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**Building Organisationally Sensitive
Technological Solutions for Knowledge
Management in IT Support Services**

David Tonade

A dissertation submitted in partial fulfilment of the requirements of
Dublin Institute of Technology for the degree of
M.Sc. in Computing (Knowledge Management)

November 2008

I certify that this dissertation which I now submit for examination for the award of MSc in Computing (Knowledge Management), is entirely my own work and has not been taken from the work of others save and to the extent that such work has been cited and acknowledged within the text of my work.

This dissertation was prepared according to the regulations for postgraduate study of the Dublin Institute of Technology and has not been submitted in whole or part for an award in any other Institute or University.

The work reported on in this dissertation conforms to the principles and requirements of the Institute's guidelines for ethics in research.

Signed: _____

Date: *10th November 2008*

ABSTRACT

With the advent of the internet, information and communications technology has changed the way organisations operate and do business. There now exist an extremely dynamic and competitive business landscape, where information and knowledge are continuously created, used and distributed across business units. People have become more involved with the use of technology to aid them in their business tasks. In the course of generating and transmitting information comes the realization that knowledge is a vital asset of the company. Thus, most firms embark on various initiatives to enable Knowledge Management (KM).

This study revolves around the IT tools involved in the process of knowledge management across firms. These IT tools exist in a variety of forms and technologies that have been adapted by organisations to manage their knowledge and improve learning by their employees. As such, it has been found that organisational factors such as organisational culture and technical/IT infrastructure are strong indicators for the successful selection of IT knowledge management tools. Coupled with the belief that appropriately selected IT KM tools ensure the success of a knowledge management initiative, organisational factors are deemed to influence the selection of IT KM tools. Hence, this study established a direct relationship between organisational factors and the right selection of KM IT tools for knowledge management using a survey questionnaire responded by IT managers from firms who are currently engages in a KM initiative. The respondents are also currently using IT tools for KM and have identified enterprise portals as their primary tool for enabling knowledge management.

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1 INTRODUCTION

1.1 Overview of the Project Area

The goal of this research is to investigate the influence of organisational factors (e.g. organisation culture, knowledge, motivation, reward, and the use of IT etc.), on technologies which can be used to support knowledge management and to assess the actual or potential contribution the factors identified have on to the basic processes of knowledge creation and sharing within IT.

The issues of staff turnover and the crucial nature of keeping valuable information are but some of the reasons that rationalise the need for an effectual knowledge management strategy. As new knowledge management initiatives are being developed, the choice of IT applications are often planned and implemented without a careful assessment of the organisational context (e.g. social and culture issues, business environment and intensity of IT use) and as a result, fail to achieve the desired outcomes to take optimum benefit of knowledge available to the organisation.

It is worth noting that problems associated with knowledge management can typically not be solved by the deployment of a technology solution alone, according to Marwick (2001), but mainly by overcoming the greater issue of changing peoples behaviour. This does not by any means lower the role of technology in knowledge management initiatives as it helps to scale the big issue of barriers of time or space, which are important issues in a successful knowledge management strategy.

The provision of IT support in large business solutions provider necessarily involves interacting

with a variety of organisation involved in many different business areas, of different sizes, different levels of maturity in their IT infrastructures and different levels of experience in interacting with the products of the business solutions provider. As such the nature of IT support required differs significantly from customer to customer. Within an IT support centre it is important that the knowledge of the workers is shared and managed in such a way that they can provide the most appropriate service to each and every customer in an effective, cost-efficient manner while focusing on quality service. The research for this dissertation will start by investigating the organisational factors which influence knowledge management and the technologies available to support knowledge creation and sharing. It will then assess the influence these factors have on the IT support.

1.2 Background: Infrastructure Solutions

As Knowledge Management is a relatively new area in various industries, the difficulty arises for companies to rightly choose suitable support tools to manage knowledge in their organisation. The project will explore many possible ways of managing and leveraging value from intellectual assets by defining methods of identifying the best solution among various applications in the marketplace.

At the highest level, Prusak (1998) explained that KM pertains to all the necessary tools, practices, incentives and technologies associated with such to create, maintain and preserve knowledge and make it available to those who need to know it given a particular time. Thus, there is a certain flow of knowledge moving around from explicit to tacit and so on. According to Davenport and Prusak (1998) and Marwick (2001), the flow is present on both the individual and team levels. Usually, it starts off with solving a particular problem. This produces new knowledge, which is at first classified as tacit since it is not yet known. It undergoes a transformation to explicit once it is

documented already and made known usually after sharing through emails or put into databases. Upon being made explicit the resulting knowledge is then used to solve a new problem. Thus, the cycle goes on across the organisation. The entire cycle gives rise to a variety of interaction between human and technology as technology is the enabler for the efficient and effective management of knowledge.

The support of technology solution to management of knowledge, constitute an extremely dynamic domain. Research and development has been prolific and new products and applications burgeon in the market. There have been several attempts to give sense to this apparently chaotic arena, and some schemes for categorising technologies have been suggested (e.g. Binney, 2001; Luan & Serban, 2002; Tsui, 2003). These previous research falls into three categories in classifying knowledge management technologies.

The most common ones are composed of studies which adopt a knowledge management framework by identifying a set of major knowledge processes, and describe KM technologies according to the processes supported (Alavi & Leidner, 2001; Marwick, 2001; Nonaka, Reinmoller & Toyama, 2001; Awad & Ghaziri, 2004; Jashapara, 2004).

The second category take a market approach and look for commercially available solutions that support knowledge management, or for applications implemented in KM initiatives in organisational settings (Wenger, 2001; Luan & Serban, 2002; Lindvall, Rus & Sinha, 2003; Rao, 2005).

A third set of studies focuses on state-of-the-art technologies supporting knowledge management, and is mainly intended to map hot topics for research and development (Zdrahal, 2002; Kicin, 2002).

These studies and categorisations do not show clearly the link between KM technologies and organisational issues (e.g. social and cultural issues, motivation and alignment of resources, knowledge and IT infrastructural settings) they assume particular stances and lack generality and comprehensiveness.

1.3 Intellectual Challenge

Given these, this paper is set to create a clearer and more comprehensive relationship between the decisions to deploy the appropriate knowledge management technologies and the host of organisational factors. Also, the challenge is to create a more formal classification of KM technologies by discussing tools available in the KM strategy under in the context of tacit and explicit knowledge. Moreover, it is an imperative for the paper to also touch on the derived benefits from the use of various technological tools in knowledge management as well as the evaluation of the effectiveness of such.

1.4 Project Aims and Objectives

The objectives of the research are as follows:

- 1) To describe the IT tools used for knowledge management.
 - a) To determine the IT tools used by the respondents of the study.
 - b) To ascertain the length of time the IT tools are used.
 - c) To determine the reasons for adopting a KM initiative.
 - d) To identify the factors considered in selecting suitable IT tools for KM.
 - e) To determine the benefits derived from using IT KM tools evaluation of it tools for knowledge management in relation to the success of km as a strategy.
 - f) To determine the perceived dependence of IT Knowledge Management success on organisational factors.

- 2) To ascertain the importance of specific organisational factors in the selection of a KM initiative.
 - a) Organisational culture.
 - b) Management support or management's knowledge on KM tools.
 - c) Technical or IT culture.
 - d) Structure of an organisation.

- 3) To determine the utility of IT tools in creation, preservation and utilisation of explicit and tacit knowledge in the organisation.

1.5 Research Methodology

Both quantitative and qualitative research methodologies will be used for this research. These include the critical reflection on available scientific literatures relating to knowledge management, the tools available for KM and the underlying factors, with particular focused on organisational factors and the factors which influence the of the decision of firms when choosing technology to support knowledge management. Moreover, a qualitative analysis of the indicators to technologies that can capably sustain decisions and initiatives of organisations for knowledge management is carried out. From this analysis a set of key organisational factors which influence the choice of technology to support knowledge management creation and sharing are derived.

The emphasis of the research is the IT support provision in a large business solutions provider. A critical analysis of the literature relevant to knowledge management in IT support is undertaken. The set of organisational factors derived previously will be used to guide this analysis. Subsequently the technologies available to support knowledge management in IT support provision are assessed.

To assess the predictors of technological infrastructure needs relating to knowledge management for this product, a questionnaire based on the previous research was developed to ascertain what the organisational factors which should be considered when choosing technologies to provide IT support to a variety of organisations. Using the findings of this survey a proto-type tool-kit was developed, deployed and evaluated by the knowledge workers in the IT support centre.

Given this, the primary means of gathering data are research of scholarly and scientific journals

and related publications to the topic of KM and its relation to organisational factors. Data also included relevant online sources. Careful filtering of research materials will be employed to ensure that only relevant information is included in this dissertation.

1.6 Resources

The resources for this study include all academic, scientific and peer reviewed publications encompassing books, journals and online sources. Moreover, the questionnaires will be the sources of data for the assessment of the effectiveness of available KM tools; the identification of organisational factors influencing the proper selection of KM IT tools; establishment of relationship between KM IT tools and the identified organisational factors and the evaluation of the said organisational factors in the success of the KM initiative.

Personal research using an online database was the primary resource in searching for academic, scholarly and peer-reviewed materials. Moreover, statistical analysis is carried out from the responses obtained from the survey. The statistical results are the resources for the discussion and explanation of the results and the documentation of findings in this study.

1.7 Scope and Limitations

Given the various amounts of literature available in knowledge management, this study shall only focus on IT tools available for knowledge management. Moreover, data and information obtained is restricted to the acquired literatures. The discussion and results portion of this paper shall be based from both the review of literature and the quantitative analysis obtained from the responses

in the survey questionnaires.

The organisational factors explored and utilized in this research in the attempt to establish relationships with KM tools are based from the review of literature. The factors are limited and narrowed upon the evaluation of the author and then deployed in the questionnaire for the survey. The survey will test the validity of such factors in relation to the review of related literature.

2 KNOWLEDGE MANAGEMENT AND TOOLS

2.1 Introduction

The following sections presents all the pertinent concepts that have been gathered from secondary data sources, including books, journals, and online resources. Knowledge management and IT support are discussed in profound detail in the following sections.

2.2 Knowledge and Knowledge Management

Our current era has given birth to a knowledge economy where knowledge is of increasing importance to the success and survival of any business. Moreover, the way a company creates, captures, manages and preserves knowledge is seen by company executives as primary concern. With workers of the new age, as part of organisations with interests, known as ‘knowledge workers,’ the importance of knowledge is paramount as it is continuously shared, generated and accumulated across the enterprise. Hence, knowledge management is one of the strategic trends companies try to focus on to build and take care of the knowledge in their organisations.

It is vital to define what knowledge is in this respect. Nonaka and Takeuchi (1995) and Cabrera-Suarez, De Saa-Perez and Garcia-Almeida (2001) define knowledge as a relevant and actionable information drawn from experience and education. Moreover, Chirico (2008) explains that it comes from the minds of people and is transformed, shared and developed by one’s personal beliefs, values, experience and education.

Further exploration of knowledge leads us to a literary consensus of its two basic forms: *explicit* or pure knowledge and *tacit* or applied knowledge. Explicit or pure knowledge pertains to the actual

knowledge acquired through education. These encompass basic principles, concepts and beliefs demonstrable and verified through the years. Thus, this body of knowledge is easily replicated. Simple and relevant examples of these include the subjects that we take up in school. Meanwhile, tacit or applied knowledge refers more to the skills obtained from experience and hence are not easily captured and transferable as it is often considered unique to an individual. It basically results from the application of pure knowledge accumulated in time. In other words, explicit knowledge pertains to the information needed to carry out a particular task or skill. On the other hand, tacit knowledge is the ability or the way one carries out a specific task or activity because the individual has practiced it by either learning by observation or being involved in activities that do a particular task. (Chirico, 2008; Polanyi, 1967; Nonaka 1991; Nonaka & Takeuchi 1995).

Coming off from this clear distinction, companies have increasingly concerned themselves with both types. In particular, firms focus on how best to manage skills of tacit knowledge as it constitutes the more challenging aspect of knowledge. From this, knowledge management can be given several definitions and views. Mack, Ravin & Byrd (2001) describes knowledge management (KM) as encompassing the tools and methods for the capture, storage and dissemination of knowledge and expertise (skills) across communities. These communities include: corporate, scientific, academic and even government-based ones. Among these realms, it is particularly noteworthy to point out that the use of KM has never been more unprecedented than it is in the corporate setting where majority of technology and innovations are developed and utilized.

In an attempt to give a clearer definition to knowledge management, an article entitled, “Defining

knowledge management: Knowledge management or not knowledge management? That is the question” (2005) in the journal Strategic Decision draws from what Firestone and McElroy (2005) have thought of regarding genuine knowledge management. They tried on clarifying the commonly held belief the objective of KM is to ultimately improve the effectiveness of the workforce or an organisation or perhaps both. The authors argued that KM ultimately leads to an improvement in quality solutions by developing the knowledge processes of an organisation. KM has a direct influence on knowledge processes which are the ones driving knowledge outcomes.

Moreover the authors have contended that it is vital for knowledge to be distinguished from information as the latter may or may not produce the benefits sought. Linking knowledge to DNA, according to them, knowledge has been a tried and tested element and structure of information that enables the organisation or system that created it to survive and adapt. Building from this, true knowledge management, as a strategy for competitive advantage must fulfill a set of criteria to be considered as true KM. Firestone and McElroy (2005) proposed the following set of criteria:

- 1) There ought to be a recognition and efficient resolution of problems encountered in business processes aimed by the strategy. This points out the pragmatic nature or aspect of a knowledge management strategy; that is, if it does not help the organisation reach its ultimate strategic objectives, then the KM strategy is futile or is of little value.

- 2) There must be a clear recognition and identification of the differences of knowledge and information in the strategy. There should be a clear distinction between knowledge and information for the strategy to have optimised utility and purpose.

- 3) If the strategy targets to capture information which will eventually be used to solve problems discovered in business process, there should be an established standard for taking measures which could be used later on to determine the extent of contribution of the information in resolving the problem. Such standards will help in monitoring the effectiveness of the strategy, through clearly laid down key performance indicators which may be tracked across the deployment of the strategy.

- 4) It should aim to assess levels of knowledge, are there existing standards to measure the said levels together with their significance and success.

- 5) The strategy should aim to enhance individual or group learning, one of the eventual thrusts of a KM strategy is to enhance the learning within an organisation.

- 6) There should be an aim to improve knowledge management per se in the organisation, including standards for measuring corresponding issues such as problem recognition, crisis management, and resource allocation to bring knowledge management. The solutions to these issues must be put forth to maximise the impact of the KM strategy. In this sense, the approach shall be more holistic.

Therefore as a strategy, knowledge management employs a systematic way of arriving at choices and decisions. The proposed set of criteria is aimed at initially evaluating the success of a KM initiative to properly assess the perceived benefits and their successfully delivery to the organisation. The set of criteria is apparently focuses on setting measures on assessing the initiative before rolling it out as a strategy.

2.2 *Explicit and Tacit Knowledge in KM*

For ages humanity has found himself transmitting information and knowledge to generations. Familiar stories across history have attested that transfer of knowledge is possible through writings and word of mouth. More often than not, people have conventionally passed on knowledge by telling experiential stories, which reveal their thoughts and know-how. Moreover, historically speaking, explicit knowledge has existed and persisted through some form of documentation, written in some form through an area's language such as those found in Ancient Egypt, Babylon or Persia. Hansen, Nohria and Tierney (1999) has alluded to conventional means of transmitting knowledge saying that contemporary people nowadays utilise face-to-face encounters and more involved "hands-on" techniques to express and share their own know-how. This know-how is what has been referred to as tacit knowledge, the more difficult type to capture and share.

Smith (2001) through her study focused on identifying the role of tacit and explicit knowledge in the workplace recognizes the value of knowledge for organisational success and hence advocates that management openly and readily supports various efforts and activities for knowledge management such as the gathering, sorting or classifying, transforming and recording knowledge. The creativity of people is the primary asset here as knowledge comes from people's heads. In relation to this, Wagner and Sternberg (1987) have long since stressed the importance of obtaining and managing tacit knowledge as opposed to explicit signifying that it is one of the secrets to managerial success.

However, there is no denying that both explicit and tacit knowledge are vital organisational resources. Hence, organisations must strike a balance between the usages of the two as knowledge

coming from both types is considered the source of competitive advantage. Both types of knowledge should be addressed and given attention in any knowledge management effort of an organisation (Johanessen, Olaisen and Olsen, 2001).

With this Smith (2001) presented a table of the uses of tacit and explicit knowledge in the workplace (see Figure 1). The author conveniently categorized both into 10 categories on how they are expressed. These categories are: work process/practice, learn, teach, type of thinking, share knowledge, motivation, reward, relationships, technology and evaluation. More particularly, a distinction between explicit knowledge and tacit knowledge has been made. Explicit knowledge refers to the person's what the person knows (know-what) as documented while tacit knowledge pertains to the more elusive knowledge of a person that is accumulated through experiences and application (know-how).

Explicit knowledge – academic knowledge or “know-what” that is described in formal language, print or electronic media, often based on established work processes, use people-to-documents approach	Tacit knowledge – practical, action-oriented knowledge or “know-how” based on practice, acquired by personal experience, seldom expressed openly, often resembles intuition
<i>Work process</i> – organized tasks, routine, orchestrated, assumes a predictable environment, linear, reuse codified knowledge, create knowledge objects	<i>Work practice</i> – spontaneous, improvised, web-like, responds to a changing, unpredictable environment, channels individual expertise, creates knowledge
<i>Learn</i> – on the job, trial-and-error, self-directed in areas of greatest expertise, meet work goals and objectives set by organization	<i>Learn</i> – supervisor or team leader facilitates and reinforces openness and trust to increase sharing of knowledge and business judgment
<i>Teach</i> – trainer designed using syllabus, uses formats selected by organization, based on goals and needs of the organization, may be outsourced	<i>Teach</i> – one-on-one, mentor, internships, coach, on-the-job training, apprenticeships, competency based, brainstorm, people to people
<i>Type of thinking</i> – logical, based on facts, use proven methods, primarily convergent thinking	<i>Type of thinking</i> – creative, flexible, uncharted, leads to divergent thinking, develop insights
<i>Share knowledge</i> – extract knowledge from person, code, store and reuse as needed for customers, e-mail, electronic discussions, forums	<i>Share knowledge</i> – altruistic sharing, networking, face-to-face contact, videoconferencing, chatting, storytelling, personalize knowledge
<i>Motivation</i> – often based on need to perform to meet specific goals	<i>Motivation</i> – inspire through leadership, vision and frequent personal contact with employees
<i>Reward</i> – tied to business goals, competitive within workplace, compete for scarce rewards, may not be rewarded for information sharing	<i>Reward</i> – incorporate intrinsic or non-monetary motivators and rewards for sharing information directly, recognize creativity and innovation
<i>Relationships</i> – may be top-down from supervisor to subordinate or team leader to team members	<i>Relationships</i> – open, friendly, unstructured, based on open, spontaneous sharing of knowledge
<i>Technology</i> – related to job, based on availability and cost, invest heavily in IT to develop professional library with hierarchy of databases using existing knowledge	<i>Technology</i> – tool to select personalized information, facilitate conversations, exchange tacit knowledge, invest moderately in the framework of IT, enable people to find one another
<i>Evaluation</i> – based on tangible work accomplishments, not necessarily on creativity and knowledge sharing	<i>Evaluation</i> – based on demonstrated performance, ongoing, spontaneous evaluation

Figure 1: Uses of Explicit and Tacit Knowledge in the Workplace (Smith, 2001)

Moreover, Wagner and Sternberg (1987) provided classifications for tacit knowledge saying that it could be categorized in content, context and orientation. Usually, the usage of tacit knowledge is possible among different contexts and orientations. Its usage is usually dependent on the type of person and the situation the person is in. Content knowledge pertains to a personal level: how one manages one’s self and tasks including others. Meanwhile, context knowledge could be grouped into local or global. Orientation could either be pragmatic or ideal. A pragmatic orientation pertains to the knowledge of how feasible an idea is without regard to an ideal state or to its ideal quality. Meanwhile, the ideal one is the opposite emphasizing ideal conditions and quality of a goal or idea. An example could be a private reprimand executed instead of a public one.

Conventional patterns or movement from knowledge types exist in organisations. As knowledge is

created, utilised and shared a variety of what could be called transformations between knowledge types. Nonaka (1991) identified four basic patterns in the creation of knowledge on organisations.

(1) Tacit to tacit → this trend could be manifested and accomplished through learning by observation, imitation and practice. A certain kind of socialization occurs between a person and a particular way of doing things. Learning through mentors and peers within the organisation could be an example of this. As the pattern suggests, there is no explicit knowledge at this level.

(2) Explicit to explicit → this involves combining or merging two or more explicit knowledge to create a new one. Usually, this happens when one extracts and combines various data from different sources to create a report. The resulting outcome from two known explicit sources is also explicit.

(3) Tacit to explicit → this pattern is becoming more evident in organisations. Usually discussions occur about a particular issue, problem or product development. The proceedings from these talks are then recorded and put into a document like a manual. The recorded content is then used for the generation of new knowledge say for instance, a new product. In a nutshell, this pattern involves the process of manifesting what eludes manifestation or expression. Usually, a starting point for this pattern involves a vision or idea as to how a product, service or outcome should be ideally and from their work on the proceedings.

(4) Explicit to tacit → this pattern involves the interpretation of explicit knowledge by utilising a specific perspective of a person. The aim is for knowledge to be understood and absorbed by other

people. Thus, it involves the application of the unique tacit knowledge of a person to re-interpret, give new meaning or extend a particular idea. It is important to note, however, that for tacit knowledge to be created; a person must have expressed and imbibed it.

Looking at the patterns signified by Nonaka (1991), there is an apparent interplay between explicit and tacit knowledge. Throughout the organisation, the dynamics of tacit and explicit knowledge exists very evidently. Thus, the combination or interaction of both types is essential in the creation of new knowledge.

Considering the realities of both types of knowledge Smith (2001), cited that knowledge sharing is extremely important in an organisation for the efficient management of both knowledge types. Thus, a culture of trust, cooperation and willingness to contribute knowledge must be exercised throughout the organisations. Moreover, to strengthen this knowledge sharing culture, a reward system must be instituted to encourage individuals to collaborate, share and participate in the creation of new knowledge.

The importance of both explicit and tacit knowledge has been paramount in organisations. Jasimuddin, Klein and Connell (2005) believed that organisational knowledge is a continuum of both types: explicit and tacit. In their conceptual paper, “The Paradox of Using Tacit and Explicit Knowledge: Strategies to face dilemmas,” the authors presented and advocated a knowledge management strategy known as the “symbiosis strategy” focused on enabling the management of both types of knowledge for the ultimate objective of competitive advantage for the organisation. In the symbiosis strategy, the integration of personalisation and codification strategies in capturing

and creating both types of knowledge is made possible. This constitutes two sides and elements. One is that explicit knowledge is codified (recorded and kept) internally. On the other hand, the codes arising from the codification strategy is personalised and thus externally manifested as tacit. The adoption of this kind of view and strategy is believed to lead to an organisational culture wherein knowledge is easily copied and multiplied internally while maintaining a high level of difficulty for imitation by competitors.

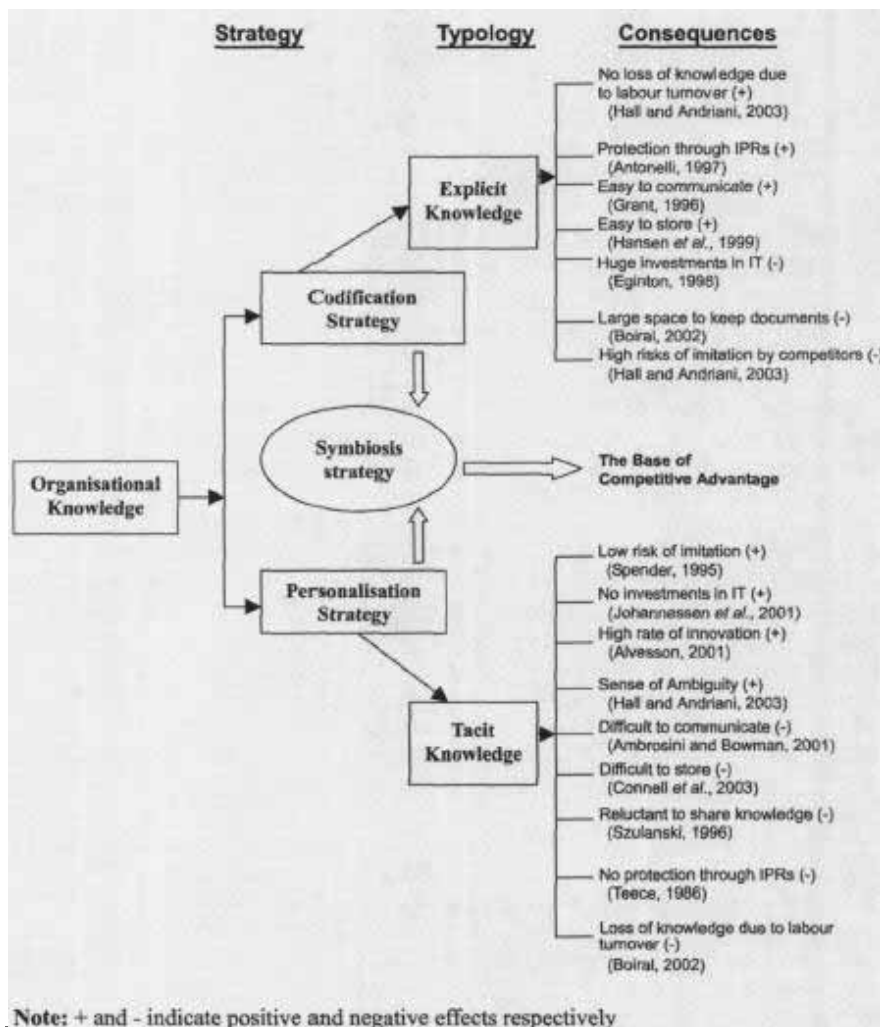


Figure 2: Implications/effects of the Different Knowledge Management Strategies With the Proposed Symbiosis Strategy at the Core (Jasimuddin et al 2005)

In relation to their proposed strategy, Jasimuddin, Klein and Connell (2005) gathered the different views of various authors in relation to explicit and tacit knowledge together with the corresponding strategies by default to each: the codification strategy for explicit knowledge and personalisation strategy for tacit knowledge. From these, they have devised a model featuring the positive and negative implications of the two conventional strategies with the proposed symbiosis strategy represented as leveraging on both (see Figure 2).

Figure 2 is based from a similar representation by Jasimuddin, Klein and Connell (2005) in Figure 3, which identified and collated the various features present in explicit and tacit knowledge. Both explicit and tacit knowledge were compared and contrasted using eight general features including: content, articulation, location, communication, media, storage, strategy and ownership.

Features	Tacit knowledge (i.e. skills and experience of employees)	Explicit knowledge (i.e. documents, codes, tools)
Content (Polanyi, 1967; Hu, 1995; Nonaka and Kanno, 1998)	Non-codified	Codified
Articulation (Spender, 1995)	Difficult	Easy
Location (Polanyi, 1958, 1967)	Human brains	Computers, artefacts
Communication (Ambrosini and Bowman, 2001)	Difficult	Easy
Media (Boje, 1991; Connell <i>et al.</i> , 2003; Johannessen <i>et al.</i> , 2001)	Face-to-face contact, storytelling	Information technology and other archives
Storage (Boiral, 2002; Connell <i>et al.</i> , 2003)	Difficult	Easy
Strategy (Hansen <i>et al.</i> , 1999)	Personalisation	Impersonalisation
Ownership	Organisation and its members	Organisation

Figure 3: The observable Features of Tacit and Explicit Knowledge (Jasimuddin et al, 2005).

Generally, explicit knowledge exists in codified form hence it is easily expressed, kept and transmitted. In opposition, tacit knowledge exists in an abstract and non-codified form making it difficult to be expressed and hence captured and thus requiring a more personalised strategy focused on face-to-face encounters and storytelling. Noteworthy to look at in Figure 3 is the

involvement of information technology for handling, storing and distributing explicit knowledge. This is in stark contrast to tacit knowledge, where the prevalent media for transmission of knowledge is through stories and face to face encounters. From this, it could be readily observed that in terms of information technology and tools available for knowledge management, the battle for capturing, preserving and distributing tacit knowledge remains to be a large gap area and thus also a huge opportunity area. The prevailing use of IT tools for knowledge management centres on explicit knowledge since it is the one easily coded and documented.

The proposed symbiosis strategy may be taken into account when designing and enabling technology tools specifically tailored to handle tacit knowledge. It is important to maximize the potential of both knowledge types and as such the implication of conversion may present a vital link to more effective tools for handling tacit knowledge.

2.3 Knowledge Management as a Strategy

It is important to understand KM in the context of it being a strategy employed by the firm to achieve a competitive advantage. Cohen and Levinthal (1990) explained that knowledge management is to be understood as a process of change and a means of renewing the organisation through the use of innovation in creating, sharing and applying new knowledge. Giving a more concrete definition of KM as a strategic tool, O'Dell and Grayson (1998), building on Prusak's principle, believed that KM is a strategy to be adopted by an organisation to ensure that knowledge is made available to the right people at the right time. Also, they underscored that as such, people should share that knowledge with the common aim of improving the functions of the organisation. This gave birth to the necessity for companies to assess the information and capabilities formed

and enabled and transform them to outcomes that would add value to the firm. This, in turn, enables a continuous learning process in the organisation. In line with this, Kogut and Zander (1992) noted that through the deployment of a KM strategy, the organisation's learning capability is enhanced and its ability to integrate other knowledge-based capabilities for better use is developed.

Seeing in a larger perspective the KM strategy is a continuum. It is a continuous cycle of processes which could be called the '*KM cycle*.' Its implementation cycle span the creation, storage, distribution and application of knowledge. Hence, with the goal of creating new knowledge, the cycle and the strategy is closely related to the idea of innovation. The process of knowledge of creation provides an important point for innovation as it signals the use of tacit knowledge and of intelligence. There exists interplay of knowledge and information through the interaction of actions and behaviours. (Forcadell and Guadamillas, 2002).

From this, Soo, Midgley and Devinney (1999) also noted a number of important considerations in the process of knowledge creation such as: the internal knowledge base of the organisation; the role of external sources in the acquisition of information and knowledge; the integration of both internal and external knowledge and how it is applied to the solving of problems; the creation of knowledge and the corresponding innovation brought about by such and of course the ability of the organisation to absorb new knowledge and hence its ability to learn.

Indeed, knowledge management exists with the aim of preventing redundancies of knowledge-based activities. (Arora, 2002). Hence, it is implied that with the reduction in redundancies,

efficiencies will be achieved and leading to some financial benefit or value.

From what we have so far, KM as a strategy and a process for continuous improvement and innovation is related to a number of organisational factors most notably the ability of the organisation and its members to learn and absorb such knowledge for effective utilisation and application. Yet apart from these, it is also important to note what the available tools are for the implementation of such strategies. After highlighting innovation as part of the KM process and life cycle, technology comes inevitably. With the increasing role of information technology and the various technologies that have sprung as a result of the internet revolution, there have been numerous ways from which firms can choose from in applying technologies for their knowledge management decisions.

2.4 Organisational Factors in a KM strategy

Indeed, organisations have been aware that their true assets are their people. It is from people where knowledge is created, managed, shared and transmitted. Thus, the idea of considering people as the firm's most valuable asset is not a novelty. The focus on the individual and his or her knowledge underlies the need for the implementation of knowledge management in today's knowledge-based economy. Moreover, especially for companies that are considered technical, know-how is extremely important as it is what drives the individual to progress in such technology-intensive and analytical environments.

While, it is a given that people drive the need for the adoption of a knowledge management initiative, there are still several indicators playing crucial roles in influencing the need for

knowledge management. Twietmeyer, Lyth, Mallak & Aller (2008) utilized the term knowledge measurement or intellectual capital measurement as a necessity in today's knowledge-based economy. Largely, such a necessity is driven by monetary or financial value. Knowledge makes up the intangible assets of the company. Hence its value makes up a significant part of a firm's assets as a whole.

Given this, the classic problem of knowledge management arises. As mentioned a while ago, the more valuable knowledge is the tacit one and it is every firm's desire to capture, preserve and transmit that tacit knowledge. In short, the need to make explicit what is currently tacit knowledge. (Erikson, GS, Rothberg, HN and Wuerz, 2002).

Moffett, McAdam and Parkinson (2003) believe that there are two components in knowledge management: people and technology. With this, there exists an interrelation between cultural (where people is a part of) and technical (where technology is a part of). As such, they have identified and proposed four key factors to be considered in knowledge management:

(1) Macro or external environment. This could be an organisational factor outside of the organisation but nonetheless directly influencing the organisation's core and operations. This presupposes that organisations exist freely and openly and as such subjects to the influences of their external environment. Building from this, the internal stability and operations of a firm are affected by changes in the external environment which could be brought about by legislative changes, market economy, competition, mergers, takeovers, acquisitions and pressure groups. Thus, there is a need for continuous change to adapt to the changing and more dynamic times. KM

provides a paradigm for such and hence any KM initiative must consider and must be able to respond to the pressures exerted by the external environment. What must be understood in this context is that KM advocates and enables collaborative training, working and communicating. These could spell an organisational change and thus needs to be managed accordingly.

(2) Organisational Culture. The overall culture of an organisation inclusive of the behaviours and attitudes of its workforce make up this factor. Building from the point early on about the importance of the human person in organisational performance and knowledge management, Handy (1989) and Peters and Waterman (1982) affirm the vital role humans, as components of culture, play in achieving an effective business performance and implementing an effective change management. They emphasized that changing people's attitudes is a must should anyone plan on overhauling an organisation such as when introducing a knowledge management tool or initiative. Moreover, a twofold classification of culture is seen relevant to point out the impact of organisational culture in knowledge management. Smircich (1993) cites that culture is both what an organisation has and what an organisation is. Applying this to KM, a firm could adopt a knowledge culture and at the same time can be a knowledge organisation. Knowledge culture, in this sense, is expressed in KM through its various tools, methods and processes. Meanwhile, the second part of the application that is the being a knowledge organisation shall follow once a firm has already adopted a knowledge culture. This would only be made possible once people have the mindset of creating, sharing and developing knowledge.

(3) People. While it may seem as an overlap with the organisational culture aspect, it is still important to separate people or employees in this respect as they are the subjects and actors of a

KM initiative. With the advent of knowledge workers, the role of people in shaping and implementing a sound KM initiative is virtually unprecedented. An employee's attitudes, beliefs and overall mindset will determine the success of a KM initiative. It is through projects that KM is implemented and teams comprise this. As such, proper and effective communication with the KM team is essential for the successful transmission and dissemination and sharing of knowledge. Moreover, proper and effective communication must also be encouraged among organisational members as this paves the way for the sharing and transfer of knowledge.

(4) Technology. This is rather self-explanatory. Simply put by Davenport and Prusak (1998) technology is another key element that is viewed as both contributor and enabler of KM. As such, with the increasing complexity of technology, the management of knowledge has become systematic together with the development of information and communications technology (ICT).

Davis (1994), Abecker, Decker, Hinkelmann and Reiner (1987), Sprague and Watson (1996) and Peppard (1993) outlined the evolution of technology in the context of knowledge management identifying three phases as: mainframe, personal computer (PC) and networking. Among these phases, today we see the prevalence of the realm of networking as barriers of time and space are shattered due to the development and use of supporting technologies for knowledge sharing and collaboration.

Given these, we see the role of information technology in the context of knowledge management as making information accessible to whoever needs it. It is in this context that information technology and the tools that are available become the natural medium of the flow of knowledge in organisations.

Moreover, as Davenport and Prusak (1998) warned, technology in itself will not enable the adoption of a knowledge culture. Rather, it is the effective implementation of a well-designed and uniform technical infrastructure for KM that can harness and overcome the challenges of organisational development such as information processing capabilities, discovery of knowledge, project collaboration, and quick decision making within the enterprise thus leading to a cultural overhaul and change. It is in this sense that culture plays a key role in the selection and implementation of a specific technological tool for knowledge management.

2.5 *Knowledge Management Tools*

Mack, Ravin & Byrd (2001) provides an extensive discussion and exploration of various IT KM tools pioneered and utilized by IBM Global Services. An example of a huge virtually catch-all technology discussed was portals. The authors were keen on tracing the origins of the said technology as starting from a web-based application, which provides a single-point of access to a variety of information distributed in an online medium. This includes but is not limited to specific documents resulting from search, news channels or other links to other websites. With the significant increase of information available in organisations, portals have become information portals which allow the search to larger volumes of information organised into schemes and taxonomies. However, a more appropriate term for the context of our study is knowledge portals.

Simply put, knowledge portals are wide-based platforms that support the vast array of tasks by a knowledge worker. It works under the premise of having a unified view of the tasks and processes. In a nutshell, the process of utilising knowledge portals is summarized as: (1) the knowledge

worker collects information relevant to a specific task, (2) he then organises it, (3) performs search; (4) analyzes it; (5) formulate solutions to achieve goals of the tasks and (6) disseminate and share the information to other knowledge workers. IBM captured examples of work tasks together (see Figure 1) with the corresponding technologies supporting each. The breakdown and enumeration of tasks and supporting technologies within the IBM portal is based from the business and activities of a consultant as the knowledge worker.

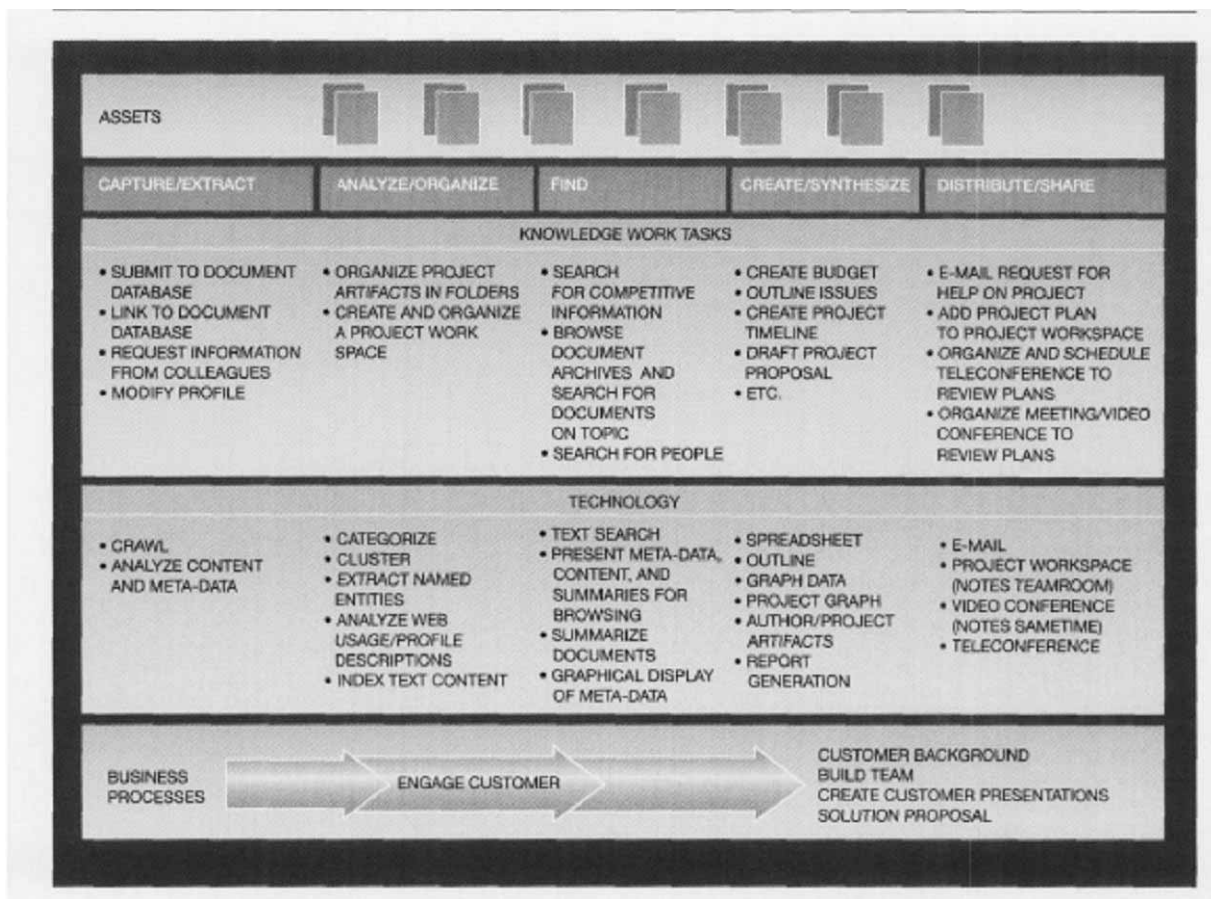


Figure 4: Examples of knowledge workers tasks together with supporting technologies (Source: Mack, Ravin, Byrd (2001))

Looking at *Figure 4* it is noticeable that the knowledge work tasks and the supporting technologies are divided into five groupings namely: (1) capture and extract; (2) analyze/organise; (3) find; (4) create and synthesize and (5) Distribute/Share. These five clusters signify the KM process.

Moreover, the knowledge work tasks constitute the IBM business processes from engaging the customer (finding data about him), to analyzing data up to creating solutions and presentations for the customer.

Meanwhile, focusing on the technologies available for knowledge management, we would see that the portal is a point of convergence of various technologies. These technologies enable the searching, gathering, analyzing and presenting the data. Thus, these technologies are embedded within the portal or are integrated with the knowledge portal. Examples of these technologies include the storage of metadata or base information, search engines, spreadsheet programs, report generators and data graphing and presentations as well as e-mails, project workspace, videoconferencing and emails. Thus, portals provide an avenue for utilising various technologies in the creation, management, storage and distribution of knowledge and information across the organisation.

A closer look at the technologies in portal is seen in *Figures 6 and 7*.

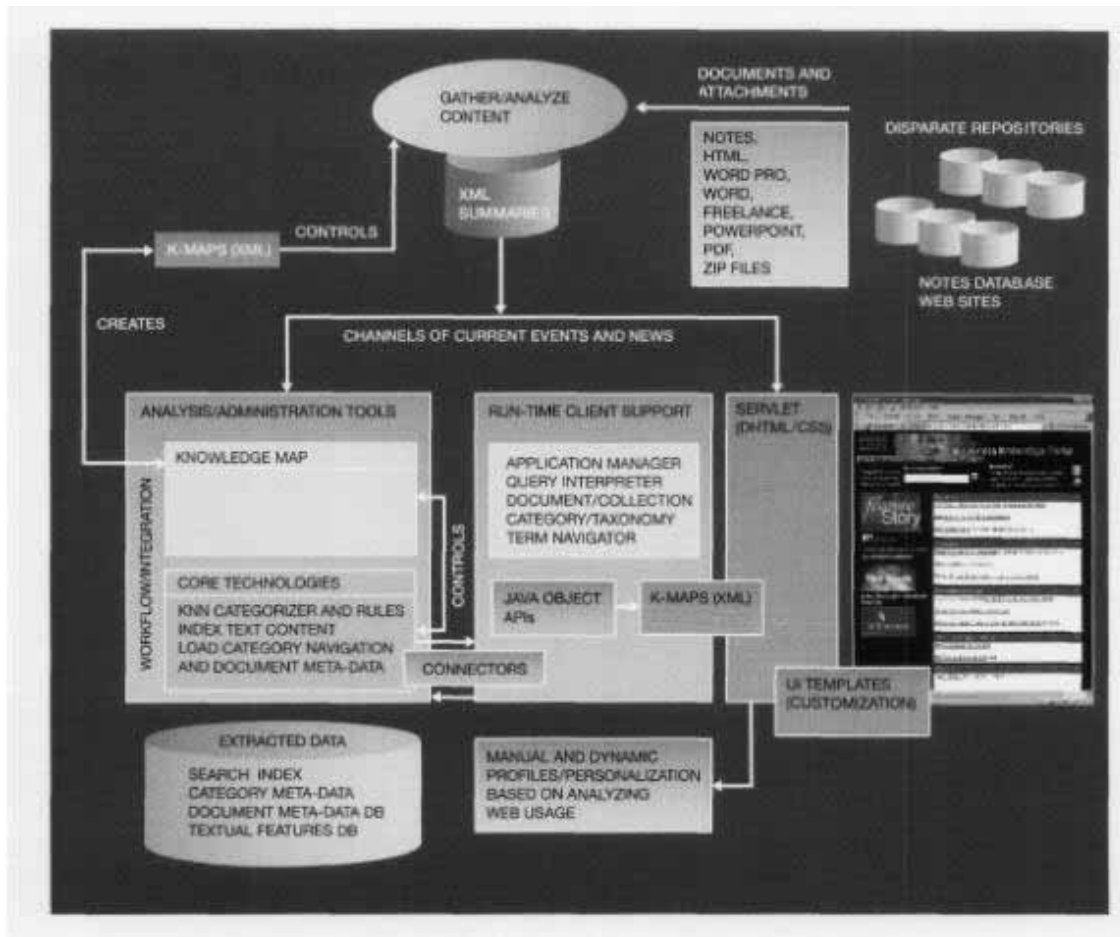


Figure 5: Technology architecture for the example knowledge portal from the gathering of document information, to indexing and categorization and the generation of web pages. (Mack, Ravin, Byrd, 2001)

If we look into the diagram, we could see that documents in various formats are stored in disparate repositories. The meta-data are thus stored in multiple repositories and databases. From here, data is gathered or collected in a process known as crawling. The data is extracted is presented in an xml format. In this format, information is readily made available for analysis and indexing. The meta-data from xml are then loaded to the relational database tables including their categories. The text from the data is then indexed and the documents are automatically categorized and made available through search. A user interface is needed for the client (whoever will use the information) and are displayed accordingly. User profiles are created to identify users and their

content.

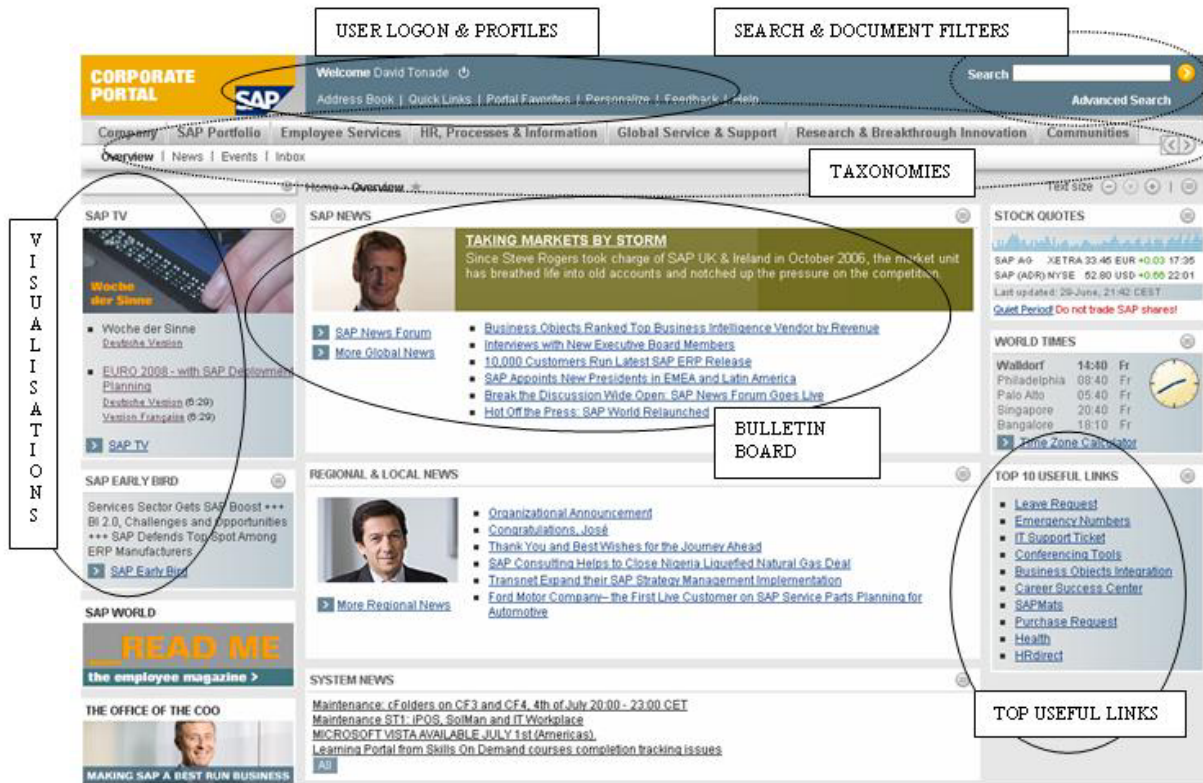


Figure 6: Snapshot of SAP knowledge portal homepage labelled accordingly to show bulletin board, search input fields, frequently accessed documents and links to other taxonomies. (SAP Corporate portal)

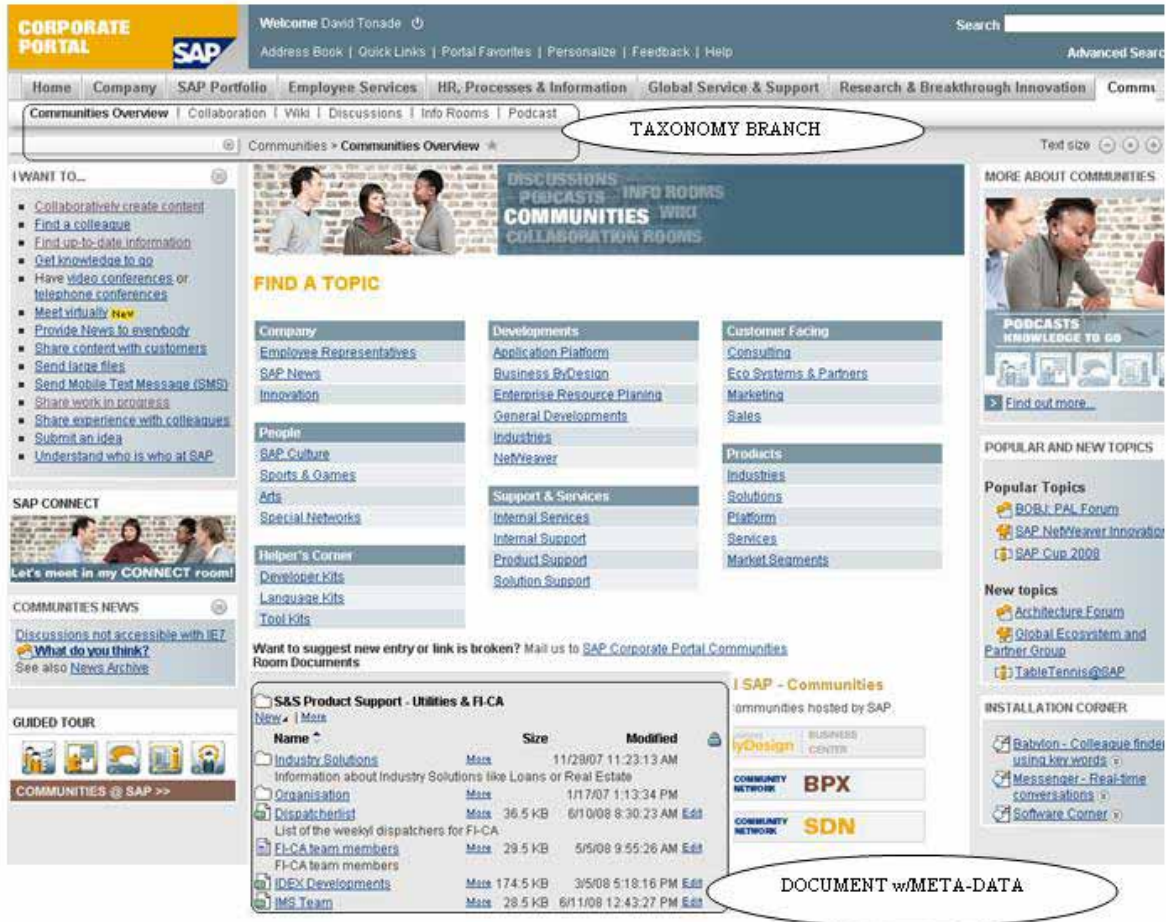


Figure 7: Another snapshot of the knowledge portal showing a branch of taxonomy together with the classification of documents and meta-data. (Source: SAP Corporate Portal)

Looking specifically to the technologies available in knowledge portals for this particular example, we should look into the technology architecture of the portal. Figure 5 depicts such architecture.

Apart from the existence of knowledge portals, knowledge management IT tools has gone a long way to deliver benefits in various areas of the organisation. Most often, a knowledge management strategy is tied up with a suite of KM IT tools that support business functions and as well as the knowledge management processes employed by an organisation.

A particular example of this suite is by SAP, a company considered to be one of the most established, and revered international providers of business software. The company is headquartered in Waldorf, Germany and operates in the EMEA, Americas the Asia Pacific region. Its employs more that 50,000 staff globally with 47,800 companies running SAP software across 25 industries. Its software suite had earned the 'Knowledge-Centered Support (KCSsm) Verified' Certification signifying that the modules within the suite are in sync with the industry best practices and meet the standards for service improvement in Knowledge Management.

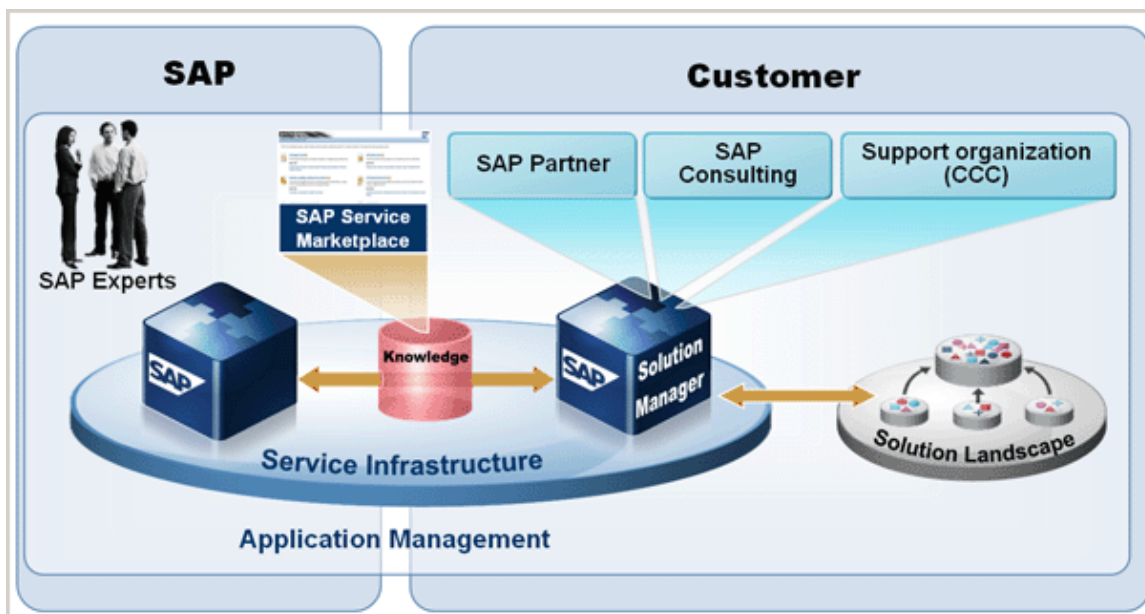


Figure 8: SAP Service and Support Infrastructure Strategy (Source SAP Solution Manager)

SAP provides comprehensive services and professional consulting for companies that use SAP Solutions already or plan to do so in the future. This covers all requirements and industries. SAP's support infrastructure is key prerequisite for an efficient delivery of services. It consists of SAP Service Marketplace, operated by SAP, and SAP Solution Manager, embedded in the customers' system landscape. This infrastructure enables optimal collaboration between customers, their service partners, and SAP.

SAP Service Market place divided into multiple portals tailored to meet the needs of specific interest groups. It provides a central point of access to SAP's entire portfolio via the Internet. Users have direct access to the information and can utilize support processes. In addition, the SAP Service Marketplace serves as technological platform that connects the SAP Solution Manager with SAP.

SAP Support Portal provide comprehensive knowledge transfer regarding topics related to SAP applications and services, solutions for known problems in a central database - SAP Notes, and reporting of problems to SAP support if SAP Notes don't provide a suitable solution. Also it provide maintenance of system data to accelerate and to improve the quality of SAP Notes searches, creation of support messages, problem resolution by SAP Support and download of support packages out of the SAP Software Distribution Center.

The SAP Support Portal knows about the SAP applications deployed by a customer. However, more detailed information is available in the SAP Solution Manager embedded in the customer solution. For example, this includes knowledge regarding how the SAP applications are integrated in the customer solution or which business process is supported by which component. With this additional information, functions of the SAP Support Portal can be enhanced customer-individually in SAP Solution Manager.



Figure 9: SAP Services, End to End Lifecycle. (Source SAP documentation)

In addition, customers have access to more functionality as SAP Solution Manager filters SAP Notes and software corrections such that only those objects are displayed that are relevant for the customer solution. SAP Solution Manager contains a complete Service Desk that enables the support organisations of SAP customers to run the complete process of message processing in an integrated way. This includes creation of messages by a user, root-cause analysis, search for a solution, if necessary, forwarding the message to SAP support, and finally the deployment of the solution.

2.6 *Impact of Organisational Factors in a KM Strategy*

The implementation of a knowledge management initiative is viewed as an organisational change as the application of tools especially that of IT in nature involves subscribing to technologies that necessitate changes in people's attitudes and behaviours. As all organisational changes, the views, feelings and attitudes of the targeted employees or organisation members who will be impacted play a crucial role for the success of the initiative. The study of Washington and Hacker (2005) explored the question why organisational change fails. They have identified that people's attitudes and feelings toward change specifically that of the managers is crucial to achieving less resistance to change and hence ensuring a more successful change program. This suggests that at the outset, organisational elements are at the forefront of any organisational change.

The employees' view on the planned organisational change could be considered as largely personal. This view constitutes the experiences and knowledge of the individual employee as well as his or her interaction with others. (Lowstedt, 1993). Given this, the willingness of an employee to change or to welcome the planned change is dependent on how useful, relevant and timely the information one receives (Miller, Johnson, Grau, 1994). Looking into these suppositions, the success of knowledge management might very well depend on the employees' understanding and knowledge on the initiative and the changes that it might effect. The changes mentioned here cover largely the organisational factors. Failing to consider these factors might very well be the cause for the roughly 70% failure rate of new change programs such as re-engineering, introduction of new technology or changing culture according to Hammer and Champy (1993) and Beer and Nohria (2000).

Since adopting knowledge management is considered as an organisational change, the impact of organisational factors should never be neglected. In particular, organisational culture plays a major role in influencing the deployment and implementation of knowledge management using IT. The said organisational culture encompasses a lot of aspects mostly relevant to people's attitudes and behaviours in relation to knowledge and its transfer.

The transfer of knowledge is undoubtedly an important aspect of knowledge management. For transfer of knowledge to be successful, a certain level of willingness in a group or individual must be exercised. That is the willingness to work with others to be able to share knowledge recognizing that it is for their own benefit and advantage. Since knowledge is transmitted not only among or between individuals, but also from groups or teams to individuals, among teams and vice versa, Goh (2002, p. 25) stressed an evident cooperative behaviour is a prerequisite for individual employees, teams and workgroups to successfully transfer knowledge. Without this cooperative behaviour, knowledge transfer will be impossibility. Hence, the value of people and their people reflect the significance of organisational factors specifically changing people's behaviour and enabling the change of knowledge by the people's behaviour.

Realizing that the basic hurdle brought about by organisational culture is the hoarding of knowledge or the challenge of convincing and motivating people to share their knowledge, Twietmeyer et al. (2008) identified three inherent factors under organisational culture that works for the implementation of a knowledge management system in an organisation. These are:

- (1) The firm's rewards and compensation culture. Due to the increasing complexity of knowledge

in a dynamic organisation, teamwork and collaboration is highly valued and encouraged to enable the easy sharing and transfer of knowledge. Working well with this is an appropriate rewards system consisting of bonuses depending on the company's return on investment (ROI).

(2) History of innovation and the value given to knowledge. It is previously discussed that knowledge breeds innovation as that knowledge is re-applied time and time again. An organisation exhibiting or valuing innovation implies putting the same emphasis on knowledge. Hence, a company with a history and culture of innovation is more likely to adapt to a knowledge management system.

(3) Layout of the engineering department. Since the authors' subject focuses on the engineering department, it is normal to include it in the list of criteria. Nonetheless, what the authors were driving at is the IT or applications development group of the company, the one responsible for mapping and establishing technologies. Because this group is directly interfacing with other groups within the organisation, it plays a significant role in enabling knowledge transfer through the use of technology.

Meanwhile, Davenport and Prusak (1998) also underscored the importance of organisational culture citing the political forces of an organisation as one of its most powerful components. Hence knowledge maps or how knowledge is to be captured and transferred must be clear and known for knowledge management to work.

2.7 Conclusion

The review of related literature began by pointing out the importance of knowledge and knowledge management in this modern age of information. The distinction between explicit and tacit knowledge has clearly been laid out. Firestone and Mcelroy's (2007) criteria for identifying authentic KM has been presented. Smith (2001) discussed the role of tacit and explicit knowledge and presented the uses of tacit and explicit knowledge in the workplace. Moreover, Wagner and Sternberg (1987) provided classifications for tacit knowledge saying that it could be categorized in content, context and orientation.

Nonaka (1991) identified four basic patterns in the creation of knowledge on organisations: tacit to tacit; explicit to explicit; tacit to explicit; and explicit to tacit. Jasimuddin, Klein and Connell (2005) devised a model summarising the implications of the use of explicit and tacit knowledge. In addition, Cohen and Levinthal (1990) explained that knowledge management is to be understood as a process of change and a means of renewing the organisation through the use of innovation in creating, sharing and applying new knowledge.

KM has been discussed as a strategy and a process for continuous improvement and innovation is related to a number of organisational factors most notably the ability of the organisation and its members to learn and absorb such knowledge for effective utilisation and application. Yet apart from these, it is also important to note what the available tools are for the implementation of such strategies. After highlighting innovation as part of the KM process and life cycle, technology comes inevitably.

3 IT SUPPORT SERVICE

3.1 Introduction

With the increasing role of information technology and the various technologies that have sprung as a result of the internet revolution, there have been numerous ways from which firms can choose from in applying technologies for their knowledge management decisions. This chapter presents a short review of IT Support and how organizational factors affects the choice of tools to be deployed to achieve knowledge management strategy within IT Support services.

The chapter is structured as follows. It begins with review of IT Support roles, units and types of supports. Followed by a section pointing at influences of organization on IT Support. Then, another section aiming at identifying knowledge to be managed in IT Support. The last two sections dealt with Knowledge management tools in IT Support and mapping of types of Support tools and organization types.

3.2 IT Support (role, types of support units, types of supports)

Today's internet age has spawned new ways of collaborating, integrating and executing business processes. As with every organisation in this day and age, technology remains to be at the forefront of driving and enabling the execution of business processes to meet today's demands. These businesses processes operate within and across organisations oftentimes in a global scale as the different organisational business units of a firm are scattered all over the world. Given these, the successful marriage of meeting business demands and the implementation of technology specifically IT, is important to every organisation.

IT support has evolved through time through its aiding of business processes. This evolution has been sparked by a variety of perspectives and movements such as: business process re-engineering (BPR), computer supported cooperative work (CSCW) and workflow management (Wetzel and Klischewski, 2004). BPR advocated the radical change in business processes to address gaps and meet increasing demands. Meanwhile, CSCW pushed for providing workers with computerized tools and argued for situated and tacit ways of working. As for workflow management, it advocated the technical feasibility of enabling the automation of business processes and the integration of applications systems. Because of these approaches, IT support has gone to new levels as the modes of services delivery increased in complexity through the years.

Hence in this sense, Wetzel and Klischewski (2004) discussed support in terms of the technical perspective saying that it is defined as the means to enable the often decentralized process execution across heterogeneous workflow or enterprise systems. As such, IT support should enable the delivery of services in a flexible and configurable manner, provide flexible adjustment of different providers, and extend opportunities for caring and addressing customer concerns while not neglecting different areas of customer satisfaction.

In the oftentimes decentralized working model for companies in the world, IT support means two things: integration and cooperation to efficiently carry out business processes and meet customer demands.

The decentralized model of companies is very evident in how multi-unit organisations, which span

the world, collaborate and operate as a whole despite obvious geographic and time barriers. Faced with increasing competition, organisations strive to maintain integrated operations through virtual technologies that provide IT support services. Malhotra and Majchrzak (2004) did a study on what they call “far-flung teams,” which pertain to virtual teams that are geographically distributed, where knowledge workers are cross-functional but are working on related and interdependent tasks. The level of complexity is heavy for these far-flung teams and as such the level of innovation and technological presence is also high. Since these teams operate usually using electronic media, the ways in which knowledge through a dispersed workforce provides good insight into the different types of IT support together with their impact in the success of knowledge sharing and ultimately knowledge management.

The authors have evaluated the four distinct types of IT support evident from this far-flung team model and assessed their impact. The said four types are as follows:

(1) IT support for task coordination: This pertains to technologies that enable people to be informed of the progress of tasks. This also refers to technologies that keep everyone informed of what everyone is doing and in terms of the team, the overall progress attained.

(2) IT support for external connectivity. This refers to technologies that enable one to connect to others external to one’s workplace using an electronic medium. Frequently, knowledge workers in distributed organisations, ask for assistance to other people by using calls. This includes directories and networks of who is appropriate for a particular task or subject area. Thus, in the main, networks and directories constitute this type.

(3) IT support for distributed cognition. This includes technologies that enable the sharing and integration of divergent perspectives, which are natural components of organisations these days. By distributed cognition, we mean the examination of each other’s assumptions or ideas through the solicitation and extension of feedback and as such creating alternative representations and meanings. Given this, IT tools in this type should enable the team members to share and retrieve varying perspectives synchronously or asynchronously and also allow the capture of knowledge as it changes and evolves through the development of interpretations.

(4) IT support for interactivity. Interaction is vital for the successful collaboration and of teams in large multi-unit organisations. These include technologies that permit synchronous interaction using tools such as: electronic white boards,

From these types of IT support, Malhotra and Majchrzak (2004) suggest that the kind of IT support to be deployed is dependent on the kind or nature of the task, the composition of team members.

Figure 10 below shows this.

<i>Task outineness</i>	<i>Team composition</i>		<i>Information technology support required</i>
	<i>Low heterogeneity</i>	<i>High heterogeneity</i>	
Routine	Efficient knowledge exchange between team members (e.g. regional customer service team)	Merge diverse perspective within team as needed (e.g. global customer service team; global IT support service team)	Technology support for task coordination (for efficiency)
Non-routine	External knowledge exchange to develop new perspectives (e.g. IT infrastructure team; sales improvement team; single function new product development team)	Merge diverse perspective within team as needed (e.g. global multi-company new product development team)	Technology support for interactivity (for collaboration)
Information technology support required	Technology support for external connectivity (locus of new ideas outside the team)	Technology support for distributed cognition (locus of new ideas within the team)	

Figure 10: IT Support Required for the Creation of Knowledge (Malhotra and Majchrzak, 2004)

Each task performed by an organisation could be classified as routine and non-routine. Moreover, teams are either have high diversity (high heterogeneity) or low diversity (low heterogeneity). For routine tasks regardless of the kind of team composition, the technology support is focused on coordination. This is evident in the roles outlined in the table. For a team with low heterogeneity and performing routine tasks, the regional customer service team role is an example, where efficient knowledge exchange among team members in the region (thus less diverse) is needed. Similarly, for highly diverse teams doing routinary tasks such as the global customer service team and global IT support team, IT support for coordination is required.

Meanwhile, for teams with non-routinary tasks, the IT support needed is for interactivity as interaction is required for tasks that continuously generate knowledge from people. For teams with low diversity and perform non-routine tasks, exchange of knowledge from the outside is paramount and hence examples of these include the IT infrastructure team, sales improvement team and single function new product development team. For teams with high diversity, such as the global multi-company new product development team combining diverse perspectives within the team is necessary.

Looking at another perspective, regardless of the types of task, if we look into the nature of composition of the teams, less diverse teams need IT support for external connectivity since the focus in on ideas outside the team. Meanwhile, for highly diverse teams, technology support for distributed cognition is key as the focus is on ideas within the team.

3.3 Influence of Organisation on IT support

Organisations play a major role in deciding which IT support tools for KM are to be used and

deployed. Kautz and Thaysen (2001) studied the utilization of knowledge through IT support technologies in a software company. Basically, the problem of the company is how best to present 20,000 warehouse items on a small 14” screen in a systematic and fast way. It has found that the different types of knowledge (theoretical, practical, social, explicit, tacit, individual and collective) are interdependent and closely related to the learning processes of a person individually or in a group. These are also related to the knowledge processes identified such as: acquisition/construction, distribution/organisation, storage/memory and interpretation/application. The appropriate IT support tools are vital in the sense that it is influenced by the aforementioned components. The company studied employs an organisational culture characterized by openness, trust, mutual respect, and commitment to intention, autonomy and fluctuation. The organisation also practices continuous dialogue and involvement due its conducive structures. Organisation members generally employ and exhibit these attitudes. As such, the organisational settings helped the company to support its IT-based environment and led to the success of the IT support.

From this, the culture of the organisation and its settings influence the success of IT support tools for KM. Given these, it is also important to identify what drives an organisation to develop a knowledge management initiative as this provides insight on the role of the organisation on IT support.

3.4 Knowledge to be Managed in IT Support

The knowledge management systems specifically for IT support both explicit and tacit knowledge. In their study on help desks, Gonzalez, Giachetti, and Ramirez (2005) expressed that knowledge is organised according to taxonomy of problem scope, product and feature. Such classification is

context-specific to the help desk and is dependent on how the agent perceives the domain he or she is operating on. The problem scope describes the type of problem if it is related to hardware, software or network. Meanwhile, product pertains to the actual product the problem is encountered from. The feature is a feature of the product that causes the problem. These types of knowledge are logged in and documented and includes mostly explicit knowledge from the clients. The resolution implemented by the agents in every scenario represents the form of tacit knowledge captured and made explicit through recording. The new knowledge applied by agents to address a specific problem came from the variety of sources such as their own documentations, other agents and repositories of data and documents as well as through the internet.

Meanwhile, Halverson, Erickson and Ackerman (2004), which also studied help desks particularly the FAQ process, gives insight on what knowledge is captured and maintained in IT support. The authors focused their study on the services division of Gamma Corporation (not true name) and its help desk known as the Technical Engagement Helpdesk. In line with the TE help, a FAQ Process was formulated. It was created to collect and disseminate common answers to problems and questions of consultants as their clients. The FAQ process works in the following manner:

- Subject Matter Experts (SME) closes the problem in the help desk database once a consultant agrees that it is solved.
- If the problem closed contains common aspects to other problems he tags it with a specific code “Closed as FAQ” and is therefore flagged as having the potential to be included in the

FAQ. Together with these other codes are indicated to identify and indicate the root cause of the problem.

- The actual problem and its solution are then tallied and summarized in a format for Q and A on the call tracking software used.
- The finished FAQ is then displayed in the website.

Based from these examples, knowledge to be managed in IT support includes the problems or issues, their attributes and characteristics, and their corresponding solutions.

3.5 KM Tools in IT Support

Apart from the KM portal discussed earlier, Malhotra and Majchrzak (2004) also identified the different IT tools for IT support. Using data from the far-flung teams they have studied, they have found that most of them used the following tools:

- LiveLink
- ClientCafe
- Eroom
- SameTime
- Groove
- Netmeeting
- Some other proprietary technologies

These tools (except for the proprietary technologies) are primarily standardized across industries and focused on instant messaging and application sharing to increased interaction and deliver

feedback synchronously or real time. As such, it could be inferred that these tools enable the capture of knowledge instantaneously based from the conversations and knowledge sharing of the employee workforce of an organisation.

If we look into the grouping of the types of IT support tools, for distributed cognition, a knowledge repository was a staple. This stores documentation. However, it has been found that the repositories extend from being used for documentation but also for what is known as “virtual living room” concept which also promotes communication as the documents contain annotations as they are being updated. These annotations enable all members to provide comments on the document to facilitate brainstorming and promote visibility. Thus, some form of data management technology is present. Moreover, the repository enabled the storage of documents in folders according to the teams’ process and its stage in its life cycle. Within these folders are sub groupings that contain documents for activities under such process, which may include meeting minutes in the virtual environment and the like.

One of the surprising findings in the study above revealed that some complex functionality of KM tools is not used by teams such as keyword search and navigation tools. This is due to the reason and belief that keywords are not enough to capture and index dynamically changing knowledge. As such it is hard to codify (King and Majchrzak, 2003).

A look into the IT tools and technologies used for KM in virtual teams are in Figure 11.

<i>What is used</i>	<i>What is not used</i>
<ul style="list-style-type: none"> ■ Collaborative tool with multiple channels of information sharing (such as text, drawings, audio supplemented) ■ Instant Messaging ■ Synchronous application sharing ■ Use of templates for virtual meeting minutes entries, virtual meeting scheduling ■ Interactive synchronous brainstorming using the collaborative technology – application sharing and electronic whiteboards 	<ul style="list-style-type: none"> ■ E-mail notification of new entries in knowledge repository ■ Sophisticated knowledge navigation and search features ■ Sophisticated keyword mechanisms for indexing the knowledge entries ■ Sophisticated search mechanisms ■ Videoconferencing

Figure 11: Used and not used IT Tools (Malhotra and Majchrzak, 2004)

While Figure 11 shows the various IT support tools for KM classified distinctly into those used and not by the sample far-flung teams, it provides a snapshot of all available tools for KM specifically in IT Support. Such technologies include: instant messaging, application sharing, templates for virtual meeting, electronic whiteboards, emails, search tools and videoconferencing.

Another important example to illustrate the technologies involved in IT support for knowledge management is the help desk model. Gonzalez, Giachetti, and Ramirez (2005) have explored, identified and evaluated the help desk model. Basically the help desks are significant for the IT department of an organisation because it provides contact to clients with regards to resolving and addressing issues. Callers consult problems and are addressed through the help desk. The agent, the one answering calls and delivering solutions, need to access a wealth of information (hence knowledge) to effectively The sources for such information include the agent's computer, access to database or repository, communication with other agents and access to the internet. The aim is to resolve problems directed to them and as such uses the problem solving approach. The major technology to enable this is what is called CTI or computer-telephony integration combining both technologies to reap the benefits of a knowledge-centric help desk.

Gilbert, Morse and Lee (2007) that given the right selection of KM IT tools and the proper implementation of a KM Strategy, the benefits of KM for IT support can reap the following benefits:

- Reduction in support costs due to fast learning of new people (as such shorter learning curve)
- Reduction in costs by preventing rework and duplication of research activities. This is achieved because of the presence of more knowledge which enables rapid resolution of problems
- Increase in customer satisfaction because of lesser resolution time for issues.

3.6 Mapping of type of support tools and organisation type

Venkitachalam and Scheepers (2004) evaluated four case studies on different organisations (employing IT support) which implemented a knowledge strategy and evaluated the influence of already existing information technology infrastructure (which also includes KM tools for IT support) in the establishment and communication of a knowledge management strategy. Their study focused on the four strategic views on investment in IT infrastructure based from Weill and Broadbent (1998). These four are described as follows:

- (1) None. This view suggests that the organisation has no shared view on IT infrastructure and hence each unit invests independently in its own IT needs as such economies of scale are lost and integration is hampered
- (2) Utility. This view hinges on the fact that IT infrastructure is established because it allows the organisation to achieve low-cost and efficiency thus achieving economies of scale. Only investments within the cost savings and efficiencies framework will be allowed.
- (3) Dependent. This perspective is largely fueled by the strategy of the organisation. IT investments are dependent on the current business plans to meet strategic goals and objectives.
- (4) Enabling. This perspective views IT as a core competency and component of the organisation and as such the organisation employs extensive IT capabilities and could affect strategy to expand to available IT options.

From these, the four companies in study are:

(1) EduCo. This could be classified under ‘the none’ view. It is a consulting firm which caters to the education sector with a number of branches in cities in Australia and New Zealand. The organisation’s current IT infrastructure prevents them from achieving efficient knowledge sharing between members and branches as their set-up currently only uses an e-mail system and a plain website. The postal system is still used to share hard copies of documents. The

management desires a centralized database system that is readily and conveniently updated by members to capture and document past and current experiences.

(2) ManuCo. This represents the 'utility' perspective. It is a chemical manufacturing and selling firm servicing local and global markets. Its processes could be classified as knowledge intensive because it is heavily dependent on knowledge expertise from the various parts of the organisation. It has a wide range of IT systems all dedicated to reduce costs and efficiencies such as: databases, control and production scheduling systems, intranet, website and many more. A notable system is a sensor-based structure, installed in the areas of their clients, that monitors the levels of raw materials and automatically warns the company if supply is already needed. Most of the IT tools are standalone systems mainly built to support a particular manufacturing and business process.

(3) StatCo. This could be grouped in the 'dependent' view. It is a public sector organisation based in Australia. It provides a variety of services including research data and statistical content, advice for policy development and economic planning. It has an explicit knowledge strategy with a visible knowledge program. The strategy is mainly focused on codifying knowledge embedded in routines and processes. It also possesses a massive IT infrastructure dedicated to meeting business strategies. Its IT tools include: massive networks, communication tools, stored audio and video clips, intranet and a number of databases. The information contained in these repositories is aggregated across the other components using a codified metadata. An example of this is that when an employee produces a new analysis

report, the person is automatically alerted of related documents in the past that falls within the metadata.

(4) GloConCo. This illustrates an example of the 'enabling' view. This organisation is a massive and multinational consulting organisation with offices situated around the globe. The said company provides consulting services for the areas of general management and technology areas. Since its managing a large network of contacts and consultants, knowledge is extremely essential. As such, the concentration of the company is to code, store, reuse and sell the knowledge. Having an explicit knowledge strategy, the company is dedicated to KM having a separate team to handle KM initiatives. The organisation prides itself with a variety of tools extending in its global IT infrastructure. Among the support tools and technology used are: global networks, email, teleconferencing, groupware applications, multiple databases, portals, intranets, search tools and many more. Taxonomies are used to store and classify all the information. The preference and orientation towards IT support technologies to enable KM is at the core of this organisation and as such is constantly finding new ways of doing things which include the proposed E-room tool for the support and enabling of collaboration of customers and pool of consultants.

Issues in KM	Case organizations			
	EduCo	ManuCo	StatCo	GloConCo
Articulation of knowledge strategy	Implicit knowledge strategy	Implicit knowledge strategy	Explicit knowledge strategy	Explicit knowledge strategy
Strategic views of IT investment	None	Utility	Dependent	Enabling
Existing IT infrastructure and applications	E-mail network and website	Intranet, databases, distributed control systems, website and other systems (not integrated)	Networks, intranet, numerous databases, communication tools, website, and codified processes (integrated via meta-data)	Networks, portals, intranet, numerous databases, communication tools, search tools (integrated via knowledge taxonomy)
Influences of existing IT infrastructure on knowledge strategy and knowledge processes	Minimal IT infrastructure constrains explicit knowledge strategy formulation Lack of codified knowledge, resulting in knowledge loss and reinvention	Fragmented IT infrastructure constrains explicit knowledge strategy formulation Lack of integration, resulting in knowledge loss and reinvention	Extensive IT infrastructure enables explicit knowledge strategy Minimal knowledge exchange beyond processes	Extensive IT infrastructure enables explicit knowledge strategy Lack of awareness of codified knowledge due to size and complexity of the IT infrastructure

Figure 12: Organisation Types, KM Issues, and tools (Venkitachalam and Scheepers 2004)

Given these, we can see the various existing tools for IT support in KM alongside the type of organisation that uses it. This suggests that companies with more explicit knowledge strategies, which put primacy on IT support tools, tend to have more complex IT infrastructure. Investments dedicated to these tools directly influence the kind of knowledge strategy employed the company. The more integrated the IT technologies of an organisation, the more they are likely to enable the capture, preservation, sharing and re-use of knowledge. In contrast, a fragmented IT infrastructure, lacks sufficient means for making KM succeed.

3.7 Conclusion

Knowledge management and IT support concepts were discussed. Malhotra and Majchrzak (2004) did a study on what they call “far-flung teams”. Malhotra and Majchrzak (2004) further suggest that the kind of IT support to be deployed is dependent on the kind or nature of the task, the

composition of team members. An important example to illustrate the technologies involved in IT support for knowledge management is the help desk model which has been explored by Gonzalez, Giachetti, and Ramirez (2005). Gilbert, Morse and Lee (2007) assert that given the right selection of KM IT tools and the proper deployment of a KM Strategy, the benefits of KM for IT support can be reaped including:

- 1) Reduction in support costs due to fast learning of new people (as such shorter learning curve);
- 2) Reduction in costs by preventing rework and duplication of research activities; and
- 3) Increase in customer satisfaction because of lesser resolution time for issues.

4 ORGANISATIONAL FACTORS AND IT TOOLS FOR KNOWLEDGE MANAGEMENT SURVEY

4.1 Introduction

The previous chapters have presented an extensive discussion extensively on how IT strategy can be linked to achieving knowledge management objectives. As part of this, it is essential to recognise that IT tools can be used effectively to share knowledge critical to achieving the organisation's strategies. Having said this, it is important to note, not all knowledge management needs can be addressed through IT solutions, organisational context is a key factor which must always be considered as a variable in knowledge transfer and knowledge preservation activities which should be among the core thrusts of an effective IT strategy.

This chapter presents the survey undertaken as part of the research described in this dissertation which aimed to investigate further the use of IT tools to support IT strategy and to investigate the influence of organisational factors on the choice of such tools. The chapter starts by outlining the audiences of survey respondents and the methodology used to create, disseminate and analyse the survey. A detailed analysis of the responses to the survey are then presented. These results are then further analysed to assess the direct impact of organisational factors and IT tools in knowledge management initiatives.

4.2 Survey Design

The first section contains questions related to knowledge management tools, specifically for IT support services. The content of the questions range from the identification of KM tools the respondents currently use, the length of time they have been using these tools and their reasons for selecting an IT-centric knowledge management initiative together with corresponding tools. Moreover, the respondents were also queried on the factors for the selection of a knowledge management initiative focused on IT support services. Specifically, factors considered in the selection of IT tools were asked in the questionnaire. In relation to these, the questions also covered the benefits obtained from IT knowledge management tools and evaluation on the effectiveness of such tools on the overall process of knowledge management.

The second section consisted of questions on knowledge management and organisational context issues ranging from the influence of organisation culture, organisation structure, management's knowledge on KM tools and internal technical/IT culture. Also included in this section is the all important management support and inclusiveness in the overall initiative.

The last section of the questionnaire was devoted to tacit and explicit knowledge. Questions included the effectiveness of choice of IT tool in creating, preserving and utilizing tacit and explicit knowledge. Motivational policy that could encourage employees to get knowledge, tacit and explicit, documented and shared.

These sections were deliberately designed to be able to address the following sub-problems which have been put forth in the research.

4.3 *Sample and Sampling Plan*

Since the primary aim of the survey was to gain an understanding of the relationship between the deployment of IT support tools for knowledge management strategy and the organisational factors on this deployment in practice, the target respondent included knowledge managers and experts who have one way or the other had the responsibility of managing knowledge. However, since the aim of this study is accessing appropriate IT tools in building a knowledge management for the use of employees, end users of such tools were also included. This is because end users can reveal operational views of these tools and thus led to interesting findings. Among the respondents are managers from large enterprises as well as small and medium enterprises (SME) that use enterprise computing solutions. Experts included consultants and IT tools power users.

A total of 40 respondents composed of managers of organisations have been requested to respond to the survey. They have been purposively sampled through the following inclusion criteria:

- 1) have been engaged in KM initiatives and have been utilising IT tools for KM;
- 2) are willing to participate in the research.

4.4 *Procedure*

The first step in the conduct of the research was the gathering of secondary data pertinent to the research. This entailed gathering books, journals, and online sources to be able to build a solid theoretical foundation for the study. After this, the researcher began to construct the instrument to be used for the research. This was content validated through the help of subject matter experts who reviewed the tool. The researcher proceeded with the purposive selection of respondents who can participate; and were asked to answer the tool in advance for the pilot study.

This survey was done using survey monkey, a web-based survey platform which allows design, collection of responses and analysis of results. The survey web link (http://www.surveymonkey.com/s.aspx?sm=a2wKtboSmdRml81EFghiBg_3d_3d) was delivered through emails over the internet to respondents and completed surveys are subsequently collated. The preference to conduct a web-based survey was due to the advantage of being delivered cheaply and faster than traditional paper-and-pencil surveys.

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The last section of the questionnaire was devoted to tacit and explicit knowledge. Questions included the effectiveness of choice of IT tool in creating, preserving and utilizing tacit and explicit knowledge. Motivational policy that could encourage employees to get knowledge, tacit and explicit, documented and shared.

4.6 Survey Results Analysis

4.6.1 IT Knowledge Management Tools

4.6.1.1 Use of IT tools

The first question of the survey is to get respondent identify if they have been using any type of IT support tools, of which 92% of the respondents said yes and 8% indicated they do not use any IT support.

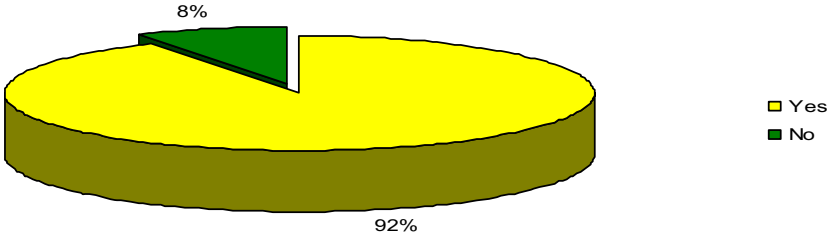


Figure 13: Distribution of use of IT tools

4.6.1.2 Frequency of use of types of IT tools

According to the survey conducted, most of the firms have been using enterprise portals as tools for their knowledge management initiative, with 34% of the respondents signifying use of such daily. This is not surprising as portals enable an array of services that firms surveyed want to capitalize on. Document management tools for the generation, monitoring, keeping and distribution of documents came in at second with 20% of the respondents using them. Document management also came second with search technologies on daily frequency of use. E-learning and Search technology modules came third and fourth with 11% and 10% of the respondents employing such technologies in their KM initiative. 9% of the respondents were using Groupware such as wiki, email and text messenger while 7% respondents uses community support systems.

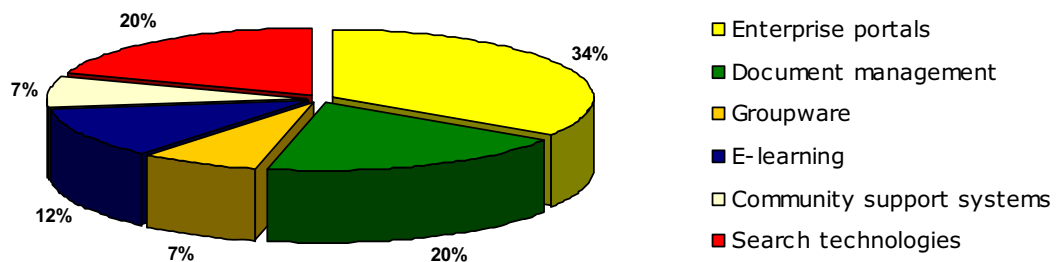


Figure 14: Distribution of Use of Types of IT Tools

Based on the responses gathered in the survey, enterprise portals have been the primary KM tools among the organisations surveyed. This is not surprising as portals have been the mainstream technology to support and enable knowledge management among organisations across different

industries. As the study of Mack, Ravin & Byrd (2001) revealed, the advent of the internet made possible the proliferation of a web-based platform that has long since evolved to enterprise portals. This goes to show that the respondents have been leveraging on a mainstream technology that are enterprise portals banking on them being all-in-one suites. The online medium which enterprise portals operate upon has made possible the collation of information and documents in an attempt to preserve and transmit explicit knowledge.

Building on these information, it could be said that majority of the respondents undergo this conversion of knowledge types. The explicit knowledge found in documentations and previous records are stored in repositories, which the knowledge workers can access. The workers utilize this information to work on a current problem building new knowledge and documenting new solutions. Therefore, the application of the explicit knowledge searched and utilized on a new scenario involves tacit knowledge, which is then captured and documented for future use thus making it explicit. Thus, the pattern that could be assumed is explicit-tacit-explicit.

Following the research done by Mack, Ravin & Byrd (2001), the responses in the survey conducted by this study indicate that the use of enterprise portals in capturing, synthesizing and preserving knowledge allows clustering and grouping of information.

Document management tools and search technologies tied at second position from the responses, which signifies the focus of organisations on explicit knowledge since they pay particular emphasis on documents, which could be treated simply as the records of explicit knowledge. Groupware and E-learning tools imply that organisations also pay attention to collaboration. They

recognize that using these tools could help them capture knowledge that is generated through group activities, discussions and interactions. Thus, the explicit-tacit-explicit pattern is still held true.

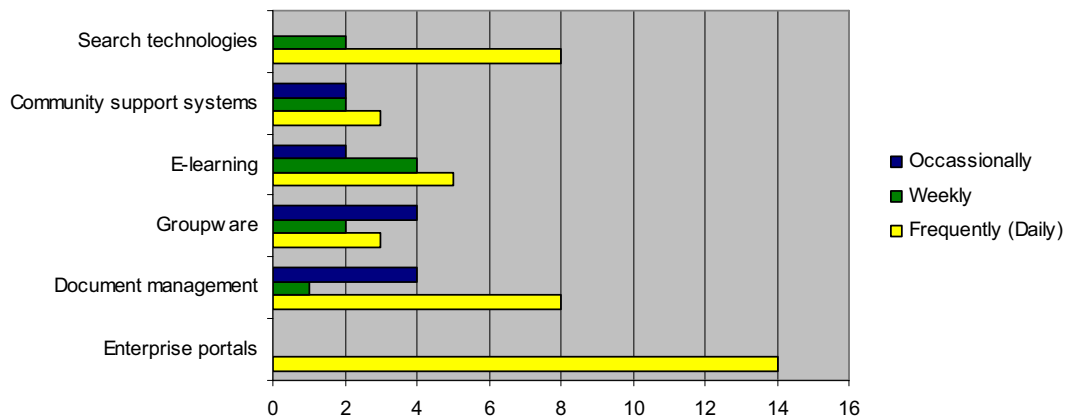


Figure 15: Frequency of IT Tools use Distribution

4.6.1.3 Length of Time for Using IT KM Tools

To give a profile of the respondents in relation to IT KM tools, the length of time of usage of these IT KM tools were asked (Figure 16). More than half of the respondents revealed that they have been using IT KM tools for two to five years. Those who have been using IT KM tools for more than 5 years but less than 10 years came in at second with 25% of those surveyed. Meanwhile, those who are new to the usage of IT tools in KM were identified at 13 % of the respondents.

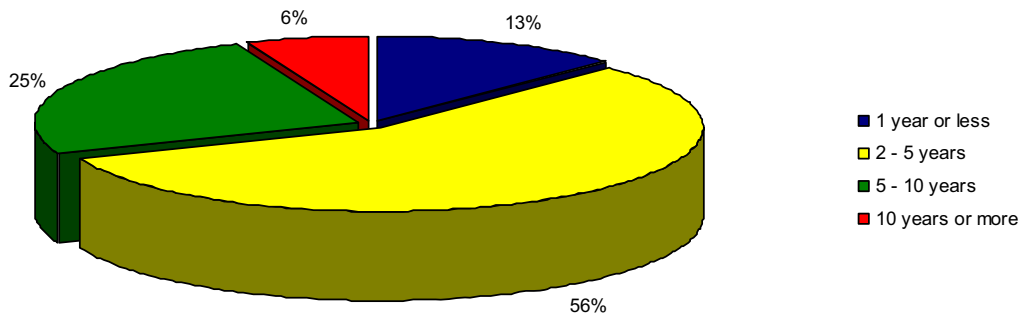


Figure 16: Distribution of length of time for using IT KM tools

4.6.1.4 Reasons for Adopting a KM Initiative Focused on IT Tools

The respondents were also surveyed as to what are their reasons for choosing a KM initiative focused on IT support services. Top reasons identified were to improve firm and organisational performance and /or efficiency with over 90% of the respondents citing this as their number one reasons and for the continuity and preservation of knowledge assets with 57% of the respondents naming this reason as their top reason. 50% of the respondents also identified reduction of costs and 45.5% of the respondents see the potential to innovate or grow as an organisation as number one reason for adopting IT tools for their KM initiative.

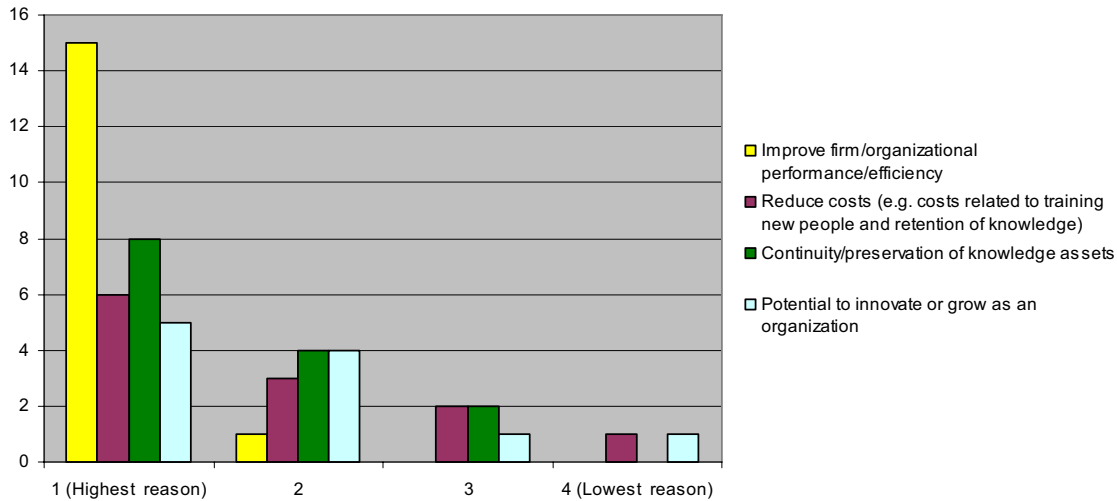


Figure 17: Distribution for Adopting a KM Initiative Focused on IT Support Services

Since most of the respondents have been utilising IT KM tools for more than two years, the prevalence of IT tools in aiding and enabling knowledge management and its process is undisputed. This shows that organisations have been capturing information for a long time already indicating a various levels of information being stored, retrieved and transmitted. IT is an integral aspect of every organisation and their attention to knowledge management is primarily driven by information technology. Thus, the integrity and credibility of the respondents are attested by their years of experience in utilizing knowledge management tools.

Also analyzing the responses, the observable attitudes of the respondents are their preference for integrated technologies and the unifying atmosphere they bring than on individual technologies to support their knowledge management initiatives. They all recognize the value of collaboration and integrating knowledge from different sources. They want to leverage on a technology that enables a lot of things for the company.

However, as early as now, the challenge of converting tacit knowledge to explicit knowledge has been very evident as what Erikson, Rothberg and Wuerz (2002) have early on recognized. As Prusak (1997) suggested, there is a natural flow moving from explicit to tacit knowledge and so on. Indeed, tacit knowledge presents a harder challenge to capture but technologies have been moving towards making that a lot more possible.

Based from the known literatures citing reasons for adopting a knowledge management initiative (Firestone and McElroy, 2005; Arora, 2002; Twietmeyer, Lyth, Mallak & Aller 2008), improving firm performance and thus leading to efficiency is the primary reason for organisations to embark on a KM initiative. The survey results confirm this as majority of the respondents (93%) ranked this criterion on top. Coming in second among those answered by the respondents is the continuity or the preservation of knowledge assets accounting for 57% of the respondents. This is an inherently given factor in choosing to engage into a KM initiative as knowledge assets constitute a firm's intangible value following the findings of Twietmeyer, Lyth, Mallak & Aller (2008). The importance of knowledge assets is apparent as showed by Syed-Ikhsan and Rowland (2004). It is important in the fulfilment of other KM processes such as the transfer of knowledge.

Thus, the responses obtained from the survey are in consensus with what available literatures lay down. Firms engage in knowledge management initiatives to improve organisational performance by enabling efficiencies through the reduction of redundant knowledge work. By eliminating inefficiencies, the firm is in pursuit of some financial value brought about by the efficiency and improved performance. Ultimately, this could only be done in recognition of the value that knowledge assets bring to an organisation. Thus, KM initiatives are generally decided in pursuit of

an improved organisational performance or efficiency. Despite being ranked third, reduction of costs is an underlying reason of organisations for pursuing a KM initiative. While, improved organisational performance and efficiency maybe deemed as on top of the reasons, the respondents' low recognition for cost drivers is justifiable given that this is a natural result of an increase in organisational performance and efficiency.

The survey conducted for this research changed the question a bit in the sense that it added the element of IT support services, phrasing the question to cite reasons for adopting a KM initiative focusing on IT tools.

4.6.1.5 Factors considered in selecting suitable IT Tools for KM

Apart from the reasons identified for the adoption of a KM initiative focused on IT support services, factors were also questioned as to what influence them in selecting a suitable IT tool for KM. Among the factors listed, respondents were asked to select all the factors that they consider in selecting the appropriate KM IT tool. Most respondents (24%) cited organisational factors as their major consideration in selecting the proper and suitable IT tools for KM. Moreover, 23 % of the respondents identified the perceived benefits of those tools such as if the tool could eventually lead the organisation to a strategic advantage in the long term. The third reason as identified by respondents is cost of which 19% says this will be a consideration. Tied at fourth and fifth position is the popularity of the tool and availability in the marketplace. Popularity here refers to the prevalence of IT tool in the industry; how popular or how frequent it is adopted and used by other organisations.

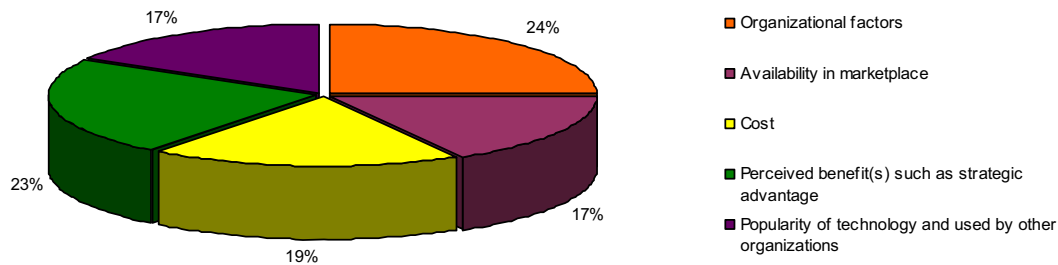


Figure 18: Distribution of Factors Considered In selecting suitable IT Tools for KM

The respondents identified organisational factors, perceived benefits and popularity of technology as the factors considered for the selection of the right IT tools for KM. This suggests that firms primarily consider organisational elements before selecting the right tool for their KM initiative. Despite this, firms also consider the benefits that they perceive a tool could provide in the organisation together with the prevalence of technology in the industry as other determinants for choosing the right IT tools for KM. The study of Syed-Ikhsan and Rowland (2004) which explored and established relationships between organisational factors and performance of knowledge transfer is affirmed and echoed by this study.

Indeed the attention of managers to the perceived benefits of a KM tool is an important consideration for the selection of the appropriate IT KM tool. However, this seems to be in contrary with the other choice of respondents, which is popularity of technology. Strategic advantage is defined within the long-term scale of things. Choosing to adopt a widely used technology for an organisation's KM initiative put the company at par with the others who are also using the technology. Indeed, it is beneficial to adapt to a certain extent to what has become

industry standard, but in the long run, strategic advantage will not be met as all of the firms will employ such technologies. The value of strategic advantage will only be realized depending on the unique circumstances of the firm. These circumstances are also dependent on the kind of technology but the more pressing aspect here is how best the company uses this technology to its own advantage. Given that one is employing the industry standard or popular technology, it is still the task of the organisation on how it would operate and roll out the said technology to its advantage.

One more finding that is surprising is those organisations tend not too focus much attention on the cost of a specific IT technology in selecting the right one. The benefits that the technology provides is considered more important factor for the respondents in selecting the right kind of IT KM tool.

4.6.1.6 Benefits Derived from Using IT KM Tools

The benefits derived from IT KM tools were also surveyed in relation to the respondents' reasons for use. Those surveyed were again asked to select all the benefits they get from using IT KM tools. The respondents cited earlier (Figure 17) that primary reason for their adoption of a KM initiative focusing on IT support services is for improved firm/organisational performance and efficiency. Following this is for the continuation or preservation of knowledge and knowledge assets. In Figure 19, there is a slight shift in the nature of responses in relation to the benefits obtained from these IT KM tools. Topping the list with majority of the respondents marking this is for improved firm/organisational performance/efficiency. Coming second is continuation and preservation of knowledge and knowledge assets. Other selected benefits were the ability to

leverage on IT to create, manage and utilize knowledge and the innovation leading to strategic advantage.

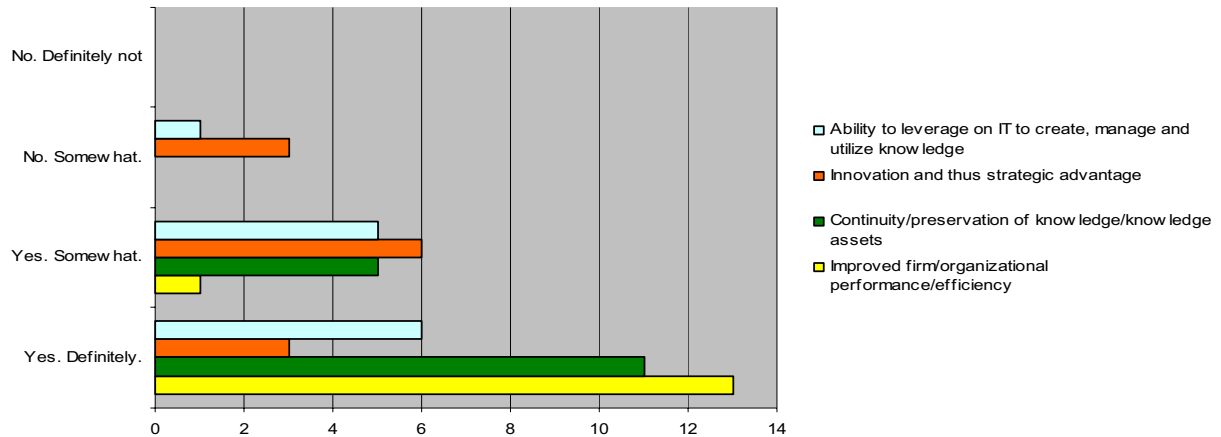


Figure 19: Distribution of the Benefits Derived from Using IT KM Tools

In relation to the factors being considered, the study attempts to find a relationship between the factors considered by the organisation in selecting the right IT KM tool and the actual benefits obtained from using the said tools in knowledge management. The study found a correlation between the factors for consideration in the selection of IT KM tool and the actual benefits obtained from using such tool. A minor difference is that when asked about the benefits they have obtained from utilising their IT KM tools, more of the respondents cited the continuity and preservation of knowledge assets compared to improved firm or organisational performance or efficiency. This could be seen in Figure 17 and 18. Probably, the existing IT KM tools are really believed to enable the continuity and preservation of knowledge and knowledge assets. Improved firm performance and efficiency is also considered a benefit by most of the respondents as this could also be assumed to be the result of the preservation of knowledge and knowledge assets.

Nevertheless, the switch in rankings in these two elements is negligible as they both have been consistent with the factors identified for selecting the appropriate IT KM tool. Therefore, the benefits derived by the respondents from utilising IT KM tools is also the one they are seeking to obtain in selecting the appropriate KM tools.

4.6.1.7 Evaluation of IT tools for KM in Relation to the Success of KM as a Strategy

Meanwhile, the respondents were also asked to evaluate the effectiveness of the IT tools for KM that they are using in the success of the overall KM as a strategy (Figure 20). The underlying principle here is that KM is a strategy that ties up with the overall strategy of the firm. More than half of the respondents (56 %) extremely agree and consider that their IT tools for KM are effective in aiding the organisation's strategy. Meanwhile, 44% of the respondents agree that the IT tools for KM they are using are somewhat effective in helping achieve the success of the overall KM strategy. None expressed that IT tools for KM are ineffective in any way.

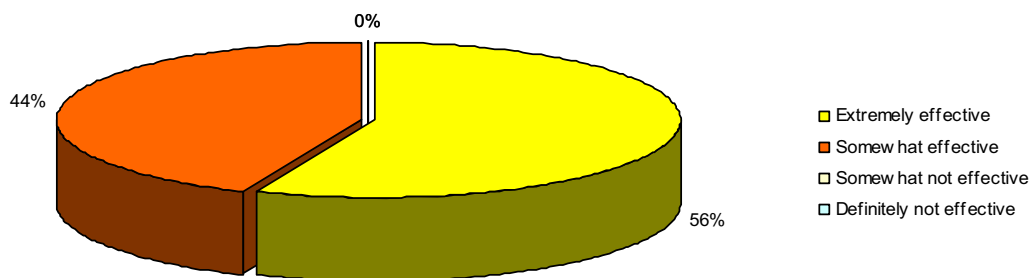


Figure 20: Distribution of Evaluation IT Tools for KM in Relation to the Success of KM as a

Strategy

Meanwhile, in terms of the effectiveness of these IT tools in achieving the overall KM strategy, all respondents agree that IT tools have been effective looking into the general KM context in mind. Hence, it could be inferred once again basing from the responses that an effective IT KM tool, which aids in the fulfilment of the basic KM processes is also likely to attain the overall objectives of a KM strategy.

4.6.2 Knowledge Management and Organisational Factors

The second section of the questionnaire focused on the organisational factors considered or related to knowledge management. The questions attempted to find relationships and establish connections between KM and organisational factors as illustrated in various literatures. Questions ranged from how the respondents view the significance of organisational factors in the success of an IT KM tool, the indicators for the selection of KM IT tools and the importance and significance of each according to the respondents' perception. Moreover, the significance of the role of IT in the implementation of a KM initiative was also surveyed.

It has been established both in the results of the current research and in previous pertinent literature, that organisational factors are the primary considerations for selecting the right and appropriate KM tool. The more important question that comes from this is: what are the individual elements that make up these organisational factors. As evidenced in the review of literature, Syed-Ikhsan and Rowland (2004) have identified organisational culture, organisational structure, technology, people and political directives as those factors under organisational factors. Similarly,

Forcadell and Guadamillas (2002) also identified culture, structure, people and leadership style as organisational factors considered in KM having derived it from the 7-S McKinsey model of Waterman (1982). Moreover, Moffett, McAdam and Parkinson (2003) agreed with the previous two authors also citing people and technology or the technical and IT infrastructure of an organisation as important components of knowledge management. In line with this, they also named organisational culture, people and technology as organisational factors adding only the macro or external environment of an organisation. The human factor has never been underscored more fully with Handy (1989) and Peters and Waterman (1982) also citing people as the major influence and component of an organisational culture. Viewing these literatures, the questionnaire was tailored to ask what the respondents think, feel and believe about organisational factors and their relation to an effective knowledge management initiative.

4.6.2.1 Responses on the Dependence of the Success of an IT KM Tool to Organisational Factors

The respondents were surveyed on the importance of organisational factors such as organisational culture, knowledge, reward and usage of IT/IT infrastructure in the success of an IT KM tool. Majority of the respondents (49%) strongly believe that the success of an IT KM tool is dependent on organisational factors. Meanwhile, 38 % of the respondents also signified that they somewhat agree with that statement. Only 13% of those surveyed disagree that the success of an IT KM tool is dependent on organisational factors.

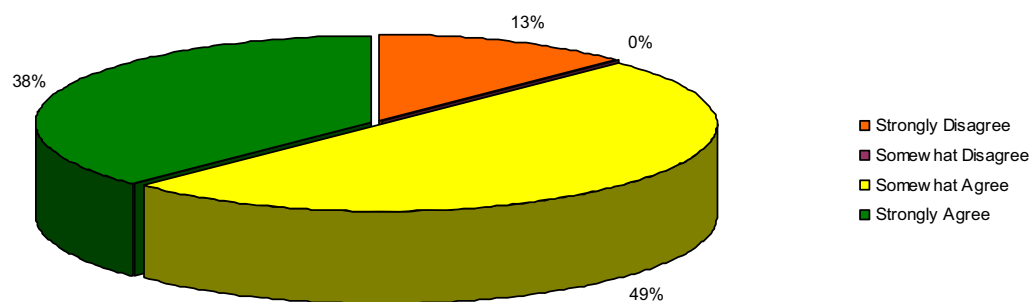


Figure 21: Responses on the Dependence of the Success of an IT KM Tool to Organisational Factors

The respondents re-affirmed the influence and impact of organisational factors for the success of a knowledge management initiative (Figure 21) with majority finding a dependence on organisational factors for the success of a KM initiative. From these, the respondents were asked to identify which among the organisational factors could be considered as strong indicators for the selection of IT KM tools. To qualify, the term “strong indicator” means that these factors are primary determinants for the selection of the right IT KM tool.

4.6.2.2 Organisational Factors as Indicators for the Selection of Knowledge Management IT Tools

In relation to the identified organisational factors based on the review of literature, the respondents were questioned as to which of these factors are strong indicators for their firm to select the appropriate and right KM IT tool. The people surveyed were asked to select all of the factors that they believe are strong indicators for the selection of KM IT tools. 23% of the respondents named Organisational culture as one of the factors they strongly consider in the selection of IT tools for KM. Coming in at second is Organisation structure (flow of knowledge) garnering 21% of the

responses. Moreover, 20% of the respondents believe internal technical/IT culture is a strong indicator for the selection of KM IT tools. Tied at 18% is management commitment and training and education all got 20% of the responses.

After surveying the strong indicators for KM IT tools, the respondents were asked on how they perceive each indicator. They were surveyed on how important they view each indicator in the selection of an effective IT KM tool. Results showed that the predictors are deemed important parallel to how they were identified as strong indicators for the selection of IT tools. Thus, there is a general consensus and validation on the previous question (Figure 18).

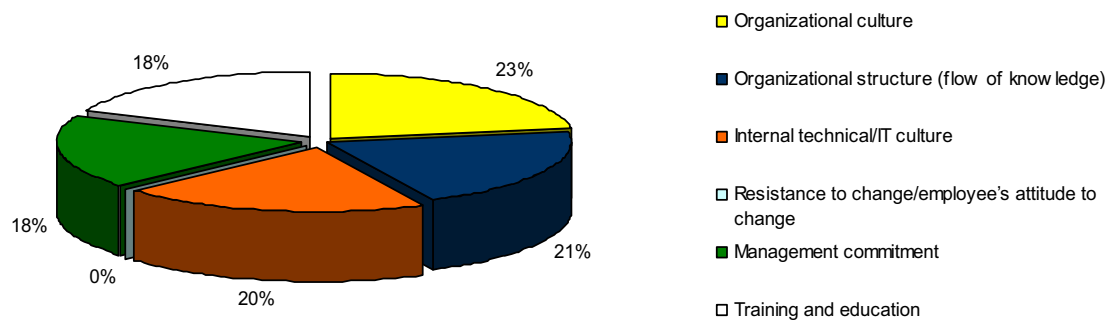


Figure 22: Organisational Factors as Indicators for the Selection of Knowledge Management IT Tools

Going into the specifics, organisational culture, that is a member's individualism (sense of independence) as well as culture of sharing together with other organisational elements, was deemed an extremely important indicator in the selection of an effective IT KM tool (See Figure 23). 69% of the respondents indicated this belief. While 31 % believe that organisational culture is

somewhat important for the effective selection of an IT KM tool. No one signified otherwise attesting to the undoubted significance of organisational culture in the selection of a KM tool.

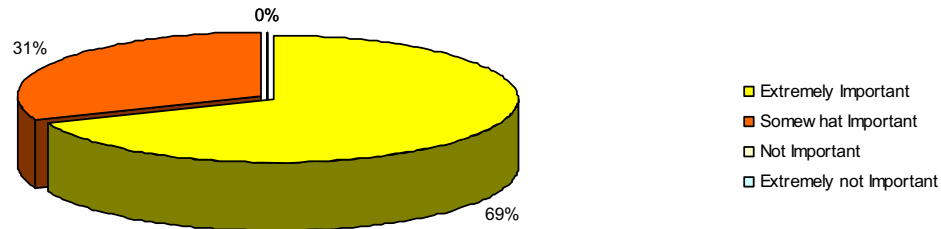


Figure 23: Importance of Organisational Culture in the Selection of an Effective IT KM Tool

Based from literature, the survey narrowed down the options to these organisational factors as deemed most important and having the most impact: organisational culture, organisational structure, internal technical/IT culture, resistance to change (people) and management commitment. The management commitment may touch on the political directives identified by Syed-Ikhsan and Rowland (2004). The clout of the upper management is an important determining organisational factor that could influence the decision of the selection of a KM tool.

The results of survey are not surprising and achieves consensus with literatures with organisational culture comes on top with 68.8% of the respondents citing this alongside internal technical/IT infrastructure and organisational structure (flow of knowledge) garnering 62.50% each, of the respondents.

As told by Davenport and Prusak (1998), an internal technical/IT infrastructure is extremely necessary to adopt a knowledge management culture in an organisation. They view technology as both contributor and enabler of KM. Similarly, the respondents believe in the same way, that for KM to work, the organisation should have an innovative culture that welcomes technology and recognizes its potential in the organisation. However, as stressed by Davenport and Prusak (1998), technology in itself will not enable the adoption of a knowledge culture. It is more dependent on the effective implementation of an IT/technical infrastructure. Hence culture in this sense overrides technology. The effective implementation of an IT/technical infrastructure is largely dependent on the kind of culture imbibed and practice by the organisation. This cultural aspect is primarily identified and lived by the people and hence, people's attitudes and behaviours are important considerations for the success of an IT KM tool and the entire KM initiative as a whole.

Organisational culture is deemed important by all of the respondents (Figure 22) while, technical IT infrastructure was considered important by 75% respondents. The difference is negligible and expected based from the margin of error and the literatures presented.

Davenport and Prusak (1998) have identified the increasing role of technology in the successful implementation of a KM initiative. They have observed a system in the management of knowledge enabled by the advent and growth of information and communications technology. Thus, it came as a no surprise when the respondents vehemently agree on the significance of IT in the overall KM strategy and initiative.

This is of course taking into consideration that KM is a strategy as what Cohen and Levinthal

(1990) and O'Dell and Grayson (1998) believed. KM as a strategy ushers organisational changes in a process that could be likened to a renewal. Moreover, realizing that KM is a strategy enables knowledge to be available to the right people at the right time. As such KM is a continuum and a cycle that is set to persist as these processes are done: the creation, storage, distribution and application of knowledge.

From this, the results of the survey suggest that those who believed that organisational factors are important for the selection of the right KM tool also believe in the high importance of IT in the success of a KM initiative.

4.6.2.3 Importance of Organization's Structure, Management Support, Technical or IT Culture in the Selection of an Effective IT KM Tool

To wrap up the section on the KM and its relationships with organisational factors, the respondents were asked on their overall perspective in terms of organisation's structure, management support, technical or IT culture in the selection of an effective IT KM tool. Majority of the respondents said it is somewhat important consideration while 38% strongly believe it is extremely important (see Figure 24). It is important to explain and qualify what technical or IT culture element here means. The technical or IT culture of an organisation reflects the organisation's affinity to technology. It holds that the organisation is not technologically averse and hence is comfortable with technology and its power to aid the business. Consequently, the organisation's members are thus more welcoming to technology because they have been used to it. Most of the respondents who identified these factors as being extremely important must have come to this conclusion for the sake of IT culture as more than half (56 %) of the respondents had earlier extremely agree and

consider their IT tools for KM are effective in aiding the organisation's strategy.

The inclusiveness of managers in selection of an IT KM tools is also considered in this question.

Moreover, in terms of the organisational structure, or the level of presence of hierarchies and bureaucracy in an organisation, majority believed it is somewhat important hence is not a good predictor or indicator for the selection of the right KM tool. The organisational element of organisational structure is relevant in the sense that it affects communication levels in the organisational. The structure of the organisation determines the ease of communication flow within its departments and hence affects the transmission and accessibility to knowledge.

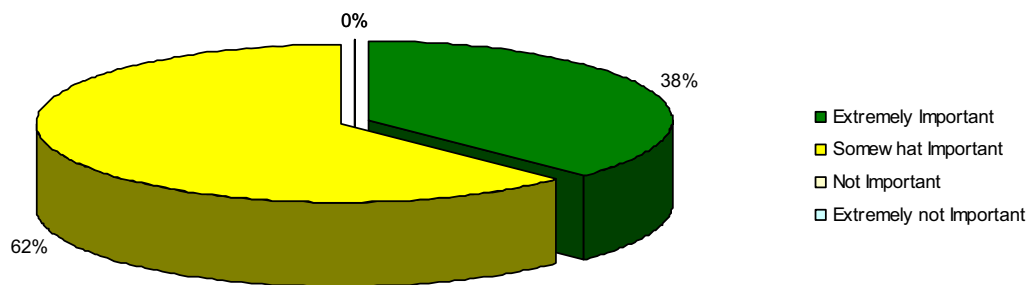


Figure 24: Importance of Management Support and Knowledge in the Selection of an Effective IT KM Tool

In relation to the results of this study, the respondents strongly associated internal technical and IT infrastructure to organisational culture suggesting a correlation between the two (see Figure 22).

Since respondents were asked to select all of the organisational factors they think are strong indicators for the selection of IT KM tools, the high percentages obtained by both organisational

culture and internal technical/suggest that they are the top picks for the respondents. A dependency or strong linkage could thus be assumed. Hence, using this line of argument, the selection of the right IT KM tools is strongly determined by organisational culture and the internal technological infrastructure of an organisation. This is further strengthened by the evaluation of the importance of each of the identified organisational factors by the respondents as seen in Figure 23 and 24.

4.6.3 Explicit and Tacit Knowledge

The perspectives and sentiments of the respondents in terms of explicit and tacit knowledge were also surveyed. Explicit and tacit knowledge are the two main classifications of knowledge and hence are important aspects of a KM initiative. The respondents were surveyed if their current IT tools enable them to create, preserve and utilise explicit and tacit knowledge in the organisation. Covering this aspect aims to establish a view on how effective are the IT tools being utilised by the organisation in achieving the KM processes.

4.6.3.1 Use of IT Tools for KM in Creating, Preserving and Utilizing Explicit Knowledge

Looking into explicit knowledge, when the respondents were asked if their current IT tools for KM support the creation, preservation and utilisation of knowledge within and across the organisation (as in Figure 25), 94% admitted a 'yes' signifying that IT tools really enable an organisation to perform KM processes. With this, only 6% signified opposition.

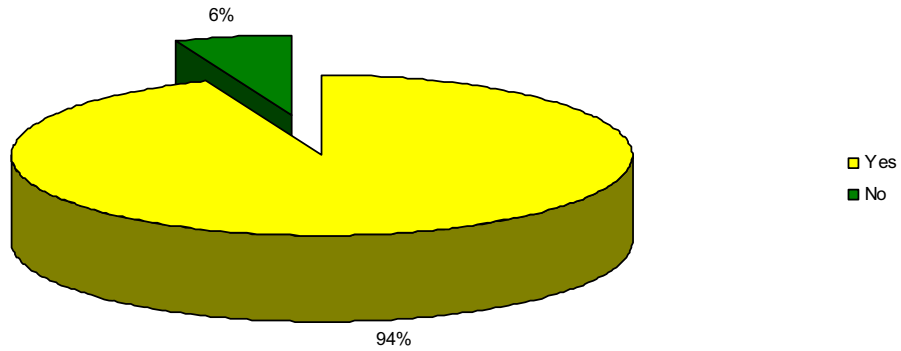


Figure 25: Effectiveness of IT tools for KM in managing explicit knowledge

4.6.3.2 Types of IT Tools Used to Manage Tacit and Explicit Knowledge

Similarly, when asked on the kind of IT tools to manage tacit and explicit knowledge. Groupware, community support systems and document management system were chosen by respondents in that order for managing tacit knowledge. On other hand, respondents said they use E-learning, Enterprise portal and document management in same order to manage their explicit knowledge.

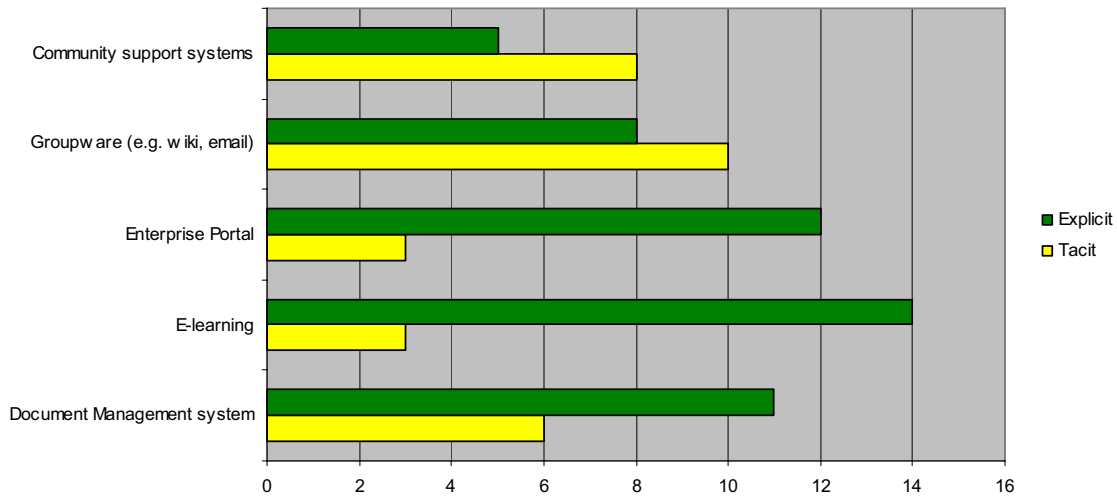


Figure 26: Distribution on Use of IT Tools to Manage Tacit and Explicit Knowledge

4.6.3.3 Use of Reward to Encourage Sharing, Documenting and Transfer of Knowledge

In order to determine if some sorts of reward and recognition is responsible for the success respondents have in the use of IT tools in their KM initiative, the researcher asked if they have in place reward policy to encourage management of tacit and explicit knowledge. This helps to see what things are companies doing in the area of Recognition & Reward to create a culture of knowledge-sharing. In figure 27, 69 % said they have some kind of reward in place, while surprisingly, 31 % have no reward and recognition policy at all.

This underscores the rule that it is motivational to always acknowledge the contributor of ideas, knowledge, and time. Even when people collaborate in teams, the team can recognize each other for their varying levels of contribution, but the organisation, should recognize the team.

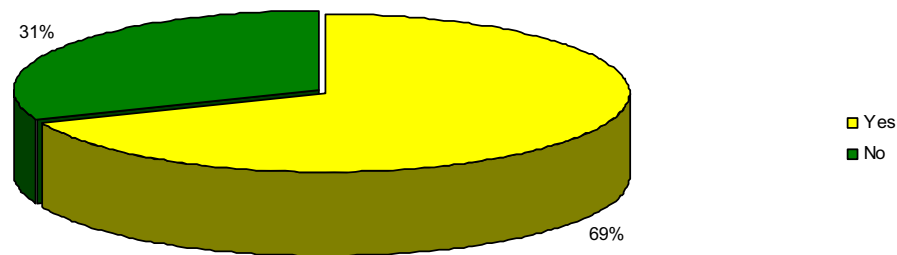


Figure 27: Distribution of Reward Knowledge

For every knowledge management initiative, the transformation of knowledge between its two known types is inevitable. The operation of the KM cycle involves the conversion of knowledge from explicit to tacit, from tacit to explicit and all the other combinations possible. Smith (2001) and Nonaka (1991) have provided various classifications, uses and patterns of explicit and tacit knowledge in the context of an organisation. It is therefore important to get a glimpse of how the respondents feel on these two types in relation to their IT KM tools.

There was a consensus among respondents (94%) that their current IT tools enable them to capture, store and distribute tacit and explicit knowledge (Figure 25).

The respondents all agree on the importance of both explicit and tacit knowledge in the organisation, which must be the case as these two types span across the organisation. This implies that these IT managers realize and recognize the role of both types of knowledge in the success of their KM initiatives. Having this in mind, they are striving for a more effective approach to

managing tacit knowledge without jeopardizing the already enabled explicit knowledge management. Moreover, an implication of these findings suggests that the respondents also monitor or track patterns of knowledge across the various activities and processes in the organisation. Knowing and identifying these knowledge patterns is key to which knowledge will be managed for others to access and apply in various creative ways.

However, the survey questionnaire was unable to meet the desired mapping of explicit to tacit; tacit to explicit and all the other combinations of such conversions.

4.7 Conclusion

This chapter is about the survey conducted, showing the relationships that exist between organisational factors and the choice of IT tools in knowledge management initiatives. The audiences of the survey were discussed after the introduction of the chapter in section 5.2. The chapter then discussed the methodology of the survey taken. The fourth chapter provided the questionnaire design.

The chapter then presented the survey results analysis. The results were categorized into three subsections namely; IT knowledge management tools, knowledge management and organisational factors and lastly explicit and tacit knowledge.

Based from the results collated and tallied above, a number of observations can be drawn vis-à-vis the review of literature included in this study. This part focused on the discussion of the results in the previous section with the aim of addressing the research questions of this study and in the

process providing new insights on the realm of knowledge management. Since the results have been quantitatively run and evaluated in the prior chapter, this part zooms in on the critical and subjective evaluation of the results. It is important to note that the succeeding sections were not solely based on the outcomes of the survey, but are rather insights that have been gleaned from past literature, and put side by side with the survey results.

Drivers	Types	Knowledge Management Strategy and Tools
Type of Knowledge (Smith, 2001)	Explicit Tacit	
Knowledge Movement (Nonaka, 1991)	Tacit-tacit Explicit-tacit Explicit-explicit Tacit-explicit Explicit-tacit	
Need for either codification or personalisation in KM	Codification strategy	
Jasmuddin et al (2005)	Personalisation strategy	
Organisational Factors	Macro or external environment	
Moffett et al (2003)	Organisational culture People Technology	
IT Support Required	Task-outliness (routine vs. non-routine)	
Malhotra and Majchrzak (2004)	Team composition (low vs. high heterogeneity)	

Figure 28: Proposed Framework

On the basis of the results of the current study, the foregoing framework is put forth. Essentially, the framework indicates that the type of knowledge (Smith, 2001), the need for either codification of KM (Jasmuddin et al, 2005), organisational factors (Moffett et al, 2003), and the IT support required (Malhotra & Majchrzak, 2004) are all important consideration in the crafting of the knowledge management strategy and the corresponding IT tools that shall support it.

Basically, the results of the survey established a clear and defined relationship between IT tools for knowledge management and organisational factors. The study has found that organisational factors are the top considerations for the adoption of KM IT tools. Underlying this is the establishment and determination of the role of organisational factors in the overall success of the KM initiative and the study has found a positive relationship. Moreover, the study has specifically identified the various organisational factors influencing the selection of IT KM tools. These factors are: organisational culture, internal technical/IT infrastructure, organisational structure, people (resistance to change and attitude of employees), management commitment and training and education. Among these, the most powerful and important are organisational culture and internal technical/IT infrastructure. The study moved further than identification of organisational factors as it has also enabled the evaluation of their importance to an effective IT tool selection and KM initiative.

Moreover, with the vast technologies available for KM, the study has identified specific technologies currently used by the respondents. From these, enterprise portals won the most number of usages from all the respondents signifying the continued importance of portals in managing knowledge in today's virtual and online world.

This study also showed the evaluation of the importance of explicit and tacit knowledge in the context of KM, its processes and overall success.

5 CONCLUSION AND RECOMMENDATION

5.1 Introduction

As a whole, the study focused on the identification of the various IT tools used in a knowledge management initiative particularly that of IT support services. Through an extensive literature review, these technologies have been identified and then tested using a survey with 40 respondents consisting of managers of organisations who have been engaged in KM initiatives and have been utilising IT tools for KM. Moreover, the study established linkages between organisational factors and these IT KM tools as well as the evaluation of each factor in their effectiveness in the KM strategy. The importance of explicit and tacit knowledge and the effectiveness of IT KM tools in managing these two types of knowledge have also been surveyed to the sample.

5.2 Problem Definition & Research Overview

The research problem is concentrated on the identification, classification, and evaluation of IT tools for knowledge management. Organisational factors related to the deployment of these KM tools are also linked to them to identify their power and influence in the KM decisions. Utilising a thorough review of related literature and a survey based on prepared questionnaires, the research enabled the aforementioned objectives and topics to be covered. Thus, this study is both quantitative and qualitative.

5.3 Main Contributions

This study has several contributions:

- 1) Provided an extensive literary review of knowledge management with particular emphasis on IT tools and their relationship to organisational factors. This literature review presented various case studies available in the context of knowledge management and organisational factors relating to it.

- 2) Through a survey mechanism, it established a clear relationship between organisational factors and the adoption of KM IT tools. It has found that organisational factors are the primary consideration for the selection of IT KM tools.

- 3) Moreover, the study also found a direct relationship between organisational factors and the success of the knowledge management initiative.

- 4) It has identified specific organisational factors as strong indicators for the selection of IT KM tools. These organisational factors are: organisational culture, internal technical/IT infrastructure, organisational structure, people (resistance to change and attitude of employees), management commitment and training and education. Among these, organisational culture and internal technical/IT infrastructure was mostly cited as the most important.

- 5) Apart from identifying specific organisational factors as strong indicators for KM, the study has evaluated the importance of these individual factors to an effective IT KM tool and KM initiative.

- 6) Identification and evaluation of IT KM tools currently used was done through the survey.

Enterprise portals were determined to be the most widely used KM tool. Moreover, respondents were able to affirm the effectiveness of the IT KM tools they use in general as they collectively enable basic KM processes.

7) Also through the survey mechanism, the respondents' views on the importance of explicit and tacit knowledge as well as the effectiveness of current tools in KM in capturing, preserving and distributing explicit and tacit knowledge.

The survey results and the review of related literature reached a consensus on the importance of explicit and tacit knowledge in the context of knowledge management.

5.4 Evaluation & Limitations

Despite the number of contributions cited, this research possesses limitations. The respondents were restricted to IT managers and few users who have been using IT tools for KM and are practicing KM. Thus, the views that this research offers in terms of the survey is mostly managerial view. Moreover, the study was unable to map the conversion of explicit to tacit knowledge within those surveyed due to the ambiguous nature of the task. Thus, there was difficulty in creating questions for this objective.

Moreover, since this study is only focused on IT KM tools identified in literature and covered in the survey, it might not include the other technologies available for KM.

5.5 *Future Work & Research*

Given the aforementioned gaps, future research could specifically map a particular IT KM tool to an organisational factor to establish a much more concrete and complete relationship. Mapping of explicit and tacit knowledge conversions could also be incorporated in future researches. Moreover, a lot more technologies could be included in future research. A particular case study may be helpful for a more thorough evaluation of KM tools, their effectiveness and their relation to organisational factors.

5.6 *Conclusion*

The role of IT in knowledge management has been undisputed and once again affirmed by this research. As a whole, this study enabled the successful identification and linkage of IT tools for knowledge management and organisational factors. Organisational factors are discovered and verified to be the primary consideration for the selection of an appropriate KM tool for IT support services. Thus, organisational factors are strong determinants for the success of a KM initiative taking into account that a successful KM initiative is dependent on the successful selection of the proper IT tool to aid and enable KM. Among the organisational factors identified and surveyed, the internal technical/IT infrastructure and organisational culture are the strongest indicators for KM success. Meanwhile, enterprise portals are the most prevalent IT KM tool, employed by the respondents signifying the importance of unification of information and knowledge through an online medium brought about by these portals.

Indeed, looking into the various literatures and the results of the survey conducted, information technology has changed the way people think, see, and do things with respect to knowledge

management. The technology environment of today offers a vast array of solutions for companies to adopt in pursuit and fulfilment of their knowledge management decisions. A major consideration before actually leveraging on a technology or tool for KM is the significance of the organisation in starting, planning, developing, communicating and rolling out changes, changes that include knowledge management.

Nonetheless, the potential of this research to be expanded in the future is apparent. Opportunities for future research include the specific mapping of IT KM tools to organisational factors and their classification on the notions of explicit and tacit knowledge. Moreover, creative perspectives on the presence and significance of explicit-tacit knowledge dynamics could be formulated in an attempt to classify and identify effective strategies for KM initiatives.

For now, this research has provided the foundation for affirming the direct relationship that exists between IT KM tools and organisational factors, a missing link that has been affirmed through this study.

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APPENDIX A

This Appendix contains the survey questionnaire used to collect information on IT tools and their relationship to organisational factors to support knowledge management strategies in organisations.

Knowledge Management Tools

1. Do you use any IT Support Tools?

Yes

No

Other (please specify)

2. How often do you use the below IT tools?

	Frequently(daily)	Weekly	Occasionally
Enterprise portals	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Document management	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Groupware	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
E-learning	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Community support systems	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Search technologies	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

Other (please specify)

3. How long have you been using IT knowledge management tools?

1 year or less

2 - 5 years

5 - 10 years

10 years or more

Other (please specify)

4. What reasons make you use IT tools? Please rank these reasons (1 being the highest and 4 the lowest).

	1	2	3	4
Improve efficiency and performance	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Reduce costs (e.g. Training and retention of knowledge)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Continuity/preservation of knowledge assets	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Potential to innovate or grow as an organization	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Other (please specify)	<input type="text"/>			

5. What are the factors you considered important for the right IT tools for Knowledge Management? Please select all that apply.

- Organizational factors
- Availability in marketplace
- Cost
- Perceived benefit(s) such as strategic advantage
- Popularity of technology and used by other organizations

Other (please specify)

6. What benefits do you reap from using IT Support tools? Please select all that apply

	Yes. Definitely.	Yes. Somewhat.	No. Somewhat.	No. Definitely not
Improved organizational performance/efficiency	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Continuity/preservation of knowledge/knowledge assets	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Innovation and thus strategic advantage	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Ability to leverage on IT to create, manage and utilize knowledge	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Other (please specify)	<input type="text"/>			

7. How effective are IT Support tools in helping to manage knowledge?

- Extremely effective (8 - 10)
- Somewhat effective (5 - 7)
- Somewhat not effective (2 - 4)
- Definitely not effective (0 - 1)

Other (please specify)

Knowledge Management and organizational Factors

1. Do you agree with the statement that: "The success of an IT Support tool is dependent on organizational factors such as organizational culture, knowledge, reward, usage of IT and IT infrastructure"?

- Strongly Disagree (0 - 1)
- Somewhat Disagree (2 - 4)
- Somewhat Agree (5 - 7)
- Strongly Agree (8 - 10)

Other (please specify)

2. Which of the following organizational factors are strong indicators for the selection of Knowledge Management IT tools? (Check all that apply)

- Organizational culture
- Organizational structure (flow of knowledge)
- Internal technical/IT culture
- Resistance to change/employee's attitude to change
- Management commitment
- Training and education

Other (please specify)

3. How important is organizational culture (that is member's individualism, culture of sharing etc.) in the selection of an effectiveness of an IT Support tool in managing knowledge?

- Extremely Important (8 - 10)
- Somewhat Important (5 - 7)
- Not Important (2- 4)
- Extremely not Important (0 - 1)

Other (please specify)

4. How important is the organization's structure, management support, technical or IT culture in the selection of an effective IT Support tool in a managing knowledge?

- Extremely Important (8 - 10)
- Somewhat Important (5 - 7)
- Not Important (2 - 4)
- Extremely not Important (0 - 1)
- Don't know. Can't say.

Other (please specify)

Tacit and Explicit knowledge

1. Does your current IT Support tools for sharing and preserving knowledge help you create, preserve and utilize knowledge?

Yes

No

Other (please specify)

2. What IT tools will you use to manage types of knowledge below?

	Document Management system	E-learning	Enterprise Portal	Groupware (e.g. wiki, email)	Community support systems
Undocumented Knowledge	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Documented Knowledge	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

Other (please specify)

3. Do you have in place some kind of reward for employees to encourage mentoring, documentation and sharing of knowledge?

Yes

No

Other (please specify)

4. What are the examples of undocumented and documented knowledge part of your work?