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# The Contribution of Technological Factors on Knowledge Sharing Quality among Government Officers in Malaysia

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## 1. Introduction

Knowledge management is an emerging discipline with many ideas, discussions and researches that need to be explored (Beckman, 1999). It is multidisciplinary in nature dealing with managing knowledge in organizations (Andersson, 2000). The concept was coined by Karl Wiig during his keynote address for United Nation's International Labour Organization in 1986 (Beckman, 1999). To date, many researches on knowledge management in organizations have been executed worldwide. However, studies on knowledge sharing particularly in public sector in Malaysia are still handful (McAdam & Reid, 2000; Syed Ikhsan & Rowland, 2004). A number of studies in Malaysia limit their scope on antecedents of knowledge sharing or knowledge transfer (Ismail & Yusof, 2008; Syed Ikhsan & Rowland, 2004) from individual, organizational and technological perspectives. It is not evident that empirical research has been conducted to identify the relationship between technological factors and knowledge sharing quality in government agencies except that by Syed Ikhsan & Rowland (2004). However, the study was conducted on one agency only. Therefore, the results of the study could not be generalised to other government agencies.

Syed Ikhsan and Rowland (2004) suggest that public or private sector need to manage knowledge to ensure that the organization could take full advantage of organizational knowledge. Prevalently, the Ninth Malaysia Plan (2006) reported that there is lack of information/knowledge sharing among government agencies. Why? To answer the question, it is important to investigate factors that hinder public employees from sharing their knowledge particularly technological related factors. Thus, the objectives of this paper are:

- To investigate technological factors that influence knowledge sharing quality among government officers.
- To identify the most important technological factor that influence government officers' knowledge sharing quality.

In the following section, we present literature review related to the study. This is followed by the research theoretical framework, research methodology and discussion on the results. As conclusion, we summarize the main findings and discuss the limitations of the research.

## 2. Literature Review

### 2.1. Knowledge Management, Knowledge Sharing and Information Technology

Knowledge management is a process that encompasses three main elements: organizational learning, information management and information technology (Stoddart, 2001). Organizational learning is closely related to changing employees' attitude towards knowledge sharing whereas information management focuses on categorization, compilation and access to information and data in computer applications. Stoddart (2001) views information technology as tools to facilitate the flow of information and knowledge sharing. This indicates that information technology is part of knowledge management and it plays an important role in knowledge sharing.

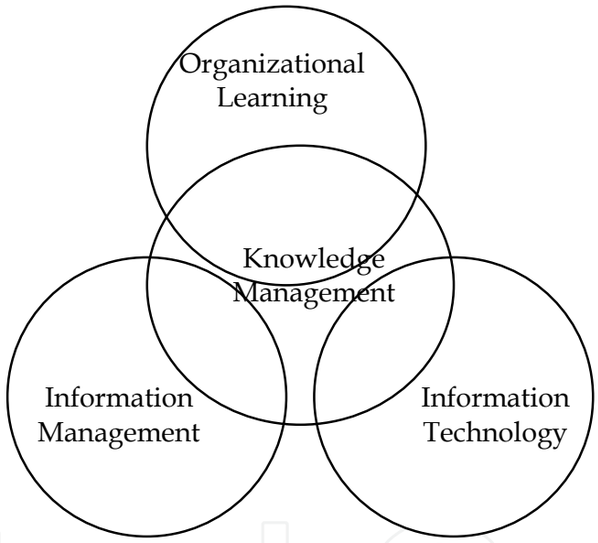


Fig. 1. Three elements of knowledge management (Stoddart, 2001)

Knowledge that is shared by individuals in organizations becomes organizational knowledge and could be described by four modes of knowledge exchange (Nonaka & Takeuchi, 1995; Sveiby, 1997). These are socialization, externalization, combination and internalization. Based on these modes, Van den Brink (2003) explains the knowledge sharing process that occurs in each mode as shown in Table 1.

The process of knowledge sharing could take place either through technology-mediated channel or non-technology mediated channel (Lee & Al-Hawamdeh, 2002). Technology-mediated channel could be in the form of video-conferencing, listservs, newsgroup, groupware, virtual team rooms, e-mail, voicemail, etc. (Lee & Al-Hawamdeh, 2002). Thus, the reliability of technology is paramount for knowledge sharing (Lee & Al-Hawamdeh, 2002) because it has become a facilitator for knowledge transfer (Roberts, 2000).

| | Process | Knowledge sharing |
|---|---|---|
| 1. | Tacit to tacit (Socialization) | Knowledge is shared during social interaction such as story telling that enable transfer of complex tacit knowledge from an technological to another. |
| 2. | Tacit to explicit (Externalization) | Knowledge sharing happens when an individual try to communicate his/her tacit knowledge with others through for example writing ideas and thoughts in the form of theory. |
| 3. | Explicit to explicit (Combination) | When knowledge is written in the form of documents, it is shared with other people. If they combine their knowledge, it will create new ideas that written on papers. |
| 4. | Explicit to tacit (Internalization) | Human can get knowledge when rational behind a document is informed by other individuals. |

Table 1. Knowledge sharing process and SECI modes adapted from Van den Brink (2003) and Nonaka & Takeuchi (1995)

### 2.2. Technological Factors and Knowledge Sharing

Technology is defined as material artefacts such as software and hardware used to perform duties in organization (Orlikowski, 1992). A lot of innovative software has been developed to enable knowledge sharing (Lee & Al-Hawamdeh, 2002) and as a result more than 1800 software products have been labelled as knowledge management solutions (Edgar, 1999).

According to (Orlikowski, 1992), the concept of technology comprises of two main elements i.e. scope and function. In terms of scope, there are two types of research. One, research that considers technology as 'hardware'; and two, views technology as 'social technology'. In terms of function, early research predicts technology as an objective while other research focuses on technology as a product which include people action on technology. The latest research refers technology as soft determinant in which technology is considered as external factor that has impact but controlled by human and organization.

Nevertheless, technology plays important role in knowledge management. Though it is not the centre of knowledge management, but it plays critical role as an enabler in increasing the level of knowledge sharing among employees (Andersson, 2000). Technology has always been the main variable in organizational theory (Orlikowski, 1992) and "*The fundamental requirement of knowledge sharing has always been technology*" (Lee & Al-Hawamdeh, 2002). It facilitates and accelerates the process of knowledge sharing both intra and inter-organizations beside plays an important transformational role in changing corporate culture to knowledge sharing (Gurteen, 1999). Information technology has the potential to affect the functions of coordination and communication within and inter organizations (Fountain, 2001). The role of information technology in knowledge sharing has been studied by communication theorists (Binz-Scharf 2003). For instance, Yates et al. (1999) research on how a new electronic medium being adopted and used by a firm to identify the types of communication shaped by groups based on their needs. These patterns change the social interaction between groups (Yates et al., 1999). Thus, to McDermott (1999) current development in information technology encourage organizations to think of new ways of sharing knowledge such as storing documents in a common knowledge base and use electronic networks to share knowledge within the entire organizations.

Despite the function of ICT as facilitator to knowledge transfer, a number of studies were conducted to identify technology-related factors that affect knowledge sharing behaviour. For instance, Riege (2005) lists 7 technological barriers that hinder people from sharing knowledge such as:

- Lack of information technology process and system integration which limit employees to work.
- Lack of internal and external technology support.
- Unrealistic expectation what technology can do and cannot do.
- Mismatch between technological needs, systems integration and information technology processes.
- Reluctant to use information technology because of not familiar to.
- Lack of training to get use to new information technology systems and processes.
- Lack of communication and usage of new system advantages compared to current system.

The high dependency on information technology has resulted in quick need for effective knowledge management (Sena & Shani, 1999). Organizations need to ensure the value of data is optimised when it is managed so that it can be shared by many applications and knowledge workers. In this regard, technology is to be exploited to disseminate information (English, 1996) as it could provide a bigger and deeper space to the creation, storing, transfer and application of knowledge in organization (Alavi & Leidner, 2001).

Based on Orlikowski (1992), technology in this paper is defined as Information Communication Technology (ICT) which includes software and hardware used by employees in organizations in executing their duties. Synthesizing from Orlikowski's concept of technology and the study by Syed Omar & Rowland (2004), three constructs are identified as technological factors that affect knowledge sharing quality among public sectors employees namely ICT infrastructure, ICT tools and ICT know-how.

### a) ICT Infrastructure

The causal relationship between knowledge and technology has lead to the invention of computers (Binz-Scharf, 2003). The role of computer in enabling knowledge sharing is significant. Therefore, ICT infrastructure needs to be in place to facilitate the endeavour (Beckman 1999) especially to support the creation, structuring, penetration and usage of knowledge (Brink, 2003). It is impossible for organization to embark on knowledge sharing without proper ICT infrastructure (Hasanali, 2002) as its presence particularly in the form of new technology and systems could increase technological motivation to share knowledge (Hendriks, 1999). The effectiveness of knowledge management depends on the readiness of employees to share knowledge through computers that can be accessed by all employees in the organization (Syed Ikhsan & Rowland, 2004). The up to date ICT infrastructure could help employee create, transfer and share knowledge (Syed Omar & Rowland, 2004). Sometimes organizations have to overhaul completely their ICT infrastructure in order to make their employees share knowledge (Hasanali, 2002). In this paper ICT infrastructure is defined as up-to-date ICT infrastructure available in their organizations such as computers, networking, internet etc are considered by employees will affect their knowledge sharing quality. Hence, it is hypothesized that:

*$H_1$: ICT infrastructure has a significant effect on knowledge sharing quality.*

**b) ICT Tools**

According to Hasanali (2002), one of factors that contribute to the success of knowledge management is the used of simple technology. It is common that employees become frustrated if they have to clicks more than three times to find knowledge in the system. This indicates that ICT plays dominant role in knowledge management (Smith, 2001). Perhaps, to Anderson and Smith (1998), ICT functions that support knowledge sharing could be grouped into several segments as follows:

i) Office applications such as e-mail, message, calendar and timetable.
ii) Groupware that support teamwork and collaboration. It provides technological support to teamwork such as databases forum, sharing application, electronic meeting systems.
iii) Document systems that support document creation, storage and management life recycle. Printed document are being replaced by digital documents.
iv) Work process systems – ICT helps and monitors work flow generation and related work process. For example workflow management systems, process support systems and e-form.
v) Analytical systems that support analysis and translation of structured data for strategic planning and operation and decision making. For instance decision support systems and data warehouses.

In this paper, ICT tools or software available in the organization such as groupware, computer-based information systems etc. are considered by employees could affect their knowledge sharing quality. Hence, it is hypothesized that:

*$H_1$: ICT tools have a significant effect on knowledge sharing quality.*

**c) ICT Know-how**

Adequate ICT training is one of the factors that significantly contribute to the success of knowledge management (Hasanali, 2002). Adequate technology and well-trained people are important for knowledge management. A well-implemented technology with a well-trained people are important to make people work effectively and efficiently (Gurteen, 1999). As such, sufficient and appropriate ICT training to all employees has positive relationship with knowledge creation and knowledge transfer. Employees who are familiar with ICT are more ready and willing to share knowledge (Syed Omar & Rowland, 2004). In this paper ICT know-how is defined as the degree to which an employee considers their level of IT literacy would affect their knowledge sharing quality. Hence, it is hypothesized that:

*$H_3$: ICT know-how has a significant effect on knowledge sharing quality.*

### 2.4. Knowledge Sharing Quality

Van den Hooff et al. (2003) define knowledge sharing as a process where individual exchange knowledge (tacit or explicit) and together create new knowledge. Knowledge sharing is a process between individuals (Ryu et al.., 2003) which could not be seen directly

nor observed. Knowledge sharing in a broader perspective refers to '*the communication of all types of knowledge*' either explicit knowledge or tacit knowledge (al-Hawamdeh, 2003). Knowledge sharing occurs when an individual is really interested in helping others to develop a new capability for action (Senge, 1990). Thus, knowledge sharing refers to the willingness of individuals in an organization to share whatever they possess or create with their colleagues (Gibbert & Krause, 2002).

However, it is often a question whether the knowledge shared is of quality. Knowledge sharing is meaningless unless the quality is guaranteed. However, much of previous studies focused on knowledge sharing behaviour instead of the quality. As such, it is deemed necessary to study the quality of knowledge shared rather than limiting to only knowledge sharing behaviour since quality knowledge is becoming the concern of matured community (Chiu et al., 2006). The quality of knowledge is measured in terms of relevancy, easy to understand, accuracy, completeness, reliability and timeliness (Chiu et al., 2006). The items are derived and modified from McKinney et al. (2002) and DeLone and McLean (2003).

## 3. Theoretical Framework and Hypotheses

The framework outlined in this paper is adapted from Syed Ikhsan and Rowland (2004) and Chiu et al. (2006). The former investigates the relationship between technological factors and knowledge transfer performance. While the latter focuses on knowledge sharing quality. In this study, the model is adapted and modified to identify the relationship between technological factors and knowledge sharing quality. The quality of knowledge shared becomes the main focus as knowledge sharing could occur anytime but the quality of knowledge shared is essential.

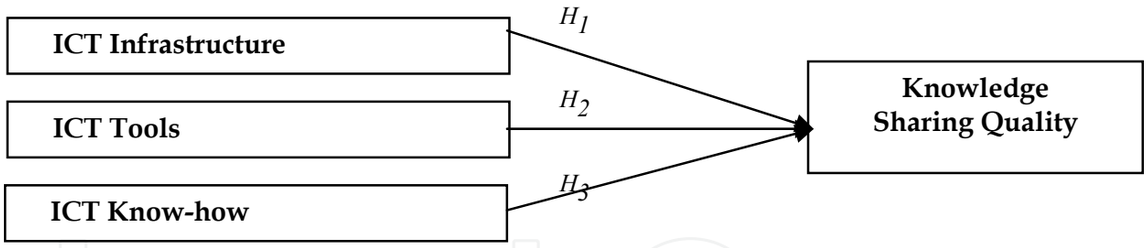


Fig. 1. Theoretical framework of relationship between technological factors and knowledge sharing quality

## 4. Method

### 4.1. Population and Sample

The population for the study are officers from the Management and Professional Group (MPG) in three government agencies in Putrajaya. These officers are middle managers positioned between top management (Premier Group) and supporting staff (Support Group). Middle managers are chosen since they are directly involved in policy making in the public sector human resource, financial management and socio-economic development of the country. Knowledge are aspired and created by middle managers who are the leaders of a working group or task force that mediate the exchange process between top management and supporting staff (Nonaka & Takeuchi, 1995). Moreover, knowledge is

systematically generated at this level (McAdam & Reid, 2000). Policy making and business development are generated by the knowledge-based activities of government agencies (Husted *et al.*, 2005). The agencies are involved in public sector human resource management policies, public sector financial management policies and national socio-economic policies. In this study, stratified random sampling is used to select the sample. Questionnaires were distributed to 734 officers. The return rate is 61. 25% (450) and the number of questionnaires processed are 428. 22 questionnaires are not processed because of missing data is more than 10% (Hair et al., 2006).

### 4.2. Measurement

The measurement used in this study is adapted from Syed Ikhsan and Rowland (2004) (for technological factors); and Chiu et al. (2006) (for knowledge sharing quality). The measurements are modified to suit the public sector context. Technological factors consist of three constructs i.e. ICT infrastructure, ICT tools and ICT know-how. Each of these constructs contains three items. Six items are used to evaluate the response towards the quality of knowledge sharing. The respondents are asked whether they agree to the statements related to technological factors and knowledge sharing quality. All items are measured using a 5-point Likert scale ranging from 1=strongly disagree to 5=strongly disagree.

The questionnaire is pretested and refined to ensure its validity. The pre-test is carried out to ensure the clarity in wording, meaning and validity of the question. Two post-graduate students, four government officers and two experts in knowledge management and statistics were approached to comment on the wordings and questions. The comments provide a basis for improvement in construct measurement. After pre-testing, the refined instrument is pilot-tested with 48 officers to test the reliability of the constructs. The final instrument is then used in the study.

## 5. Findings and Discussion

### 5.1. Demographic Profile of the Respondents

The respondents' demographic characteristics are presented in the Table 1 below.

| Demographic Characteristics and Classification | | Frequency | Percentage |
|---|---|---|---|
| Gender | Male | 195 | 45.6 |
| | Female | 233 | 54.4 |
| Age | <26 years old | 86 | 20.1 |
| | 26 to <30 years old | 125 | 29.2 |
| | 30 to <35 years old | 96 | 22.4 |
| | 35 to <40 years old | 38 | 8.9 |
| | 40 to <45 years old | 28 | 6.5 |
| | 45 to <50 years old | 24 | 5.6 |
| | ≥ 50 years old | 31 | 7.2 |
| Level of Education | PhD | 2 | 0.5 |
| | Masters | 106 | 24.8 |
| | First Degree | 317 | 74.1 |
| | Others | 3 | 0.7 |

| | | | |
|---|---|---|---|
| Position Grade | 54 | 26 | 6.1 |
| | 52 | 43 | 10.0 |
| | 48 | 74 | 17.3 |
| | 44 | 53 | 12.4 |
| | 41 | 232 | 54.2 |
| Years of service in public sector | <1 | 90 | 21.0 |
| | 1-5 | 169 | 39.5 |
| | 6-10 | 55 | 12.9 |
| | 11-15 | 48 | 11.2 |
| | 16-20 | 17 | 4.0 |
| | >20 | 49 | 11.4 |

Table 1. Respondents' demographic characteristics (n=428)

There were 195 (45.6%) male and 233 (54.4%) female respondents involved in the study. Most of them age between 26 to 40 years old (71.7%) and 66.6% are junior managers (grade 41 to 44). Almost all of the respondents have a first degree and 73.4% have less than 10 years work experience in public sector

### 5.2. Descriptive Profile of Technological Factors and Knowledge Sharing Quality

| | Mean | Standard Deviation |
|---|---|---|
| ICT Tools | 3.57 | .727 |
| ICT Infrastructure | 4.05 | .489 |
| ICT Know-how | 3.76 | .578 |

Table 2. Descriptive profile of technological factors

The results indicate that ICT Infrastructure (mean=4.05, S.D=.489) is the most influential factors that affect the quality of knowledge sharing among government officers followed by ICT Know-how (mean=3.76, S.D=.578) and ICT Tools (mean=3.57, S.D=.727) as shown in Table 2.

| | Mean | Standard Deviation |
|---|---|---|
| Relevancy | 4.11 | .462 |
| Easy to understand | 4.06 | .418 |
| Accuracy | 3.85 | .564 |
| Completeness | 3.67 | .639 |
| Reliability | 3.95 | .469 |
| Timeliness | 3.96 | .452 |

Table 3. Descriptive profile of knowledge sharing quality

Table 3 shows the descriptive profile of knowledge sharing quality. The relevant knowledge sharing had the highest mean with a statistical value of 4.11 and standard deviation = 0.462 followed by easy to understand (mean 4.06, SD=0.418) and timeliness (mean 3.96, SD=0.452).

Based on the item mean scores, relevancy is considered as the most important dimension in knowledge sharing quality followed by easy to understand and timeliness of knowledge sharing quality construct.

### 5.3. Goodness of measure

Validity and reliability test are carried out to test the goodness of measure used in the study. Validity test is conducted by submitting data for factor analysis. Factors analysis is a data reduction technique and used to determine whether items are tapping into the same construct. During factor analysis, factors with eigen value of more than one would be retained for further analysis (Hair et al., 2006). To ensure consistency in measurement across time and various items in the instrument (Sekaran, 2005), reliability test was performed by obtaining Cronbach Alpha values.

#### a) Technological Factors

All the 9 items of technological factors are submitted for analysis using Principal Component Analysis (PCA). Initial results indicate that the KMO value is 0.654 which exceeds the recommended value of 0.6 (Kaiser, 1974; Pallant, 2001) and the Bartlett's Test of Sphericity is significant as shown in Table 4 below. The results (KMO and Bartlett's) suggest that the sampled data is appropriate to proceed with a factor analysis procedure.

| | | |
|---|---|---|
| Kaiser-Meyer-Olkin of Sampling Adequacy | | 0.654 |
| Bartlett's Test of Sphericity | Approx. Chi Square | 1891.250 |
| | Df | 36 |
| | Significance | 0.000 |

Table 4. KMO and Bartlett's test for technological factors instrument

| Technological Factors | Component | | |
|---|---|---|---|
| | 1 | 2 | 3 |
| I2. Computer-based information systems provide me with more up-to-date information than that available in manual files. | .892 | | |
| I3. Computer-based information systems make new information available to me that was not earlier available. | .883 | | |
| I1. My organization uses Groupware such as Lotus Notes, Microsoft Exchange to encourage the sharing of ideas. | .729 | | |
| **J1. My organization has a very up-to-date ICT infrastructure which helps knowledge sharing.** | **.505** | **.405** | |
| K2. Employees in my organization are given adequate training internally to use ICT tools. | | .938 | |
| K1. Employees in my organization are given adequate training internally to use computers. | | .931 | |
| K3. The technology know-how among employees is easily transferable. | | .372 | |

| | | | |
|---|---|---|---|
| J3. ICT facilitates my daily work | | | .938 |
| J2. ICT can speed up my work in searching for information | | | .928 |
| Cronbach Alpha | 0.785 | 0.713 | 0.890 |
| Eigenvalues | 3.209 | 1.640 | 1.598 |
| Percentage of common variance | 26.951 | 23.043 | 21.646 |
| Cumulative percentage | 26.951 | 49.995 | 71.641 |

* cutt off point used is 0.30 since the sample is more than 350 (Hair et al.. 2006). All loadings less than 0.30 are not shown

Table 5: Factor analysis and reliability test result on technological factors instrument

Table 5 presents the results of initial varimax factor rotation of all variables for technological factors. All the 9 items loaded on three factors. Four items loaded in Factor 1 with a variance of 26.95, three items loaded on Factor 2 with 23.04 percent and two items loaded on Factor 3 with a variance of 21.65 percent. The total variance achieved is 71.64 percent. One item '*J1. My organization has a very up-to-date ICT infrastructure which helps knowledge sharing*' cross loaded on Factor 1 and Factor 2. In order for an item to be retained, the minimum cross-loading is at least 0.20 (Nunnally & Berstein, 1994). The item is dropped since the different of cross-loading between the two factors is less than 0.2.

The PCA is run again with 8 items without item 'J1'. The KMO value is 0.604 which is above the acceptable value of 0.6 (Kaiser, 1974; Pallant, 2001) and the Bartlett's Test of Sphericity is significant as shown in Table 6. The results show that factor analysis procedure could be performed and all the items loaded on three factors. Three items loaded in Factor 1 with a variance of 27.53, three items loaded on Factor 2 with 24.34 percent and two items loaded on Factor 3 with a variance of 23.78 percent. The total variance achieved is 75.65 percent as shown in Table 7. Reliability test is also performed again without item 'J1' and the results shows that all the Cronbach's Alpha value were between 0.730 to 0.890.

| | | |
|---|---|---|
| Kaiser-Meyer-Olkin of Sampling Adequacy | | .604 |
| Bartlett's Test of Sphericity | Approx. Chi Square | 1723.708 |
| | Df | 28 |
| | Significance | 0.000 |

Table 6. KMO and Bartlett's test for technological factors instrument

| Technological Factors | Component | | |
|---|---|---|---|
| | 1 | 2 | 3 |
| I2. Computer-based information systems provide me with more up-to-date information than that available in manual files. | .905 | | |
| I3. Computer-based information systems make new information available to me that was not earlier available. | .897 | | |
| I1. My organization uses Groupware such as Lotus Notes, Microsoft Exchange to encourage the sharing of ideas. | .721 | | |
| K2. All employees in my organization are given adequate training internally to use ICT tools. | | .946 | |

| | | | |
|---|---|---|---|
| K1. All employees in my organization are given adequate training internally to use computers. | | .939 | |
| K3. The technology know-how among employees is easily transferable. | | .378 | |
| J3. ICT facilitates my daily work | | | .941 |
| J2. ICT can speed up my work in searching for information | | | .929 |
| Cronbach Alpha | 0.799 | 0.730 | 0.890 |
| Eigenvalues | 2.817 | 1.638 | 1.596 |
| Percentage of common variance | 27.527 | 24.338 | 23.783 |
| Cumulative percentage | 27.527 | 51.865 | 75.648 |

* cutt off point used is 0.30 since the sample is more than 350 (Hair et al.. 2006). All loadings less than 0.30 are not shown

Table 7: Factor analysis and reliability test result on technological factors

**b) Knowledge Sharing Quality**

Principal Component Analysis (PCA) is also performed for the 6 items of knowledge sharing quality. The result shows that Kaiser-Meyer-Olkin of Sampling Adequacy (KMO) value is 0.813. This value is excellent because it exceeds the recommended value of 0.6 (Kaiser, 1974; Pallant 2001) and the Bartlett's Test of Spehericity is significant (0.000). The results (KMO and Bartlett's test) suggest that the sampled data is appropriate to proceed with a factor analysis procedure. The PCA extracted one distinct component with eigen values exceeding 1.0. Six items are loaded on a single factor with the variance of 53.65 percent. The Cronbach's Alpha value is 0.827 meeting the acceptable value 0.6 (Sekaran, 2005; Hair et al., 2006) and 0.70 (Nunnally 1978, Nunnally & Bernstein 1994). The results are presented in Table 8 and 9 below.

| | | |
|---|---|---|
| Kaiser-Meyer-Olkin of Sampling Adequacy | | 0.813 |
| Bartlett's Test of Sphericity | Approx. Chi Square | 878.067 |
| | Df | 15 |
| | Significance | 0.000 |

Table 8. KMO and Bartlett's test for trust instrument

| **Knowledge sharing quality** | **Component 1** |
|---|---|
| Q3. Knowledge that I share with my colleagues in my organization is accurate. | .780 |
| Q5. Knowledge that I share with my colleagues in my organization is reliable. | .773 |
| Q6. Knowledge that I share with my colleagues in my organization is timely | .730 |
| Q2. Knowledge that I share with my colleagues in my organization is easy to understand. | .723 |
| Q4. Knowledge that I share with my colleagues in my organization is complete. | .695 |

| | |
|---|---|
| Q1. Knowledge that I share with my colleagues in my organization is relevant to my job. | .689 |
| Cronbach Alpha | 0.827 |
| Eigenvalues | 3.29 |
| Percentage of common variance | 53.651 |
| Cumulative percentage | 53.651 |

Table 9. Factor analysis and reliability test result on knowledge sharing quality

Overall, the results statistically show that the instrument used in the study are valid and measure what it is supposed to measure. The instrument is reliable because of high consistencies with Cronbach Alpha were more than 0.70 for all the factors meeting the acceptable value of 0.70 (Nunnally, 1978, Nunnally & Bernstein, 1994).

### 5.4. Test of Relationship

In order to identify the relationship between technological factors and knowledge sharing quality, correlation analysis is conducted. Correlation analysis indicates the strength and direction of bivariate relationship between the independent and dependent variables. The result of correlation analysis of the study is shown in Table 8 below.

| | Mean | Standard Deviation | ICT Tools | ICT Infra-structure | ICT Know-how |
|---|---|---|---|---|---|
| ICT Tools | 3.57 | .727 | 1.000 | | |
| ICT Infrastructure | 4.05 | .489 | 0.381** | 1.000 | |
| ICT Know-how | 3.76 | .578 | 0.221** | 0.335** | 1.000 |
| Knowledge sharing quality | 3.93 | .367 | 0.224** | 0.274** | 0.339** |

** p< 0.01

Table 10. Correlation analysis

The above results show that all the variables are significantly correlated with knowledge sharing quality. It indicates that ICT Know-how (r=0.339, p<0.01), ICT Infrastructure (r=0.274, p<0.01) and ICT Tools (r=0.224, p<0.01) have shown significant correlations with knowledge sharing quality among government officers. Cohen (1988) suggests guidelines in which the correlation between 0.10/-0.10 to 0.29/-0.29 is low, 0.3/-0.3 to 0.49/-0.49 is moderate and 0.5/-0.5 to 1/-1 is high. Based on the guidelines, ICT know-how has a moderate positive significant correlation with knowledge sharing quality whereas ICT Infrastructure and ICT Tools have low positive significant correlation with knowledge sharing quality.

In order to find the strongest predictor to knowledge sharing quality, a multiple regression is conducted. Multiple regressions also identify how much variance in knowledge sharing quality explained by technological factors. Table 11 show the results of multiple regression analysis.

| | *Dependent variable*<br>Knowledge sharing quality |
|---|---|
| *Independent variables* | (Beta Standardised Coefficient) |
| ICT Tools | 0.111* |
| ICT Infrastructure | 0.142** |
| ICT Know-how | 0.267** |
| F value | 25.82* |
| $R^2$ | 0.152 |
| Adjusted $R^2$ | 0.148 |

** p < 0.01, * p < 0.05

Table 11. Results of regression analysis

The results of multiple regression show that technological factors have significant effects on knowledge sharing quality. The model is significant ($p<0.01$) with F-value of 25.82. The coefficient of determination ($R^2$) is 0.152, which indicates that 15.2% of the variance in knowledge sharing quality is explained by the independent variables (ICT Tools, ICT Infrastructure and ICT Know-how). The results indicate that ICT Know-how ($b=0.267$, $p<0.01$), is the most significant predictor of knowledge sharing quality followed by ICT Infrastructure ($b=0.142$, $p<0.01$) and ICT Tools ($b=0.111$, $P<0.05$) Therefore it can be concluded that all hypotheses ($H_1$, $H_2$ and $H_3$) are supported.

## 6. Conclusion

The findings of the study clearly indicate the achievement of the objectives for the study. Apparently, technological factors have significant positive relationship with knowledge sharing quality. ICT know-how is discovered as the strongest predictor of knowledge sharing quality among Malaysian government officers followed by ICT infrastructure and ICT tools. This shows the role of technology is crucial in knowledge management especially in facilitating and accelerating communications among employees. Simple technology, well-equipped ICT infrastructure and well-trained employees could foster better knowledge sharing. However, a well-equipped technology and easy to use ICT tools are meaningless unless employees know how to make use of it. It is the people that play a critical role. So it is crucial for the government of Malaysia to increase the ICT know-how of its employees in order to increase knowledge sharing quality. The emphasis on hardware and software ought to be balanced with ICT know-how.

Like any other study, this study also experiences some limitations. Firstly, the study is conducted in one location only i.e Putrajaya which is the administrative capital of Malaysian government. Future research will have to be conducted involving various government agencies at both state and district level. Secondly, the study embraces only quantitative approach. To understand better why employees are reluctant to share knowledge, particularly related to technological factors, qualitative approach should be considered. Thirdly, the unit of analysis are officers from middle management group. This is insufficient to draw comprehensive understanding of knowledge sharing in public sector in Malaysia. Thus, top management and supporting staff should be considered in future studies.

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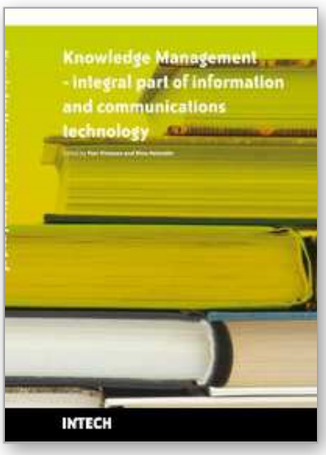


**Knowledge Management**

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This book is a compilation of writings handpicked in esteemed scientific conferences that present the variety of ways to approach this multifaceted phenomenon. In this book, knowledge management is seen as an integral part of information and communications technology (ICT). The topic is first approached from the more general perspective, starting with discussing knowledge management's role as a medium towards increasing productivity in organizations. In the starting chapters of the book, the duality between technology and humans is also taken into account. In the following chapters, one may see the essence and multifaceted nature of knowledge management through branch-specific observations and studies. Towards the end of the book the ontological side of knowledge management is illuminated. The book ends with two special applications of knowledge management.

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