Daud, 2009) that communication is a critical success factor for knowledge sharing adoption. As discussed in Section 2.3.4, individual behaviour is influenced by cultural values held by individuals and are influenced by national culture (Srite and Karahanna, 2006; Hofstede, 1993; Wei et al., 2008). As empirical researches show that differences in national culture may affect knowledge management (Finestone and Snyman, 2005; Voel and Han, 2005), the contradict results obtained could be because of the influence of Hofstede’s (1994) national cultural individualism and collectivism dimensions on knowledge sharing adoption.

Furthermore, this study analysis results seem to suggest that most respondents are not motivated to share knowledge with their co-workers and do not have personal satisfactions from making contribution to others. Davenport and Prusak (1998) argues that knowledge sharing is usually not natural and individuals do not share their knowledge because they believe that knowledge is valuable and important. Different motivational factors for knowledge sharing behaviour may be caused by individual and organisational dimensions (Connelly and Kelloway, 2003) as discussed in Section 2.4.3 and Section 2.4.4.
5.2.4 Better predictors of good knowledge sharing practices

The third research question focuses on the examination of which of these important knowledge management dimensions (people, leadership, information systems, processes, organisational structure and reward system) are better predictors of good knowledge sharing practices in Singapore organisations. Although empirical studies have been conducted by different researchers, authors, theorists, academics and practitioners use different critical success factors of knowledge sharing adoption, no studies have identified critical success factors of knowledge management for better knowledge sharing practices.

The present study shows that knowledge management dimensions such as leadership, people (trust and communication) and knowledge sharing processes are better predictors of knowledge sharing adoption in Singapore organisations than other knowledge management dimensions such as information system, organisational structure and reward system. These research findings confirm and are consistent with empirical studies conducted in the United States (Chen and Barnes, 2006; Han and Anantatmula, 2007), Taiwan (Chen and Barnes, 2006; Hsu and Wang, 2008; Lin et al., 2009), and South Korea (Kang et al., 2008) that leadership is an important predictor of knowledge sharing adoption. In addition, these research findings are consistent with empirical studies conducted in Bahrain (Al-Alawi et al., 2007), the United States (Quigley et al., 2007), Taiwan (Cheng et al., 2008; Lin et al., 2009),
and China (Ma et al., 2008) that trust is an important predictor of knowledge sharing adoption. Also, these research findings confirm and are consistent with empirical studies conducted in Bahrain (Al-Alawi et al., 2007), Taiwan (Lin et al., 2009), and South Korea (Kang et al., 2008) that communication is an important predictor of knowledge sharing adoption. Finally, these research findings are consistent with empirical studies conducted in Taiwan (Hsu and Wang, 2008), and India (Batra, 2010) that knowledge sharing processes is an important predictor of knowledge sharing adoption.

**Hofstede’s National Cultural Dimensions:** The results of data analysis showed that the dimensions of knowledge management such as leadership, people and knowledge sharing processes are better predictors of adoption of knowledge sharing in Singapore organisations. This finding is consistent with the Hofstede’s (1980) research on the national culture of Singapore as shown in Table 2.3, which states that Singapore has a collective, large power distance, moderate nurturing and low uncertainty avoidance national culture.

Singapore has a large power distance with a score of 74 points from a total of 100 points (Hofstede, 2012). Centralised decision making in which employees have the formal attitude to the managers, and they are expected to act mainly on the instructions of their managers and the rules (Hofstede, 2012). The results of this
present study is consistent and fits with the Hosfstedee’s (1980; 2012) findings that leadership is a better predictor of the adoption of knowledge sharing in Singapore organisations.

Singapore is a collectivistic society with the score of 20 points from 100 points (Hosfstedee, 2012). In a collectivistic society, being regarded as members of particular groups and maintain harmonious relationship in this group are perceived by individual as an important task (Hosfstedee, 2012). In maintaining a harmonious relationship and avoiding open conflict, all the members hold their individuality and act with courtesy, instead of giving honest feedback (Hosfstedee, 2012). A score of 48 points from 100 points puts Singapore national culture on the nurturing side, which shows modesty, humbleness, quality of life and caring for others, as the primary values in society (Hosfstedee, 2012). During the discussion, the individual is expected to be cautious and avoid conflicts. The results of this present study is consistent and fits with the findings of Hosfstedee (1980; 2012) that people characteristics (such as trust and communication among staff) are better predictors of the adoption of knowledge sharing in Singapore organisations.

Low score of 8 points from 100 points placing Singapore in a position of low uncertainty avoidance (Hosfstedee, 2012). Low uncertainty avoidance culture may be less likely to show resistance to the process of knowledge management because
individuals may be enthusiastic in the pursuit of knowledge management opportunities and are always looking for new and superior way to perform their tasks (Furner et al., 2009). According to Hosfstede (2012), people in Singapore who used to rules and regulations set by the company and government put up with the rules not for the reason that they are need to be structured but for the reason that Singapore has a high power distance index. Thus, the present study finding is consistent and fits with the findings of Hosfstede (1980; 2012) that organisational structure is a better predictor of the adoption of knowledge sharing in Singapore organisations.

5.3 Implications of research findings

This present study has valuable contributions and implications for academic researchers and business practitioners. Significant practical implication of this present study is that it offers Singapore organisations involved in knowledge sharing adoption, strategies and guidelines needed to manage the influence of knowledge management factors on knowledge sharing adoption.

First, these research findings contribute and offer evidences that attempt to link the use of knowledge sharing techniques/tools with knowledge sharing adoption in Singapore organisations. Second, this research findings offer business practitioners with a better understanding of knowledge management dimensions, such as leadership, information systems, processes, organisational structure, reward system,
and trust and communication among staff. Third, this research findings also showed that a positive association between people characteristics with knowledge sharing adoption in Singapore organisations and that the management of the organisation who depends only on motivation factor is not sufficient to promote knowledge sharing adoption. Furthermore, the research findings also reveal new insights for business practitioners when implementing knowledge sharing adoption in organisations that management may consider the emphasis on leadership, people and knowledge sharing processes. Finally, this present study offers a foundation for discussion and study of critical success factors that reinforces success of knowledge sharing adoption. This study may contribute to current literature on knowledge sharing adoption, especially in the context of Singapore, in which researchers and business practitioners may reproduce, extend and enhance the findings of this study.

5.4 Implications for Business

The intention of this research does not offer absolute step by step solutions and implementation procedures for knowledge sharing adoption in Singapore organisations but it offers implications for business.

First, managers are offered a checklist of suggested knowledge sharing techniques and tools. In the effort to increase knowledge sharing activities in the organisation, managers may consider frequently used knowledge sharing techniques and tools,
such as discussions, trainings, collaboration/teamwork and brainstorming session. Alternately, managers may also apply less frequently used knowledge sharing techniques and tools helpful for knowledge sharing adoption, such as workshops, conferences, seminars, and focus groups.

Second, a significant set of critical success factors for knowledge sharing adoption identified in this study, such as leadership, information systems, processes, organisational structure, reward system, and trust and communication among staff, can be a list of factors for managers to concentrate on when planning, applying and developing knowledge sharing practices within the organisation. Then, this set of factors gives a basic tool for managers in evaluating the success of their knowledge sharing adoption. However, managers should not have to limit their focus to the above-mentioned critical success factors for knowledge sharing adoption, because it is essential to appreciate the uniqueness of each organisational culture, as mentioned in Table 2.5. Managers may consider the presence of other knowledge sharing adoption factors excluded from the scope of this research, such as ethics (Lin, 2007; Wang, 2004), and reputation (Ensign and Hebert, 2010) that may influence knowledge sharing adoption.

Third, strong organisational leadership is important and needed to enhance knowledge sharing adoption in organisations. Leaders contribute in modelling
preferred knowledge management behaviours (Wong, 2005) and in setting social norm that sets knowledge sharing behaviours displayed by staff (Alavi et al., 2005).

Next, in maximising knowledge sharing adoption, organisations should set up knowledge sharing processes that include create, acquire, retain, identify, inflow, outflow, and transmit organisational knowledge between knowledge workers. Most important, knowledge sharing process must match organisational culture.

Finally, organisation must recognise that people involvement contributes to knowledge sharing adoption. Organisation should create the trust and communication among co-workers to drive knowledge sharing practices. Furthermore, appropriate rewards and recognition programs can be incorporated to motivate employees to engage in knowledge sharing activities.

5.5 Research Limitations

Although findings in this research offer an adequate view of knowledge sharing adoption in Singapore organisations, potential limitations are identified.

First, the research findings have been influenced by the limitations associated with the structure of the questionnaire, the time given to answer the questionnaire, and respondents’ understanding of questions that may lead respondents to give incorrect
opinions.

A second limitation is the self-reporting bias in which respondents combine their self perception, working situations and personal experiences when answering questions (Han and Anantatmula, 2007).

Next, this research uses six main classifications of Gupta and Govindarajan’s (2000) framework of organisational culture. Other factors of organisational culture that may affect knowledge sharing adoption are not tested in this research. Research outcomes may vary if different factors of organisational culture are used.

Last, this present study applies convenient sampling method that may have weaknesses for not able to generalise the research findings. Nevertheless, a convenient sampling approach is acceptable for this research (Bryman, 2004) as it give a representative sample because of the wide range of opinions and views obtained from a variety of demographic characteristics, such as from non-gender specific adults, working full time in operational or managerial level without industry restriction, who are enrolled in certificate, diploma and degree programs with different educational agents.
5.6 Future Research

There is rapid growth of knowledge management literature, but research in Singapore context is limited. Although the findings in this study offer an adequate view of knowledge sharing adoption in Singapore organisations, it is too ambitious to conclude that the results are universal.

This study may offer a basic foundation for research, which in the future can be more sophisticated and detailed. In this study, the majority of respondents worked in finance/insurance (21.4%), government (16.7%), professional services (14.1%) and construction (11.1%), which amounted to 63.3% of samples collected. Findings from this study can be reproduced and expanded through exploration with larger sample sizes in specific industry, such as finance/insurance or government. Other research methods, such as longitudinal studies and qualitative observations, can also be included in future research to improve the research findings.

Previous studies conducted in various countries have identified different critical success factors for knowledge sharing adoption because of the effect of national culture (Hofstede, 1994). Since this present study is conducted in a single country setting – Singapore, further additional research in other countries may be conducted to generalise the research findings.
Last, future research may include other organisational culture stated in Table 2.5 **Organisational Culture Profile Attributes** and knowledge management critical success factors identified in Table 2.2 **Knowledge Management Critical Success Factors** that may affect knowledge sharing adoption but are not tested in this research.

### 5.7 Conclusions

This present study has identified frequently used knowledge sharing techniques and tools, such as discussions, trainings, collaboration/teamwork, and brainstorming session that organisations may use to increase knowledge sharing adoption. Although workshops, conferences, seminars and focus groups are less frequently used, these knowledge sharing techniques and tools may support knowledge sharing adoption in organisation.

This present study discusses the influence of knowledge sharing adoption critical success factors, such as leadership, information systems, processes, organisational structure, reward system, and trust and communication among staff, on knowledge sharing adoption in Singapore organisations.

Findings of this present study give managers a better understanding that knowledge management dimensions, such as leadership, trust and communication, and
knowledge sharing processes, help knowledge sharing adoption in Singapore organisations.

This present study gives managers with a better knowledge on how to use knowledge sharing practices effectively for the benefit of the organisation.
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APPENDICES

Appendix 1  Participants Information Statement
Information Statement for the Research Project:
The relationship between Knowledge management factors and the adoption of knowledge sharing:
- A study of Singapore organisations

Dear Potential Participants,

You are invited to participate in the research project identified above which is being conducted by Mingyen Tan, who is currently undertaking the Doctor of Business Administration program at the Newcastle Graduate School of Business, The University of Newcastle, Australia. As part of his degree requirements, he is conducting this research project with his research supervisor, Dr Reiny Iriana.

The primary objectives of this research are: first, to determine the critical knowledge management factors that influence the adoption of knowledge sharing in Singapore organisations. Second, the research findings aim to provide management in Singapore organisations with a better understanding of how to effectively utilise knowledge management practices within their organisations.

Participation in this research is entirely voluntary. Potential participant are free to choose whether they want to participate in this research or not. Your decision not to participate will not disadvantage you in any way. If you decide to participate, you may withdraw at any time without giving any reason. All responses will be kept anonymous and confidential. All information gathered from the survey will be entered into a spreadsheet. The questionnaires will be shredded upon final acceptance of the thesis. An electronic copy of this research data will be securely stored at the Newcastle Graduate School of Graduate Studies, The University of Newcastle, for a minimum period of five years from the date of final acceptance of the thesis. No individual participants will be identified in any reports resulting from this research.

If you are interested to participate, your consent to participate will involve:

- Completing a 20-minutes anonymous questionnaire; and
- Returning the completed questionnaire by dropping it into the collection box at the venue.

Should you have any concerns or if you would like to know the outcome of this project, please contact Mingyen Tan or Dr Reiny Iriana at the contact details below.

Thank you very much for taking the time to read and consider our invitation.

Yours Sincerely,

Mingyen Tan
Research Student, Graduate School of Business
The University of Newcastle, Australia
University Drive, Callaghan NSW 2308
Email: Mingy.Tan@student.newcastle.edu.au
Mobile: (02) 63864442 or (98) 1326952701

Dr Reiny Iriana
Project Supervisor, Graduate School of Business
The University of Newcastle, Australia
University Drive, Callaghan NSW 2308
Email: Reiny.Iriana@newcastle.edu.au
Tel: (012) 8227 3225

Complaints about this research
This project has been approved by the University’s Human Research Ethics Committee, Approval No. H [Ref. H-2009-0241].

Should you have concerns about your rights as a participant in this research, or you have a complaint about the manner in which the research is conducted, it may be given to the researcher, or, if an independent person is preferred, to the Human Research Ethics Officer, Research Office, The Chancellery, The University of Newcastle, University Drive, Callaghan NSW 2308, Australia, telephone (012) 4921 6333, email: Human-Ethics@newcastle.edu.au.

The University of Newcastle Human Research Ethics Committee – Initial Application - Expedited Review
HREC Reference no. H-2009-0241
[Acknowledgement: This material is an adaptation of Griffith University’s research ethics arrangements.]
APPENDICES

Appendix 2  Questionnaire
Questionnaire

Research Project - Knowledge management factors and the adoption of knowledge sharing: A study of Singapore organisations

For any enquiry on this research, please contact Ming Yen Tan or Dr Reiny Iriana at the contact details as stated below.

Ming Yen Tan
Research Student, Graduate School of Business
The University of Newcastle, Australia
University Drive, Callaghan NSW 2308
Email: ming.yen.tan@newcastle.edu.au
Mobile: (65) 62584442 or (65) 1308392701

Dr Reiny Iriana
Project Supervisor, Graduate School of Business
The University of Newcastle, Australia
University Drive, Callaghan NSW 2308
Email: reinya.iriana@newcastle.edu.au
Tel: (612) 9227 3225

This questionnaire consists of three parts.

Please do not complete this questionnaire if you are:
A) under 18 years of age;
B) currently unemployed or not employed in Singapore; and
C) working in an organisation with less than 50 staff.

Part A: Knowledge Sharing

Knowledge: “Information combined with experience, context, interpretation, and reflection”

Knowledge sharing: “activities of transferring or disseminating knowledge from one person, group or organization to another”

References

Please select the response that closely reflects your opinion by making a tick (✓) in the provided boxes.

A 1 Knowledge Sharing: Please mark the level of knowledge sharing in your organisation.

☐ Excellent  ☐ Good  ☐ Poor

A 2 Techniques: Please mark which of the following techniques and tools are used to facilitate knowledge sharing in your organisation. You may select more than one option.

A 2a Brainstorming sessions

A 2b Chatting during breaks time

A 2c Collaboration and Teamwork

A 2d Communication networks (Internet, Intranet & Extranet)

A 2e Conferences

A 2f Discussions (Formal and informal)

A 2g Focus groups

A 2h Knowledge sharing tools (Emails, groupware and etc)

A 2i Seminars

A 2j Quality Circles

A 2k Training

A 2l Workshops
### Part B: Influence of knowledge management factors and the adoption of Knowledge Sharing activities within your organisation

This section contains questions relating to factors of knowledge management practices and the adoption of knowledge sharing activities. There are six key factors of knowledge management practices and factors: leadership, information system, knowledge sharing processes, organisational structure, reward system and people.

Please select the response that closely reflects your opinion by making a tick (✓) in the provided boxes, of which:

- SD stands for Strongly Disagree
- D stands for Disagree
- NAD stands for Neither Agree nor Disagree
- A stands for Agree
- SA stands for Strongly Agree

<table>
<thead>
<tr>
<th></th>
<th>Knowledge Sharing</th>
<th>SD</th>
<th>D</th>
<th>NAD</th>
<th>A</th>
<th>SA</th>
</tr>
</thead>
<tbody>
<tr>
<td>B1 a</td>
<td>Co-workers commonly exchange their knowledge and experience while working.</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>B1 b</td>
<td>The problem of people hoarding (keeping) knowledge does not exist and most staff members are willing to share their knowledge freely.</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>B2 a</td>
<td>My organisation’s leadership supports the activities relating to knowledge sharing.</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>B2 b</td>
<td>Manager encourages work group members to exchange information with one another.</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>B2 c</td>
<td>Manager is willing to help employees in sharing knowledge.</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>B3 a</td>
<td>My organisation provides various tools and technologies to facilitate knowledge sharing and exchange (e.g. groupware, email, intranet).</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>B3 b</td>
<td>The technology tools available at the organisation for sharing knowledge are effective.</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>B3 c</td>
<td>I feel comfortable using the knowledge sharing technologies available.</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>B4 a</td>
<td>My organisation is good in generating new knowledge.</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>B4 b</td>
<td>My organisation is efficient at leveraging knowledge to improve performance.</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>B4 c</td>
<td>My organisation is good in transferring existing knowledge to other parts of the organisations.</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
Part B: Influence of knowledge management factors and the adoption of Knowledge Sharing activities within your organisation

Please select the response that closely reflects your opinion by making a tick (√) in the provided boxes, of which:

- SD stands for Strongly Disagree
- D stands for Disagree
- NAD stands for Neither Agree nor Disagree
- A stands for Agree
- SA stands for Strongly Agree

<table>
<thead>
<tr>
<th>B5</th>
<th>Organisational Structure</th>
<th>SD</th>
<th>D</th>
<th>NAD</th>
<th>A</th>
<th>SA</th>
</tr>
</thead>
<tbody>
<tr>
<td>B5 a</td>
<td>Information flows easily throughout the organisation regardless of employee roles or other boundaries.</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
</tr>
<tr>
<td>B5 b</td>
<td>Certain tasks require the formation of teams with members from different departments in order to be accomplished.</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
</tr>
<tr>
<td>B5 c</td>
<td>Workers actively participate in the process of decision making.</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>B6</th>
<th>Reward System</th>
<th>SD</th>
<th>D</th>
<th>NAD</th>
<th>A</th>
<th>SA</th>
</tr>
</thead>
<tbody>
<tr>
<td>B6 a</td>
<td>Employees are rewarded for sharing their knowledge and experience with their colleagues.</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
</tr>
<tr>
<td>B6 b</td>
<td>The knowledge sharing rewards available are effective in motivating staff to spread their knowledge.</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
</tr>
<tr>
<td>B6 c</td>
<td>Employees are more likely rewarded on teamwork and collaboration rather than merely on individual performance.</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>B7</th>
<th>People</th>
<th>SD</th>
<th>D</th>
<th>NAD</th>
<th>A</th>
<th>SA</th>
</tr>
</thead>
<tbody>
<tr>
<td>B7 a</td>
<td>A considerable level of trust exists between co-workers in my organisation.</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
</tr>
<tr>
<td>B7 b</td>
<td>I do not hesitate to share my feelings and perceptions with my fellow colleagues.</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
</tr>
<tr>
<td>B7 c</td>
<td>Most of my colleagues are people whom I know well and thus are considered trustworthy.</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
</tr>
<tr>
<td>B7 d</td>
<td>There is a high level of face-to-face interaction among colleagues in the workplace.</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
</tr>
<tr>
<td>B7 e</td>
<td>Teamwork discussion and collaboration enhance communication between colleagues.</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
</tr>
<tr>
<td>B7 f</td>
<td>I am motivated to share what I know with my co-worker.</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
</tr>
<tr>
<td>B7 g</td>
<td>I have satisfactions from making a contribution to others.</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
</tr>
</tbody>
</table>
Part C: Demographic and Industry Information
This section contains questions related to demographic information of the participant (yourself). Your answers will enable classification and analysis of respondents.
Please kindly complete the following demographic information by marking a tick (✓) as your responses in the appropriate box.

<table>
<thead>
<tr>
<th>C 1</th>
<th>Gender:</th>
<th>□ Female</th>
<th>□ Male</th>
</tr>
</thead>
<tbody>
<tr>
<td>C 2</td>
<td>Age:</td>
<td>□ Less than 25</td>
<td>□ 25 to less than 35</td>
</tr>
<tr>
<td>C 3</td>
<td>Education:</td>
<td>Please select your highest education level that you have completed:</td>
<td>□ High School</td>
</tr>
<tr>
<td>C 4</td>
<td>Type of Industry or Business</td>
<td>Please select the type of industry or business that your company belongs to:</td>
<td>□ Business Services</td>
</tr>
<tr>
<td>C 5</td>
<td>Organisation Size:</td>
<td>□ Less than 50</td>
<td>□ 50 to less than 100</td>
</tr>
<tr>
<td>C 6</td>
<td>Position:</td>
<td>□ Senior Manager</td>
<td>□ Operational Staff</td>
</tr>
</tbody>
</table>

Thank you for your precious time and support in completing this survey. Your input is very much appreciated.

Now, please kindly return this questionnaire by dropping it into the designated collection box, mailing it back to us using the provided stamped pre-address envelope, or by e-mailing to Ming.Y.Tan@studentmail.newcastle.edu.au.