The Influence Of Information Technology On The Knowledge Management Process

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ABSTRACT:

Due to rapid development of knowledge management and information technology, business environments have become more competitive. Knowledge is increasingly being recognized as a vital organizational resource that provides competitive advantage; IT can help a company's aiming to gain a competitive advantage. The role of information technology in knowledge management is an essential consideration for any company wishing to exploit emerging technologies to manage their knowledge assets.

This paper examines the influence of IT tools, technology, organization information, IT accessibility for employee, IT supports, IT skill, and IT infrastructure and investment on knowledge management process .The survey questionnaires were distributed to the IT department employees in MSC Malaysia world class companies in Klang valley. The finding of the study and data analysis indicates that all the IT elements except IT supports have positive relationship with knowledge management process. Although many organizations have practices KM in their organizations, there is a need to develop a proper IT model in KM implementation. The present study would be valuable to industrial practitioners because the proposed model can serve as a practical assessment for measuring the IT factors KM implementation

Keywords: *Information technology, Knowledge management process, MSC Malaysia.*

1. Introduction

In today's highly competitive marketplace, knowledge is the important source of improving performance and it is the structural asset that allows sustainable competitive advantage in competitive environments (Alavi and Leidner, 1999). Due to the fast growth of knowledge, vital information needs to be accessible to employees. Hence, it is important to recognize how to rapidly store, capture, transfer, and use knowledge to maintain a competitive advantage (Bolisani and Scarso, 1999).

Knowledge management investments continue to increase dramatically from year to year. Effective knowledge usage improves competitive advantage and increases organizational success. The importance on knowledge has led to improved attention to information technology as one of the most significant bases of competitive advantages. It plays an important role in forming organizational activity for knowledge management. It is a significant tool for an effective organization and contains the capture, the process, the storage, the transferring and sharing of knowledge. Knowledge management without IT is unusable for competitive ends. IT can develop knowledge creation, transfer and searching, that grows communication, transfer, storage and sharing of organizational knowledge (Lee and Suh, 2003) as well as increasing the dynamic abilities of the enterprise.

A study from the American Productivity and Quality Center displays that organizations boarding is usually reliant on knowledge management efforts, for achieving their goals, on the setting up of an appropriate IT infrastructure (McCampbell et al., 1999).

Hence, this paper would like to discover the role of IT in knowledge management process and to examine the extent of IT influence on knowledge management in Malaysian telecommunication industry.

2. Knowledge Management Processes

Knowledge is a justified individual belief that grows a person's capability to take effective action (Nonaka, 1994). It is information that has value and the cooperative understanding of the organization (Arthur Anderson and APQC, 1996).On the other hand, knowledge management, refers to a general managerially method for gaining, shaping and connecting both explicit and tacit knowledge of human resources thus other individual might find to be more useful and dynamic in their work. Knowledge management contains the capability of organizations to be adaptable and reply more rapidly to change in the market environment, and the capability for being innovative and new in order to improve decision making and efficiency (Alavi and Leidner, 1999).

KM process is the center of KM. Most researchers defined knowledge management process (Lee and Choi, 2003). Table 1 shows the classification of Knowledge management process. Knowledge managers help the organization increase the efficiency of their knowledge processes. The main key of the knowledge management processes is to help the flow of knowledge among employees .

Table 1: Knowledge Management Process

Author(s)	Knowledge management process
Alavi and Leidner (2001)	create, store, transfer, apply
Gold et al (2001)	acquiring, converting, Appling, protecting
Leonard and Barton (1995)	acquire, sharing, storage, using knowledge capture, transfer
KPMG (1998)	creation, exploitation, application, dissemination, encapsulation, sharing sourcing, learning
Nonaka and Takeuchi (1995)	acquiring, sharing tacit knowledge, creating, justifying
Wiig (1995)	creation, manifestation, use, transfer

Based on the literature, the characteristics of KM process abilities allow them to be grouped into the dimensions of knowledge creation, sharing, storage, transfer and, and application.

2.1. Knowledge Creation

Structural knowledge creation includes improving new idea or changing current idea in the organization's both tacit and explicit knowledge (Pentland 1995). Knowledge is created over cooperative processes same as a person's cognitive processes and can be shared, and justified in structural sets (Nonaka 1994). Knowledge creation is supported by the processes and activities of improvement, opinion and communication (Alavi and Leidner, 2001). Knowledge creation refers to the improvement of new organizational know-how and ability (Nonaka, 1994; McLean, 2001). Knowledge originates in persons or socially (Alavi and Leidner, 2001). Some organizations assign devoted resources to the knowledge creation process. IT could thus play a critical role in the knowledge creation process over its support of cooperative relations among persons.

2.2 Knowledge Storage

In companies that create knowledge, they do not remember, forget and lose of the developed knowledge (Duffy, 2000). Therefore, storing, organization, and recovery of organizational knowledge (Fyyad and Uthurusamy, 1996) are important parts of effective organizational KM. Knowledge exist in many factors as well as information stored by databases system, documented organizational actions and organized people knowledge stored in system by persons knowledge and networks of persons (Alavi and Leidner, 2001).

Knowledge storage refers to development of organizational memory and the means for accessing its idea. Many organizations save large volumes of transactional data. However, data is rarely of direct

benefit (Fyyad and Uthurusamy, 1996). Knowledge storage uses IT for storing of knowledge. Data warehouse is a centralized source that integrates and creates data. Data warehouse then helps to find important data (Alavi and Leidner, 2001). Data mining is an useful technique for uncovering such information. Data mining is explained as the process of searching for unknown correlation in the data by looking for interesting patterns .

2.3. Knowledge Transfer And Sharing

Knowledge transfer and sharing are a key process in KM. Transfer occurs at numerous levels: from persons to explicit sources, from persons to sets, between sets, transfer and sharing of knowledge between persons and from the set to the business. Transfer and sharing are important process of KM in structural settings by knowledge to locations where it is wanted and can be used. This is not a simple process because in many organizations they frequently do not identify what they know and frequently process is weak in system (Argote and Ingram, 2000). Knowledge transfer in organizations drive Communication processes and information flows (Gupta and Govindarajan, 2000). IT can increase knowledge transfer by some tools for formal communication such as email, teleconference, and internet (Alavi and Leidner, 2001).

2.4. Knowledge Application

One of the important parts of the knowledge system in the organization by basis of competitive advantage exists is knowledge application. Combination of knowledge to generate capability of organizational value is organization's routine. In business, knowledge is used to improve the values and actions and process. Knowledge application refers to the use of knowledge for solving the problem and decision making by persons in organizations. Knowledge cannot make structural value. Its application of new knowledge by persons is complex (Alavi and Tiwana, 2003). Knowledge application has positive effect and improves by IT and IT helps the capture and updating. IT can also improve the speed of knowledge application by codifying (Alavi and Leidner, 2001, Lee and Choi, 2003).

3. Information Technology (IT)

IT is the acquisition, processing, storage and dissemination of information by a technological based combination of computing and communications. IT is important in its own right and remains a key success factor in the improvement of an effective KM process (Browning, 1990). In the business world, IT has become a common force and from that time until now, IT can be used for information storage, information protection, information process, information transferring.

In addition, IT can help in achieving the organization objectives. Internet, data mining, browsers, data warehouses, and useful program can arrange and improve organization KM (Alavi and Leidner 1999) and thus improve organization performance (Ray, 2008) as well as gains competitive advantages. The role of information technology (IT) in sharing, transfer and storage knowledge is very important. KM without IT is useless for competitive ends. Knowledge formation and distribution are upgraded by IT that improves communication, transfer, storage and sharing of organizational knowledge (Lee and Suh, 2003; Ray, 2008). Thus, many organizations utilize IT, especially to store and transfer explicit knowledge (Nonaka and Takeuchi, 1995; Johannessen et al., 2001).

IT can be categorized into seven elements including IT tools, technology, and organization information, IT accessibility for employee, IT support, IT skill, IT infrastructure and investment. Table 2 shows the elements of information technology that is supported by many researchers in the literatures.

Table 2: Information Technology Elements

Author(s)	Information technology
Borghoff and Pareschi (1997), Rasli and Mohd (2008)	IT tools

Chan (2000), Duffy (2000), Rasli and Mohd (2008), Hawamdeh (2002)	Technology
Barton (1995), Gold et al (2001)	Organization information
Gupta and Govindarajan (2000), Azari (2008), Peck (1999)	IT accessibility for employee
Attaran (2003), Gold et al (2001), Gupta and Govindarajan (2000), Bolisani and Scarso (1998)	IT supports
Rasli and Mohd (2008), Agnihotri and Troutt (2008)	IT skill
Borghoff and Pareschi (1997), Rasli and Mohd (2008), , Chanopas (2001)	IT infrastructure & investment

3.1. IT Tools

Information technology tools is about software and hardware that can be used for connections between individuals over such tools as email, video conferencing, chat rooms, and online learning and also for storing information such as databases and data mining and data warehousing (Borghoff and Pareschi, 1997). Important point for using IT tools is managing knowledge and also IT tools are responsible to gather, process, store and transfer the information in order to help managers and personnel for supporting decision making and improving competitive advantage. Considering about IT tools could be applied to the managing of organizational knowledge and can be useful to approve a framework of organizations (Rasli and Maseri, 2008). Hence,

H1: IT tools have significant effect on KM process

3.2. Technology

Technology support is the significant element of KM and IT for improving organization performance. IT processes data, collects information, stores collected materials, acquire knowledge, and accelerates communication (Chan, 2000). The most valuable role of technology in the business structure is in improving the speed of knowledge transfer (Duffy, 2000; Rasli and Maseri, 2008). Technology enables the method of transferring and information replacing. It is coping with insecurity of knowledge (Suliman, 2002). The technology part of knowledge infrastructure includes the IT that allows the combination of knowledge and information in the business. IT has allowed the whole organization to support and distribute knowledge (Wang et al, 2006). Hence,

H2: Technology has significant effect on KM process

3.3. Organizational Information

Organizational structure of the organization should support the implementation of Knowledge management and IT. It is vital for all organization to use IT structure and knowledge management system (Gold et al, 2001). IT has the ability to enable knowledge and reduces obstacles to communication in a company. Flexible structures of organization support knowledge storage, knowledge transfer and knowledge management (Stenmark, 2002) and also apply IT to search, use and keep existing organizational information. Hence,

H3: Organizational information has significant effect on KM process

3.4. IT Accessibility For Employee

One of the main critical aspects in organization is accessibility of IT for employees (Peck et al, 1999). Finding persons with IT skill and maintaining them in the right place is the key to organizational efficiency. Employees are those who handle business concerns, communicate through the organization (Gupta and Govindarajan, 2000). Highly motivated employees in IT skill could provide organization to improve decision making. Employees must easily access necessary information and apply IT to create new knowledge. To reach desired business performance, the organization should have knowledgeable, skillful, and motivated employees in IT. Employees should have ability understanding IT. Employees have to be trained in specific parts of IT and be able easily use IT infrastructure (Azari, 2008). Hence,

H4: IT accessibility has significant effect on KM process

3.5. IT Supports

Information filtering has become an important type of IT support for knowledge employees, who are faced with ever growing amounts of information. Management support also focuses on creating a knowledge infrastructure and support system that improves and enables the sharing and application of knowledge at the suitable levels (Attaran, 2003). IT can play important role to provide information to maintenance the method and cricumstances that support knowledge managemenet. IT support is the amount of KM which is supported by IT use. IT is a vital element for knowledge transfer and creation (Gold et al, 2001; Gupta and Govindarajan, 2000). Employees can easily access to the necessary knowledge. Hence,

H5: IT support has significant effect on KM process

3.6. IT Skill

All abilities are combined by IT human skill to offer unique services to the organization. there are numerous ideas to improve the knowledge of the employees: employees education level can be promoted from time to time to improve their appreciation of the importance of knowledge management and IT, employees can be exposed to Knowledge management and IT ideas and actions in order to get their support, a devoted IT skilled should be assigned to manage IT efficiently (Rasli and Maseri, 2008). The IT group can play important role in the strategic decision processes. IT specialists are often involved in necessity studies, systems structure, installation of hardware and software (Rasli and Maseri, 2008; Agnihotri and Marvin, 2009). IT knowledge employees can design and handle an organization, IT infrastructure and manage IT activities of the competitors for an organization's business (Wang et al, 2006). Hence,

H6: IT skill has significant effect on KM process

3.7. IT Infrastructure And Investment

Information technology is very important in organizations for achieving goals by using an appropriate IT infrastructure. Knowledge management pushes management to high investments in IT (Borghoff and Pareschi, 1997). Knowledge Management is about transmitting, sharing and storage. To manage an organization's knowledge needs a specific set of IT infrastructure and IT. Management should provide enough budgets for Knowledge management, IT, IT infrastructure and IT activities and the potential of developing technologies for an organization's business (Rasli and Maseri, 2008). All organizations increasingly invest in IT. Implementing IT infrastructures requires substantial financial and non-financial investment. IT infrastructure flexibility is the capability to easily support a wide variety of hardware, software, communication, data, applications, skills, abilities, commitments and the employee's factor. All of these are achieved by strong IT investment in organizations (Chanopas et al, 2006). Hence,

H7: IT infrastructure and investment has significant effect on KM process

4. Information Technology (IT) And Knowledge Management (KM)

IT has a key role in achieving the knowledgeable organizational objectives (Alavi and Leidner 1999). The role of IT in sharing, transfer and storage knowledge are very important especially for document management, storage, search and knowledge sharing to improve organizational effectiveness. KM without IT is useless for competitive ends.

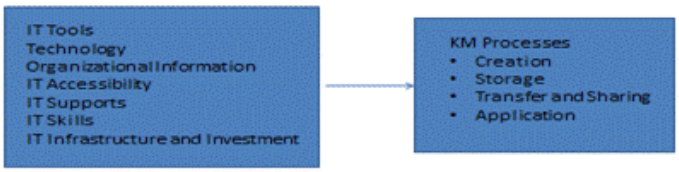
IT theories are common in the current business environment. IT is a tool which can achieve, collection, and transfer basic knowledge. IT can make the knowledge warehouse accessible to staffs (Davenport and Prusak, 1998). KM process, the fascination, making, organization, collecting, share and distribution are supported by IT. Organization can extract information by using data mining in database (Wang et al, 2006). IT application can grow the active abilities of creativity. IT shows a significant role in defining the achievement of the KM application (Davenport and Prusak, 1998). The development of KM has been closely dependent on information and communication technology (Junior, 2001; Egbu, and Botterill, 2002). The effect of IT in KM includes the capture, the storage and the transferring of knowledge. IT construction and the corresponding IT strategy can support the business strategy (Junior, 2001).

5. Research Methodology

Based on the theoretical foundation for the proposed hypotheses, the following research framework is developed for the effect of information technology in knowledge management and is shown in Figure 1. Survey was used to test the effect of IT on KM process in Malaysian telecommunication organizations. There are three sections on the questionnaire. Section A contains demographic background measured in categorical scale. Section B, contains measurement items for the seven constructs of IT and Section C, contains KM processes. These questions are measured by using Likert scale. Pilot study was done on 2 KM lectures, five KM industry experts and ten IT employees. Cronbach's alpha coefficients values was 0.896 and this shows that the questions are reliable and therefore accepted.

A total of 300 IT employees from telecommunication organizations in Klang Valley Malaysia was randomly selected. 100 questionnaires was collected within a four-week period, from 15th June 2011to 12th July 2011.

Figure 1 Research Framework



6. Findings

Table 3 shows the demographic background of the respondents. 55% from the respondents are female. 78% from the respondents are in between 25-45 years old. 43% hold bachelor degree while 32% hold master degree. 30% of them are managers whilst 49% are senior staff. 25% of them are having 1-3 years while 39% of them are having 4-6 years in their current position.

Table 3: Demographic Background Of The Respondents

	Percentage (%)
Gender	
Male	45
Female	55
Age	
< 25	13.1
25-35	45.5
36-45	32.3
Above 45	9.1
Education level	
Diploma	13
Bachelor	43
Master	32
PhD	12
Position	
Junior	20
Manager	30
Senior staff	49
Partner	1
Number of Years in Current Position	
1 year or below	10
1-3 years	25
4-6 years	39
7-9 years	16
10-12 years	3
Above 12 years	7

Descriptive analysis was performed to compare their means and standard deviation . Table 4 shows that IT tools are the most important component among the IT components. It indicates the highest mean with 4.168, followed by organizational information (4.125) IT infrastructure and information (3.953), IT accessibility (3.78), IT support (3.775) and technology (3.745). IT skills scored the lowest (3.677).

Table 4: IT Components

IT Components	Mean	Standard Deviation
IT Tools	4.168	.519
Technology	3.745	.691
Organizational Information	4.125	.557
IT accessibility	3.78	.579
IT Support	3.775	.519
IT Skill	3.677	.563
IT Infrastructure Investment	3.953	.633

Pearson correlation was then performed to test the hypothesis of the study. All of the seven components have shown significant relationship with the KM process (Table 5).

Table 5: Pearson Correlation

IT Tools	Technology	Organizational Information	IT Accessibility	IT Support	IT Skill	IT Infrastructure Investment
.356**	.428**	.586**	.566**	.385**	.584**	.597**

** significant at p<0.05

Table 6 shows that the effect size of the present study is considered as large because the coefficient of determination (R2) is 0.574. This R2 value indicates that 57.4 percent of KM process can be explained by the seven IT factors. As shown in Table 6, the overall model yields a good fit to data because F-statistic = 17.691 (p-value = 0.000) is significant at the 5% level.

The results of multiple regression analysis shows that IT tools (beta coefficient = 0.354, p-value < 0.001), IT accessibility (beta coefficient = 0.296, p-value < 0.001), IT Infrastructure (beta coefficient = 0.263, p-value < 0.05), organizational information (beta coefficient = 0197, p-value < 0.05), technology (beta coefficient = 0.175, p-value < 0.1), and IT skills (beta coefficient = 0.163, p-value < 0.1) are positively associated with KM practices. On the other hand, IT support has no significant relationship with KM process. Therefore, all hypotheses are statically supported except H5.

Table 6: Results Of Multiple Regression Analysis

		Unstandardized Coefficients		Standardized Coefficients	*t*	Sig.
		β	Std. Error	*β*		
1	(Constant)	1.099	0.285		3.860	.000
	IT Tools	.307	.068	.354	4.267	.000***
	Technology	.109	.056	.175	1.966	.052*
	Organizational Information	.153	.075	.197	2.028	.045**
	IT Accessibility	.220	.061	.296	3.619	.000***
	IT Supports	.079	.078	.096	1.017	.312
	IT Skill	.125	.075	.163	1.667	.099*
	IT Infrastructure	.179	.061	.263	2.925	.004**
	R^2	0.574				
	Adj. R^2	0.541				
	Sig. *F*	0.000				
	F-value	17.691				

Dependent Variable: KM Process
Note: *** *p<0.000*, ** *p* < 0.05 , **p<0.1*

7. Discussion

This research aims to discover the role of IT in the growth and sustainment of organizational KM; to determine the role of knowledge creation, storage, distribution and sharing, and application processes in the organizational assimilation of information technologies; and to examine how IT can affect KM. IT changes positive information into knowledge that is important to management (Alavi and Leidner, 1999). The function of IT plays an important role in forming organizational activity for KM.

The findings for impact of IT in KM process in telecommunication companies showed that, all the six components in IT are important in KM process except IT supports. It means that overall the role of IT is very critical and important in KM. IT is necessary for document management, storage, search and knowledge sharing to improve organizational effectiveness. Based on the case study of Alavi and

Tiwana in 2003 in United States there is significant positive relationship between IT and KM process. So, the analysis corroborates with findings in this study. This current finding is related to Lee and Suh (2003) and Ray (2008) where they have confirmed that there is strong positive effect between IT and KM process.

IT is important in its own right and remains a key success factor in the improvement of an effective KM process (Browning, 1990). IT can increase knowledge transfer by some tools for formal communication such as email, teleconference internet (Alavi and Leidner, 2001). IT has positive effect and improves KM process and IT helps the capture and updating. With IT, organizations can improve the speed of KM by codifying (Alavi and Leidner, 2001; Lee and Choi, 2003).

IT tools are used to improve and help KM organizations to make an infrastructure and the control, possible, and efficacy of the principal KM processes. IT tools are used for support of numerous KM process of acquisition, storing, disseminate, sharing and utilization (Alavi and Leidner, 2001). Based on the study of Rasli and Maseri in 2008 there is positive relationship among IT tools and KM process. Therefore, these analyses confirm with the outcome of this study and there is weak positive relationship between IT tools and KM processes.

IT accessibility for employee is significant related to KM process IT can help in achieving the organization objectives. Internet, data mining, browsers, data warehouses, and useful program can arrange and improve organization knowledge management (Alavi and Leidner 1999). Alavi and Leidner (1999) examined development of IT accessibility for employee to improve KM process. Based on the data analysis results, IT had a significant positive influence on KM process. So the finding is confirmed and can be supported.

IT infrastructure and investment also shows significant result as IT infrastructure flexibility is the capability to easily support a wide variety of hardware, software, communication, data, applications, skills, abilities, commitments and the employee's factor. All of these are achieved with strong IT investment in organizations. IT infrastructure & investment could thus play a critical role in the knowledge management process over its support of cooperative relations among persons (Fyyad and Uthurusamy, 1996). Referring to Junior (2001), there is positive relationship among IT infrastructure and investment and KM processes so the examination validates with the result in this research. In addition, result is confirmed by Wang et al (2006), Rasli and Maseri (2008) and they have established that positive and strong relationship between IT infrastructure and investment with KM process.

The significance of organizational information and KM process shows that the organization uses data management system and information technology, so it is an important factor for KM process. Referring to Davenport and Prusak (1998) and Wang et al (2006) correlation among organization information and KM process is positive hence this result is the same as this finding and can be supported by previous studying. Also shows that this finding is similar with theory of Egbu. and Botterill (2002), Nonaka and Takeuchi (1995) and can be sustained by this study.

Technology is also another influencing factor of KM process. The technology part of knowledge infrastructure includes the IT that allows the combination of knowledge and information in the business. Technology has allowed the whole organization to support and distribute knowledge. Based on the research by Wang et al (2006) in USA, there is positive relationship between technology and KM process. Hence, the analysis verifies the finding in this research. Finding in this study is related to Rasli and Maseri (2008) and Suliman (2002). They have established that there is positive relationship among technology and KM process.

Lastly, IT skill is very significant in each organization. Considerations about IT skills could be applied to the managing of organizational knowledge and can be useful to approve a framework of organizations (Rasli and Mohd, 2008). According to Azari (2008), Alavi and Tiwana (2003), association between IT skill and KM process is positive and result can be validate by earlier study. To reach desired business performance, the organization should have knowledgeable, skillful, and motivated employees in IT. Employees should have ability for understanding IT. Employees have to be trained in specific parts of IT and be able to use IT infrastructure easily (Azari, 2008).

Overall,, IT application can grow the active abilities of creativity. IT shows a significant role in defining the achievement of the KM application (Davenport and Prusak, 1998). The development of KM has been closely dependent on information and communication technology (Junior, 2001; Egbu and Botterill , 2002).The effect of IT in KM includes the capture, the storage and the transferring of knowledge. IT construction and the corresponding IT strategy can support the business strategy (Junior, 2001).

8. Implications

In today's business environment, organizations are gradually realizing the significance of knowledge management. Knowledge is an important element for gaining competitive advantage and many organizations are starting to implement KM activities. The practical contributions of this research are that organizations planning to implement KM, within their own organizations, will be able to know how IT elements are able to have impact in KM processes. Although many organizations have practices KM in their organizations, there is a need to develop a proper IT model in KM implementation. The present study would be valuable to industrial practitioners because the proposed model can serve as a practical assessment for measuring the IT factors Km implementation. Based on this assessment, management can then identify which IT factors constitutes a barrier, and direct their resources and effort at improving KM process.

9. Conclusion And Limitation

In conclusion, the results of the study reveal that IT has influence in the KM process. It is found that all the six IT factors have a strong positive significant effect on KM process. However, this study has some research limitations that should be acknowledged. First, cross-sectional data are used to test the model. It would be worthwhile for future studies to conduct experimental or longitudinal research in which the temporal priority of one factor over another can be tested more clearly. Second, this study does not incorporate moderating variable in examining the relationship between IT factors and KM process. Future research should attempt to include potential moderators such as individual or situational factors, in order to account adequately for the relationships between IT factors and KM process. Third, this study is based on a sample of 100 personnel in Malaysian MSC Status organizations. We recommend that future studies test the proposed model in other industries or other countries.

10. References

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