2 LITERATURE REVIEW

This chapter describes the various literatures of Knowledge Management (KM) and Knowledge Management System (KMS) based on the research framework mentioned in Chapter 1. It includes the definitions of KM and KMS, the economic transformation from the traditional economy to the new economy, the characteristics of K-Economy, the importance of KMS in K-Economy, the various IT application tools and infrastructures in KMS, the benefits and challenges related to the recent findings in Knowledge Management researches.

2.1 Knowledge, Knowledge Management (KM) and Knowledge Management System (KMS) Defined

Previous researchers have defined knowledge differently in their knowledge works. Hertog and Huizenga (1997) proposed a definition of knowledge as a collection of information and rules and with which a certain function can be fulfilled. Another author, Weggeman (1997) also gave the same approach to capabilities resulting from information but added other aspects:

> "Knowledge is a personal capacity that should be seen as the product of the information, the experience, the skills and the attitude which someone has at a certain point in time".

However, the more detailed explanation of knowledge can be found in the extended definition given by Davenport and Prusak (1998) p. 5:

> "Knowledge is a fluid mix of framed experiences, values, contextual information, and expert insight that provides an environment and framework for evaluation and incorporating new experiences and information. It originates and is applied in the minds of knowers. In organisations, it often becomes embedded not only in documents or

repositories but also in organisational routines, processes, practices and norms".

Although information forms the backbone of knowledge, the two concepts are not interchangeable though highly related. Moreover, information is transformed data presented in a meaningful way for the user (Hansson, 2000). It requires the concept of data to be taken into consideration. Similarly, Beijerse (1999) has proposed the definition of knowledge as information; the capability to interpret data and information through a process of giving meaning to these data and information; and an attitude aimed at wanting to do so. As such, we must understand what data is, in order to differentiate it from information.

Data is the lowest level of information, which is unsorted, unformatted and in some situations unreadable (Hansson, 2000). It is a set of discrete, objective facts about events. In organisational context, data is most usefully described as structured records of transactions (Probst et al., 2000). They are usually stored in some sort of technological system, which is entered by multi-sources functional departments such as operations, finance, accounting and marketing. This is similar to the definition given by Tiwana (2000) that from the perspective of a firm, data is a set of particular and objective facts about an event or simply the structured record of a transaction.

It is important that we distinguish the various levels of information in order to avoid any confusion with regard to the objective of implementing any information system. Confusion about what data, information and knowledge are – how they differ, what they mean – have resulted in enormous expenditure on technology initiatives. They rarely obtained what they wanted from the spending (Davenport and Prusak, 1998). In addition, information is seen as descriptive and historical in nature, related primarily to the past and present. On the other hand, knowledge is predictive, associative and unveils hidden facts (Kock and McQueen, 1998).

Knowledge can be divided into two categories; namely explicit and tacit knowledge (Nonaka, 1998). The explicit knowledge is formal, systematic, easily communicated and shared. Tacit knowledge is highly personal, hard to formalise and difficult to communicate to others. It can further be categorised into the following categories (ISIS, 2000):

- Know-what refers to knowledge about facts which are closely linked to information. For example, how many people live in a city?
- Know-why refers to scientific knowledge of principles and laws in nature, in the human mind and in society. It is the production and reproduction of normally specialised organisations.
- Know-how refers to skills to do something which is developed and kept within the borders of the individual firm
- Know-who refers to mix of different kinds of skills, which is increased and enhanced by social relationship.

Next comes the question of what Knowledge Management (KM) is all about. It is not easily defined; nevertheless, it is one of the many components of good management and is considered as an emerging discipline (Ives et al., 1998). It is considered as an emerging discipline for potential uses, features and benefits. As it is defined there are increasing numbers of people and organisations that begin to explore this new forms of communication and organisational learning (Shariq, 1997).

While the term covers a very broad area, the difficulty lies in the definition of knowledge itself, which is very vague in nature. The traditional managers are accustomed to working with assets that are tangible and concrete. To them knowledge is an "invisible, intangible, ephemeral, soft assets" (Clippinger, 1995; Bennet, 1999). The fact that "knowledge is power", so "knowledge politics" is important within an organisation, where sharing of knowledge by managers is frequently regarded as threatening and "unnatural" (Davernport, 1997). As such, there is still no consensus regarding the definition of KM that can be used as an

acceptable area of concern to align different workers. However, this concept has been newly developed by new technologies, media, devices and techniques (Ives et al., 1998).

According to Beijerse (1999), KM is defined as achieving organisational goals through the strategy-driven motivation and facilitation of (knowledge-) workers. This is to develop, enhance and use their capability to interpret data and information (by using available sources of information, experience, skills, culture, character, personality, feelings, etc.) through a process of giving meaning to these data and information.

Other researchers have defined it as the process of creating, capturing, and using knowledge to enhance organisational performance (Bassie, 1997). It is management of information, knowledge and experience available to an organisation – its creation, capture, storage, availability and utilisation – in order that organisational activities build on what is already known and extend it further (Mayo, 1998). It is about encouraging individuals to communicate their knowledge by creating the environment and systems for capturing, organising, and sharing knowledge throughout the company (Martinez, 1998).

There is no general approach for managing knowledge in an organisation. A few accepted, isolated and diverging notions have been proposed by Wiig (1997). Among others it includes the technical approaches that focus on knowledge acquired from people, in computer knowledge bases, knowledge-based systems that are made available to technology-based network using e-mail, groupware and other tools. The second notion focuses on the "intellectual capital" and the third one has broader focus, which includes all knowledge-related aspects and best practices.

The second notion of Wiig's is similar to the definition given by another researcher. Sveiby (2000) has emphasised on the intangible asset when defining

knowledge and therefore defines KM as the art of creating value from organisational intangible assets.

In order to make our data useful, which will be informative and subsequently turned into a form of knowledge, a process of adding value to each level of this information is needed. According to Armistead (1999):

> "Within the knowledge management field it is accepted that processes, people and technology tend to come together to increase organisational effectiveness through learning.... These are processes by which knowledge is created, captured and codified, shared and transferred, embedded and used, measured and valued".

As such, KM can be defined as a process of creating, capturing, codifying, storing, sharing, transferring, using knowledge to achieve organisational effectiveness and business goals. However, an important prerequisite for knowledge creation is information. Knowledge creation is made possible only by the availability, diffusion and productive use of information (Botkin, 1999), most prominently in the form of IT (Sobri and Rahim, 2000).

KM is not solely an IT problem but it is partly a management problem today. We must be able to align both IT and management to construct KM technologies that will enable an effective KMS. Therefore, Tiwana (2000) has defined KM is not about:

- Knowledge engineering
- A process, or just digital networks
- Building a "smarter" intranet
- A one-time investment
- Enterprise-wide "infobahns"
- "Capture"

Having looked at the various definitions of KM, I shall now define what constitute a KMS. The following definition as proposed by Meso and Smith (2000) will be used as a guideline for the study. They defined organisational KMS as a system that provides for the creation of new knowledge, the assembly of externally created knowledge, the use of existing knowledge, and the finding of knowledge from internal and external sources.

They also came up with two perspectives of KMS; namely the technical perspective, which holds that it is an advanced assembly of software and its associated hardware infrastructures. The other is the socio-technical perspective that recognises there is more to KMS than mere technology. This includes complex combination of technology infrastructures, organisational infrastructures, corporate culture, knowledge and people (Meso and Smith, 2000).

It is interesting to observe from the above definitions that effective KMS does not refer to an effective IT implementation alone. At the same time, attention must also be paid to strategic, personal, organisational and cultural aspects, which are at least as important as the technological aspect. Hence, effective KMS frequently boils down to the selection and implementation of methods for transforming knowledge stored in brainware (and thus only available to one or a few individuals) into forms (groupware, documentware and hardware) that can be shared by many (Bennet and Gabriel, 1999).

The first technical perspective proposed by Meso and Smith (2000) will be used in the study, which concentrates only on the Information Technology component in KMS.

2.2 *The Importance of KMS in A Knowledge-Based Economy (K-Economy)*

The global economy is currently experiencing a transitional phase from a traditional economy based on physical assets into an entrepreneurial economy (Audretsch and Thurik, 1997) or more commonly referred to knowledge-based economy. The concept of the 'knowledge-based economy', 'knowledge driven economy' or K-Economy is used to describe an economy in which the generation and exploitation of knowledge play a predominant part in the creation of wealth (UK Dept of Trade and Industry, 1998). In addition, K-Economy can be defined as an economy, which is directly based on the production, distribution, and use of knowledge and information (OECD, 1996). Similarly this new economy can be defined as economy having characteristics of 'digital economy', 'innovation-based economy' or 'global economy' (Tapscott, 1996).

As such, the economic transition requires different fundamental characteristics and development. Jacobs (1996) writes in his *Het Kennisoffensief* about four stages in the development of the knowledge-based economy:

- Increasing importance of information in which information and communication technology are broadly applied. Owing to these technologies, it is possible to organise processes in the company more efficiently; the transport and exchange of information can go faster
- Shortening of the life cycle of products and technologies. As entrepreneurs use the technological possibilities to offer their customers a broader spectrum of products, competition by imitation therefore becomes almost impossible
- Immaterialisation of the economy from supply-side to demand-side. Customers have become of greater influence which leads to the importance of marketing, consumer research and product design
- Rising of network economy. These are the human networks that are necessary to deal with an economy in which specialisation and combination of different forms of knowledge are crucial

Consequently, one of the main assets of companies is their stock of knowledge and to be knowledge driven, companies must learn how to recognise intellectual capital that is important to their business and subsequently in their balance sheets. A company's intellectual capital comprises its articulated and formalised idea that is ideally applied to produce valued assets (Swanborg and Myers, 1997). Intellectual capital is made up of both human and knowledge capital. Human capital comprises individual talents and knowledge that is acquired through education, training, experience, and cognition. While knowledge capital is the documented knowledge that is available in such forms as research papers, reports, books, articles, manuscripts, patents and software. According to ITAG (1999), a firms' intellectual capital – employees' knowledge, brainpower, know-how, and processes, as well as their ability to improve these processes – is a source of competitive advantage. As such, knowledge has become the third factor of production, besides land and capital of leading economies which is seen as a company's key asset as Toffler and Toffler (1993) said:

> "The real value of companies like Compaq or Kodak, Hitachi or Siemens, depends more on the ideas, insights and information in the heads of their employees and in the data banks and patents these companies control than on the trucks, assembly lines and other physical assets they may have. Thus capital itself is now increasingly based on intangibles".

Similarly, Peter Drucker, the Management guru is very clear in his conclusion when he analyses this knowledge-based economy. He says that the only or at least the most important source of wealth in the contemporary post-capitalist society is knowledge and information (Drucker, 1993). As long as there is knowledge, he says, the other production factors are easy to obtain.

From the above we can identify the important components that are crucial for the existence of a K-Economy. Among others, the IT revolution has not only brought and continues to bring dramatic changes to work at an unprecedented and

breathtaking pace. Intangible information and ideas have become both input and output. Industries are continuing to globalise and knowledge will become the key source of competitive advantage as economies liberalise and traditional barriers subside.

KMS is essentially important to ensure business organisation adapt and survive in today's challenging world. According to Malhotra (1998):

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

The Western economies are becoming more and more knowledge-intensive. For example in the US, almost sixty percent of workers are knowledge workers (ITAG, 1999). OECD further argues in *The Knowledge-Based Economy* that politicians and policy makers have to be aware of the fact that contemporary society is an information society and that the contemporary economy is a knowledge-based economy or has to be a knowledge-based economy (OECD, 1996).

A rapidly globalising economy unified by improved communication and transportation gives consumers an unprecedented choice of goods and services and an endless cavalcade of new and better offerings from global companies (Davenport and Prusak, 1998). While the world is changing with uncertainty at a twist of a second, organisations are crawling, competing to meet market demands. Nonaka (1998) stated in *The Knowledge Creating Company:*

> "In an economy where the only certainty is uncertainty, the one sure source of lasting competitive advantage is knowledge.... Successful companies are those that consistently create knowledge, disseminate it

widely throughout the organisation and quickly embody it in new technologies and products".

Thus, the pressure of global economy has put organisations to converge their products and services, which form part or all of the products they offer. Consequently, products and services are differentiated by knowledge and intellectual capital. In the era characterised by mobility, free of ideas, reverse engineering and widely acceptable technology; it is almost impossible to prevent competitors from copying or improving on new products and production methods. KMS, however, can be considered as a sustainable competitive advantage through the innovation process, which resulted from creation of new knowledge. New knowledge is created in the process of organisation learning. Thus, KMS can be viewed as creation of sustainable competitive advantage through continued organisational learning (Meso and Smith, 2000). And unlike material assets, which decrease as they are used, knowledge assets increase with use (Davenport and Prusak, 1998). Moreover, the fact that knowledge strives to be public good or non-rivalrous (ITAG, 1999). It has zero marginal cost for sharing it with others and hard to prevent others from using it.

2.3 Information Technology (IT) in Knowledge Management System (KMS)

The major objective of KM is to enhance innovation and the early IT was designed to assist managerial and professional workers by processing and disseminating vast amounts of information to managers organisation-wide (MIS). Over several decades, systems evolved to systems focusing on providing tools for decision analysis to specific decision makers (DSS), and to systems designed to provide updated, often real-time, relevant information to senior and middle

managers (EIS). However, an emerging line of systems, targets professional and managerial activities by focusing on creating, gathering, organising, and disseminating an organisation's 'knowledge' as opposed to 'information' or 'data'. These systems are referred to as Knowledge Management Systems (KMS) (Alavi and Leidner, 1999).

As mentioned before, innovation stemmed out from continued organisational learning. In a bid to achieve these goals and to maximise benefits that can be derived from effective KMS, many firms are investing heavily in the development of organisation knowledge management systems aimed at supporting knowledge work and enhancing organisational learning (Meso and Smith, 2000). A study of 109 companies from various industries in US found that the highest estimated average budgets for KMS was reported $50,000,000 which is equivalent to RM190, 000,000 while the lowest was $25,000 which is equivalent to RM95, 000 (pegged at RM3.80 exchange rate) (Alavi and Leidner, 1999).

IT plays a vital role in the process of converting data into information, subsequently information into knowledge. According to Carneiro (2000) in his article *How Does Knowledge Management Influence Innovation and Competitiveness*:

> "Data and information are used for a variety of purposes in organisations namely for improving the possibility of increasing knowledge potential...Sophisticated or specific information is included in a management information system".

The processes of converting written word into association of ideas will provide us with a range of decisions. Unless that information can be transferred into knowledge to improve sales, operations, strategic planning and bottom-line results, it can only lead to information overload and confusion (McCampbell et al., 1999). They further argued that in computer systems, the weakest link has always been between the machine and human because the bridge spans a

space that begins with the physical and ends with the cognitive. However, according to Lawton (1999), advanced software and hardware technologies are converging in machine-human interfaces that vastly extend knowledge transfer capacities.

In today's business environment, there is great need for a vast and complex interpretation of information outputs generated by computer systems. It should further be noted that a key enabler for the implementation of KMS is technology. The focus of technology is to primarily enhance two broad areas in KMS namely storage and retrieval, and communications. Nevertheless, the role of IT is emerging as an integrator of communications technology, rather than solely a keeper of information. Manasco (1996) said that the critical role of IT lies in its ability to support communication, collaboration, and those searching for knowledge and information, not static repositories of best practices.

In organisations, most intellectual capital resides in the minds of IT workers. In US, for example, big companies such as Andersen Consulting, Ford and Mosanto encourage employees to put tacit knowledge, the know-how in their heads, into explicit form, such as written reports or video presentations. This captured knowledge is then stored in repositories such as databases and intranet Web servers, all of which users can search (McCampbell et al., 1999).

Despite initial fragmentation, KM technologies are quickly evolving and converging, spurred by requirements of top global organisations, attention by consultants and integrators and efforts by pioneering vendors (Mantelmann, 1999). According to a survey done by Nerney (1997), about a quarter of US blue-chip companies used KM and that 70.0% planned to introduced it in 1998. Similarly, Skryme and Amydon (1997) did a survey on 430 European and North American companies revealed that one-third of them are developing programmes to improve their KM and 96.0% percent regarded customer knowledge as the most important asset for maintaining competitiveness. In addition, according to

Gartner Group findings for 1998, implementation of KMS has begun and is currently being deployed by most large companies. One third of Fortune's 1000 companies are now including knowledge management initiatives in their 1999 plans (Smalley-Bowen and Scannel, 1999).

Most knowledge applications have evolved from pre-existing types for managing documents, databases, workgroups and customers. Most explicit knowledge lives in documents, Web or PC files, paper or scanned images (McCampbell et al., 1999). The development of information and communications technology support the knowledge processes to a greater extent than previously. There are four types of technologies to be considered: databases; decision support tools and artificial intelligence; GroupWare including email and video conferencing; and intranets and extraneous (Armistead, 1999). Likewise as to the types of technologies implemented, a study done by KPMG in 1998 of 100 UK companies revealed that half of the 90.0% respondents, which implemented Internet access had KM in their minds. Two-third of respondents used document management systems, 46.0% percent with KM as primary focus and two-third of respondents used intranets; only 41.0% percent had KM as primary focus (KPMG, 1998).

In another study, it was found that the technology-centred KMS organisation in use today employ one or a combination of ten technologies: group-ware, messaging, web-browser, document management, search and retrieval, datamining, visualization, push technologies, group decision support and intelligent agents (Hibbard, 1997; Chaffey, 1998).

Although IT can be an excellent performing enabler in KM, Malhotra (2000) in his paper *Knowledge Management for E-Business Performance: Advancing Information Strategy to Internet Time* laid out some myths about KM technologies: -

- Knowledge management technologies can deliver the right information to the right person at the right. The new business model in the Information Age,

according to him requires business to adapt to the more flexible 'anticipation of surprises' model. Thus, it is impossible to build a system that can pre-define and predict who the right person, what is the right time and what constitutes the right information

- Knowledge management technologies can store human intelligence and experience. He mentioned that technologies such as databases and groupware applications can store bits and pixel of data, but they cannot store the rich schemas embedded in human minds that are used for making sense of bits and pixel
- Knowledge management technologies can distribute human intelligence. As mentioned, technologies cannot communicate the meaning embedded in complex data as it is constructed by human minds. In addition, technologies cannot be used for rich exchange between humans to make sense about bits and pixels

What is more important for organisations is to clearly understand the meaning of knowledge and the objective of employing IT in managing their existing knowledge reservoir to produce bottom line results. Davernport et al. (1998) survey of KM projects in 31 large US companies identified four dominant objectives for KM programmes:

- The creation of knowledge repositories;
- The improvement of knowledge access;
- The enhancement of knowledge environment; and
- The development of knowledge as corporate asset.

As far as the implementation of KMS is concerned, Skyrme and Amidon (1997) have suggested seven key success factors, which include a well-developed technology infrastructures, in their study of KMS in the range of organisations. Others are related to organisational business imperative, compelling vision and architecture, knowledge leadership, knowledge creating and sharing culture, a systematic organisational learning process and continuous learning.

IT is undoubtfully, an enabler for sharing, applying, validating and distributing of primarily, explicit knowledge. However, its problem emerges as organisations are trying to apply the same techniques to tacit knowledge. There is little that IT can support tacit knowledge, particularly it provides a channel of exchange and expedites the conversion processes from human brains to physical disks.

In implementing KMS, there is no best solution except to look at our own organisational requirements and try to match the KM architecture (Tiwana, 2000) elements. Initially, KMS architecture can be divided into:

- Repositories: Hold formal and informal knowledge and rules associated with them
- Collaborative Platforms: Support distributed network and incorporate pointers, skill databases, expert locators and informal communication channel
- Networks: Support communication and conversion
- Culture: Encourage sharing and use of the above

Above all, a clear vision and sound strategy of KMS is very important in ensuring effective implementation. The earlier mentioned study by KPMG further revealed that nearly half of UK's large companies are currently doing benchmarking while 40% are establishing formal KM network. On the other hand, 19% are developing or measuring intellectual capital as activities in the overall KM strategies (KPMG, 1998). And as far as implementation is concerned, most commonly it is championed by senior general managers (Alavi and Leidner, 1999).

As such, although IT may facilitate the processes involved in KM through effective implementation of KMS, the actual potential benefits would only be realised if organisations have the right environment and suitable infrastructures in place that enhances the creation, development, storage, transfer and dissemination of knowledge. In general, organisations will be able to fully benefit

from the implementation of KMS if all the three components namely knowledge, people and technology are properly combined to focus on the ultimate objective of having the systems in the organisations.

2.4 Benefits and Challenges of Knowledge Management System

At the level of organisations, benefits are perhaps potentially derived from different forms depending on the levels of management level i.e. strategic, tactical and operational. Wiig (1999) has listed down some organisational benefits of KM. Among others, he outlined the strategic benefits to organisation that increase competency to provide enterprise service paradigms and the ability to produce and deliver products and services with higher knowledge content than previously possible. The organisation will also develop a broadening capability to create and deliver new products and services and a greater capacity to deliver products and services to new markets.

Some of the tactical benefits Wiig mentioned for organisations include faster organisational and personal learning by better capture, retention, and use of innovations, new knowledge and knowledge from others and from external sources. In addition, knowledge workers will have effective possession of and access to relevant expertise in the form of operational knowledge that enables them to gain greater understanding of how individual goals coincide with the organisational goals.

Similarly, at the operational level, employees will have access to and be able to apply better knowledge at points-of-action for example training knowledge workers to operationalise abstract knowledge to match requirements with practical situations. Furthermore, operational areas will experience less rework and errors.

Other popular claims for the results of KMS include the ability of organisations to be flexible and respond more quickly to changing market conditions and the ability to be more innovative as well as improving decision making and productivity (Stata, 1997; Harris 1996).

As for the challenges of KMS implementation, Arthur (1994) suggested that the new world of knowledge-based business is characterised by a continuous redefinition of organisational goals, purposes and an organisation's "ways of doing things". This new business environment is characterised by radical and discontinuous changes, demands anticipatory responses from organisation members who need to carry out mandate of a faster cycle of knowledge creation and action based on this new knowledge. Thus, the realisation of KMS requires noticeable changes in the organisations, which influence the processes, procedures, and mindset of people but also include the changes to the workplace where there is an increased reliance on IT. As such, the major challenge to managing knowledge is not its creation but more its capture and integration (Grant, 1996; Davernport , 1997a).

2.5 Knowledge Management System (KMS) and K-Economy in Malaysia

Malaysia is progressing from a predominantly production-based economy to K-Economy. This industrial backbone currently contributes to more than 33 percent of its Gross Domestic Product (GDP) and provides 30 percent of all jobs. It worked well for a while but the advent of globalisation and liberalisation has necessitated the adoption of new technologies and ways of doing things. We need to acclimatise ourselves to the K-Economy (Malaysian Business, October 1 2000).

As we are moving to a knowledge-based economy, which emphasises on the importance of knowledge of the people, Malaysian researchers argue that knowledge is a necessity and can be used as a strategic tool against competitors (Naquiyuddin and Heong, 1992). The number of knowledge workers and new knowledge-based opportunities, according to Bontis et al., (2000), is expected to increase dramatically in the next few years. The concept of organisational knowledge as a valuable strategic asset has been popularised. As such, enterprise, which leverages its intellectual resources, can focus that power on critical challenges, fostering innovation and potentially altering its competitiveness (Narayanan et al., 2000).

There are three main aspects of a K-Economy that differentiate it from the previous P-Economy. Firstly, K-Economy focuses on knowledge as the driver of economic growth as it can increase the capacity of the other production factors and transform them into new products and services. Secondly, K-Economy stresses on both qualitative and quantitative changes that in order for organisation to compete, one needs to focus on the exploitation of intellectual capital, information advantage, a learning culture and agile organisation. Thirdly, firms in K-Economy focus on investments in intangibles such as human capital, research and development, customers database, brand names and reputation.

In the case of Malaysia, the ability to tap the vast opportunities provided by the knowledge revolution and the ability to shift will enable Malaysia to leapfrog from the industrial era to the post-industrial era that will ensure its competitiveness, which is deteriorating. According to the World Competitiveness Yearbooks 1994-1999, Malaysia is ranked at the 27th place in 1999 as compared to 17th in 1997 and 20th in 1998. (Refer to Appendix 1)

Moreover, the fact that there is currently a skill gap and shortage in Malaysia, it requires the Government, people and organisations to restructure if not enhance their businesses. For example, in 1997 Malaysia had only 10.7 percent of K-skills

workers out of its total workforce, which is the lowest among the Asia economies. (Refer to Appendix 2 for comparison between Malaysian and other economies)

The move to setup NITA and the development of MSC has then given birth to the emergence of a body that has steered the transformation of the society in the context of a turbulent world. The National Information Technology Council (NITC) has come into the picture acting as think-tank at the highest level to the Government. They also believe that information and knowledge would be the most valuable assets in the new millennium (NITC, 2000).

Nevertheless, NITC has also organised the Second Global Knowledge Conference in June 2000. This is an effort to explore the issues of building a knowledge society in the context of a borderless and Internetworked world among members' countries. It will also narrow the gaps between developed and developing countries in term of ICT. At the same time, a master plan, called the K-Economy master plan is being developed. This is to identify the future direction of Malaysia in response to the heating globalised, knowledge-based, innovative competition and business uncertainty of the world.

In a recently held conference on knowledge and the economy, it was highlighted that Malaysians must be prepared to do away with their existing assumptions about the economy and learn new ideas if Malaysia is to be successful in its quest to be a K-Economy (The Star, October 18 2000).

As KMS is just beginning to appear in organisations, little research and field data exists to guide the development and implementation of such system or to guide expectations of the potential benefits of such systems. There is however, an increasing interest to concept shown by different Government bodies, organisations and academic institutions in Malaysia.

A study of knowledge management system within Malaysian engineering companies (Narayanan et al., 2000) found that more than one third (34.3%) of these companies have between 0-50 employees, followed by 20.4% having >1000 employees. It further revealed that 79.6% of the respondents used e-mail to share expertise, 76.6% used technical libraries within the organisations and 66.4% used technical seminar/presentation within the company to share their knowledge. 65.0% of the respondents stated that costly mistakes could be avoided because employees lacked sufficient knowledge or expertise. It was also found that the major challenges faced by these organisations in creating knowledge-based organisation were changing people's behaviour (83.2%), retaining talented people (52.6%) and lack of time (51.8%) as opposed to the technological limitation, which is only 30.7%.