THE INFLUENCE OF KNOWLEDGE MANAGEMENT CAPABILITIES ON THE LEARNING ORGANISATION AND THE MODERATING EFFECT OF IT INFRASTRUCTURE AND CORPORATE CULTURE

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The Influence of Knowledge Management Capabilities on the Learning Organisation and the Moderating Effect of IT Infrastructure and Corporate Culture

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This thesis which signifies the important of continuous lifetime learning will also be a special gift for both of my lovely kids, Zhen Yang, Zhen Hong and 3rd baby as an encouragement to their learning process in future.

TABLE OF CONTENT

LIST OF TABLES

LIST OF FIGURES

ABSTRAK

Pengetahuan adalah suatu harta yang amat penting dalam ekonomi kini yang berdasarkan pengetahuan. Pengurusan pengetahuan adalah amat penting dalam ekonomi global yang mengalami perubahan yang sangat besar mengenai memperoleh, mengubah, memerangkap, membahagikan dan mempergunakan pengetahuan untuk mencipta dan mempertahankan kelebihan bertanding suatu organisasi. Kelebihan bertanding ini adalah penting kepada organisasi untuk memperolehi keuntungan yang boleh dipertahankan pada masa depan. Proses kitaran dalam memperoleh, mengubah, memerangkap, membahagikan dan mempergunakan pengetahuan memerlukan satu struktur seperti "organisasi yang membelajah" untuk sokongan supaya prosesnya boleh berkitar secara berterusan. Aktiviti untuk pengurusan pengetahuan dan mengubah "organisasi yang membelajar" adalah bersifat salingan yang mana pengurusan pengetahuan memberikan objektif kepada sebuah "organisasi yang membelajar" dan sebaliknya "organisasi yang membelajar" akan menyokong proses kitaran pengurusan pengetahuan. Keputusan penyelidikan ini telah membuktikan bahawa keupayaan dalam pengurusan pengetahuan mempengaruhi variasi atas pembinaan sebuah "organisasi yang membelajar" secara positif. Antara keupayaan pengurusan pengetahuan, keupayaan pembahagian pengetahuan dan keupayaan pengunaan pengetahuan adalah yang paling penting dalam pembinaan sebuah "organisasi yang membelajar" diikuti oleh keupayaan perolehan dan pengubahan pengetahuan. Sebaliknya, penyelidikan ini mendapati pemerankapan pengetahuan tidak mempengaruhi pembolehubah tergantung. Hasil penyelidikan juga membuktikan bahawa kedua-dua pembolehubah penyederhana, infrastruktur IT dan kebudayan korporat tidak mempunyai pengaruh ke atas hubungan antara keupayaan pengurusan pengetahuan yang dirasai dan kejayaan dalam pembinaan sebuah "organisasi yang membelajar". Sebaliknya, keputusan dari analisa ini mendapati bahawa kemungkinan besar kedua-dua infrastruktur IT dan budaya korporat adalah suatu pembolehubah bebas. Penyelidikan ini telah menyediakan asas bagi penyelidikan dalam bidang ini pada masa depan. Penyelidikan ini juga mendapat keputusan yang penting bagi pihak pengurusan untuk mengenali dan mengutamakan inisiatif dalam aktiviti pengurusan pengetahuan dan pembinaan sebuah "organisasi yang membelajar". Tetapi, penyelidikan ini telah dibataskan oleh profil responden yang terutamanya dari Semenanjung Malaysia Barat dan kebanyakan responden mempunyai minimum tingkat pelajaran ijazah.

ABSTRACT

Knowledge is an important asset in today's knowledge-based economy. Knowledge management is important in the global economy which entails tremendous changes in terms of acquiring, converting, capturing, sharing and using of the knowledge to create and sustain an organisation's competitive advantages. These competitive advantages are in turn important to ensure an organisation to achieve sustainable profitable growth in future. The cyclical process of the knowledge acquisition, conversion, capturing, sharing and application require a structure such as the learning organisation to support it to grow on continuous basis. Knowledge management and learning organisation activities are reciprocal in nature whereby knowledge management provides an objective for the learning organisation and in turn the learning organisation will support the cyclical process of the knowledge management. The results of this research showed that the perceived knowledge management capabilities have significant positive influence on the success in building a learning organisation. Among the knowledge management capabilities, perceived knowledge sharing and perceived knowledge application capabilities are the most significant in building a learning organisation, followed by the perceived knowledge acquisition and perceived knowledge conversion capabilities. However, no influence was found by the perceived knowledge capturing capability on the dependent variable. The result of this research also revealed that both IT infrastructure and corporate culture did not have moderating effect on the relationship between the perceived knowledge management capabilities and the success in building a learning organisation. The result of the regression analysis however implies that both IT infrastructure and corporate culture are potential independent variables rather than moderator. This study has set a base for future study in the similar area and also yielded important results for the management to identify and prioritise their knowledge management and learning organisation initiatives. The study is however limited by its existing respondent profiles which are mainly from West Malaysia and majority of them are having minimum education level of bachelor degree.

CHAPTER 1

INTRODUCTION

1.1 Introduction

There are tremendous changes in the global economy which entails the evolution from industrialisation to computerisation and the transformation from capital-based economy (i.e. tangible) to knowledge-based economy (i.e. intangible). Knowledge is the key to manage the change and sustain the growth of any organisation. It is the knowledge that contributes to the success of Bill Gates as the second richest man in the world. Bill Gates was ranked the richest man in the world for the past fourteen years. The same goes to Warren Buffett who is now the richest man in the world overtaken the position of Bill Gates during last year. Knowledge is the engine behind the success of their companies, Microsoft and Berkshire Hathaway respectively. Knowledge is an important asset to build competitive advantages which in turn generates sustainable profitable growth for these companies.

Knowledge management (KM) is an important tool to create, acquire, capture, share and use of knowledge within an organisation. The knowledge created and acquired via the knowledge management strategy must be captured by the organisation, shared among the members in the organisation and used by the organisation to create new knowledge in order to generate competitive advantages. This is a cyclical process and the key to ensure the continuity of this cyclical process is the learning organisation (LO) as promoted by Senge (1990). In short, KM is the tool to promote organisational learning and to build the LO. In return, LO is the key to ensure the success of the KM efforts; a reciprocal process.

It is important for the organisation to retain the knowledge and organically create new knowledge, rather than reliance on the individuals who may eventually leave the organisation for whatever reasons. Successful implementation of the knowledge management system will enhance the organisation's capability in the creation of solutions to

the existing problems, new ideas and identifies new opportunities with the aim to create competitive advantages. Hence, KM capabilities (i.e. knowledge creation, knowledge acquisition, knowledge capturing, knowledge sharing and knowledge application) are critical factors in determining the successful transformation of an organisation to a LO. However, the success of KM is dependent on the IT infrastructure and corporate culture. This study will examine the relationship between the KM capabilities and LO, and the moderating effect of IT infrastructure and corporate culture.

1.2 Problem Statements

Today, the key to the success of an organisation is the organisation's capabilities to produce better products (i.e. in term of quality and functionality) and provide better services than its competitors. In order to do that the organisation needs to be able to convert its weaknesses into strengths and threats into opportunities, i.e. create, renew and sustain its competitive advantages. The creation of such capabilities is powered by the knowledge. The problem for most of the organisation is that the knowledge that powered the success of an organisation always resides in and scatters around various part of the organisation. The knowledge about the industry, products, suppliers, customers, competitors and other stakeholders is not shared among the members of the organisation.

The lack of knowledge sharing will lead to issues such reinventing the wheel which will in turn leads to issues such as ineffective use of human resources, slow response to the market, etc. It will also become an obstacle for knowledge creation, knowledge acquisition and knowledge capturing activities.

Furthermore, individuals that make up the organisation have limited life span whereas an organisation may have unlimited life span. The key issue is that knowledge is normally captured at the individual level and it will leave the organisation when such

individual resign, retire or decease (i.e. hidden cost of retraining). This explains why some organisations are unable to continue their glory when the key individual leaves the organisation for reasons mentioned above.

Hence, the research aims to provide solutions to the following problems:

- Reduction in the hidden cost of retraining whereby the knowledge on suppliers, customers and competitors are remained at the individual level rather than organisational level.
- Reduction in the effort in reinventing the wheel. Most of the time, solutions to a problem faced by an organisation are residing in the organisation (e.g. at individual level, a department, a division, a subsidiary, etc.) but not being captured and shared among the members of the organisation.
- Lack of knowledge on the suppliers, customers, competitors and markets whereby there is no formal process in acquiring and capturing of such information which led to ineffectiveness in managing the supply chain, customer relationship and competition (e.g. longer time taken to introduce new products.
- Lack of formal process in knowledge acquisition, conversion, capturing, sharing and application which led to ineffective knowledge management process. This will eventually lead to higher cost of knowledge management.
- The learning of an organisation is reactive rather than proactive whereby organisations are only start to look for solutions when encountered with the problems rather than proactively anticipate the needs for learning.
- The organisation is overly focus on resolving existing problems rather than promoting collective learning and adapting to the changing environment.

1.3 Research Objectives

Successful knowledge management entails benefits such as improved organisation performance and innovation via the knowledge creation, retention and application processes. This will eventually lead to capitalisation of the strength of the organisation to improve operating result or create new opportunity, transformation of weaknesses to strengths, realisation of the opportunities and conversion of threats to opportunities.

Knowledge management contributes to both individual learning and organisational learning. However, organisational learning is more important to the long term growth of an organisation based on the fact that individuals can come and go but the organisation will continue to operate towards its vision and mission. Hence, it is very important for the organisation to capture the knowledge created and acquired for current sharing and future usage to avoid redundant efforts. The organisational learning therefore will provide the basis to create the learning organisation.

As defined by Senge (1990), "a learning organisation is where people continuously expand their capacity to create and achieve results they truly desire, where new and expansive patterns of thinking are nurtured, where collective aspiration is set free, and where people are continually learning how to learn together" (Lien, B. Y. H., Hung, R. Y. Y., Yang, B., & Li, M., 2006). There are not many researches that focus on combining these two disciplines even though there are couples of concept papers discussion on the synergy of these two concepts. The key word here is "continuity", where the learning organisation will bring about the continuity of the knowledge management processes which are dependent of the system rather than individual. This reciprocal process will also benefit the learning organisation as knowledge management provides the learning objectives to the organisation. This automated process is one of the resulting benefits of a learning organisation.

This study seeks to identify the influences of the knowledge management capabilities on the learning organisation. The study also seeks to identify the influence of the moderating variables such as the IT infrastructure and corporate culture on the relationship between the knowledge management capabilities and learning organisation. Knowledge management capabilities refer to the capabilities in knowledge creation, acquisition, sharing and application. Based on the above research model, the effectiveness of the KM will facilitate organisational learning and eventually lead to a learning organisation.

1.4 Research Questions

With reference to the research problems identified in the section 1.2 above, the following research questions have been developed to address those issues:

- What strategy the organisation can deploy to continually and organically learn the critical knowledge in order to create and maintain its competitive advantages?
- What types of knowledge management capabilities are important for its transformation to a learning organisation?
- Would the IT infrastructure and culture moderate the effect on the knowledge management factors on the transformation to learning organisation?

The above research questions will be used to derive the research framework with the aims to identify solutions to the research problems.

1.5 Significance of the Study

Davenport T. H., De Long, D. W., and Beers, M. C. (1997) shared couples of industry examples to provide evidences for the contribution of KM in either cost saving or increase in profit. Some of the examples are as follows:

- At Texas Instruments (TI), a strategic focus was increasing revenues through licensing of patents and intellectual property. In 1995, this strategic focus has contributed to the generation of nearly $200 million profit for TI which represent more than half its total profits.
- Hoffmann-LaRoche has engaged in projects designed to produce significant reductions in time-to market for new drugs (i.e. speed of product introduction) in an industry where every day's delay can represent $1 million in lost revenues.
- At Hewlett-Packard (HP), a support team paid close attention to the actual problems experienced by dealers as revealed in their phone calls, and then pre-empted many potential support calls by alerting its customers to most frequently asked questions and providing solutions through a Lotus Notes database. Another project at HP is the customer support area where a reduction in the cost of answering customer calls by 50% within two years, and allowed hiring less technically-experienced support analysts.

The learning organisation which entails continuity of the learning process that is relying on the organisational system rather than individuals, will provide the solution to today's organisation which is facing challenges in managing their intellectual properties (e.g. high turnover of staffs). Hence, the study intends to provide an insight on which knowledge management factors should be focused on by the management to facilitate the transformation to learning organisation. At the same time, the study also provides an understanding on the impacts of the IT infrastructure and corporate culture on the relationship between knowledge management capabilities and learning organisation.

1.6 Scope of the Study

Gold, A. H., Malhotra, A., and Segars, A. H. (2001) introduced the knowledge management model which investigated the influence of the knowledge infrastructure capacity and knowledge process capacity on the organisational performance. The key variables of the Gold *et. al.*'s model are presented in the Figure 1 below:

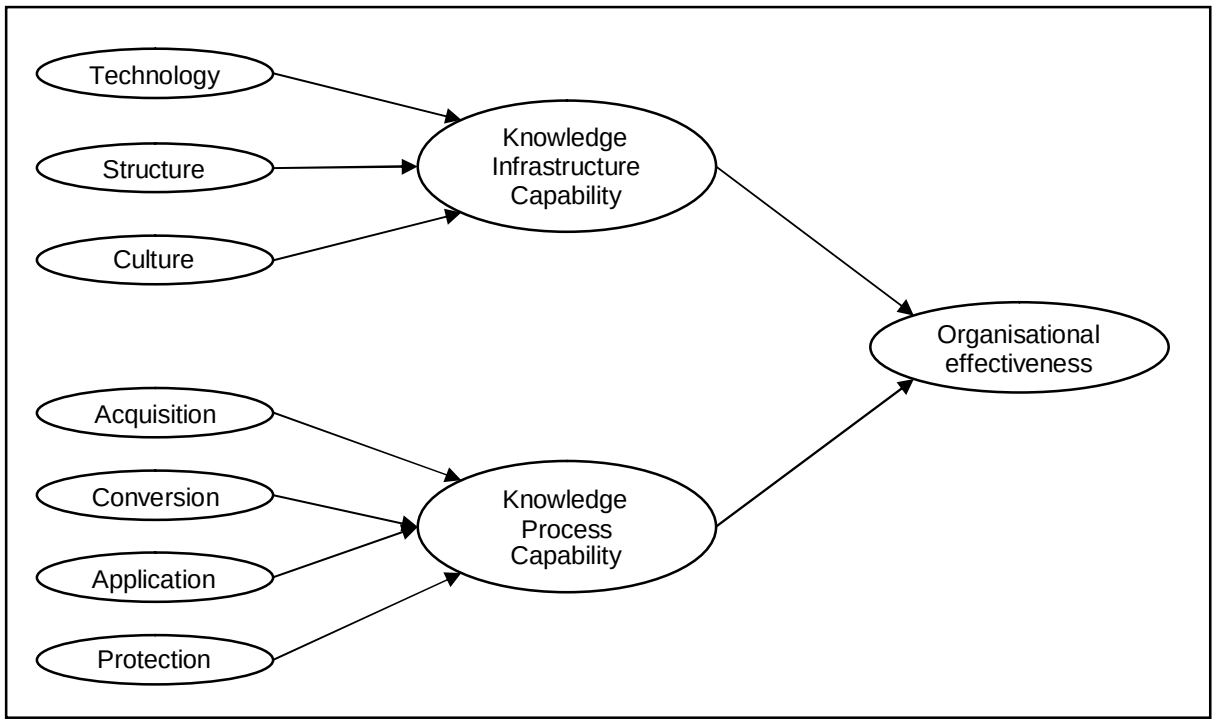

Figure 1. Knowledge Management Capabilities and Organisational Effectiveness

This study will focus on the following knowledge management capabilities: acquisition, conversion, capturing, sharing and application. The knowledge acquisition and conversion capabilities were adopted from Gold *et. al.*'s model (Gold *et. al.*, 2001). Whereas, the knowledge capturing and sharing were expanded from the knowledge application capabilities specified in Gold *et. al.*'s model. In addition, the knowledge management capabilities also being refined by reference to the KM cycle model summarised by King, W. R., Chung, T. R., and Haney, M.H. (2006) which is presented in Figure 2 below.

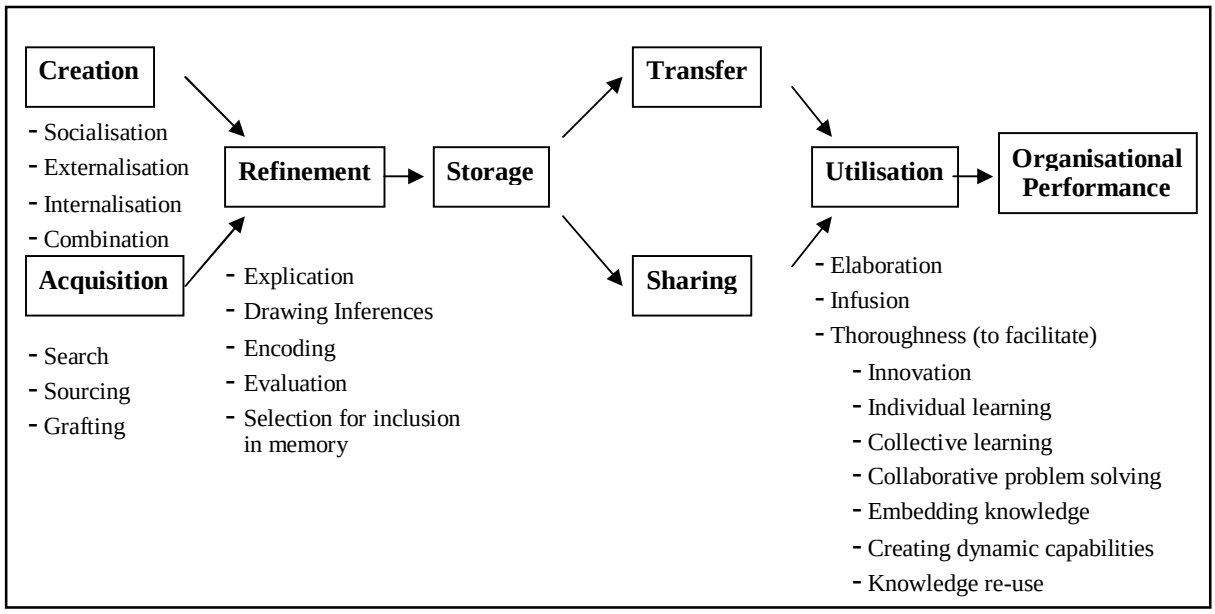

Figure 2. KM Cycle Model

Even though both the model presented in Figure 1 and 2 argue that the knowledge management factors will eventually impact the organisational effectiveness and performance. Various researches have revealed that the success in knowledge management will contribute positively towards organisational effectiveness and performance. Hence, it is not the intention of this study to measure the contribution of knowledge management capabilities on the organisational effectiveness and performance. This study is intended to examine the relationship between the two distinct yet interrelated constructs; knowledge management and learning organisation (Rowley, J., 2000, Loermans, J., 2002; Yang, B, Watkins, K. E., & Marsick, V.J., 2004; Aggestam, L., 2006a & 2006b). The learning organisation will possess the seven distinct but interrelated dimensions (i.e. as depicted in the Figure 3 below) identified by Watkins and Marsick (Yang, *et al.*, 2004).

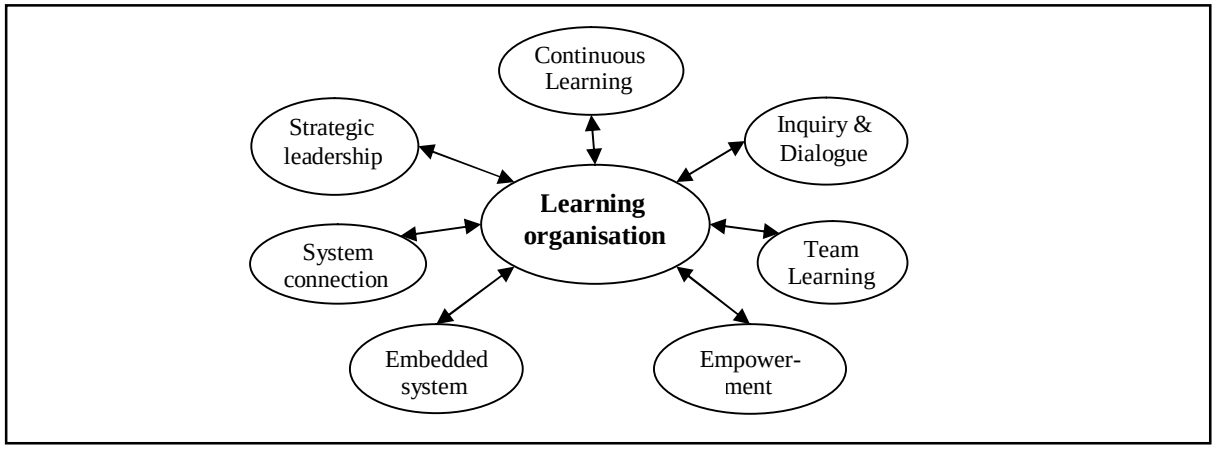

Figure 3. Seven Dimensions of a Learning Organisation

The study also built by reference to the "Maturity Model of Learning Organisation" introduced by Aggestam (2006a) as depicted in the Figure 4 below. However, it is also true that the learning organisation with the system thinking as contended by Peter Senge will provide the continuous learning environment for the knowledge management. This idea was supported by Aggestam's holistic model of LO and KM (Aggestam, 2006b).

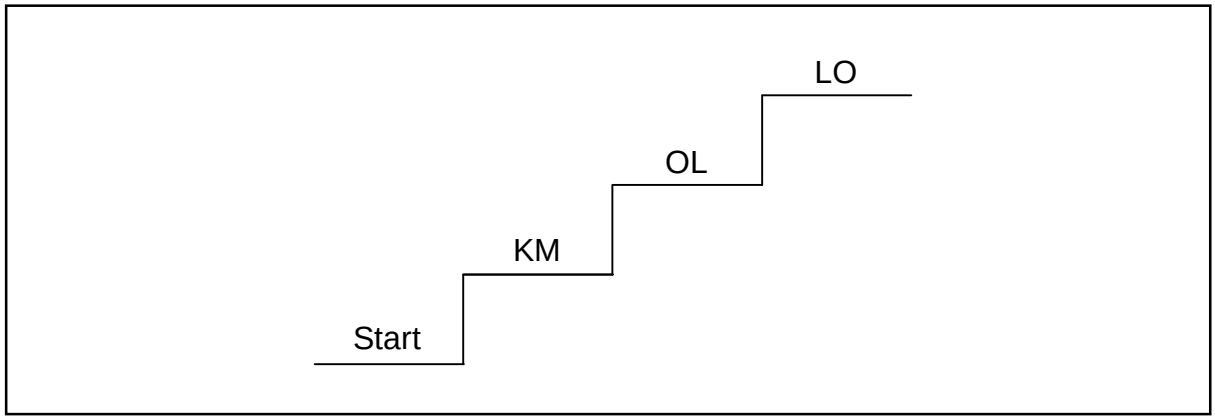

Figure 4. A Maturity Model of Learning Organisation (Source: Aggestam, 2006b)

In addition to the above, the study will also investigate the impact of the IT infrastructure and corporate culture on the relationship between knowledge management capabilities and learning organisation.

1.7 Definition of Key Terms

1.7.1 Knowledge management

Loermans, J. (2002) found that:

> Swan, J., Scarborough, H., and Preston, J. (1999) defines KM as, "…any process or practice of creating, acquiring, capturing, sharing and using knowledge, wherever it resides, to enhance learning and performance in organisations."

1.7.2 Organisational learning

According to Yang *et. al.* (2004), organisational learning refers to collective learning used to acquire knowledge and develop skills.

1.7.3 Learning organisation

According to Lien *et al.* (2006), Peter Senge (1990) defined a learning organisation as one "where people continuously expand their capacity to create and achieve results they truly desire, where new and expansive patterns of thinking are nurtured, where collective aspiration is set free, and where people are continually learning how to learn together". Yang *et. al.* (2004) argues that learning organisation normally refers to organisations that exhibit continuous learning and adaptive characters.

1.8 Organisation of the Remaining Chapters

The remaining of this thesis is organised in such a manner that the review of the literatures relevant to this study and hypothesis is presented in Chapter 2 and followed by a detailed discussion of the methodology used in the study is presented in Chapter 3. Thereafter, the research findings are presented in Chapter 4. Finally, the discussions and conclusions are included in Chapter 5.

CHAPTER 2

LITERATURE REVIEW

2.1 Introduction

This Chapter presents the results of the review of the literature and research conducted to support this study. There were tremendous researches that have been done on the knowledge management and related topics. Although the volume of researches were not as extensive compared to knowledge management, there were also voluminous researches being done on the learning organisation and related topics. However, there are limited research being done on the relationship between knowledge management and learning organisation. The literature review will examine the research done on knowledge management, organisational learning, and learning organisation.

2.2 Review of Literature

2.2.1 Knowledge Management

2.2.1.1 What is knowledge?

Knowledge is defined by The Oxford English Dictionary as (i) expertise, and skills acquired by a person through experience or education; the theoretical or practical understanding of a subject, (ii) what is known in a particular field or in total; facts and information or (iii) awareness or familiarity gained by experience of a fact or situation. (Wikipedia) Based on the first definition, knowledge at the individual level can be acquired through experience or education, this mean it can be acquired from both formal and informal setting. This can be linked to a learning process.

Knowledge can also be classified into explicit knowledge and tacit knowledge. According to Gupta, B., Iyer, L. S., and Aronson, J. E. (2000), Michael Polanyi (1891-1976) was the first one to distinguish between tacit (or implicit) and explicit knowledge.

Gupta *et al.* (2000) found that Polanyi (1966) used the following statement, "We know more than we can tell" (i.e. it is difficult to put tacit knowledge in words) in differentiating the two types of knowledge. Explicit knowledge is an objective and rational knowledge which can be codified and documented for future usage. The explicit knowledge typically can be embedded in procedures and processes of an organisation. In contrast, tacit knowledge is subjective, cognitive and experiential and hard to formalise; it normally kept at individual level (Stonehouse, G. H., & Pemberton, J. D., 1999; Nonaka, I., Toyama, R., & Nagata, A., 2000; Gupta *et al*., 2000; Chan, V. S., Zannes, E. & Pace, R.W., 2002).

The key objective of knowledge management is to facilitate the conversion or transformation of the tacit knowledge to explicit knowledge at both the individual level to organisational level. Both the tacit and explicit knowledge need to be transformed from individual level to organisational level to benefit the organisation and avoid wasting resources to reinvent the wheel. This is extremely important as the knowledge on the vendors, customers and competitors are normally stored at the individual level which typically gets lost upon the resignation and retirement of the particular individual. Most of the researchers agreed that knowledge is the key driver to build the competitive advantage. Hence, the knowledge management capabilities must be able to handle this conversion process.

The greatest challenge in the process of knowledge conversion is to convert tacit knowledge into explicit knowledge. In 1995, Nonaka and Takeuchi's study complemented Polanyi's work by introducing the SECI (i.e. Socialisation, Externalisation, Combination and Internalisation) model. Under the SECI model, the creation of knowledge is via the dynamic interaction between the explicit knowledge and tacit knowledge. Knowledge is created through the SECI spiral (as shown in Figure 5 below) via the four modes of conversion:

(a) Socialisation – Conversion from tacit knowledge to tacit knowledge. In this mode, tacit knowledge is created via shared experience or observation (e.g. on-the-job training);

(b) Externalisation – Conversion from tacit knowledge to explicit knowledge. In this mode, individuals codified or conceptualised its tacit knowledge to create new explicit knowledge;

(c) Combination – Conversion from explicit knowledge to explicit knowledge. This mode involves the use of social processes to combine different bodies of explicit knowledge held by individuals. According to Nonaka (1994), by reconfiguring the existing information through sorting, re-categorisation, and re-contextualisation of explicit knowledge can lead to the creation of new knowledge; and

(d) Internalisation – Conversion from explicit knowledge to tacit knowledge. In this mode, the individual consolidated its understanding on the explicit knowledge to create the new tacit knowledge. This process of embodying the explicit knowledge as part of the individual's tacit knowledge is similar to the traditional notion of learning.

This knowledge creation concept provides a good description of knowledge management process (Nonaka *et al.*, 2000).

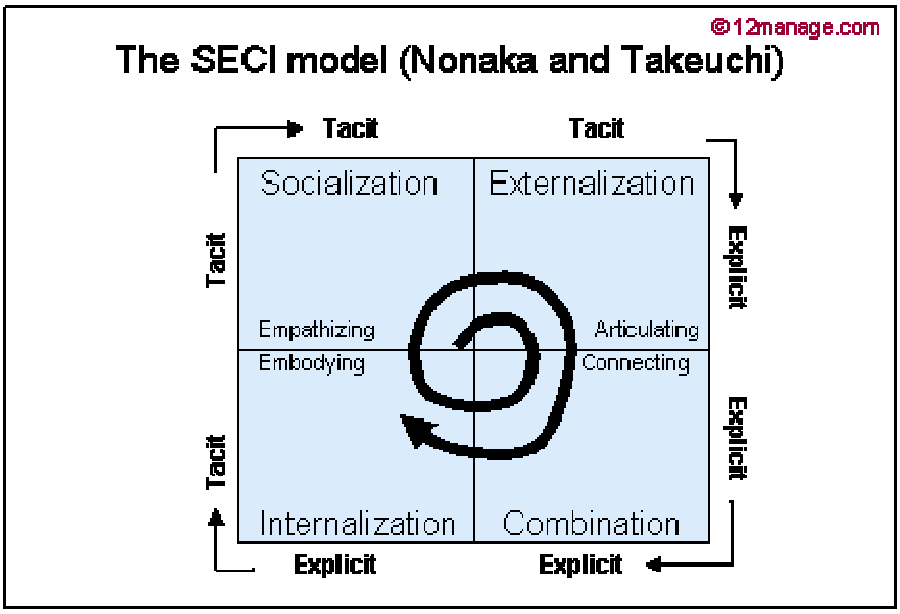

Figure 5. The SECI Model introduced by Nonaka & Takeuchi (Source: www.12manage.com)

In order to further enhance the understanding of the above concept, the following citation by Gupta *et al.* (2000) is provided. As cited by Gupta *et al.* (2000), Dataware Technologies, in their executive briefing, identify the following four processes that are commonly used by organisations for knowledge conversion:

(a) *Socialisation*: sharing of experiences through observation, imitation and practice. It generally occurs through workshops, seminars, apprenticeships and conferences.

(b) *Capture*: the conversion of tacit knowledge (e.g. what one learned at a workshop) into explicit form (e.g. written report or plan).

(c) *Dissemination*: copying and distribution of explicit knowledge throughout the organisation.

(d) *Internalisation*: process of appreciating the knowledge through an explicit source, i.e. one can combine the experience of formal learning with the actual experience.

(Gupta *et al.*, 2000).

Organisational knowledge can take many forms. Some of which are summarised by Stonehouse and Pemberton (1999), "Sanchez and Heene (1997) analyse it into know-how (practical knowledge), know-why (theoretical knowledge) and know-what (strategic knowledge), while Whitehill (1997) devises a typology centred on encoded (know-what), habitual (know-how) and scientific (know-why) knowledge" (Stonehouse & Pemberton, 1999).

2.2.1.2 What is knowledge management?

There are various definitions of KM found from the literature review. López, S. P., Peón, J. M. M., & Ordás, C. J. V. (2004) posits that defining the concept of KM is difficult as KM has been studied by several disciplines and from different approaches. Based on their research, the following definitions were offered by different researchers:

Table 1: Various Definition of Knowledge Management

No	Name of Researchers	Definition of Knowledge Management
1	Davenport *et al.* (1998)	KM is a process of collection, distribution and efficient use of the knowledge resource.
2	O'Dell and Grayson (1998)	KM is a strategy to be developed in a firm to ensure that knowledge reaches the right people at the right time, and that those people share and use the information to improve the organisation's functioning.
3	Bhatt (2001)	KM is a process of knowledge creation, validation, presentation, distribution and application.
4	Bounfour (2003)	KM is a set of procedures, infrastructures, technical and managerial tools, designed towards creating, sharing and leveraging information and knowledge within and around organisations.

Gupta *et al.* (2000) defined KM as a process that helps organisations find, select, organise, disseminate and transfer important information and expertise necessary for activities such as problem solving, dynamic learning, strategic planning and decision making. Swan, *et al*. (1999) defines KM as, "…any process or practice of creating, acquiring, capturing, sharing and using knowledge, wherever it resides, to enhance learning and performance in organisations". This definition is found to be one of the most useful definitions as it provides the objectives of KM and the inclusion of "wherever it resides" covers tacit knowledge (Loermans, 2002). This definition will be used for the purpose of this research.

Based on the research done by Gupta *et al.* (2000), there are currently two major trends in KM: (1) Measuring the intellectual capital of an organisation (i.e. developing of measurement ratios/indexes and benchmarks) and (2) Knowledge mapping (i.e. capturing of knowledge gained by individual and disseminating it throughout the organisation, mainly via information technology). The knowledge mapping should also include the creation of knowledge as proposed by Nonaka and Takeuchi (1995).

The literature review revealed that there are mainly two major schools of knowledge management. One focuses on the information technology system which supports the capturing, and sharing of knowledge. Another one focuses on the knowledge management process capabilities. The focus of this study is on the knowledge management process capabilities. As posited by King *et al.* (2006), the life cycle models provide a useful way to organise one's thinking about knowledge management. There are numerous KM life cycle models that describe the key aspects of KM ranging from 3-stage model to 7-stage model. According to King *et al.* (2006), Davenport and Prusak (2000) recommended a 3-stages model: knowledge generation, codification/coordination and transfer. Gold *et al.* (2001) contends that there are 4 major processes: knowledge acquisition, conversion, application and protection. Whereas, Ward and Aurum (2004) proposed a 7-stage model: knowledge creation, acquisition, identification, adaptation, organisation, distribution, and application.

2.2.2 Learning Organisation

During the 1990s, the concept of learning organisation ("LO") was popularised by Peter Senge via his book, "The Fifth Discipline". Senge (1990) highlighted that "the most successful corporation of the 1990s will be something called a learning organisation. The ability to learn faster than your competitors may be the only sustainable competitive advantage" (Rowley, J., 2000). Peter Senge defined LO as one "where people continuously expand their capacity to create and achieve results they truly desire, where new and expansive patterns of thinking are nurtured, where collective aspiration is set free, and where people are continually learning how to learn together" (Lien *et al.*, 2006). In essence, Senge highlighted the core characteristic of the LO, i.e. collective and continuous learning at a pace which is faster than the competitors.

According to Baines, A. (1997), Peter Senge (1990) has identified the 5 disciplines of the learning organisation to be: *System thinking* (i.e. non-linear and organic thinking, more commonly referred to as systems thinking - a way of thinking where the primacy of the whole is acknowledged); *personal mastery* (Personal mastery relates to individual learning: without this foundation, one cannot build a learning organisation); *mental models* (i.e. a framework for the cognitive processes of our mind which determines how we think and act); *building shared vision* (i.e. the organisational vision must not be created by the leader, rather, the vision must be created through interaction with the individuals in the organisation) and *team learning* (i.e. the process of aligning and developing the capacity of a team to create the results its members truly desire).

Prior to Senge, Pedler *et al.* (1988) defined a learning company as "an organisation which facilitates the learning of all its members and continuously transforms itself". Based on this definition, there are two components: one is individual learning and organisational learning and transformation. It is essential for an organisation to transform the individual learning into organisational learning.

Pedler *et al.* (1988) elaborate further on the concept of a learning organisation as one which:

- has a climate in which individual members are encouraged to learn and to develop their full potential;
- extends this learning culture to include customers, suppliers and other significant stakeholders;
- makes human resource development strategy central to business policy;
- is a continuous process of organisational transformation.

(Rowley, 1998)

Senge (1990) and Pedler *et al.* (1988) seem to focus on the knowledge sharing and no discussion on the need to create, capture and re-use of the knowledge acquired by the organisation. The definition of learning organisation has subsequently evolved to include the importance of knowledge creation, capturing and application.

Watkins and Marsick (1996) defined a "learning organisation" as one that captures, shares, and utilizes knowledge to change the manner in which an organisation responds to challenges (Lien *et al.*, 2006). They have also developed a 43 items of the Dimensions of Learning Organisation Questionnaire (DLOQ).

As cited by Hong and Kuo (1999), Ruggles (1998) believes that a learning organisation should be able to carry out the following basic activities:

- Create new knowledge.
- Make use of external resources to obtain knowledge.
- Integrate and apply external knowledge.
- Combine knowledge with production, operation, and services.
- Lay out knowledge in forms of documentation, data, or software.
- Use incentives to boost knowledge growth.
- Transfer new knowledge to other units in the organisation.
- Evaluate the value of knowledge to organisational development.

Hong and Kuo (1999) further suggested that a learning organisation possesses three learning modes: maintenance learning, adaptive learning and creative learning. Each of the three learning modes serve different functions. Maintenance learning is the learning for organisational survival; adaptive learning is benchmark learning (setting a competitor as the goal to catch up with); and creative learning is to take the lead in learning (surpassing competitors in acquiring required knowledge).

2.2.3 Organisation Learning

Kloot, L. (1996) found that, Argyris (1997) defines organisational learning (OL) as:

"…the process whereby members of the organisation respond to changes in the internal and external environments of the organisation by detecting errors which they then correct so as to maintain the central features of the organisation. When the process enables the organisation to carry on its present policies or achieve its objectives, the process may be called single loop learning. The existing strategies, structures and actions - the existing operational paradigm - continue: only minor changes to operating policies are made. When learning encompasses not only detecting errors but also questioning underlying policies and goals it may be called double loop learning".

López *et al.*, (2004) described the organisational learning process as a series of essential features. First, learning is a transformation process which is continuously created and recreated and not an independent entity to be acquired or transmitted. Second, it is cumulative in nature. Third, it is a process whose goal is to improve the development of the organisation by means of new initiatives. Finally, it embraces the whole of the organisations.

Organisation learning has the impact of increasing an organisation's ability to take effective actions. LO is an organisation that embraces the principles of OL either consciously or unconsciously and provide an environment where OL activities can flourish (Loermans, 2002). The contribution of OL towards building of LO is sustainable. As found by Dimitriades (2005), LO may indeed be viewed as a strategic objective "like, for example, increased profitability or customer satisfaction", representing the desired "ends" (learning organisation) to be achieved via the appropriate "means" (organisational learning).

2.2.4 Knowledge Management and Organisational Learning

Stonehouse and Pemberton (1999) highlighted that, the challenge, therefore, revolves around developing organisational knowledge by formalising the context, structures and procedures which promote the building and sharing of knowledge. Furthermore, not only must an organisation learn about its internal and external relationships, but such learning must take place quicker than competitors in order to deliver sustainable competitive advantage. The relationship between KM and OL in an intelligent organisation as defined by them can be demonstrated in the following figure:

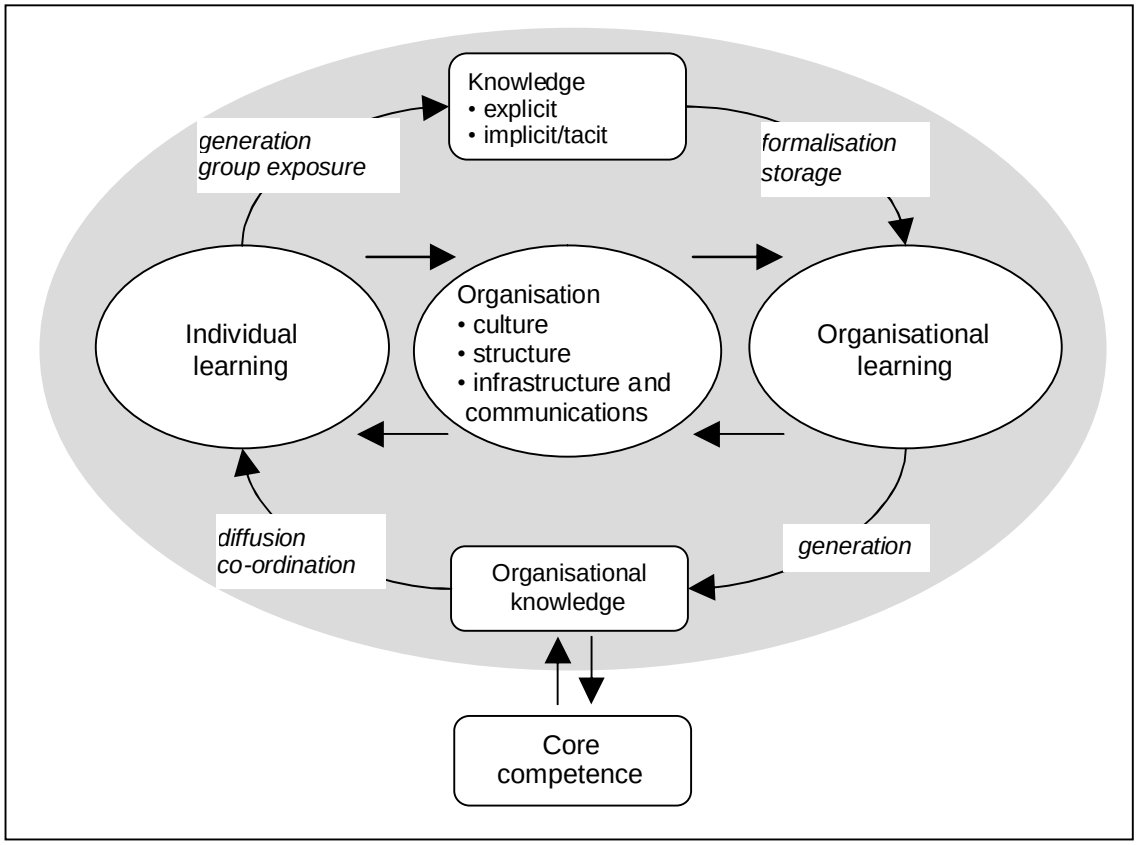

Figure 6. Relationship between knowledge management and organisational learning (Sources: Stonehouse and Pemberton, 1999)

The above support the research model of this study that KM contributes to the organisational learning. Pemberton and Stonehouse (2000) posit that, successful learning organisations create an organisational environment that combines organisational learning

with knowledge management. Whereas organisational learning is primarily concerned with the continuous generation of new knowledge to add to existing stocks of assets, knowledge management is primarily centred on the formalisation, storage, sharing and distribution and co-ordination of existing knowledge assets throughout the organisation, building and exploiting core competencies that yield superior performance. An inherent feature of both is the sharing of ideas to create and develop new knowledge, enhanced by conducive organisational structures and culture and supported by effective knowledge management systems.

The link between KM and OL is also supported by Dimitriades' findings. As quoted by Dimitriades' (2005), "innovation is about learning new ways to understand or configure the world around us. It is about seeing possibilities while others see constraints, converting failure into success, or acting in novel ways. Innovation pertains to creating new knowledge or using existing knowledge in ways that create new forms of thinking or new products. In that sense the results of innovation are transformative since the outcome is something entirely different from what you had before. Hence, building a LO or creating and then using KM systems are organisational innovations (DiBella, 2001)".

King *et al.* (2007) found that OL is a complementary to KM. An early view of OL defined it as "… encoding inferences from history into routines that guide behaviour". According to King *et al.* (2007), Easterby-Smith and Lyles (2003) contended OL to focus on the process and KM to focus on the content of the knowledge that organisation acquires, creates, processes and eventually uses. Another way of understanding the linkage between OL and KM is to view OL as the goal of KM (King *et al.*, 2007). Eventually, the successful in promoting OL will lead to the creation of sustainable LO.

2.2.5 The Relationship between KM, LO and OL

According to Firestone and McElroy (2004), OL is identical with organisational knowledge processing in knowledge life cycle and decision execution cycle when consider it from a process view. But when we take the prescriptive point of view often associated with the idea of the learning organisation, they considered OL as approximating KM. The LO is the normative aspect of OL. It is the form of organisation that according to some is best suited for double-loop OL, in the process sense, to occur. KM, however, is that management activity or process whose objective is to enhance double-loop knowledge processing in the organisation by creating a sustainable innovation system. So, KM is also normative in nature and with the objective to enhance double-loop organisational learning processes which it calls knowledge processes.

Loermans (2002) has highlighted that there is lack of attempts to identify the synergies between LO and KM. Loermans' study found that the researchers of the KM school, namely Davenport and Prusak (1998) and Sveiby (1997), hardly mention the learning organisation or organisational learning. Their work on knowledge management seems to be disconnected from the learning organisation. Are they implying that there are no learning activities during the knowledge management process? On the other hand, the key supporter of LO, namely Senge (1990) did not mentioned the term KM and rarely discussed about knowledge at all. Is this suggests that there is no knowledge being learned by the learning organisation? However, Loermans' work suggest that there inter-relationship between KM and LO.

As found in the recent research and conceptualisation, the situation has been changed, where more and more researchers try to marry the two concepts, i.e. KM and LO. If we investigate the "Conceptual Model of LO and KM" introduced by Aggestam (2006) as depicted in the Figure 7 below, we can observed the evolution from the previous model

introduced by Stonehouse and Pemberton (1999) to explain the relationship between knowledge management and organisation learning.

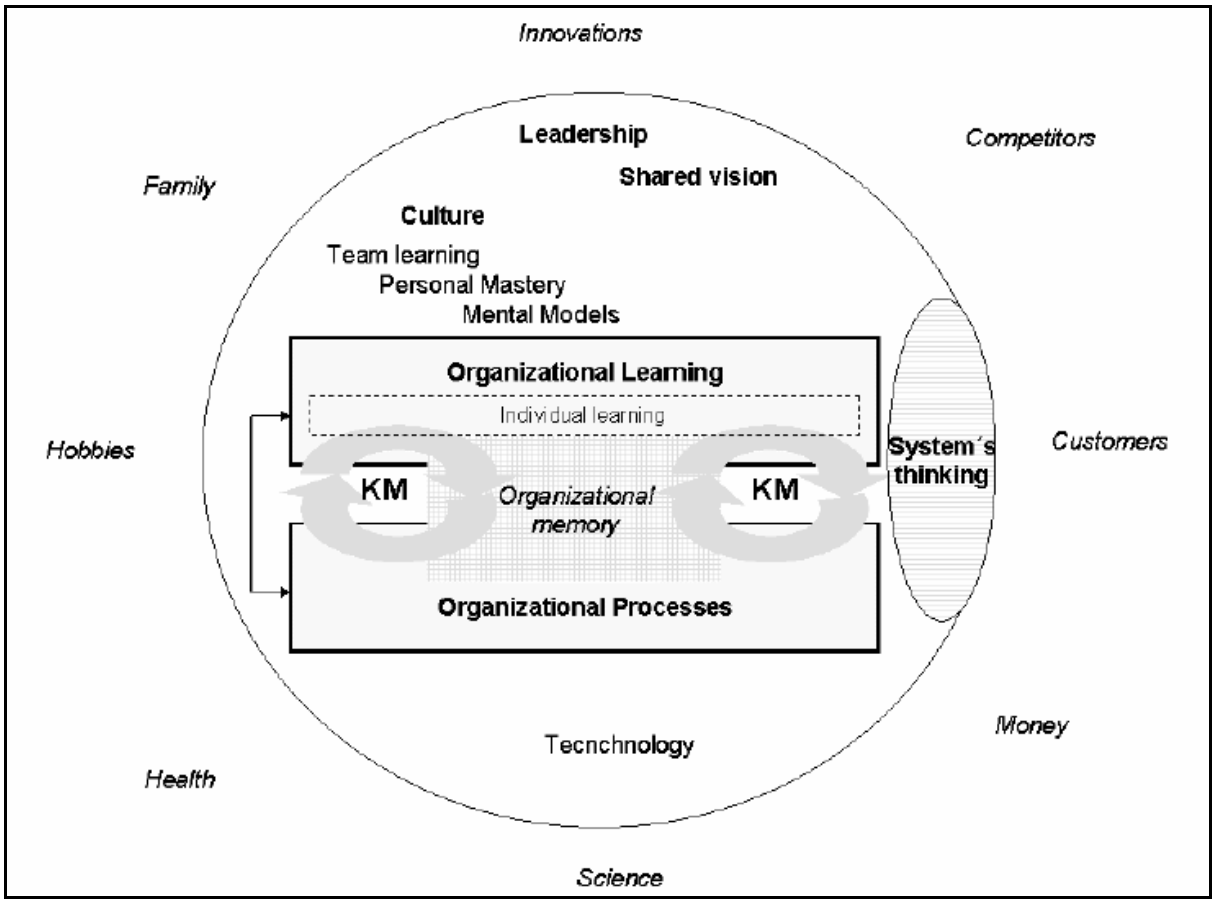

Figure 7. A conceptual model of LO and KM

The above model attempts to connect the five disciplines introduced by Senge (1990) with the knowledge management process and organisational learning.

2.2.6 IT Infrastructure

Sher, P. J. and Lee, V. C.(2003) posited that IT infrastructure is an indispensable enabler of knowledge management. The knowledge management initiative or project requires effective IT infrastructure to create the knowledge repository and facilitate the collaboration and sharing of information and knowledge (Davenport *et al.*, 1997; Yeh *et al.*, 2006). The organisation needs to distinguish between information management initiative and knowledge management initiative. Otherwise the IT initiative will be turned into the initiative for managing daily needs of data and information. The IT infrastructure not only facilitates the knowledge management initiative and enhances the knowledge management capabilities but also moderates the success of the creation of the learning organisation.

Davenport *et al.* (1997) argued that knowledge projects are more likely to succeed when they can take advantage of a broader infrastructure of both technology and organisation. Technological infrastructure is the easier of the two. It consists partially of technologies that are knowledge-oriented (e.g., Lotus Notes and the World Wide Web). If these tools and the skills to use them are already in place, a particular initiative will have an easier time getting off the ground. Most of the companies interviewed by them during their research employed multiple tools, which can either provide opportunities for organisational learning or increase functional specialization. An exampled quoted by them was National Semiconductor, engineers gravitated toward the Web, while sales and marketing personnel preferred Lotus Notes.

Yeh *et al.* (2006) findings from literature review reveals that information technology can enable rapid search, access and retrieval of information, and can support collaboration and communication between organisational members. In essence, it can certainly play a variety of roles to support an organisation's KM processes.