Knowledge Management Systems Success Model for Higher Education Institutions: A Partial Least Square Approach

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ABSTRACT

The implementation of Knowledge Management (KM) in various organizations including higher education institutions (HEIs) have provided significant benefits in making the best use of knowledge in meeting organizational strategic objectives. This study reports the findings of the factors that influence the success of knowledge management systems (KMS) in higher education institutions (HEIs). The KMS success model for HEIs was proposed and tested to 204 academicians in Malaysian public universities using partial least square approach. Out of seventeen hypotheses, fifteen hypotheses were supported. It was found that perceptions of usefulness of KMS and satisfaction levels of academicians play important roles in determining KMS success in higher education. These perceptions require the support of organizational factors such as leadership, incentive, culture of sharing, subjective norm, and training. The KMS success model developed in this study can help stakeholders in implementing successful KMS in higher education.

Keywords: higher education; knowledge management; success factors; success model.

I INTRODUCTION

The convergence of information and communication (ICT) accelerates the shift to the trend of global knowledge-based economy. This trend has caused the company's value to be associated with the strategic resource that is employees' knowledge. Similar to other knowledge-based industries, higher educational institutions (HEIs) are highly dependent on the experience and knowledge of its employees, mostly tacit in nature, for their survival in the market. The employees' knowledge is the largest asset of HEIs as it is the key ingredient of innovation (Omerzel, Biloslavo, Trnavčevič, & Trnavčevič,, 2011). Therefore, this asset is of significant importance, hence must be protected and preserved in a globalized educational environment (Altbach, 2015). To generate value from this asset, the active and dynamic implementation and management of knowledge is required in HEIs.

HEIs, whose activities involve the continuous capturing, generating, and disseminating of knowledge through the use of information and communication technology (ICT), are perceived to have some level of KM (Rowley, 2000). For example, the use of online social networking such as facebook, twitter, and other ICT such as email, video conferencing, and portal has increased as an education platform to accumulate and share knowledge between students and lecturers in HEIs (Benson, Morgan, & Tennakoon, 2012). These are Knowledge Management Systems (KMS), the KM tools which support people engaged in knowledge work, and a mediating tool for collaboration.

Despite the availability of these tools, organizations are facing the challenges in getting people to participate resulting KMS to fail. Therefore, for universities to have successful KM, they should first understand the factors that can contribute to the success of KMS. Although a number of studies have reported the implementation of KM in HEIs (Benson, Morgan, & Tennakoon, 2012; Brewer & Brewer, 2010; Cranfield & Taylor, 2008), these studies did not pay attention to the factors that can promote KMS success in HEIs. As organizational setting in HEIs is different from other business organizations, it is expected that knowledge might not be managed in a similar fashion, and the existing KMS success model may not be suitable to be applied in HEIs. Thus, it is important that a success model for KMS be developed for HEIs as a guideline in implementing their successful KMS. The objective of this paper is to investigate the factors that contribute to the success of KMS in HEIs by considering technological and organizational factors, and thus develop a KMS success model for HEIs.

II BACKGROUND

Knowledge management is defined as a process of managing knowledge through the activities of generation, storing, sharing, and application of knowledge (Alavi & Leidner, 2001; Davenport, Delong, & Beers, 1998). The challenge of organizations is to get employees to voluntarily contribute to the KMS. Employees' willingness to share knowledge is a key element in the implementation and success of any knowledge-management endeavor.

The KM activities in organizations are facilitated by the use of KMS. Two important functions of KMS are to store useful documents and knowledge via knowledge repository that are accessible by other

organizational members, and to serve as a network of experts that help organizational members find individuals with particular expertise (Davenport et al., 1998). Both of the functions of KMS enable individuals to share their knowledge and retrieve knowledge for use.

Despite the availability of KMS, KM initiatives cannot guarantee to be successful if the employees are not willing to share their knowledge. Contrary to computer information systems, KMS involve more human activity for creating repository for lessons learned, and best practices, as well as for interactions with others for providing expertise. This predicament has led researchers to conduct studies on KMS success.

A. Previous KMS Success Studies

Previous studies on KMS success were conducted in business organizations (Wu & Wang, 2006; Halawi, McCarthy, & Aronson, 2008; Hwang, Chang, Chen, & Wu, 2008). These studies focus on the technological factors such as content quality, system quality as well as attitudes towards the KMS. While these insights are important to note, these studies did not address the human dimension (referred to as people dimension in KM literature), which is very much crucial for the success of KM in organization. Based on the view that KMS is more cultural issues than technological issues, Kulkarni, Ravindran, and Freeze (2007) developed a KMS success model in one of the universities in US by integrating organizational factors and technological factors. Organizational factors that were proposed in their KMS success studies are leadership, incentives, and role of supervisors and coworkers. These organizational factors were found to be contributing factors to the success of KMS.

Similarly, Lee and Roth (2009) developed a conceptual framework that proposed organizational factors to be examined as part of KM strategy in HEIs. They viewed that organizational factors such as leadership, incentives, the influence from their peers as well as cultural of sharing are needed for effective KM. The importance of linking cultural and organizational factors to the effective knowledge management initiatives has also been highlighted in the study of KM in HEIs (Khalil & Shea, 2012; Mathew, Rodrigues, & Vittaleswar, 2012).

The previous studies of KMS success were mainly in business organizations, and there are no studies of KMS success being conducted in HEIs. Although prior research of KM in higher education place emphasis on the importance of organizational factors, they lack empirical evidence. Specifically, the important organizational factors such as leadership, culture of sharing, incentive, subjective norm, and training were not addressed in any empirical studies of KMS in HEIs. Therefore, this study aims to bridge this gap by integrating these organizational factors and technological factors in the KMS success model.

III RESEARCH MODEL

A KMS success model developed in this study considers the technological factors: knowledge content quality, KM system quality, user satisfaction, and perceived usefulness. Knowledge content quality, KM system quality, and user satisfaction are derived from DeLone and McLean IS success model (DeLone and McLean, 2003), while perceived usefulness is derived from Technology Acceptance Model (TAM) founded by Davis (1989). The organizational factors to be integrated are leadership, culture of sharing, incentive, subjective norm, and training.

Knowledge content quality (KCQ). With the advanced information and communication technology such as electronic discussion forum, emails, and intranet, it is much easier for academicians to share their knowledge. If the knowledge is of high quality, then using electronic discussion forum to share knowledge may be perceived as useful. This has been confirmed by the previous studies, which suggested that knowledge content quality has a positive impact on KMS success via perceived usefulness of KMS (Wu and Wang, 2006).

KMS System Quality (KMS SQ). KMS system quality is how well the system meet needs and expectation of users and organizations (Wu and Wang, 2006). The quality of functions provided by KMS such as reliable, accessible, and easy to use are perceived to influence the use of KMS. The system that is not stable, not user-friendly, difficult to use, not reliable and accessible is likely to be abandoned by the users (especially if they are 'technophobic'). Academicians have to access high volume of knowledge for their teaching and research, thus, having a high quality system is likely to increase their belief on the usefulness of KMS for sharing and accessing knowledge. Prior studies have proven the significance of system quality in influencing the KMS Use via Perceived Usefulness (Kulkarni et al., 2007; Wu and Wang, 2006).

User Satisfaction (US). User Satisfaction in this study is measured on user satisfaction with the sharing and retrieval capabilities of the KM system, the adequacy and quality of knowledge needed, and user satisfaction that the system can enhance job performance. Wu and Wang (2006) found that user satisfaction gives positive impact to KMS use and Kulkarni et al. (2007) found that user satisfaction with KM initiatives significantly affects knowledge use. In this study, it is perceived that academicians who are satisfied with KMS are more inclined to use KMS.

Perceived Usefulness (PU). Perceived usefulness is defined as "the degree to which a person believes that using a particular system would enhance his or her job performance" (Davis, 1989, p. 320). Davis (1989) asserts that the tendency to use the system is higher if they believe that using the system can improve their performance. Wu and Wang (2006) in their studies assert that PU had a strong and positive effect on KMS success. Similarly, in HEIs, it is perceived that PU may affect KMS success.

Training (TR). In this study, training is defined as the exposure given to the academicians with regards to KM and KMS, such as training via seminars, workshops, etc. An individual can be trained about information systems through college courses, vendor training, in-house training, and self-study. Training is posited to facilitate user participation (Sabherwal, Jeyaraj, and Chowa, 2006). In previous studies, training was found to affect behavior intention indirectly through facilitating condition and facilitating condition affects perceived usefulness (Aggelidis, and Chatzoglou, 2009). Training can enhance skills and confidence in using the KMS, and thus, enables users to overcome knowledge barriers to successful implementation of KMS.

Subjective norm (SN). Subjective norm is defined as the degree to which an academician perceives that his/her colleagues believes he or she should or should not perform (that is contribute or seek knowledge via KMS). Subjective norm is perceived to shape a person's intention to perform a behavior (Ajzen, 1991). In this study, subjective norm is perceived to be an important factor to influence academicians to share or retrieve knowledge through perceived usefulness of KMS.

Culture of sharing (CS). Alavi, Kayworth, and Leidner (2006) believe that organizations whose culture do not value and support knowledge sharing will face difficulties in integrating KMS. A knowledge friendly organizational culture is viewed as one of the most important conditions for the success of KM initiatives in organizations (Davenport et al., 1998). Cultural values, such as knowledge-friendly culture, openness, and trust will lead to positive KM behaviors (Alavi et al., 2006; Ciganke, Mao, and Srite, 2008).

Leadership (LS). Various terms are used to refer to 'leadership' such as chief executive officers or top management (Singh, 2008). Kulkarni et al. (2007) describe leadership as the commitment of top levels of management in all KM activities.. They posited that leaders can influence the behavior of employees, and they have the ability to change employees' behavior towards implementation of KMS. Similarly in HEIs, Mathew et al. (2012) posited that the consistent and continued support of the top management is important for the KMS success

1) Incentive (INC). Incentives, defined as some forms of recognition given to the employees to encourage sharing of knowledge, has been highlighted in previous studies as a critical element for KMS success that must not be overlooked (Kulkarni et al., 2007). Markus (2001) viewed that the use of incentives is a way to recognize the efforts of knowledge contributors, who are frequently expected to produce high quality knowledge content. In higher education, the rewards should stimulate more contribution of knowledge sharing with high quality of knowledge content. Hence, incentives are perceived to influence knowledge content quality as well as KMS use for Sharing.

The outcome variables for this study are KMS use for sharing and KMS use for retrieval. These variables measure the use of KMS from the tasks they use KMS for, not the amount of use (Wu and Wang, 2006; Kulkarni et al., 2007; He and Wei, 2009). These variables reflect the two functions of KMS as knowledge repository and network of experts. The resulting KMS success model and its hypotheses are shown in Figure 1.

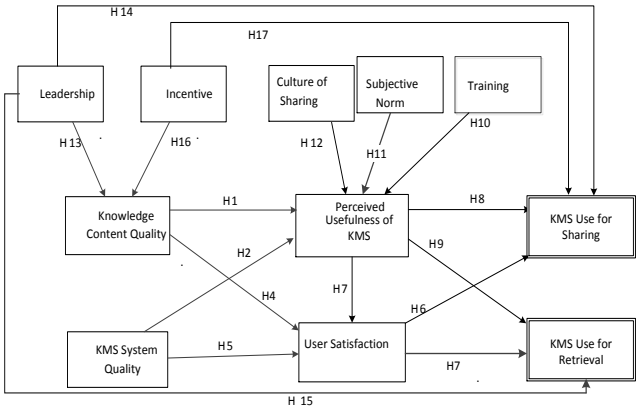

Figure 1: A Proposed KMS Success Model for Higher Education Institutions

IV RESEARCH DESIGN AND METHOD

The survey was sent to 950 academicians in Malaysian public universities; they are local lecturers, tutors, and foreign lecturers. In each survey, the definition of KMS was included as the introductory note of the survey. The survey was divided into two sections. The first section requires the respondent to indicate his or her degree of agreement with each item using a seven-point Likert scale (1=Strongly disagree, 7=Strongly agree). The second section was on the respondent's profile. The respondents were asked to complete both sections. A link to an online survey was sent to the academicians via email, followed by the first reminder two weeks later. The last reminder was sent a week after the second reminder. A total of 204 completed questionnaires (response rate was about 21.4%) were used in the analysis.

V DATA ANALYSIS AND RESULTS

This paper employs the partial least squares (PLS) technique to validate our model. The PLS, is a second generation statistical analysis software that is widely used in the IS field. PLS simultaneously models structural and measurement paths (Chin, 1998). The recommended sample size in PLS is at least 10 times the number of independent variables. There are two steps in the process of theory testing: (1) developing valid measures of theoretical constructs; and (2) testing the relationship between theoretical constructs.

A. Assessment of Measurement Model

The measurement model was tested with respect to individual item reliability, internal consistency, and convergent and discriminant validity. The construct validity was assessed by item reliability and convergent validity of scale items was assessed using three criteria suggested by Fornell and Larcker (1981): (1) all item factor loadings should exceed 0.70, (2) composite reliability (CR) for each construct should exceed 0.80, and (3) average variance extracted (AVE) for each construct should exceed 0.50. In this study five items had factor loading values lower than 0.7 and were therefore, deleted from consideration, leaving a total of 67 items for further analysis. Five items that were found less than 0.7 are in the following constructs: (1) knowledge content quality (1 item); (2) leadership (2 items); (3) user satisfaction (1 item); (4) KMS system quality (1 item). Internal consistency was assessed by looking at the composite reliability (CR) value. Composite reliabilities of all constructs (after dropping five items) exceeded the required minimum of 0.80. Further, the AVEs ranged from 0.64 to 0.75 which are well above the recommended threshold of 0.50, exhibiting acceptable convergent validity. The square root of AVE is between 0.80 and 0.87, which exceeds the correlations with the other constructs exhibited discriminant validity.

B. Assessment of Structural Model

The test of the structural model includes estimating the path coefficients (the strengths of relationship between the dependent and independent variables) and the R^2 value (the amount of variance explained by independent variables). SmartPLS was chosen using a bootstrap resampling method (500 resamples) to determine the significance of the paths within the structural model. The PLS results of the analysis are shown in Figure 2. Out of seventeen hypotheses, fifteen hypotheses were supported.

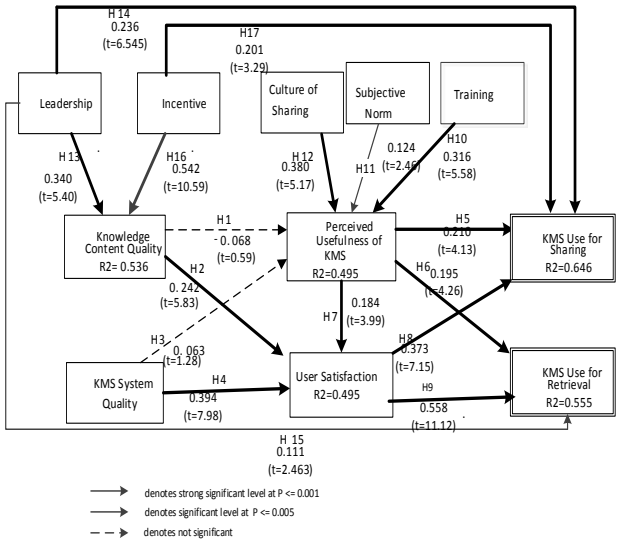

Figure 2. PLS Analysis of Research Model

As shown in Figure 2, approximately 65 percent (R^2 = 0.646) of the variance in KMS use for sharing, 55 percent (R^2 = 0.555) of the variance in KMS use for retrieval, 49 percent (R^2 = 0.495) of the variance in PU and US respectively, and 54 percent (R^2 = 0.536) of the variance in KCQ are explained. The standardised path coefficients ranged from 0.124 to 0.558, with eleven of the fifteen paths exceeding the suggested minimum value of significance at 0.20 (Chin 1998). Thus, the fit of the overall model is good. The results show that PU (path coefficient = 0.210, p <= 0.001) and US (path coefficient = 0.373, p <= 0.001) were found to affect KMS use for sharing.

The effect of PU (path coefficient = 0.4.26, p <= 0.001) and the effect of US (path coefficient = 0.558, p <= 0.001) on KMS use for retrieval are more than the effect on KMS use for sharing, which is consistent with the study by Wu and Wang (2006), and Hwang, Chang, Chen and Wu (2008). These findings indicate that PU and US should be the concern of higher education in implementing successful KMS. It was found that TR (path coefficient = 0.316, p <= 0.005) had a significant effect on PU, which is consistent with the study by Arntzen and Ndlela (2009). However, KCQ and KMS SQ were found to have no significant effect to PU. It was found that CS (path coefficient = 0.38, p <= 0.005) and TR (path coefficient = 0.316, p <= 0.005) had a significant effect to PU. The culture of sharing seems to be important to influence the perception of KMS's usefulness among academicians and thus, supports the view of Wang, and Noe (2010) that culture may contribute to the success of KM initiatives. The insignificant result of KMS SQ and KCQ on PU implies that these two factors may not be their priorities in their perceptions of usefulness of KMS as long as they have good knowledge sharing culture,

good support from their peers, and are sent for training. System quality and content quality may be important during the initial implementation but for a long term commitment, cultural factor should be given more attention.

The significant effect of KMS SQ, KCQ, and PU on US implies that these factors are needed to fulfill the academicians' satisfaction towards using the KMS. The results also show that LS (path coefficient = 0.34, p <= 0.005) and INC (path coefficient = 0.542, p <= 0.001) had strong effect on KCQ, which support the findings of Kulkarni et al.'s (2007) study in business organizations. This result implies the support from leaders and some incentives can influence the contribution of high quality of knowledge content.

VI DISCUSSIONS

This study examined the factors contributing to KMS success by looking at technological and organizational factors that influence KMS use for sharing and retrieval. It was motivated by the need to develop a model incorporating the organizational and technological factors that may contribute to the success of KM initiatives in HEIs.

A. Limitations of the Study

There are several limitations of this study, requiring further examination and additional research. One limitation is this study is based on general KMS., not specific KMS. Some universities may use KMS specifically designed for their organizations and this study may not provide the same finding. For the study of specific KMS in an organization, future research may use a single case study to achieve an in-depth, qualititative understanding of the object of investigation: to investigate factors that influence a purpose-built KMS. Finally, the sample size is limited may be due to KMS being new in HEIs and not many really use KMS to share knowledge. Although the sample size is acceptable for PLS analysis, a larger and more heterogeneous sample would bring more statistical power.

B. Implications for Theory

From a theoretical perspective, our findings imply that technological factors by themselves are insufficient to KMS success. Knowledge content quality, KMS system quality, perceived usefulness and user satisafaction can contribute to KMS success to some extent but it is organizational factors (e.g. culture of sharing, incentives, and training) that contribute more to KMS success in terms of use of KMS for sharing and retrieval. The distinction between KMS use for sharing and KMS use for retrieval is an important distinction, which should receive more attention in determining the factors for KMS success. The result of incentive being a factor that has a greater effect on KMS success than other factors may have indicate that in HEIs, incentive is needed to promote their academic staff either to contribute their knowledge to KMS or to retrieve knowledge from KMS. This is contrary to other organizations, where incentive did not have much effect on KMS success. The results also indicate that there is an empirical evidence that a culture of sharing is a pre-condition necessary for KMS success, which was not empirically tested previously due to its complex domain.

C. Implications for Practice

The findings of this study have important implications for HEIs interested in implementing KMS and how to leverage the KMS for competitive advantage. Leaders such as a Vice Chancellor, Deans and Head of Departments play important roles in motivating academicians to share and retrieve knowledge from KMS. They should set an example in promoting the high quality of shared knowledge and its reuse. It is important that they model appropriate behaviors in using the system to share and retrieve knowledge. Thus, it opens a credibility gap with respect to employee belief and trust in KMS.

The management of HEIs may consider of rewarding those academicians, who contribute high quality knowledge and those who use and apply knowledge to their work that may impact organizational performance. Management of HEIs should focus on building up the practice of knowledge sharing such as providing more opportunities for academicians to participate in the workshops, seminar, conferences, and share with other colleagues in their universities. Wang, Noe and Wang (2014) found that employees who were explicitly rewarded for knowledge sharing would make greater knowledge contributions to the KMS compared with those who were not given the rewards. In addition, training should also be part of KM strategy to provide skills needed by employees in using KM effectively. Providing training to employees can overcome barriers of the usage of the system due to the technical complexity of the system (Sharma & Yetton, 2007).

VII CONCLUSION

This study presented a theoretical model of KMS success in HEIs presenting the factors contributing to the success of KMS in HEIs. This study enhances the understanding of factors contributing to KMS in organizations in general and in HEIs in particular. It can be guidelines for higher education stakeholders in implementing successful KMS. The resulting model was empirically validated using a survey of academicians in HEIs in Malaysia. Overall, the results demonstrate the importance of organizational factors in addition to technological factors to ensure the success of KMS in higher education. This study

supports the KM researchers' view that KM is more of organizational issues than technological issues. Future researchers may need to investigate other organizational factors that are not listed in this study, and to examine in greater depth this area of research.

ACKNOWLEDGMENT

The authors would like to extend our great appreciation to University Tenaga Nasional, Malaysia for funding this project. We would also like to thank our graduate research assistant, Ahmed Salami for his help in data collection.

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