THE SYNTHESIS MODEL OF KNOWLEDGE MANAGEMENT SYSTEM IN THE INFORMATION TECHNOLOGY SERVICES AT HIGHER EDUCATION

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ABSTRACT

This research has an intention to study about elements and the Knowledge Management System (KMS), in order to bringing about a tendency of building a synthesis model of knowledge management system in the information technology services at higher education, by studying elements and process of knowledge management system from the tendency of professionals and some well-known organizations in knowledge management. Then arrange and group those who are similar the most and use them to survey in 5 levels regarding opinions of the professionals who manage in departments involving the career of the information technology in universities. From studying, it is realized that there are totally 7 popular elements to be using. The most important elements according to opinions of professionals are including; leadership & strategies, procedure of knowledge management, executors, information technology and communication. Important elements are source of knowledge and organizational culture. And neutral important element is evaluation. And there are 8 steps of procedure of the knowledge management which are widely using. The most important procedure according to the opinions of professionals are; conveyance & dissemination of knowledge, constructivist learning, sharing & exchanging, improvement and appliance. The important procedure of knowledge management consequently are; knowledge acquisition, storage & retrieval and indication of knowledge. Procedure of knowledge management from what have been studying is to be using to create a model of a new knowledge management. We can use it to manage the body of knowledge of the information technology services at higher education effectively.

Keywords: KM, KMS,

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Introduction

Nowadays, offices & departments in all parts including either government or municipality are all realize and give precedence to the importance of knowledge management inside the organization, much more. If any organization is able to do storage & retrieval the knowledge; for example: Know-How or the Best Practice, it is valuable to transfer and share to the others in the same organization and it shall bring about a sustainable improvement to them. Previously, we found from surveys that organizations from all around the world have a trend to grow up in the knowledge management rapidly. They realize about the importance of using the knowledge management system as a tool in their work (1), which is successful in knowledge management in accordant to various factors. Anyway, the Information and Communication Technologies is the factor that encourages of ease and comfort in the knowledge management and make it becomes concrete. Abilities of the Information and Communication Technologies which is used to manage the knowledge to bring about and improve the Knowledge Management System (KMS) make it easier and more convenient (2). The Information and Communication Technologies becomes a powerful tool that organizations use to manage knowledge effectively. They can search, store and use knowledge comfortably and quickly. Especially, it eradicates obstacles about distance and time in conveyance and dissemination the knowledge (4). There are 4 difficulties found in research of Desouza (3) that

interviewed users of the KMS regarding to the obstacles in appliance of the Knowledge Management System are consisting of;

1. Difficulty of the system to indicating of which person is a professional that can convey and disseminate knowledge to the others.

2. Difficulty of the system to catch up knowledge from persons or Tacit Knowledge and how to convey and disseminate knowledge to the others in the organization and let them learn and accessible.

3. Lack of activation from executives.

4. Incorrect push or drive from the executives, previously the executors could feel about the pressure and lack of motivation to use technology.

Result of the research of Quaddus and Xu (1) which studied about factors that affect to using the KMS of officers in companies in Australia is including; organizational culture, support from the executives, advantages that each person shall get and image of the KMS itself.

Su Huishuang and Tian Shuo (5) analyzed process of knowledge management of big organizations via multi-dimension of methods by using purposes and behaviors according to human factor in theory of Wuli, Shili and Renli. This work presents simple theory and principal to encourage an effective KMS in big organizations in order to achieve process of wanted knowledge collecting.

Junming Hou and group (6) studied about how to manage the knowledge by building ontology for co-designation. By presenting to use the ontology in knowledge management, which has a cooperation of the whole organization (professionals, knowledge engineers and executors of the system), it provides a flawless result in artificial intelligence and including presenting ideas to apply semantic web.

Hanlie Smuts (7) and group studied about framework of the KMS and found a problem that obstructs is a difference in each organization. Each organization has a different process to improve the KMS then cause of a confusing to anyone who will improve it and also gets confusing when choose for a good practice.

If consider from the information we got, there are various steps that we can use the KMS to help improving the system. To insinuate the information technology services into the KMS, we have to choose for a suitable element the most, or which elements should use other method of management or process to handle. This is for ability to build a technology environment that is beneficial for building a sustainable knowledge in the organizations.

From what have been mentioned above, researchers are interesting to study about process of building the KMS has which elements and many popular processes, which standard should be suitable to use in any organization that serve especially in the information technology services.

Objectives of the Research

To analyze elements and processes of the KMS in the organizations that reflect to the success of knowledge management inside the organizations that provide a result in the information technology services for higher education.

Hypothesis

Which elements and processes that being used the most in the KMS of organizations, they can be using to be a tendency of designing a format to improve the KMS for the organizations who serve especially in ICT sustainably.

Implementation of the Research

This research has been studied from other researches both local and overseas. And we used questionnaire to measure the priority from opinions of those professionals.

1. Study about meaning of the Knowledge Management System (KMS)

2. Collect elements of the KMS from professionals both local and overseas, totally 16 persons, and then compare of whether similar or different in order to consequent the elements to be using in the KMS.

3. Study about process of knowledge system improvement from 18 professionals (both local and overseas) then compare and conclude of which is popular in using in order to measure priority of the process of KMS.

4. Learn from opinions of professionals and executives management from where they serve the information technology, totally 9 persons, about elements of the KMS which is using the most.

Materials and Methods

This is the statistics used to evaluate the result for sample survey due to find out the average $(\bar{x})$

$$\bar{x} - \sum_{\frac{i-1}{N}}^{N} X_i$$

When

$$\bar{x} \quad = \quad \text{Average}$$

$$\bar{x} - \frac{\sum_{i-1}^{N} X_i}{N} \quad = \quad \text{TOTAL VALUE}$$

$$N \quad = \quad \text{NUMBER OF POPULATION}$$

STANDARD DEVIATION

$$\text{S.D.-} \sqrt{\frac{n\sum_{i-1}^{n} fx_i^2 - \left(\sum_{i-1}^{n} fx_i\right)^2}{n(n-1)}}$$

When

S.D.	=	STANDARD DEVIATION
x_i	=	INFORMATION OF EACH QUANTITY
f	=	FREQUENCY
n	=	NUMBER OF SAMPLE SURVEY

Evaluation by bringing information surveyed from opinions of the professionals concerning priority of elements and processes of the KMS, which is in 5 levels, and presents the information analysis that the researchers indicate standard of how to interpret the meaning of survey like this (8);

Table 1 Standards showing how to interpret the meaning of survey

Average Points	Priority of Elements and Processes of Knowledge Management System
4.50-5.00	Highest
3.50-4.49	High
2.50-3.49	Neutral
1.50-2.49	Less
1.00-1.49	Least

Primary Agreement
1. Professionals are executives in high level of management in departments that serve the information technology services in universities of both government and individual.
2. Collecting information in different date, time and place affect nothing to the result of research.

Definition of Vocabulary
1. Knowledge Management System (KMS) means collecting, system management, storage and accessibility to the information to bring about knowledge by using information technology and computer to keep storage systematically. Furthermore, share knowledge which advice by professionals who are able to interpret and apply knowledge into building innovation (10).
2. Elements of the Knowledge Management System (KMS) means components or mixing, expressing opinions by professionals and academicians in various dimensions regarding important elements of the knowledge management system (11).
3. Process of Knowledge Management System means sub-process that connecting each other's to access and use knowledge from its source and make it move then bring about development of innovation (12).

Results and Discussions

From collecting elements of the Knowledge Management System of 16 professionals and popular organizations from both local and overseas, comparing be consequence according years of publishing that information by overall image like this.

Table 2 Shows comparison elements of the KMS which is collecting from the researches

Elements / Professionals-Organizations	APQC(1995)	Lee(1997)	Carla O' DellZ1998)	Xerox(1991)	Siemens(2001)	SPRING(2001)	Siriraj (2001)	Lotus(2002)	Danai (2002)	True (2003)	Awad,E.M.&Ghaziri (2004)	SCS (2004)	Vijarn (2004)	Ben(2005)	Calaburese and Orlando (2006)	Sivanit (2008)	
Information Technology and Communication	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	16
Procedure of knowledge Management	✓			✓	✓	✓	✓			✓	✓	✓	✓	✓		✓	12
Evaluation	✓		✓	✓	✓	✓	✓			✓						✓	8
Source of knowledge	✓	✓			✓			✓				✓				✓	7
Executors								✓		✓	✓	✓	✓	✓		✓	7
Organizational Culture	✓	✓	✓				✓		✓						✓		6
Leadership and strategy	✓			✓		✓	✓		✓						✓		6
Training				✓	✓		✓			✓					✓		5
Management and behavior				✓						✓							3
Prizing				✓			✓			✓							3
Structure of organization			✓														1
Vision									✓								1

Studying from point of view of the professionals and popular organizations in KMS and take them into priority, it is found that the first 3 elements using in the knowledge Management System are; ICT 21%, process of KMS 16% and evaluation 11%, consequently.
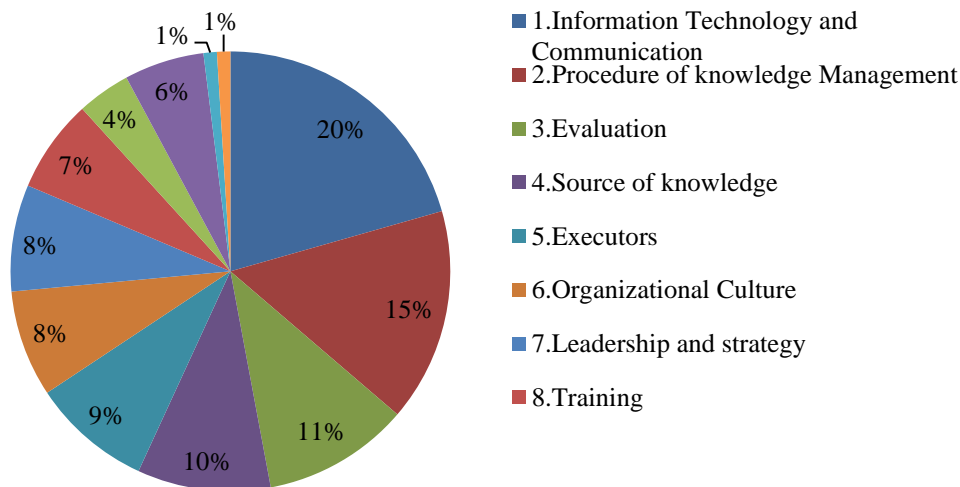

Chart 1 Showing percentage of elements of the KM

It is noticeable that all the professionals and popular organizations are using the ICT, which is 21% of all elements. It shows that the information technology and communication are primary main factors to development the Knowledge Management System.

Other elements which are high using are; process of knowledge management system 16%, Evaluation 11%, Source of knowledge 10%, Executors 9%, Organizational culture 8% and Strategic leadership 8%.

Less using elements are; training 7%, management and behavior 4%, prize 4%, structure of organization 1% and vision 1% as shown in the chart 1.

Researchers brought 16 elements in Knowledge Management System collecting from both local and overseas comparing to choose totally 12 elements for using then choose the 7 most using elements and let the professionals give opinions about the importance of each element in order to confirm the point of view, having a result as follows.

Table 3 Showing levels of opinions of the professionals regarding elements of the knowledge management system

Elements of KM	Levels of Opinions	
	$\bar{x}$	S.D.
Leadership and Strategy	4.88	0.35
Process of Knowledge Management	4.75	0.46
Executors	4.63	0.52
Information Technology and Communication	4.50	0.53
Source of Knowledge	4.38	0.74
Organizational Culture	4.13	0.64
Evaluation	3.75	0.71

From the analysis of all 9 professionals on their levels of opinions in table 3, found that priority of the elements and process of the KMS got points from the professionals during 3.75-4.88 with following details.
1. Leadership and Strategy has average point ($\bar{x}$) at 4.88% which is highest important in the Knowledge Management System.
2. Process of Knowledge Management System has average point ($\bar{x}$) at 4.75% which is highest important in the Knowledge Management System.
3. Executors have average point ($\bar{x}$) at 4.63% which is highest important in the Knowledge Management System.
4. Information Technology and Communication have average point ($\bar{x}$) at 4.50% % which is highest important in the Knowledge Management System.
5. Source of knowledge has average point ($\bar{x}$) at 4.38% which is high important in the Knowledge Management System.
6. Organizational Culture has average point ($\bar{x}$) at 4.13 which is high important in the Knowledge Management System.
7. Evaluation has average point ($\bar{x}$) at 3.75% which is high important in the Knowledge Management System.

Procedure of Knowledge Management
Knowledge to be using in order to be successful and meet the target, it is necessary to have process or procedure to manage systematically, which consists with sub-procedures in accordant to each other. Therefore, it can use knowledge from various sources and develop to be innovations (14). The professionals and famous organizations provide procedure of knowledge management which is different knowledge, comparing in the table 4.

Table 4 Comparison of procedures of the knowledge management

No	Procedure	Wiig	Marquardt	KPMG	Liebowiiz	Trapp	Goh	Protst and Orther	Vall	Kucza	Turtan and Other	Awad, E.M. & Ghaziri	Kosol	Phiroj	True	Office of National productivity	Twanna	Chalee and vanawan	Total
1	Knowledge Using	✓	✓	✓	✓	✓	✓	✓	✓		✓			✓	✓	✓	✓	✓	14
2	Knowledge Building	✓	✓	✓	✓		✓		✓	✓	✓		✓	✓	✓		✓	✓	13
3	Knowledge Sharing & exchanging	✓	✓		✓	✓		✓	✓	✓				✓	✓		✓	✓	11
4	Knowledge Indication				✓	✓		✓	✓	✓		✓			✓	✓	✓	✓	10
5	Knowledge Seeking		✓		✓	✓	✓	✓	✓			✓	✓			✓		✓	10
6	Storage and retrieval of knowledge		✓		✓				✓	✓	✓	✓	✓			✓		✓	9
7	Conveyance and dissemination of knowledge	✓		✓	✓	✓		✓			✓		✓	✓					8
8	Knowledge Development				✓	✓		✓	✓			✓	✓						6
9	Organization and indication of knowledge								✓	✓	✓	✓				✓			5
10	Knowledge Collection				✓		✓			✓					✓				4
11	Knowledge Selection				✓						✓	✓							3
12	Knowledge Evaluation					✓					✓	✓							3
13	Knowledge Improvement					✓	✓								✓				3
14	Knowledge Compilation								✓								✓		2
15	Building groups of cooperation												✓	✓					2
16	Strategy											✓			✓				2
17	Follow Up/Checking										✓	✓							1
18	Knowledge Control					✓													1
19	Target of knowledge					✓													1
20	Structure of a KMS team											✓							1
21	Technology Indication											✓							1

From using procedures of the KMS collecting from researches of both local and overseas, totally 18 researches, to compare due to show all the 21 procedures. And there are 8 procedures which are the most famous to be using, asking the professionals to give their opinions. Here is the result.

Table 5 Levels of opinions of the professionals regarding the knowledge management

Procedure of the KMS	Levels of Opinions	
	$\bar{x}$	S.D.
Conveyance and Dissemination of Knowledge	4.78	0.44
Knowledge Building	4.67	0.50
Knowledge Sharing & Exchanging	4.67	0.50
Knowledge Development	4.56	0.53
Knowledge Using	4.56	0.53
Knowledge Seeking	4.22	0.44
Knowledge Indication	4.11	0.33
Storage and Retrieval of Knowledge	4.11	0.78

From the analysis of the professionals on the 8 steps of KMS, the result is shown in table 4 can be concluded like this.

1. Conveyance and Dissemination of Knowledge has average point ($\bar{x}$) at 4.78% which is highest important in the Knowledge Management System.

2. Knowledge Building has average point ($\bar{x}$) at 4.67% which is highest important in the Knowledge Management System.

3. Knowledge Sharing & Exchanging has average point ($\bar{x}$) at 4.67% which is highest important in the Knowledge Management System.

4. Knowledge Development has average point ($\bar{x}$) at 4.56% which is highest important in the Knowledge Management System.

5. Knowledge Using has average point ($\bar{x}$) at 4.56% which is highest important in the Knowledge Management System.

6. Knowledge Seeking has average point ($\bar{x}$) at 4.22% which is high important in the Knowledge Management System.

7. Knowledge Indication has average point ($\bar{x}$) at 4.11 which is high important in the Knowledge Management System.

7. Storage and Retrieval of Knowledge has average point ($\bar{x}$) at 4.11 which is high important in the Knowledge Management System.

The conventional knowledge management uses a concept of "Knowledge Cyclic" to share knowledge. This model share knowledge that support the information technology services at higher education.
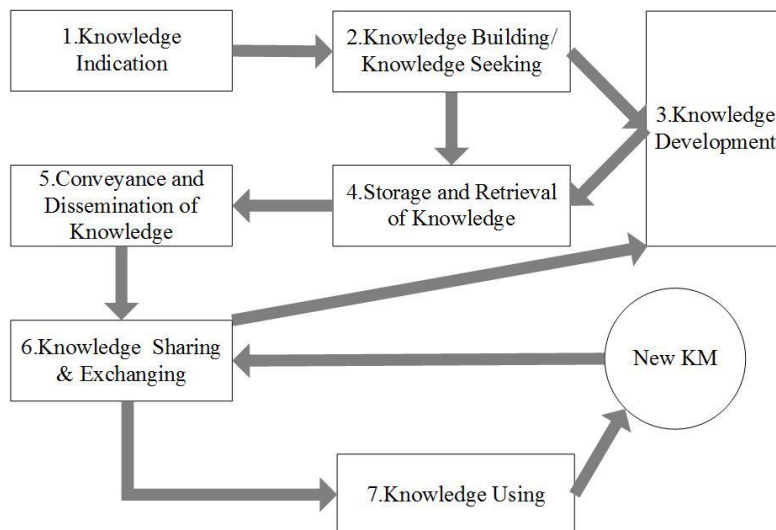
Picture 1 Knowledge management model for the information technology services at higher education.

Conclusion

If consider from opinions of all the 9 professionals, we found that elements and procedures of the KMS in the organizations that affect to the success of knowledge management at higher education has average points during 4.88-4.50 which is the most important. There are totally 4 most important elements; leadership and strategy, procedure of knowledge management, executors and information technology & communication.

Regarding the high rank of importance, there are 5 suitable procedures including; conveyance & dissemination, building knowledge, sharing & exchanging, development and using consequently. They have average points during 4.78-4.56.

Those elements and procedures mentioned shall be using in a concrete development of knowledge management system in departments who serve concerning ICT of universities, for example, computer department, academic resources center and information technology departments or any other departments concern. Because it comes from collecting points of view of the professionals of the information technology which are the most suitable and special to the departments of information and technology services.

Knowledge management model for the information technology services at higher education is a combination of interaction and innovation. This model provides an environment where the system grows with the people.

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