



The Development of Information System for Knowledge Management (KM) of Thai Public Organizations according to the Public Sector Management Quality Award (PMQA)

Sophit Onkaeo^{a*}, Dr. Somkid Soottitantawat^{b*}, Surin Cortong^{c*},
Sriparinya Toopgrajanh^{d*} and Suttipong Suvansook^{e*}

Ph.D. Students (Technology Management) ^{a*} Project Office for Consortium on Doctor of Philosophy Program,

Phranakhon Rajabhat University. 9 Changwatana Rd, Bangkhen, Bangkok, Thailand

Phranakhon Rajabhat University. ^{b*} 9 Changwatana Rd, Bangkhen, Bangkok, Thailand

Phranakhon Rajabhat University. ^{c*} 9 Changwatana Rd, Bangkhen, Bangkok, Thailand

Department of Special Investigation ^{d*} Changwatana Rd, Laksri, Bangkok, Thailand

990 Abdulrahim Place. 18-19th Floor. Rama IV Road. ^{e*} Silom. Bangrak. Bangkok 10500

Corresponding author: e-mail: onkaeo70@gmail.com, Tel.0 899674862

Abstract

Technology is a crucial key element for Knowledge Management (KM) which drives the organization to success (Alton, 2009; Bunde et al., 2005). The social currently is knowledge based society and economy (Bunde et al., 2005) the organizations to growth up must have to creation, distribution and to use knowledge for driving main of organizations because the knowledge have gain more importance within the organizations. (Bodin & Veerawuth, 2006) Knowledge Management (KM) is recognized by many organizations as an important tool in promoting competitiveness and organizational sustainability. However, it has been stressed that the organizational readiness for KM needs to be assessed before embarking on the actual implementation (Bunde et al., 2005). The government has focused on knowledge management in order to improve personals quality of learning (Kanchit, 2006; Sripr & Jhadsaporn, 2006). It has been enacted in a royal decree of the Governance rules and procedures B.E. 2003, section 11 to apply the information technology as a tool for learning and exchanging the knowledge effectively (Bodin, 2009) process has been well documented in the literature from both practitioners' and academics' perspectives. However, very limited information is available in the literature in this regard. Hence, researcher proposes to design and develop the information system for KM of Thai public organizations according to the Public Sector Management Quality Award (PMQA). The research methods were 1) To study status and requirement the information system for KM of Thai public organizations according to the PMQA. 2) To design, developed and information system for KM of Thai public organizations according to the PMQA and according to the theory of System Development Life Cycle (SDLC) (Opas, 2005), and 3) Evaluated efficiency of the information system for KM of Thai public organizations according to the PMQA then we want to analysis with computer software SPSS of percentage (%), mean (\bar{x}), standard deviation (SD) and hypothesis testing (Kanlaya, 2008).

The research results showed 1) that personals preferred to gather documents in an electronic format in order to prevent the lost in case of resignation, retired or to be dead, carried information to design information system for KM of Thai public organizations according to the PMQA. And integrated information system for KM during of Thai public organizations. 2) Models of information system for KM of Thai public organizations according to the PMQA according to conceptual framework of researcher then carried that the model to developed of information system for KM of Thai public organizations according to the PMQA. This system has been tested and evaluated efficiency with the technical of 45 peoples have commented that the mean (\bar{x}) = 3.9168 and users group of 45 peoples commented that the mean (\bar{x}) = 3.5147, when compared to the scale set out in the region between 3.50 to 4.49 at the high levels of efficiency let us to then the results of hypothesis testing. The hypothesis that the two groups were not statistically different is that information systems for KM in Thai public organization according to the PMQA. High efficiency is now recognized in <http://www.kmnoj.com>. The researcher would like to suggest any organizations



who may wish to apply the system to suit the business model, the further study is recommended in order to create the most effective outcome. And will continue focusing on users' satisfaction via online questionnaire. It is hoped that the information system of KM will be very productive and helpful as it has been synthesized until becoming a new user friendly system.

Keywords: The Design and Development, Information Systems, Knowledge Management (KM), and the Public Sector Management Quality Award (PMQA).

Introduction

The primary of the sources

The social currently is knowledge based society and economy (Alton, 2009; Bundee et al., 2005). the organizations to growth up must have to creation, distribution and to use knowledge for to driving main of organizations because the knowledge have gain more importance within the organizations. (Bodin & Veerawuth, 2006) KM is recognized by many organizations as an important tool in promoting competitiveness and organizational sustainability. However, it has been stressed that the organizational readiness for KM needs to be assessed before embarking on the actual implementation (Bundee et al., 2005). The government has focused on KM in order to improve personals quality of learning (Kanchit, 2006; Sripriti & Jhadsadapom, 2006). It has been enacted in a royal decree of the Governance rules and procedures B.E. 2003, section 11 to setup KM in the Thai public organizations is learning organizations (LO) for personality developed in the organizations have knowledge, ability and skill to activity and to receive know-how in the information to applied with activity got to be utilized in the organizations and altogether to encourage and (Bodin, 2009) to be applied in the public quickly and accurately with the situation. Including to promote a culture organization of learning the personnel should development of knowledge capability to create a vision and change the attitudes of personnel in organizations that are learning to work together effectively (Bodin, 2009).

The primary of the problem

Personnel in the organizations are not continued developing. The organizations are not storage of information and KM of executive, experts and experienced in the electronic to prevent the loss of the organization when he resigned, retirement or death and there is no integrated system of information and knowledge between organizations for achieve knowledge sharing between agencies. The Thai public organizations have promoted the development of competent personnel to learn a little time. In order to prepare to change the attitude of the government personnel who are in work. And change the attitude of the people, ensure quality performance therefore, also to support the ASEAN Economic Community (AEC). The KM in the Thai public organizations are important to encourage personnel to learn at any time unlimited space and time.

Background Related researches

1. Information System Theory (IST)

Researcher have studied the theory related to information technology by several groups (John E, 1998; Burnett & Marshall, 2003) such as Information Theories, Information System Theory: (IST), The Mathematical Theory of Communication, Diffusion of Innovation Theory, Uses and Gratification Theory and Information Seeking Theory. For KM Theory were studied from many of the scholars into the two categories (Bodin, 2009; Bundee et al., 2005; Nonaka & Nishiguchi, 2001; Vijan, 2005).

1) The Tacit Knowledge: **Tacit knowledge** is made up of best practices, experience, wisdom and unrecordable intellectual property that lives within



individuals and teams. Since tacit knowledge exists within minds, it could not be changed to the digital domain as a material asset, or be manipulated directly. However, it expresses in the social realm as the response ability of individuals, and teamwork.

2) The Explicit Knowledge: **Explicit knowledge** can be recorded digitally in documents, records, patents and other intellectual property artifacts. Explicit knowledge is representational and can be manipulated within the digital domain. Converting data-to-information, and information-to-knowledge describes a value continuum of explicit knowledge. The tools and business processes of KM are intended to enhance this continuum of value.

2. Related Researches

Researcher studied the related research both at home and abroad about the development of information system for KM in Thai public organizations according to the PMQA as follows. The development of information technology systems for KM, to finding satisfaction and components of information systems including

- 1) Document Control
- 2) KPI Forum
- 3) Weblog
- 4) Calendar Activity and links with other agencies.

(Sathaporn, 2009). Design guidelines. Data analysis and synthesis of information is important to design information systems for KM in Thai public organization according to the PMQA. (Surin, 2010) The development of learning model through the Royal Thai Air Force Wide Area Network using the constructionism for the aircraft mechanics which is improving for method analysis, (Anupong, 2008) synthesis and design the mobile phone as an offer to the design for Access to Social Network, mobile and desktop computers to send and receive chat messages posted on the social Network, such as Facebook, or Twitter, FL. by most users spent an average of 2-3 hours per day in the world of online activities. The social Network is very important for us not to use e-mail. (Anocha, 2006) Assessment Project, Center for KM and Information Technology

and Communication (ICT) to research on. Influence the success of KM in organizations, including the nature of the organization. The initiative. The behavior of individuals. The focus on KM in organizations has received little attention (Alton, 2009). Learn about the strategies of KM in organizations (Meliha, 2011) has studied the techniques of KM in an integrated (Peter, 2009) study the concept of KM (Mostafa et al., 2010) have studied the research on Influence the success of KM. For elements of information system development the four sections based on input data, data processing, output and Feedback (McLeod & Schell, 2001; Opas, 2005).

3. Hypothesis

The technical and users have opinion on the effectiveness of information systems for KM in Thai public organizations according to the PMQA is no different by $H_0 : \theta_1 = \theta_2$

4. Research Objectives

4.1 To study the status and requirement of information system for KM of Thai public organizations according to the PMQA.

4.2 To design and developed of information system for KM of Thai public organizations according to the PMQA.

4.3 To evaluated efficiency of information system for KM of Thai public organizations according to the PMQA.

Materials and Methods

This study researcher selected research method was the research and development. The study were divided into three stages are as follows

- 1) To study status and requirement the information system for KM of Thai public organizations according to the PMQA.
- 2) To design and developed information system for KM in Thai public organizations according to the PMQA according to the theory of



System Development Life Cycle : SDLC (Opas, 2005), and 3) To evaluate efficiency of the information system for KM in Thai public organizations according to the PMQA then we want to analysis with computer software SPSS by percents %, mean (\bar{x}), standard deviation (S.D.) (Kanlaya, 2008) and hypothesis testing researcher to set up method of research including.

The population and sample

1. The population: Population involved in designing and developing. the information system for KM in Thai public organizations according to the PMQA from the government agencies 10 agencies including executives, technicians and users

2. The sample: Executives, technicians and users from the government agencies 10 agencies by the sample 1 were group of executives, the sample 2 were group of technicians and the sample 3 were group of users. And selected purposive sampling and then selected the sample 1 were 10 executives, the sample 2 were 45 technicians and the sample 3 were 45 users. And group experts 11 persons from ICT 4 persons, KM 4 persons and researcher specialists 3 persons. (Bunjai, 2007)

Research Tools

This research use the research Tools including (Bunjai, 2007; Phitsanu, 2007) Content Analysis, Interview, Record Focus Group Discussion and Evaluation Efficiency

Collecting Data

Researcher using tools Content Analysis (Bunjai, 2007; Phitsanu, 2007) from document, Interview Executives from sample 10 executives, Record the Focus Group Discussion from 11 experts and Evaluation Efficiency from 45 technicians and 45 users.

Data Analysis

Researcher data were analyzed using from tools content analysis, interview Executives, Record the Focus Group Discussion from 11 experts and evaluation efficiency from 45 technicians and 45 users. (Bunjai, 2007; Phitsanu, 2007) Then researcher want to analysis with computer software SPSS of percent (%) mean (\bar{x}) and standard deviation (S.D.) and hypothesis testing.

Research Results

This study found that

1. The research result from studied and synthesized all relevant documents, research papers, and interviewed of 10 executives. Found that the human resources information technology had skill for practice lesser. There were not enough human resources to be working on several fronts simultaneously, lack of continuing development, training is on process but lack of understanding of the operation. In terms of technology: computer equipment were out of dated, network were not available, management of technology could not support the practice of human resources effectively, not enough of information system for KM for access information and knowledge thoroughly. For requirement found that the personality needs to save the KM of experienced professionals in their work with information systems for preventing the loss of the organization when they resigned or retired. For a good place to study of the learning experience necessary for operation quickly and comfortable. Researchers have discovered a way to manage knowledge effective and appropriate to the tasks to be carried by personnel guidelines according to the PMQA. As defined into 4 categories to provide information about the property at 11 need (Bodin, 2009) to be the modern information technology to support operations. The method and to provide KM the need to establish a committee KM in the organization



responsible for overseeing the operation. And to study the strategy of the organization carried the data to analyze and prioritize the importance of knowledge to contribute to the recruitment of personnel with knowledge and experience to transfer knowledge from both inside and outside the organization of the topic knowledge were selected Board KM for to lead to the knowledge extraction of knowledge from Tacit Knowledge in combination with the Explicit Knowledge into a knowledge construction (Bodin, 2009; Bundeet al., 2005; Nonaka & Nishiguchi, 2001; Vijan, 2005) then transfer in the information system so that knowledge were lost to the organization for information system, discovered to apply information technology to support the integration of information in during the Thai public organizations for easy to share and learn together thoroughly and quickly with modern communication devices, discovered (McLeod & Schell, 2001; Opas, 2005). Management process KM and information technology should contain four sections were as follows input, process, output and feedback, and that for the research of this was information system for KM in Thai public organization according to the PMQA.

This includes 16 systems were as follows 1) Member 2) Information 3) Article 4) Calendar Activity 5) Link 6) Weblog 7) Download 8) Talk 9) Search 10) Video 11) Document 12) FAQ 13) Social Network 14) Social Media 15) Mobile Phone 16) Web board which were derived from a synthesis of research related to KM and information technology. Sathaporn (2009; Surin, 2010; Anupong, 2008; Anocha, 2006; Alton, 2009; Meliha, 2011; Peter, 2009; Mostafa et al. 2010) with model development and KM technology in the United States, Oracle in Singapore, Siriraj hospital and Thai oil company limited (PCL) (Bundeet al., 2006)

2. The results of the data were to design of information systems for KM in Thai public organizations according to the PMQA a panel which includes 15 experts from 5 ICT specialists, 5 KM specialists, and 3 researchers specialists by purposive sampling was setup under the named "Focus Group Discussion" which is responsible to check and monitor (Bunjai, 2007). The model information systems for KM in Thai public organizations according to the PMQA shown in Figure 2

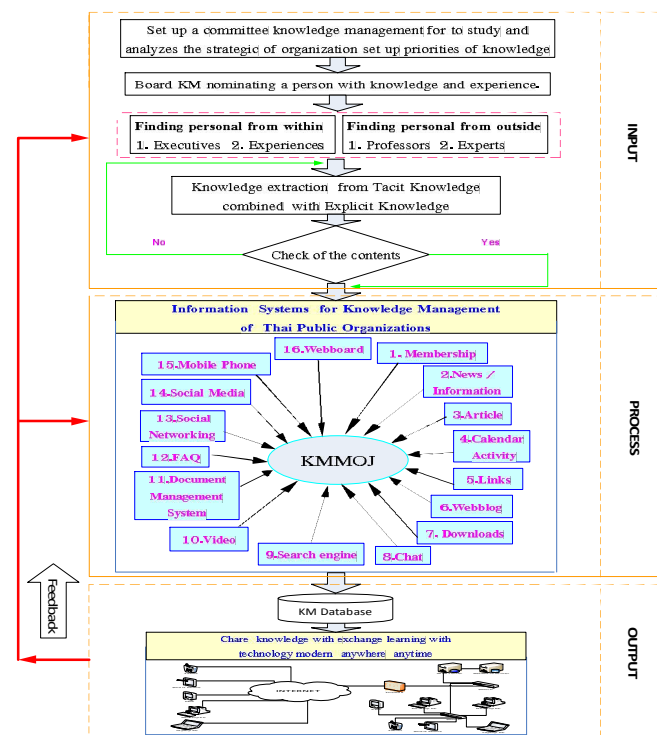


Figure 1 Shown “Models of information system for KM of Thai public organizations according to the PMQA.”

Source: Sophit Model

Researcher made the implementation pattern to developed the information systems for KM in Thai public organization according to the PMQA to the theory of System Development Life Cycle: SDLC (Opas, 2005). The operating developed system divides the system into three parts: 1) Super Admin 2) the right to update the database, 3) The development of information systems development in the form on the Internet for smoothly and friendly with a variety of commutation devices such as Laptop, Smart phone, PDA or Tablet through the wireless network displayed clearly by an information management system database. Use technology to develop were as follows 1) Technology Internet It is a large computer network computers all over the world can communicate to each other using standard transmission is the only one the protocol 2) Technology Web the presentation of data from the server go to different places. In the World Wide Web 3) Technology Database The data were

collected together which the database management system actions manages to create a database for update the database as an intermediary between users and databases. 4) Technology JavaScript was Interactive pre-router the work is object-oriented programming because can made the user interface lot more powerful and user friendly. 5) Technology Web Based Application the program were developed using a web browser as a channel for the user interface the Web browser sent a request information to the web server and provide information from a database which would help optimize the use of dynamic World Wide Web 6) Technology PHP was a PHP file requests to Web servers for run the PHP engine then connect the database and send the results to the Web browser allows users to use easy and friendly. When developing the system testing by unit testing and acceptance testing. And found that the information system for KM in Thai public organization according



to the PMQA that were completed and in full use. Now Implementation that URL:<http://www.kmnoj.com>

3. Evaluated efficiency of the information system for KM of Thai public organizations according to the PMQA then needed to analysis by the computer software SPSS by percentage(%), mean(\bar{x}), standard deviation (S.D.) and hypothesis testing.

3.1 The results of the data analysis with computer software SPSS for evaluation of efficiency

in information system for KM of Thai public organizations according to the PMQA from the opinions of the technicians and users (Kanlaya, 2008) were as follows.

3.2 The results of the evaluation of efficiency in information system for KM of Thai public organizations according to the PMQA from the opinions of the technicians were as follows

Table 1 Shown Personal Characteristics

Personal Characteristics		Number	Percent
Gender	Male	19	42.22
	Female	26	47.78
Age	20–30 years	20	44.44
	31–40 years	21	46.67
	41–50 years	1	2.22
	51–60 years	3	6.67
Education	Lower Bachelor degree	1	2.22
	Bachelor degree	28	62.22
	Mater degree	16	35.56
	Doctor of philosophy degree	–	–
Position	Operations	15	33.33
	Expertise	15	33.33
	Special expertise	2	4.45
	Others	13	28.89
Field of work	1–5 years	24	53.33
	6–10 years	14	31.11
	11–15 years	4	8.89
	Upper 16 years	3	6.67



Table 2 Opinion level of the technicians of efficiency in information system for KM of Thai public organizations according to the PMQA

efficiency each side	Descriptive Statistics		
	N	Mean (\bar{x})	Std. Deviation (S.D.)
Coverage	45	3.8278	.6073
Speed	45	3.9833	.6708
Accuracy	45	3.9556	.5251
Modernity	45	3.9556	.5747
Linkages	45	3.7333	.6315
Credibility	45	3.9422	.5918
Accessibility	45	4.0556	.6415
The ability to detect	45	3.6611	.5439
Participation in the information process	45	3.4148	.6322
Security	45	4.1444	.7414
Confidentiality	45	4.2889	.5837
Total		3.9168	.4558

The results from analysis of sample 2 of 45 peoples were their opinions that the use of information systems for KM in Thai public organization according to the PMQA efficiency at high levels Mean (\bar{x}) at 3.9168 and standard deviation at 0.4558 as shown on the Table 2, when compared with a predetermined threshold

in the range between 3.50 to 4.49 there were high levels of performance.

3.3 The results of the evaluation of efficiency in information system for KM of Thai public organizations according to the PMQA from the opinions of the users were as follows.

Table 3 Shown Personal Characteristics

Personal Characteristics		Number	Percent
Gender	Male	16	35.56
	Female	29	64.44
Age	20-30 years	33	73.33
	31-40 years	8	17.78
	41-50 years	1	2.22
	51-60 years	3	6.67
Education	Lower Bachelor degree	1	2.22
	Bachelor degree	37	82.22
	Master degree	7	15.56
Position	Operations	8	17.78
	Expertise	2	4.44
	Special expertise	3	6.67
	Others	32	71.11
Field of work	1-5 years	35	77.78
	6-10 years	6	13.33
	11-15 years	1	2.22
	Upper 16 years	3	6.67

Table 4 Opinion level of the users of efficiency in information system for KM of Thai public organizations according to the PMQA.

efficiency each side	Descriptive Statistics		
	N	Mean (\bar{x})	Std. Deviation (S.D.)
Coverage.	45	3.5833	.8627
Speed	45	3.6611	.8953
Accuracy	45	3.5333	.7894
Modernity	45	3.6333	.8023
Linkages.	45	3.2667	.8383
Credibility	45	3.5333	.6550
Accessibility	45	3.5222	.8305
The ability to detect	45	3.3389	.6932
Participation in the information process	45	3.1852	.7438
Security	45	3.6889	.6724
Confidentiality	45	3.6333	.6920
Total		3.5147	.6399

The results from analysis of sample 3 of 45 peoples were their opinions that the use of information systems for KM in Thai public organization according to the PMQA efficiency at high levels Mean(\bar{x}) at 3.5147 and standard deviation at 0.6399 as shown on Table 4, when compared with a predetermined threshold in the range between 3.50 to 4.49 there were at high levels of performance

4. The results of hypothesis testing of the technicians and users of the opinion on the effectiveness in information systems for KM in Thai public organization according to the PMQA at high levels which were not in statistically different by $H_0 : \theta_1 = \theta_2$ So we accepted the hypothesis.

Discussion and Conclusions

The results of this research have discovered that the design of information systems for knowledge management in Thai public organization according to the PMQA should contain four sections based on input data, data processing,

output and reverse (McLeod & Schell, 2001; Opas, 2005). And the information systems for KM in Thai public organization according to the PMQA. This includes 16 systems were as follows 1) Member 2) Information 3) Article 4) Calendar Activity 5) Link 6) Weblog 7) Download 8) Talk 9) Search 10) Video 11) Document 12) FAQ 13) Social Network 14) Social Media 15) Mobile Phone 16) Web board. This was consistent with the research (Sathapom, 2009; Surin, 2010; Akkaphol, 2007; Anocha, 2006; Alton, 2009; Melila, 2011; Peter, 2009; Mostafa et al., 2010) with model development and KM technology in the United States, Oracle in Singapore, Siriraj hospital and Thai oil company limited (PCL) (Bundee et al., 2005). When to developed the information systems for KM in Thai public organization according to the PMQA which was consistent with the theory of System Development Life Cycle : SDLC (Opas, 2005). And then was consistent with the Information Theories, Information System Theory: IST, the Cybernetics Feedback Theory, Diffusion of Innovation Theory and Uses and Gratification Theory. And the results of the evaluation of



efficiency in information system for KM of Thai public organizations according to the PMQA from the opinions of the technicians and users efficiency at high levels. The results of hypothesis testing of the technicians and users of the opinion on the effectiveness in information systems for KM in Thai public organization according to the PMQA at high levels which were not in statistically different to accept the hypothesis.

The research recommendation

The researchers have suggested to link between the public sector by the organization having considered the information and knowledge in information systems, KM for public sector approach to improve the quality by the good governance. To exchange information and knowledge in the system for staff to learn together effectively. So in order to allow each organization to prepare for joining into ASEAN Economic Community(AEC) should be to promote and develop human capital, the highest achievement in foreign language and provide the potential to meet international standards of the skilled workers and professionals among ASEAN countries at the highest quality.

Acknowledgements

This research made possible by the generosity and support as well from Gp. Capt. Dr.Surin Cortong and Dr.Suttipong Suvansook Phranakhon Rajabhat University Please be advised that there is value and benefit to the research I thank you very much for this research

Thank you Assoc. Prof. Dr.Preaug Kitratporn, Asst. Prof. Dr.Laongtip Mathurasa, Dr.Ratsamee Sangsirimongkolying and Prof. Dr.Prirath Zusansook Phranakhon Rajabhat University. And Asst. Prof. Dr.Prachyanun Nilsook Department of Technological Education Faculty of Technical Education King Mongkut's University of Technology North Bangkok (KMUTNB)

The research is devoted to goodness and benefits as a result of this research upon my father, mother,

and the teachers both past and present, who has kindly discipline. Promote and support the work successfully

References

- Alton Y.K. Chua. (2009). *The dark side of successful knowledge management initiatives. Journal of Knowledge Management, 13*(4), 32–40.
- Anocha Suwannakin. (2006). *Development Information Technology System for Knowledge Management of Management Quality System in the King Prajadhipok's Institute*. King Mongkut's Institute of Technology.
- Anupong Avirutatra. (2008). *Blackberry caught in Thailand. Faculty of Business Administration. Sripatum University, 32*(11552). Matichon daily on October 26, 2009.
- Bodin wijan. (2009). *Organization Improvement Toolkits: the Public Sector Management Quality Award. Category 4, measurement analysis and knowledge management*. Bangkok: Vision Print and Media Co., Ltd.
- Bodin Wijan & Veerawuth Makasiranun. (2006). *Organization Development learning (3rd ed.)*. Bangkok: Publishing X-zapoonet Co., Ltd.
- Bundee Bunyakit et al. (2006). *Knowledge Management*. Bangkok: C-edd U K Tion Co., Ltd.
- Bunjai Sristitnarakun. (2007). *Research Methodology: guidelines for success*. Bangkok: U and Inter-media Limited.



- Burnett, Robert and Marshall, P. David. (2003). *Web Theory: An Introduction*. Routledge: Taylor & Francis Group Publishing. London: [A1.1].
- John F. Gagan. (1998). *Understanding Communication Theory: The Communication Forces for Human Action*. Retrieved March 29, 2011, from <http://www.google.se/books?hl>
- Kanchit Malaywong. (2006). *The development Information Technology in Thai public and private sectors*. Retrieved October 13, 2011, from http://www.drkanchit.com/ict_management/index.html
- Kanlaya Vanithbuncha. (2008). *The use of Spss for windows used in the analysis* (11th ed.). Bangkok: Chulalongkorn University.
- McLeod, R., Jr. & Schell, G. (2001). *Management information systems* (8th ed.). Upper Saddle River, NJ: Prentice-Hall, Inc.
- Meliha Handzic. (2011). *Integrated socio-technical knowledge management model: an empirical evaluation*. *Journal of Knowledge Management*, 15 (2), 198-211.
- Mostafa Jafari, Jalal Rezaeenour, Peyman Akhavan, Mehdi N. Fesharaki. (2010). Strategic knowledge management in aerospace industries: a case study. *Aircraft Engineering and Aerospace Technology*, 82 (1), 60-74. Retrieved March 29, 2011, from <http://www.emeraldinsight.com/journals.htm?articleid=1840383&show=abstract>
- Nonaka, I. & Nishiguchi, T. (2001). *Knowledge Emergence: Social, Technical, and Evolutionary Dimensions of Knowledge Creation*. New York: Oxford University Press.
- Opas Aeramsiriwong. (2005). *Systems Analysis and Design. To improve further*. Bangkok: C-edd U K Tion Co., Ltd.
- Peter Heisig. (2009). *Harmonisation of knowledge management comparing 160 knowledge Management: KM frameworks around the globe*. *Journal of Knowledge Management*, 13(4), 4- 31. Retrieved March 29, 2011, from <http://www.emeraldinsight.com/journals.htm?articleid=1801343&show=pdf>
- Phitsanu Fangsri. (2007). *The Technique Method Evaluation Project* (4th ed.). Bangkok: Properdiprint. Co., Ltd.
- Sathaporn Saengsupho. (2009). *Development of Information Technology system for knowledge management in Graduate Level of the School of Administrative Studies Maejo University*. Doctor of Philosophy. Maejo University.
- Sripri Sakrongpongsakun & Jhadsadapom yhattanavibunchai. (2006). *Information and Technology Knowledge Management* (3rd ed.). Bangkok: C-edd U K Tion Co., Ltd.
- Surin Cortong. (2010). *The Development of learning Model through the Royal Thai Air Force Wide Area Network Using the constructionism for the aircraft Mechanics*. Doctor of Education (Educational Technolog). Educational Technology, Department of Educational Technology Agriculture University.
- Vijan Panit. (2005). *Issues Knowledge management. In the Document Academic*. Bangkok: Institute Knowledge Management for Society.