

Information Technology for Knowledge Management in Malaysia: The Effects of Organisational Factors

Fadhilah Aman¹, Ashley Aitken²

¹*School of Information Systems
Curtin University of Technology,
Western Australia 6102, AUSTRALIA
fadhilah.aman@postgrad.curtin.edu.au*

²*School of Information Systems
Curtin University of Technology,
Western Australia 6102, AUSTRALIA
ashley.aitken@cbs.curtin.edu.au*

ABSTRACT

This study attempts to identify organisational factors that could influence the adoption of IT to support KM in a Malaysian setting. In addition to the two major constructs of the technology acceptance model (TAM), a research model was developed by incorporating six variables of organisational factors. Analysis of data collected from a survey of 830 Malaysian listed organisations showed that all variables of organisational factors have significant contribution to the adoption of IT for KM, except management support and commitment, and reward and incentive. This research outlines some management implications and extends the applicability of TAM in Malaysian KM context.

Keywords

Information Technology, Adoption, Knowledge Management, Organisational Factors, Malaysia

1.0 INTRODUCTION

Knowledge management (KM) is undoubtedly a crucial activity that needs to be effectively employed by organisations. KM can be defined broadly as the process, and or efforts, of systematically acquiring, organising, distributing, and applying knowledge to achieve strategic aims of an organisation (Alavi & Leidner, 2001). In Malaysia, numerous studies have identified the importance of managing knowledge effectively in Malaysian organisations to maximise performance, accelerate growth, and also to address the lag of product development and innovation across the nation, in line with the nation's shift to a knowledge economy (Gan et al., 2006; Syed Ikhsan & Rowland, 2004).

Information technology (IT) has been identified as playing a critical role in an organisation's capability to manage knowledge (Wang et al., 2007). IT is defined as "a generic term for the convergence of computers, hardware, software, telecommunications, Internet, electronics and the resulting technologies" (Ruiz-Mercade et al., 2006). In the context of KM, IT is perceived as the knowledge platform or the infrastructure for KM. The use of IT to support KM, however, has had mixed results (Davenport et al., 1999) and it was highlighted that the high number of failures in deploying IT-enabled tools to support KM can be explained by a lack of attention to human and organisational factors (McDermott, 2000).

Managing the use of IT is perceived as a critical role towards successful KM in Malaysian organisations (Syed-Ikhsan & Rowland, 2004). However, numerous studies reveal that there is a gap between the perceived importance of IT tools and the actual utilisation of these tools to support knowledge sharing and transfer activities in these organisations (Chong et al., 2007). Motivated by this concern, we are interested in identifying the organisational factors that may be significant in influencing the use of IT to support KM in Malaysian organisations. The next section presents the theoretical background followed by the proposed research model, hypotheses, method of data collection, results, and finally discussion and implications of the study's findings.

2.0 THEORETICAL BACKGROUND

The technology acceptance model (TAM) is originally conceived by Davis (1989). TAM suggests that perceived usefulness of IT and perceived ease of use are major determinants that affect individual's attitude and intention to use IT. Perceived ease of use is also suggested to have an impact on the perceived usefulness. We use TAM

as the theoretical basis for this study as the model has been specifically applied to IT, as well as KM systems adoption, in information systems research (Money & Turner, 2005). We propose that the TAM constructs relevant to this study are perceived usefulness, or benefits, of using IT for KM and perceived ease of use of IT for KM, which will determine the adoption, or use of IT to support KM in Malaysian organisations. Perceived usefulness is defined as an individual's subjective assessment on the degree to which using a particular system would improve his or her job performance, whereas perceived ease of use is defined as the degree to which a person believes that using a particular technology would be free of effort (Davis, 1989).

2.1 Organisational factors for IT use for KM

In order to provide a more comprehensive model of IT use for KM, we propose to extend TAM to include organisational factors that could influence the extent of IT use for KM either directly or indirectly through perceived usefulness, or benefits, of using IT for KM. A review of the related literature on the investigation of IT use in KM was conducted. Five dimensions of organisational factors were identified to be investigated in this study: i) Management support and commitment, ii) Knowledge sharing culture, iii) Reward and incentive mechanism for sharing knowledge, iv) Having a knowledge classification system, and v) Institutionalisation of IT use for KM into normal work practice. These factors are discussed in detail in section 2.2.

A review of the Malaysian KM literature revealed that the majority of prior research is targeted at specific industries in isolation. Hence, we propose that a study of the use of IT for KM in Malaysian listed organisations would be useful as they cover a range of industries and hence can represent a broader context of Malaysian organisations. A list of all Malaysian listed organisations can be found on Kuala Lumpur Stock Exchange company database at Bursa Malaysia website (Bursa, 2008). In order to investigate the relevancy of the identified dimensions of organisational factors in the Malaysian context, four interviews were carried out in four organisations in Malaysia. Interview respondents were chosen from those who hold at least a managerial position in the IT, or KM, department in a listed Malaysian organisations. The interview results generally support the relevancy and appropriateness of the proposed dimensions in the Malaysian context. In addition, the interviews highlighted the importance of having the appropriate business or KM processes to support KM activities and thus support and facilitate the use of IT for KM.

2.2 Research Model and Hypotheses

The research model (Figure 1) and hypotheses for this study were thus developed based on the findings from the literature review and interviews. Below is a discussion of the variables identified in the research model.

Prior research posits that in the context of KM, IT can be used to enhance the KM capabilities of an organisation (Gold, 2001; Khalifa & Liu, 2003). Thus, in this study the 'IT use for KM' variable is represented by four dimensions of the use of IT to support knowledge creation, storage, transfer, and application capabilities in an organisation.

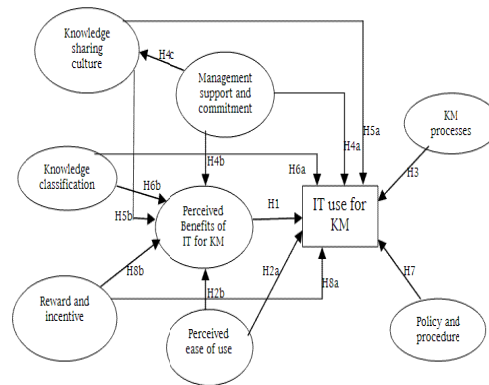


Figure 1: Research Model

The research model suggests that the variables of perceived benefits (usefulness) of using IT for KM and perceived ease of use of IT for KM (ease of use) have direct effects on the use of IT for KM. Also as per TAM (Davis, 1989), perceived ease of use of IT for KM affects the perceived benefits of using IT for KM. The research model also suggests that some of the identified organisational factors will influence the use of IT for KM directly, and some in an indirect way, with their influence being mediated by the perceived benefits and perceived ease of use (Davis, 1989). Therefore, the following hypotheses are proposed:

Hypothesis 1: Perceived benefits of using IT for KM has a positive influence on the level of 'IT use for KM'

Hypothesis 2a: Perceived ease of use of IT to support KM has a positive influence on the level of 'IT use for KM'

Hypothesis 2b: Perceived ease of use of IT to support KM has a positive influence on 'perceived benefits of using IT for KM'

The research model includes KM processes (KMP) as another variable that directly affects the extent of IT use for KM in an organisation as identified by three out of four interview respondents. In this study, the KM processes variable is defined as the

extent of an organisation's processes to acquire, organise, share, use and apply knowledge. Having the appropriate business or KM processes to support KM activities is believed to enhance the use of IT to support KM. Thus the following hypothesis is also proposed:

Hypothesis 3: Having appropriate KM processes has a positive influence on the level of 'IT use for KM'

Management support and commitment (MSC) is defined as the measure of support and commitment to KM by management, exhibited by the allocation of funds, resources, training, dedicated personnel for the use of IT for KM, and the communication of the importance of using IT for KM. This organisational factor has been found to both directly and indirectly influence the extent of IT use for KM (Kulkarni et al., 2007; Vitari et al., 2007). Individual's perception on management's support and commitment has been seen to have an impact on knowledge sharing culture in an organisation (Vitari et al., 2007). Thus, the following hypotheses are also proposed:

Hypothesis 4a: Management support and commitment has a positive influence on the level of 'IT use for KM'

Hypothesis 4b: Management support and commitment has a positive influence on 'perceived benefits of using IT'

Hypothesis 4c: Management support and commitment have a positive influence on 'knowledge sharing culture'

In this study, knowledge sharing culture (KSC) is defined as an evaluation of the extent to which a culture that values individuals' experience and knowledge for organisation's success and encourages individuals to share their knowledge exists in an organisation. Having the right knowledge sharing culture was found to have an impact on the use of KM systems, for example contributing knowledge to KM systems (Jennex & Olfman, 2004; Vitari et al., 2007). Thus, the following hypotheses are also proposed:

Hypothesis 5a: Knowledge sharing culture has a positive influence on the level of 'IT use for KM'

Hypothesis 5b: Knowledge sharing culture has a positive influence on 'perceived benefits of using IT for KM'

Knowledge classification (KC) is defined as the extent to which an organisation has an enterprise-wide classification system or taxonomy for knowledge. Prior studies on KM indicate that in order to have successful KM, organisations should use IT to manage knowledge and not just information (Alavi & Leidner, 2001; Jennex & Olfman, 2004). In addition, Kulkarni et al. (2007) suggest that having a knowledge classification

system improves knowledge content's quality, which is a factor that influences the perceived benefits of using KM systems. Based on these findings, the following hypotheses are also proposed:

Hypothesis 6a: Having a knowledge classification has a positive influence on the level of 'IT use for KM'

Hypothesis 6b: Having a knowledge classification has a positive influence on 'perceived benefits of using IT for KM'

Extant studies indicate that the institutionalisation of the use of a KM system into normal work practice leads to increased usage of the system (Damodaran & Olphert, 2000; Jennex & Olfman, 2004). Institutionalisation of IT use for KM into normal work practise is represented by having policy and procedure (PP) for the use of IT to support KM in an organisation. In the context of this study, PP is defined as the extent to which policies and procedures are established in an organisation to facilitate the use of IT to support KM activities. Thus, the following hypothesis is also proposed:

Hypothesis 7: Having policies and procedures on using IT to support KM has a positive influence on the level of 'IT use for KM'

Reward and incentive (RI) is defined as the extent to which an organisation has standardised reward and incentive systems to encourage KM activities and the use of IT to support these activities. Findings from extant studies suggest that reward and incentive is important to encourage employees' utilisation of the KM systems (Vitari et al., 2007). Moreover, incentive was found to have both direct and indirect effects on the use of IT for KM (Kulkarni et al., 2007) by enhancing the perceived benefits of using IT for KM. Thus, the following hypotheses are also proposed:

Hypothesis 8a: Reward and incentive have a positive influence on the level of 'IT use for KM'

Hypothesis 8b: Reward and incentive have a positive influence on 'perceived benefits of using IT for KM'

3.0 RESEARCH METHOD

A survey methodology was used to collect data needed in this study. Measuring items for IT use for KM construct were adapted from IT support for KM constructs from the studies of Gold (2001) and Wang et al. (2007). Knowledge sharing culture, rewards and incentives, and perceived benefits of using IT for KM constructs were developed based on existing scales from Gold (2001), Jennex and Olfman (2004), Kulkarni et al. (2007), and Vitari et

al. (2007). Based on the review of the literature to identify the influencing factors for the use of IT for KM, all the underlying issues were carefully shaped into multiple-item measures for the rest of the constructs such as knowledge classification, policy and procedure, and management's support and commitment. All measuring items were operationalised with a five-point Likert scale ranging from 1 "strongly disagree" to 5 "strongly agree".

All measuring items were then reviewed by two Information Systems (IS) academics, two statisticians, and six IT executives in six different Malaysian companies. Based on the feedback obtained, some questions were rephrased and some were dropped from the questionnaire. A pilot study of the questionnaire was then conducted in order to further refine the questionnaire and for validity and reliability testing. The finalised survey questionnaire was then administered to the target population of this study. An online survey software package was used to distribute email invitations to IT or KM managers in 830 (less 150 organisations, from total of 980 organisations, which was used in the pilot study) Malaysian listed organisations. A total of 168 organisations took part in the survey, representing a 20.2% response rate. The largest number of respondents was from manufacturing industry, representing 29.8% of the sample. This was followed by IT services and services industries, which represent 17.9% and 11.3% of the sample respectively.

4.0 DATA ANALYSIS

Data collected from the survey was analysed using Structural Equation Modeling approach using PLS-Graph (Chin, 2001) software. The measurement model was evaluated for convergent and discriminant validity. All measuring items were found to significantly load higher than 0.7 on their respective constructs, except one item that was then dropped from the analysis. The composite reliability and average variance extracted (AVE) for all constructs showed that reliability of constructs was verified and satisfied as per criteria suggested by Chin (2001). Discriminant validity was also demonstrated by the output of bootstrap method of PLS-Graph. All indicators were found to load highest on their respective construct in the cross-loading examination, and the square root of AVE for all constructs were found to be higher than any constructs' correlations.

The structural model was then evaluated to determine the predictive ability of the model and produce a path coefficients assessment to test the hypotheses proposed. Table 1 shows R^2 values for dependent constructs (IT use for KM, perceived benefits, and knowledge sharing culture), path

coefficients, t-statistics, and significance level of the path coefficients extracted from the bootstrap output.

Table 1: Path Assessment

	Path Coef.	T-statistics	Sig. level
IT Use for KM ($R^2 = 0.65$)			
KM processes	0.281	3.5871	0.01
Perceived benefits	0.219	2.966	0.01
Knowledge classification	0.194	2.5964	0.01
Policy and procedure	0.154	2.2802	0.01
Knowledge sharing culture	0.148	1.8309	0.05
Reward and incentive	0.051	0.7888	-
Perceived ease of use	0.072	1.4897	-
Management support	0.023	0.2689	-
Perceived benefits ($R^2 = 0.38$)			
Knowledge sharing culture	0.401	4.6284	0.01
Management support	0.135	1.4392	-
Knowledge classification	0.125	1.2279	-
Reward and incentive	0.042	0.5529	-
Perceived ease of use	0.006	0.1071	-
Knowledge sharing culture ($R^2 = 0.48$)			
Management support	0.696	18.5473	0.01

Based on the statistical outcome in Table 1, hypotheses 1, 3, 4c, 5a, 5b, 6a, and 7 were accepted, whereas hypotheses 2a, 2b, 4a, 4b, 6b, 8a, and 8b were rejected. The next section presents the discussion of the findings.

5.0 DISCUSSION AND CONCLUSION

The statistical results confirm anecdotal evidence that organisational factors, namely KM processes, perceived benefits, knowledge classification, policy and procedure, and knowledge sharing culture have positive impacts towards the extent of IT use to support KM in these organisations. As can be seen in Table 1, the explicative power of these factors on IT use for KM was very strong ($R^2 = 0.65$). The result also extends the support of TAM construct, which is perceived benefits of IT for KM, in the context of IT adoption for KM in these organisations. Knowledge sharing culture, which has both direct and indirect effects on the extent of IT use for KM in these organisations, was found to account for 38% of variance in perceived benefits of IT use for KM. This suggests that cultivating an appropriate culture that fosters the sharing of knowledge in these organisations is crucial to develop positive perceptions on the benefits of using IT to support KM activities.

The effect of perceived ease of use, however, was found to be not significant in predicting the use of IT for KM. Similar with the findings of Money and Turner (2005) and Vitari et al. (2007), this provides an indication that improving the accessibility or the usability of IT applications for KM has only limited, to no influence, on the level the IT applications' use. Thus, instead of focusing on IT-usability

enhancements, organisations should address their efforts towards improvements at the organisational level to enhance the adoption of IT use for KM. Having appropriate KM processes to support KM activities was found to be the most important factor, with strongest positive influence, towards the adoption of IT use for KM. This result is consistent with Xu and Quaddus's (2007) suggestion on the positive influence of having appropriate business processes to facilitate the use of IT for KM, towards the extent of its adoption in the organisation. Knowledge classification was found to be the next important factor, which suggests that before deploying IT to support KM, Malaysian organisations should take up initiatives to determine the most important and relevant knowledge that needs to be preserved, shared and reused. Next, a classification system of knowledge needs to be developed so that knowledge can be appropriately classified to facilitate their accessibility and usability by various business units or departments.

Although both policy and procedure for the use of IT to support KM and knowledge sharing culture were found to be significant determinants for IT use for KM, policy and procedure appears to demonstrate a slightly stronger influence. This could indicate that due to the lacking of knowledge sharing culture in these organisations, policy and procedure appears to play a more important role in ensuring that IT is used to support their KM activities. Reward and incentives were found to have no significant effect on both IT use for KM and perceived benefits of using IT for KM. This finding is unique from other western studies such as Kulkarni et al. (2007) and Vitari et al. (2007). However, interestingly, this finding is consistent with a study on KM systems success in another developing country (Kamla Ali & Lorne, 2005). This suggests that implementing a reward and incentive systems in Malaysian organisations, or to some extent in developing countries, has little or no effect on the adoption of IT for KM. Similarly, no direct effect was found between management support and commitment with either perceived benefits, or the level of IT adoption for KM in these organisations. Nevertheless, our results indicate that management support and commitment do possess an indirect effect, on the extent of IT use for KM, through its intermediate effect on knowledge sharing culture. Thus, this suggests that management should focus more on efforts to cultivate a knowledge sharing culture in these organisations.

This research contributes to a further understanding of the way in which IT can be more effectively implemented in Malaysian listed organisations and extends the applicability of TAM in these organisations' IT use for KM context, along with other organisational factors that were incorporated

in the model. The implications outlined in this study are important for the management in these organisations to undertake necessary steps to foster the adoption rate of IT use for KM and thus promote the country's knowledge-based economic development.

REFERENCES

- Alavi, M., and Leidner, D.E. (2001). Review: Knowledge Management and Knowledge Management Systems: Conceptual Foundations and Research Issues. *MIS Quarterly*, 25(1), 107-136.
- Bursa, M. (2008). Bursa Malaysia. Retrieved 1 March 2008, from <http://www.bursamalaysia.com>.
- Chin, W. W. (2001). *PLS-Graph user's guide (Version 3.0)*. Soft Modeling, Inc.
- Chong, C.W., Chong, S.C., & Wong, K.Y. (2007). Implementation of KM Strategies in the Malaysian Telecommunication Industry. *Information and Knowledge Management Systems*, 37(4), 452-470.
- Damodaran, L., and Olphert, W. (2000). Barriers and Facilitators to the Use of Knowledge Management Systems. *Behaviour and Information Technology*, 19(6), 405-413.
- Davenport, T.H., De Long, D.W., and Beers, M.C. (1999). Successful Knowledge Management Projects. In Cortada, J.W. and J.A. WoodsWoburn (Ed.), *The Knowledge Management Yearbook 1999-2000*. Butterworth-Heinemann, MA.
- Davis, F. D. (1989). Perceived Usefulness, Perceived Ease of Use, and User Acceptance of Information Technology. *MIS Quarterly* 13 (3): 319-340.
- Gan, G.G.G., Ryan, C., and Gururajan, R. (2006). 'Soft' Enablers of Knowledge Management in Malaysian Companies—A Qualitative Study. *Proceedings of the 17th Australasian Conference in Information Systems*, Spencer, S. and Jenkins, A. (Ed.), Adelaide, 1-12.
- Gold, A. H. (2001). Knowledge Management: An Organizational Capabilities Perspective. *Journal of Management Information Systems*, 18(1), 185-214.
- Jennex, M. E., and L. Olfman. (2004). Assessing Knowledge Management Success/Effectiveness Models. *Proceedings of the 37th Annual Hawaii International Conference on System Sciences. (HICSS'04)* 8 (8).
- Kamla Ali, A.-B., & O. Lorne. (2005). An Investigation of the Determinants of Knowledge Management Systems Success in

- Omani Organizations. *Journal of Global Information Technology Management* 8 (3): 6.
- Khalifa, M., & Liu, V. (2003). Determinants of Successful Knowledge Management Programs. *Electronic Journal on Knowledge Management*, 1(2), 103-112. Retrieved from <http://www.ejkm.com/volume-1/volume1-issue-2/issue2-art10-khalifa.pdf>, Accessed November 28, 2007.
- Kulkarni, U.R., Ravindran, S., & Freeze, R. (2007). A Knowledge Management Success Model: Theoretical Development and Empirical Validation. *Journal of Management Information Systems*, 23(3), 309-347.
- McDermott, R. (2000). Why Information Technology Inspired But Cannot Deliver Knowledge Management. *California Management Review*, 41(44), 103-117.
- Money, W., & A. Turner. (2005). Assessing knowledge management system user acceptance with the technology acceptance model. *International Journal of Knowledge Management* 1 (1): 8.
- Ruiz-Mercader, J., Meroño-Cerdan, A.L., and Sabater-Sánchez, R. (2006). Information Technology and Learning: Their Relationship and Impact on Organisational Performance in Small Businesses. *International Journal of Information Management*, 26(1), 16-29.
- Syed-Ikhsan, S.O.S., and Rowland, F. (2004). Benchmarking Knowledge Management in a Public Organisation in Malaysia. *Benchmarking: An International Journal*, 11(3), 238-266.
- Vitari, C., Moro, J., Ravarini, A., and Bourdon, I. (2007). Improving KMS Acceptance: The Role Of Organizational and Individuals' Influence. *International Journal of Knowledge Management*, 3(2), 68-90.
- Wang, E., Klein, G., and Jiang, J. J. (2007). IT Support in Manufacturing Firms for a Knowledge Management Dynamic Capability Link to Performance. *International Journal of Production Research*, 45(11), 2419-2434.
- Xu, J., and M. Quaddus. (2007). Exploring the Factors Influencing End Users' Acceptance of Knowledge Management Systems: Development of a Research Model of Adoption and Continued Use. *Journal of Organizational and End User Computing* 19 (4): 57.