COLLABORATIVE KNOWLEDDGE MANAGEMENT SYSTEM STRATEGIC PLANNING MODEL IN PUBLIC HIGHER LEARNING INSTITUTIONS

By

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Thesis Submitted to the School of Graduate Studies, University Putra Malaysia, in Fulfillment of the Requirements for the Degree of Master of Science

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Chairman : Professor Rusli bin Abdullah, PhD
Faculty : Computer Science and Information Technology

In line with the organization's mission statement to become more competitive in fulfilling the global needs, knowledge has become a powerful asset leading towards the mission's success. The organization has to pay extra attention in managing their valuable knowledge to produce better results in order to decide future actions. This can be done via the implementation of Collaborative Knowledge Management System (CKMS) to computerize the KM processes in the organization effectively. However, developing and implementing the CKMS needs a proper planning to preclude the unsuccessful system usage at the implementation level, if the strategic approach is not applied, particularly in the public higher learning institutions (PHLI). PHLI, as a knowledge hub institutions which comprises of many experts in various fields of knowledge, has become significant to have a proper standard of strategy in developing and implementing KMS to manage their knowledge effectively and efficiently. Although there is an increase in the studies that recommended KMS guidelines or strategic planning in various domains, the proposed solutions were mostly not empirically verified or validated. There was also limited study focusing on the comprehensive strategy to develop and implement the CKMS effectively to enhance the quality of knowledge services, especially in PHLI. Therefore, it is necessary and become a motivation for conducting this study and to propose a comprehensive CKMS Strategic Planning ($CKMS^2P$) Model that can enhance the quality of knowledge services in the PHLI, significantly. The model aims to enhance the management ability in managing knowledge by increasing the CKMS effectiveness in the organization. The construction of the model is based on Systematic Literature Review (SLR), which aims to aggregate all existing evidences on a research questions analytically and rigorously. The $CKMS^2P$ model is verified by conducting a preliminary survey and the validation of the model effectiveness is done via a hands on assessment and a post survey on the prototype system, namely $CKMS^2P$Monitor which is incorporated with the $CKMS^2P$ Model. The survey was executed in 5 PHLI in Klang Valley and analyzed empirically by applying the Rasch analysis and Structured Equation Modelling (SEM) analysis. The Rasch analysis results show higher agreeable measures on the survey items which verified the respondents' satisfaction with the action plans listed in the $CKMS^2P$ Model. The correlation analysis, using PLS-SEM also confirms

that all hypotheses relationships between strategies towards the CKMS effectiveness, are supported. Finally, the post survey results, which indicate a higher agreeable measures of the model and the CKMS^{2}PMonitor as a prototype system in terms of effectiveness and efficiency, has validated the model significantly. This concludes that the CKMS^{2}P Model is comprehensive and effective to be implemented in the organization. By utilizing the CKMS^{2}PMonitor, the CKMS^{2}P Model implementation can be monitored and managed effectively in achieving fast results in the decision making process with less time and effort, indirectly increasing the effectiveness of CKMS usage in the organization.

Abstrak tesis yang dikemukakan kepada Senat Universiti Putra Malaysia sebagai memenuhi keperluan untuk ijazah Sarjana Sains

MODEL PELAN STRATEGIK SISTEM PENGURUSAN PENGETAHUAN SECARA KOLABORATIF DI INSTITUSI PENGAJIAN TINGGI AWAM

Oleh

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Selaras dengan misi untuk membentuk sebuah organisasi yang lebih berdaya saing, ilmu pengetahuan menjadi aset yang penting bagi memacu ke arah mencapai kejayaan misi organisasi tersebut. Organisasi perlu memberi lebih tumpuan dalam menguruskan pengetahuan yang berharga untuk menghasilkan keputusan yang lebih baik dan seterusnya menentukan keperluan masa hadapan. Ini boleh dilaksanakan melalui pelaksanaan Sistem Pengurusan Pengetahuan Kolaboratif (CKMS) yang mendigitalkan proses menguruskan pengetahuan dalam organisasi secara berkesan. Namun, pembangunan dan pelaksanaan CKMS memerlukan perancangan yang betul bagi mengelakkan kegagalan dalam pelaksanaan sistem tersebut, sekiranya pendekatan strategik tidak diterapkan, khasnya di institusi pengajian tinggi awam (IPTA). IPTA, sebagai institusi hub pengetahuan yang mempunyai ramai pakar dalam bidang ilmu pengetahuan yang pelbagai, adalah penting untuk mempunyai satu pelan strategi yang standard bagi membangunkan dan melaksanakan KMS, untuk menguruskan pengetahuan dengan berkesan dan efisien. Walaupun terdapat peningkatan bilangan kajian yang mencadangkan garis panduan ataupun pelan strategik bagi membangunkan CKMS dalam pelbagai bidang, kebanyakan cadangan tersebut tidak disahkan secara empirikal. Kajian yang menfokuskan kepada strategi yang menyeluruh dalam membangunkan dan melaksanakan CKMS bagi meningkatkan kualiti perkhidmatan pengetahuan juga amat berkurangan terutamanya di IPTA. Oleh yang demikian, adalah penting dan menjadi motivasi untuk melaksanakan kajian ini dan mencadangkan satu Model Pelan Strategik bagi Membangunkan Sistem Pengurusan Pengetahuan Kolaboratif ($CKMS^2P$) yang menyeluruh dan dapat meningkatkan kualiti perkhidmatan pengetahuan di IPTA secara signifikan. Model yang dibangunkan ini bertujuan memacu keupayaan pihak pengurusan organisasi untuk menguruskan pengetahuan dengan meningkatkan keberkesanan CKMS dalam organisasi. Pembangunan model ini adalah berasaskan pelaksanaan kajian literatur yang sistematik untuk mengumpulkan bukti-bukti dan jawapan kepada persoalan kajian, secara analitikal dan terperinci. Bagi mengesahkan model $CKMS^2P$, kaji selidik awal (*preliminary*) telah dilaksanakan manakala pengesahan keberkesanan model dilaksanakan melalui kaedah *hands on*. Kemudian, penilaian dibuat melalui kaji selidik akhir ke atas sistem prototaip yang

dinamakan CKMS^{2}PMonitor, yang menerapkan Model CKMS^{2}P di dalamnya. Kajian dan penilaian tersebut telah dilaksanakan di 5 IPTA yang berada di kawasan Lembah Klang dan telah dianalisa secara empirikal dengan menggunakan Model Pengukuran Rasch dan *Structured Equation Modelling* (SEM). Keputusan analisis Rasch telah menunjukkan ukuran persetujuan yang tinggi bagi setiap item dalam model CKMS^{2}P yang mana mengesahkan bahawa setiap pelan tindakan dalam model tersebut adalah memuaskan bagi majoriti responden. Analisis korelasi yang menggunakan PLS-SEM juga mengesahkan bahawa semua hipotesis hubungan di antara strategi-strategi dengan keberkesanan CKMS adalah disokong. Akhir sekali, keputusan kajian akhir telah menunjukkan tahap persetujuan yang tinggi terhadap ukuran keberkesanan model dan sistem prototaip tersebut. Kesimpulan yang dapat dibuat adalah model CKMS^{2}P adalah model yang menyeluruh dan lengkap yang boleh dilaksanakan di dalam organisasi. Dengan mengaplikasikan sistem CKMS2PMonitor, pelaksanakan model CKMS^{2}P boleh dipantau dan diuruskan dengan berkesan bagi mencapai hasil yang cepat dalam proses membuat keputusan iaitu melalui pengurangan masa dan tenaga, yang secara tidak langsung meningkatkan keberkesanan penggunaan CKMS di dalam organisasi.

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APPROVAL

I certify that a Thesis Examination Committee has met on 25 May 2017 to conduct the final examination of Siti Noorasmah binti Hashim on her thesis entitled "Collaborative Knowledge Management System Strategic Planning ($CKMS^2P$) Model" in accordance with the Universities and University Colleges Act 1971 and the Constitution of the Universiti Putra Malaysia [P.U.(A) 106] 15 March 1998. The committee recommends that the student be awarded the Master of Science.

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I hereby confirm that:

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This is to confirm that:

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LIST OF ABBREVIATIONS

AVE	Average Variance Extracted
CFA	Confirmatory Factor Analysis
CKMS	Collaborative Knowledge Management System
$CKMS^2P$	Collaborative Knowledge Management System Strategic Planning
CoP	Community of Practice
CR	Composite Reliability
f^2	Effect Size to R2
HLI	Higher Learning Institutions
IS	Implementation Strategy
KM	Knowledge Management
KMPS	Knowledge Management Process Strategy
KMS	Knowledge Management System
KS	Knowledge Sharing
MNSQ	Mean Square
PHLI	Public Higher Learning Institutions
PrHLI	Private Higher Learning Institutions
PtMea Corr	Point Measure Correlation
Q^2	Predictive Relevant
R^2	Coefficient of determination
SDM	System Development Methodology
SEM	Structured Equation Modelling
SLR	Systematic Literature Review
SRMR	Standardized Root Mean Square Residual
SRS	System Requirement Specification
UIA	University Islam Antarabangsa
UiTM	University Technology MARA
UKM	University Kebangsaan Malaysia
UM	University of Malaya
UPM	University Putra Malaysia
URL	Uniform Resource Locator
VIF	Variance Inflation Factor
ZSTD	Z-Standard
β	Path Coefficient

CHAPTER 1

INTRODUCTION

1.1 Research Background

Knowledge has become a significant asset which has to be managed effectively to ensure it can be fully utilized and able to contribute in achieving the organizational goals. In recent years, the rapid growth of technologies in terms of internet evolution and competitive market has driven the organization to plan ahead on how to manage their knowledge optimally in order to improve and compete in the global challenges (Beiryaei & Jamporazmay, 2010; Gourova & Toteva, 2014; Muntean & Tarnaveanu, 2009; Saad et al., 2012). Thus, it is important to establish and implement a comprehensive strategic plan to manage the organization's knowledge via a collaborative knowledge management system (CKMS) which allows the knowledge to be captured, shared and used by individuals, group of workers or people outside the organization, by means of technology to accomplish their tasks and needs (Abdullah et al., 2009; Beiryaei & Jamporazmay, 2010; Cob et al., 2015; Smuts & Merwe, 2009).

The strategic plan is a roadmap developed using a systematic process to lead towards the organizational direction by defining organization's strategic goal, a strategy to achieve the goal and the action plans supporting on the strategy defined (Olsen, 2007). It is important for the organization to execute a CKMS strategic planning ($CKMS^2P$) comprehensively to ensure the organization has taken overall measures and monitored the plan thoroughly to increase management control in the CKMS development and implementation. Without a comprehensive $CKMS^2P$, it will lead to unsuccessful usage of the system at the implementation level (Dehghani & Ramsin, 2014).

The development and implementation of CKMS in the public higher learning institutions (PHLI) in Malaysia is significant since the system will be utilized mostly by the research community, the administration or the educational purposes (Abdul Razak et al., 2013; Abdullah et al., 2008; Sohail & Daud, 2009). In line with the importance of executing the CKMS strategic planning to overcome future CKMS implementation issues, it is necessary to apply the CKMS strategic planning in the PHLI environment.

The aims of this research is to develop, verify and validate a comprehensive $CKMS^2P$ Model that can be used as a guidance for the CKMS developers and implementers in developing and implementing CKMS strategically, which focused in the Malaysian PHLI. The proposed model emphasized on the Knowledge Management Process (KMP) strategy and implementation strategy to ensure every aspect towards a successful and effective CKMS usage will be achieved. In addition, this research study has also proposed a prototype system which will act as a monitoring system with a recommendation features to help the CKMS developers and implementers managing the $CKMS^2P$ effectively in the organization.

1.2 Problem Statement

Within the collaborative environment, the organization was struggling to overcome the obstacles in implementing KMS. The development of KMS using the latest technology may not necessarily be able to attract users to use the system and value its benefits (Gourova & Toteva, 2014). Among the problems highlighted in terms of KMS implementation were unsuccessful system usage due to lack of top management support, lack of KM skills, lack of training and promotion to use the system, lack of planning for the organizational KMP, poor support for documentation, failure to provide the basic requirements of KMS and failure to adapt specific and appropriate technology and tools in developing KMS (Dehghani & Ramsin, 2014; Floyde et al., 2013). In the PHLI environment, it was also reported slower CKMS implementation issue since the PHLI is mostly funded by the Government (Wei Chong, et al., 2014). The organization needs to integrate the KMS with the strategic business functions to ensure the knowledge is managed comprehensively and effectively (Oztemel et al., 2011; Y. Wu & Wang, 2012). However, the existing studies encounter several deficiencies as mentioned below:

a) Limited number of study with incomprehensive CKMS strategic planning
Although there is growing interest in studies pertaining the guidelines or strategic plan in developing and implementing a KMS, there is still very limited study on KMS Strategic Planning (Beiryaei & Jamporazmay, 2010; Chalmeta & Grangel, 2008; Dehghani & Ramsin, 2014) especially in the collaborative environment (Cha et al., 2014). This is including in the PHLI where only one study was found to perform the KMS strategic planning in the local universities, which was conducted by Saad et al. (2012).

Most studies have focused on development strategy rather than the implementation strategy or vice versa, which were lacking in proposing a comprehensive CKMS Strategic Planning (Y. Wang et al., 2017; Dehghani & Ramsin, 2014; Lin & Lee, 2012). Martinsons et al. (2017) in their studies, proposed solution to overcome KMS failures but the strategy only focused on overcoming the implementation issues in the CKMS execution. Previous studies were also lacking in focusing on the system development strategy in the perspective of KMP to develop a better system. This is important for the purpose of KMS is to facilitate the KMP itself (Ebrahimi & Ibrahim, 2011). The study conducted in PHLI by Saad et al. (2012) also shows that the coverage of strategy was not comprehensive where the system testing and maintenance were not mentioned at all while the design phase was not suggested completely.

The organization must ensure that the most comprehensive guideline can be practically used to fulfil the organization's purpose. In line with this, a CKMS2P Model should be developed and applied to help the organization enhancing the quality of CKMS in terms of effectiveness and efficiency.

b) Lacking in emphasizing a tool to assist the monitoring of the CKMS development and implementation

The tool is something that can help to perform a process work or task (Kanjanabootra et al., 2013), in this context, to guide and monitor the development and implementation of KMS. This is important to ensure the development and implementation of KMS in the organization is supervised thoroughly so that the constraints can be detected earlier and measures to overcome the constraints can be taken immediately. The strategy and action plans which were rather too difficult to execute or need to be enquired or focused on also can be detected earlier. A study by Cerchione & Esposito (2017) did study a tools used for KMP, however, from SLR, none of the previous studies has proposed a tool to assist the monitoring of the KMS strategic planning implementation to develop and implement CKMS in the collaborative environment.

c) Insufficient evidence of empirical support on the effectiveness of existing CKMS Strategic Plan in the organization

Although some of the existing studies claimed that their proposed strategic plan were comprehensive, there was less evidence that the strategic plan were verified appropriately, some only applied qualitative measures (Smuts & Merwe, 2009) and some was only based on a theoretical approach (Beiryaei & Jamporazmay, 2010; Gourova & Toteva, 2014; Sarnikar & Deokar, 2010). It seems that several existing studies were lacking in verifying and validating the guidelines proposed in a comprehensive environment, including studies by Saad et al. (2012) in his study in PHLI, which may possibly be generalized to other domain.

The CKMS^{2}P developed must be aligned with the organization's strategic business plan to ensure the synchronization in achieving the organization's goal towards what is to be accomplished (Dehghani & Ramsin, 2014; Goepp et al., 2013; Gourova & Toteva, 2014; Qing-song, 2013; Saad et al., 2012). This indicates the importance of having a comprehensive CKMS^{2}P Model to enhance knowledge services in the organization and to overcome the obstacle while implementing CKMS.

1.3 Research Questions

This study emphasized on the following research questions:

1) What are the important components and strategies needed to develop and implement CKMS in the PHLI, strategically?
2) How shall the CKMS^{2}P Model help the PHLI to enhance the CKMS effectiveness and efficiency?
3) How shall the CKMS^{2}P Model be used in the prototype KMS tool to automate the monitoring in the development and implementation of CKMS strategically in the PHLI?

1.4 Research Objectives

This study is aimed to achieve the following objectives:

1) To propose a comprehensive CKMS^{2}P Model in the perspective of KMP strategy and implementation strategy;
2) To verify and measure the suggested model empirically; and
3) To evaluate and validate the effectiveness of CKMS^{2}P Model to assist the CKMS developers and implementers in monitoring the development and implementation of CKMS strategically.

1.5 Scope of Research

This research was conducted in five PHLI in Klang Valley which will be detailed in Subsection 3.4.1 of Chapter 3. The participants in this research are the top management, CKMS project management team, the system developers, IT officers and users of CMKS in the selected institutions. The prototype system was developed based on a KMP strategy which are knowledge acquisition/ capturing, knowledge storage, knowledge sharing and knowledge application, and the implementation strategy to assist the CKMS developers and implementers to monitor the progress of CKMS2P implementation.

1.6 Motivation

Based on Knowledge Management Blueprint developed by MAMPU in 2011, by 2015, the Government is aiming to expand the centralized KM Hub for Public Sector by linking all the existing relevant KMS developed by Government agencies. The moving forward plan is to enhance the intelligence hub by adding more KMS in the hub. This shows that the Government is intense to manage the valuable knowledge by emphasizing the implementation of KMS in the Government agencies to enhance the public sector service delivery. In the Public Sector ICT Strategic Plan 2016-2020, it is stated that the Government aims to optimize the usage of technology and leverage on data sharing. Through the second ICT Strategic Trust, namely Data Driven Government, the Government is moving towards strengthening cross agency data sharing and managing the valuable data holistically and efficiently.

A CKMS^{2}P Model will guide the project team in developing and implementing CKMS in a strategic manner by enhancing the KMP strategy and implementation strategy thus improving the system quality in terms of effectiveness and efficiency in the organization/institution. The model is expected to be generalized and used by other Government agencies or learning institution.

1.7 Organization of Thesis

This thesis contains six chapters as listed below:

1) Chapter 1 includes the introduction of the thesis which consists of the research background, problem statements, research questions, research objectives, scope of research and motivation to execute the research;
2) Chapter 2 covers the finding of Systematic Literature Review (SLR) on CKMS strategic planning; explains the concept of KMS, CKMS and KMP; and the needs to incorporate the strategic planning in the development and implementation of CKMS in the organization, specifically in the PHLI in details.
3) Chapter 3 describes the research methodology which is divided into three phases to fulfill this research objectives;
4) Chapter 4 details the process of CKMS2P Model development by verifying all the theoretical strategies in the initial proposed model using a survey instrument;
5) Chapter 5 describes the design and architecture of the prototype system based on the verified model, subsequently, details the validation process on the effectiveness and efficiency of the prototype system and the proposed model; and finally
6) Chapter 6 discusses the result of the research and the summarization, limitations of the research and suggestion on future research.

In summary, this chapter provides an overall description on the foundation of the research. The research background, problem statement and justification to carry out the research, research questions and objectives were presented briefly to give the overview of this research. Based on these description, the details to proceed with this research will be described in the following chapters.

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