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Investigating Key Determinants for the Success of Knowledge Management System (KMS) in Higher Learning Institutions of Malaysia using Structural Equation Modeling

Shrikant Panigrahi
Faculty of Industrial Management, University Malaysia Pahang, Kuantan, Malaysia
Yuserrie Bin Zainuddin
Faculty of Industrial Management, University Malaysia Pahang, Kuantan, Malaysia
Noor Azlinna Binti Azizan
Faculty of Industrial Management, University Malaysia Pahang, Kuantan, Malaysia

Abstract:
Implementation of KMS has increased rapidly due to rapid advancement in technology up gradation and usage. After thorough review of previous literatures on KMS, it was noticed that knowledge quality, system quality and service quality are key determinants for KMS success. This study investigates the key determinants for the success of knowledge management system (KMSs) in the higher learning institutions (HLIs) of Malaysia. This paper utilized these key determinants for the investigation of KMS success contributing user satisfaction as mediating effect between key determinants and KMS success. Using the data of 223 respondents engaged with administrative and academic activities in universities and colleges of Malaysia, the relationship between knowledge quality, system quality, and service quality with KMS success using user satisfaction as mediating effect was examined through structural equation modeling. From the structural model it was found that user satisfaction plays a full mediating effect between key determinant factors (knowledge quality, system quality, and service quality) and KMS success. KMS success model generated in this study had provided both applied and theoretical recommendation.

Keywords: *knowledge management system success, higher learning institutions, user satisfaction, IS model*

1. Introduction

The importance of knowledge management has been highlighted in the last decades by both academicians and researchers. Knowledge is a fundamental concept that is unique, full of competition and non-substitutable. Gunjal (2005), defined knowledge management as "the process of managing, gathering, and sharing knowledge throughout the organization". Knowledge management is developed by the organization in order to support the operational and innovative activities that creates focus on the implementation and development of knowledge management system or processes (Gold, Malhotra, & Segars, 2001).

In the competitive economy, the higher learning institutions in Malaysia are also striving to demonstrate their commitment, excellence, research and professional services showing their accountability through their performance (Ab Hamid et al., 2012). In any organization data and business process goes together as a core knowledge to ensure quality and performance (Natek & Lesjak, 2013). Higher learning institutions (public and private) in Malaysia are in race to increase the number of students approaching them with knowledge benefits and effective establishment of knowledge activities (Muthukaruppan, Kalsom, & Amin, 2013). Huge amount of data is shared in the higher learning institutions (HLIs), due to which the data processing and business knowledge is crucial for maximizing their performance (Farkas & Dobrai, 2012; Liebowitz, 2006; Rogé, Hughes, & Simpson, 2011).

This paper is a part of study of knowledge based management model for higher learning institutions in Malaysia that focuses on the successful implementation of knowledge management system (KMS) in their organization. The model is tested using the estimation of maximum likelihood (ML) and structural equation modeling (SEM). Thus the main aim of the paper is to investigate factors influencing success of KMS in the context of higher learning institutions (HLIs) in Malaysia which adopted KMS were deemed. Nattapol, Peter, and Laddawan (2010) mentioned that, KMS has been utilized for benefits by many organizations like Ford, Chevron, Texas instrument that have obtained high revenue through an efficient KMS, but very few researchers attempted to implement this concept in the HLIs especially in Malaysia. The Malaysian higher education have shown consistent growth due to efforts taken by Ministry of Education seeking as a long term goal to make Malaysia an education hub (Ariffin et al., 2008). Delladetsima (2011), acknowledged that 'knowledge infrastructure play significant role in higher learning institutions due to providing skills, data, internal and external network connectivity'.

This paper is divided into five sections: section 1 deals with the introduction followed with literature review as section 2. Section 3 includes conceptual framework and research methodology. Section 4 discusses data analysis and research findings. The final section 5 concludes the research with further providing limitations and potential for further research.

2. Literature Review

2.1. Knowledge Management System (KMS)

Before discussing on the knowledge management system it is very important to understand knowledge management (KM). According to Adli et al (2008), knowledge management(KM) is the systematic action taken by an organization to obtain greater value of knowledge. KMS add value to KM by facilitating, sharing and preservation of knowledge. The major problem identified by Adli et al (2008) towards implementation of KMS was knowledge sharing, knowledge creation and knowledge transfer. Create, capture, refine, store, manage and disseminate are the six steps of KM provided by Turban et al (2008), as a core activities. Ong and Lai (2007), utilized four dimensions of user satisfaction in order to investigate KMS development and found that there is still needed to focus on the strategic alignment of KMS with user satisfaction.

Gunjal (2005), acknowledged that knowledge management is the discipline that leads to creativity, uniqueness, and becomes main priority for the organization through its integrative and collaborative approach. Akhavan (2012), contended that for the successful implementation of KM there is a need of long term commitment from senior officers. Therefore this paper attempts to investigate factors that determine the success of KMS, especially in the context of HLIs in Malaysia.

2.2. Information and Knowledge Management

Information plays a crucial role for the creativity of benefits for organization. Rajaraman (2013), stated that "knowledge is the perception and understanding the series of information and the application of information. Knowledge can be applied in solving current problems or operational problems". Cross and Baird (2000), concluded that simply by using technology KM is not able to improve organizational performance. Creation of organizational memory was claimed to be the important parameters for improving performance and the success of KM. Previous researchers like (Farzin, Kahreh, Hesan, & Khalouei, 2014; Huang & Lai, 2012; Luen & Al-Hawamdeh, 2001; Sallis & Jones, 2002) also highlighted critical success factors for the implementation of knowledge management system in the service sector.

Newman (1997), provided the framework of Data Information Knowledge Technology (DIKT) and mentioned that knowledge leads to technology. The path of DIKT framework as shown in fig.1 confirmed that efficient knowledge management enable organization to perform well and utilize their knowledge gaining sustainable advantage.

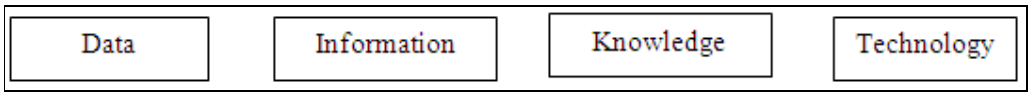

Figure 1: Newman's DIKT framework
Source: (Nattapol et al., 2010)

According to Beckett et al. (2000) DIKT model focuses on the data produced without converting it to information. There is a need for the relevant structure and patterns to convert data into information. Cheong (2005) provided three categories that DIKT can be transformed. They are (1) knowledge acquisition, (2) knowledge retention and (3) knowledge exploitation.

3. KMS Success Models

3.1. Delone and McLean IS Success Model

In 1992, DeLone and McLean defined IS success factors covering different personal perspectives of an individuals in order to evaluate information system. The model consists of six variables focusing to investigate the KMS success factors (DeLone & McLean, 1992).

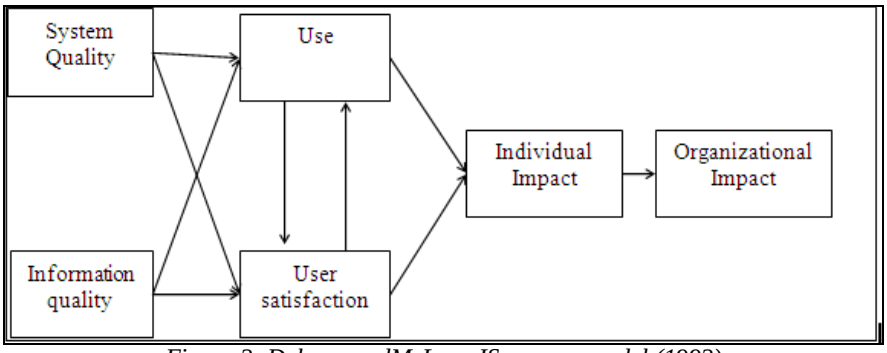

Figure 2: Delone an dMcLean IS success model (1992)

3.2. Halawi et al KMS Success Model

In the information system literature still KMS is considered as a perceived information management tools. For the successful implementation of KM, information system plays a crucial role (Anantatmula, 2005). Thus the main goal of the KM is to utilize information system in best practices, business practices, and shared knowledge in the organization. Halawi et al (2007), tested a model for the successful implementation of KMS adopting the widely accepted IS model by (Delone, 2003; DeLone & McLean, 1992) and found that knowledge quality, system quality and service quality influence intention to use the system and user satisfaction resulting to influence the KMS success.

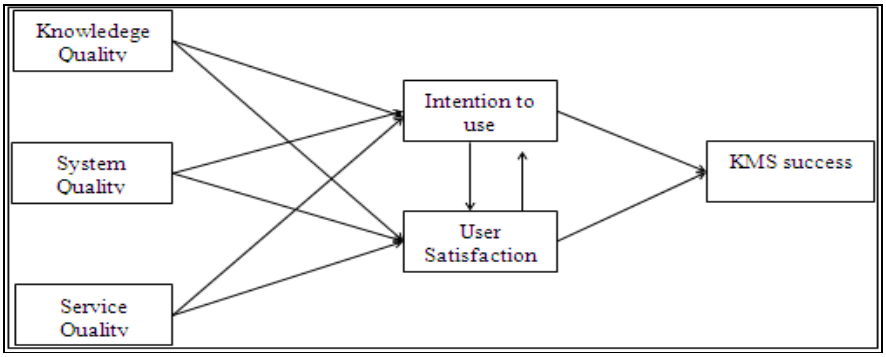

Figure 3: Halawi et al KMS success model
Source: Halawi et al (2007)

From the review of previous KMS success models by (Halawi and DeLone), the below figure is the modified conceptual framework for the success of KMS. The framework comprised of four exogenous constructs i.e. knowledge quality, system quality, service quality, information quality and two endogenous constructs i.e. user's satisfaction and KMS success. In the below provided modified conceptual framework, user's satisfaction played a mediating role between success factors and KMS success. Seven hypotheses through the path were provided as follows:

- H1: Knowledge quality has significant influence on user satisfaction
- H2: System Quality has significant influence on user satisfaction
- H3: Service Quality has significant influence on user satisfaction
- H4: Knowledge quality has significant influence on KMS success
- H5: System Quality has significant influence on KMS success
- H6: Service Quality has significant influence on KMS success
- H7: User Satisfaction has significant influence on KMS success

Below is the theoretical model that is investigated for the study modified by author following previous KMS success models of (Halawi et al., 2007; Huang & Lai, 2012). In the KMS success model by DeLone and McLean (1992), user satisfaction and use were both taken as mediating effect. But use and user satisfaction are interrelated to each other Delone (2003).

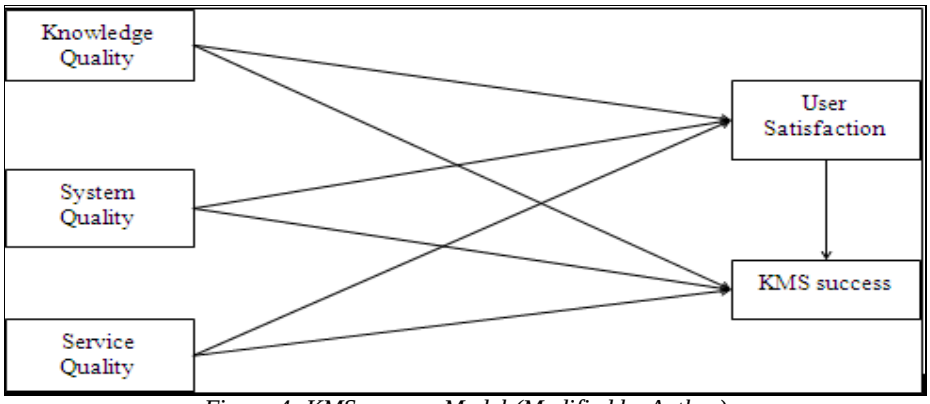

Figure 4: KMS success Model (Modified by Author)
Sources: (Halawi et al., 2007; Huang & Lai, 2012)

4. Methodology

4.1. Data Collection and Sampling

Quantitative method is approached for the data collection targeting employees working in government and private universities and colleges that are involved in the knowledge management perspectives. KMS have been implemented widely by organizations including, public, private, local and multinational companies in Malaysia, but none of them focused on the success factors of

implementation of KMS in higher learning institutions in Malaysia. Stratified random sampling was conducted and in order to reduce response bias potential respondents were emailed too in order to confirm their usage of KMS and their experience. Those having no experience of using KMS were discarded from the sample and further data were collected in order to meet the sample size required. Hypothesis testing was performed through several analyses for the initial 22 items. Reliability findings suggested that the Cronbach's alpha value of the variables were having reliability of above 80%, exceeding the acceptance criteria of 0.70 provided by (Cronbach, 1951).

5. Data Analysis

The population for the study consists of managers having knowledge of using IS system in private and public Higher learning institutions in Malaysia. The main reason to target IT managers is to share knowledge and expertise and the KMS practices. The total sample considered for the final analysis was 223 and secondary data were collected through a survey questionnaire. Statistical treatment was provided to the data collected using Structural Equation modeling with the AMOS.21 program. Reliability and validity was analyzed first in order to validate and confirm the data collected. According to Zainudin (2012), the assessment for unidimensionality, validity and reliability for the model is necessary to modeling the structured model. Unidimensionality is a statistical technique that is used for maximizing the confidence of validity and reliability. Zainnuddin (2012) mentioned that in order to achieve the unidimensionality test, low factor loading items are deleted and the analysis is repeated until the fitness index is achieved. From the factor loading of the items tabulated in table 2, the unidimensionality is acceptable as all the items were having high factor loadings.

Validity Criteria for measurement model	
Convergent Validity	AVE >0.50
Construct Validity	All fitness index for the model meet the required level
Discriminant Validity	The redundant items are either deleted or constrained as free parameter. Also the correlation between the variables less than 0.85

Table 1: Validity of the model

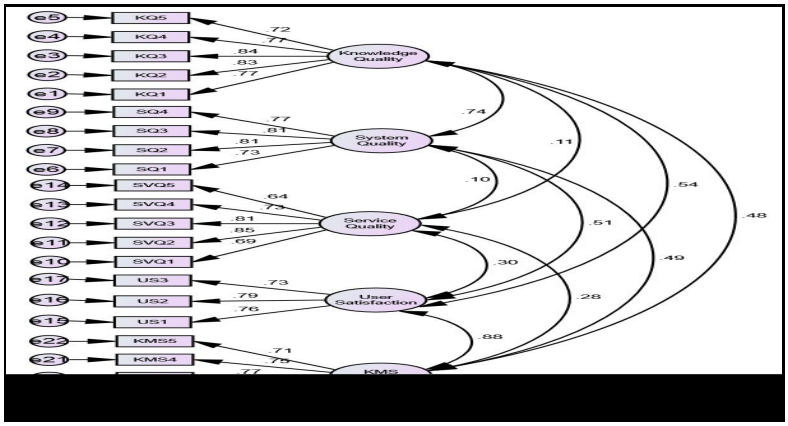

Figure 5: Measurement model

The discriminant validity is achieved when the model and its constructs is free from redundant items. AMOS identify the pair of redundant items in the model in term of high modification indices. There is a need to delete the items with high modification indices in order to make the model free from redundancy. The other way to valid the model is through identifying correlation between the latent variables. According to Zainnuddin (2012) the correlation between the latent variables should be less than 0.85 in order to validate the model.

Composite reliability is the second measurement criteria to measure the reliability and internal consistency for a latent construct. A value of composite reliability greater than 0.6 is required in order to achieve composite reliability for a construct.

Average variance extracted is the average percentage of variation as explained as explained by the measuring items for a construct. An (Average Variance Extracted) AVE greater than 0.5 is required. The result of convergent validity provided in table 2, confirms that AVE of greater than 0.50 is achieved. Thus the structural model is valid. The result indicated that the structural model was having good convergent validity. From the confirmatory factor analysis results and the factor loading in the range of 0.640 to 0.850 confirmed the measurement and structural model providing evidence of construct reliability and AVE.

Constructs	Items	Factor Loading	Construct Reliability	Average Variance Extracted
Knowledge Quality	KQ1	0.720	0.890	0.620
	KQ2	0.770		
	KQ3	0.840		
	KQ4	0.830		
	KQ5	0.770		
System Quality	SQ1	0.770	0.862	0.610
	SQ2	0.810		
	SQ3	0.810		
	SQ4	0.730		
Service Quality	SVQ1	0.640	0.863	0.559
	SVQ2	0.730		
	SVQ3	0.810		
	SVQ4	0.850		
	SVQ5	0.690		
User Satisfaction	US1	0.760	0.804	0.578
	US2	0.790		
	US3	0.730		
Knowledge Management System Success	KMS1	0.700	0.850	0.531
	KMS2	0.710		
	KMS3	0.710		
	KMS4	0.750		
	KMS5	0.710		

Table 2: Convergent validity of the model
Note: KQ-Knowledge Quality, SQ – System Quality, SVQ – Service Quality, US – User Satisfaction, KMS – Knowledge Management System Success

Structural equation modeling also known as multivariate regression model identifies the causal relationship between the variables. Factor loading obtained through the path analysis identify the acceptability of the model (Bollen, 1998). The factor loading of all the selected instruments of the variables were above the significant level of 0.50. Factor loading in the model indicates that the latent variables are having causal effect with each other. The main goal of the study is to examine the proposed model providing significant relationship between user satisfaction and KMS success. Keeping in view (Baron & Kenny, 1986), the model was explored using user satisfaction as mediating role between KMS factors and KMS success.

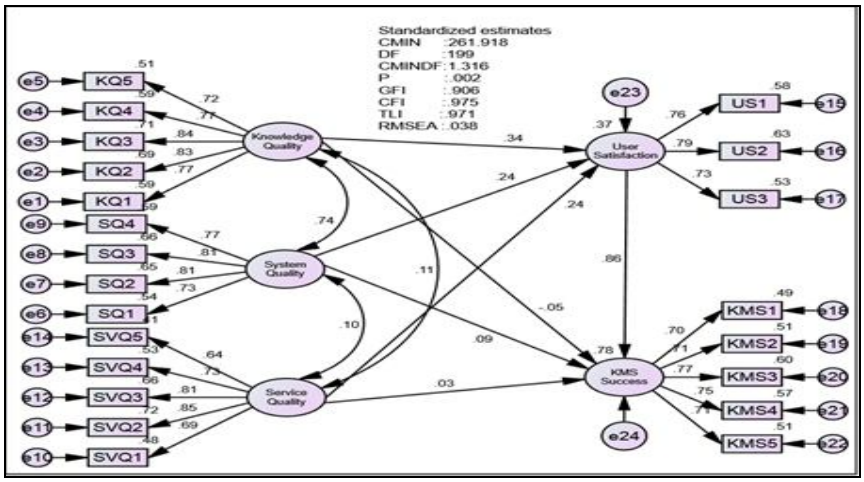

Figure 6: Structural model for KMS success

Constructs			Estimate	S.E.	C.R.	P
User Satisfaction	<---	Knowledge Quality	0.329	0.116	2.846	0.004
User Satisfaction	<---	System Quality	0.266	0.132	2.012	0.044
User Satisfaction	<---	Service Quality	0.308	0.093	3.313	0.001
KMS Success	<---	User Satisfaction	0.766	0.099	7.757	0.001
KMS Success	<---	Knowledge Quality	-0.041	0.084	-0.484	0.628
KMS Success	<---	System Quality	0.086	0.095	0.902	0.367
KMS Success	<---	Service Quality	0.030	0.068	0.446	0.656

Table 3: Standardized Regression Weights for every path estimated in figure

Name of Index	Index Value	Level of Acceptance
RMSEA	0.038	Range 0.05 to 0.08 is acceptable
GFI	0.906	0.90 is a good fit
CFI	0.975	0.90 is a good fit
TLI	0.971	0.90 is a good fit
Chisq/df	1.316	The value should be less than 5

Table 4: Name of Index and its level of Acceptance

The value of the fitness indices provided in the table.4 for the model was satisfactory and confirmed to the level of acceptance. The structural model provided in figure.6 is incorporated to test the hypothesis [H1, H2, H3, H4, HH6, and H7]. In order to confirm the hypothesis as shown in figure the path between the latent constructs were significant. The hypothesis [H1, H2, H3 and H7] was accepted whereas, the direct effect between (knowledge quality, system quality, service quality) with KMS success was not significant and thus the hypothesis was rejected. The findings of the analysis indicate that independent latent variables have indirect effect with KMS success and direct effect with user satisfaction. Thus the finding confirms that user satisfaction plays full intermediary effect between KMS factors and KMS success.

6. Conclusion

Higher Learning Institutions today already realized that in order to be competitive and increase the value of the organization, adoption of IS have great role to play. Three hypothesis [H4, H5, H6] were rejected highlighting the influence of knowledge quality, system quality and service quality towards the success of KMS. The reject of direct effect indicates a strong signal of impact of user satisfaction for the success of KMS. If the user of the system is not satisfied with the technology, there is very few chance of adoption of such technology which in turn leads to failure of the system. Knowledge quality merits the study to effect on KMS success. Thus HLI need to be encouraged to adopt the IS in the management practices in order to increase interaction between students and administration. This paper investigated the influence of user satisfaction on success of KMS implementation identifying the key KM barriers. User satisfaction was used as a mediating effect between KMS barriers and KMS success. The

structural model obtained through the quantitative analysis using structural equation modeling found that user satisfaction play a full mediating role between the KMS factors and the success of KMS. Thus further research must be carried out critically for the validation of the findings and to identify the role of user satisfaction for the implementation of IS system.

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